LATCHFORD AREA

Ontario Airborne Geophysical Surveys
Magnetic and Electromagnetic Data
Geophysical Data Set 1242

Ontario Geological Survey
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CREDITS

This survey is part of the Ontario Geological Survey's geophysical survey purchase program, funded by the Ontario Government.

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- Chris Vaughan, President and Chief Geophysicist, CGI Controlled Geophysics Inc., Thornhill, Ontario – data re-processing, compilation and products.
- Geotech Limited, Aurora, Ontario – Banting–Chambers survey data acquisition and original products.
- Fugro Airborne Surveys Corp., Mississauga, Ontario – Cobalt survey data acquisition and original products.

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CITATION

Information from this publication may be quoted if credit is given. It is recommended that reference be made in the following form.

Ontario Geological Survey 2013. Ontario airborne geophysical surveys, magnetic and electromagnetic data, grid and profile data (ASCII and Geosoft® formats) and vector data, Latchford area—Purchased data; Ontario Geological Survey, Geophysical Data Set 1242.

NOTE

Users of OGS products are encouraged to contact those Aboriginal communities whose traditional territories may be located in the mineral exploration area to discuss their project.

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1 INTRODUCTION

As part of an on-going program to acquire high-quality, high-resolution airborne geophysical data across the Province of Ontario, the Ontario Ministry of Northern Development and Mines (MNDM) does, from time to time, issue Requests For Data (RFD) in order to purchase existing proprietary data held by mining companies. Purchase of existing data complements new surveys commissioned by the MNDM. The Latchford area survey is part of the Request for Data process.

The purchase of data is attractive due to the low cost of acquisition relative to flying new surveys. The money used to purchase the data can be reinvested in exploration. The data are assessed for quality prior to purchase and are reprocessed to meet the common formats and standards of other Ontario geophysical data. Once reprocessed these data are then made public.

Ranking and valuation of submitted airborne geophysical survey data sets were based on the following criteria:

- date of survey – recent surveys were favoured over older surveys because of improved acquisition technology, greater data density and improved final products.
- survey method – magnetometer surveys, without supplementary radiometrics or VLF, were given the lowest rating in this category; AEM and magnetometer were given the highest; the objective was to acquire data that complements what is already available in the public domain, with emphasis on exploration rather than mapping.
- location of area
  - data sets occurring within areas already surveyed or scheduled for survey were only selected if they added significantly to the acquired data sets,
  - proximity or coincidence of the survey block with areas having restricted land use designations affected the value assigned to that survey,
  - consideration was given to data sets that were collected in remote areas where logistical costs are very high.
- line spacing – detailed surveys were normally accorded a higher rating than reconnaissance surveys.
- quality of data – data quality, processed products, and adherence to correct survey specifications had to be up to normal industry standards.
- survey size – data sets comprising less than 1000 line-kilometre were selected only if they fell in very strategic locations.
- other criteria – factors such as apparent mineral significance, previous exploration activity and land availability were also considered in making the final selection.

The Latchford area consists of 2 separate projects:

- A helicopter-borne VTEM and magnetic survey carried out by Geotech Limited, Aurora, Ontario for Amador Gold Corporation from December 16, 2005 to January 6, 2006 and based in Temagami, Ontario (designated as Banting–Chambers), and
- A MIDAS helicopter-borne high-resolution magnetic horizontal gradiometer survey carried out for Temex Resources Corp. by Fugro Airborne Surveys of Mississauga, Ontario from February 10 to March 6, 2006 and based in New Liskeard, Ontario (designated as Cobalt).

A total of 6708 line km were acquired and processed for this release.

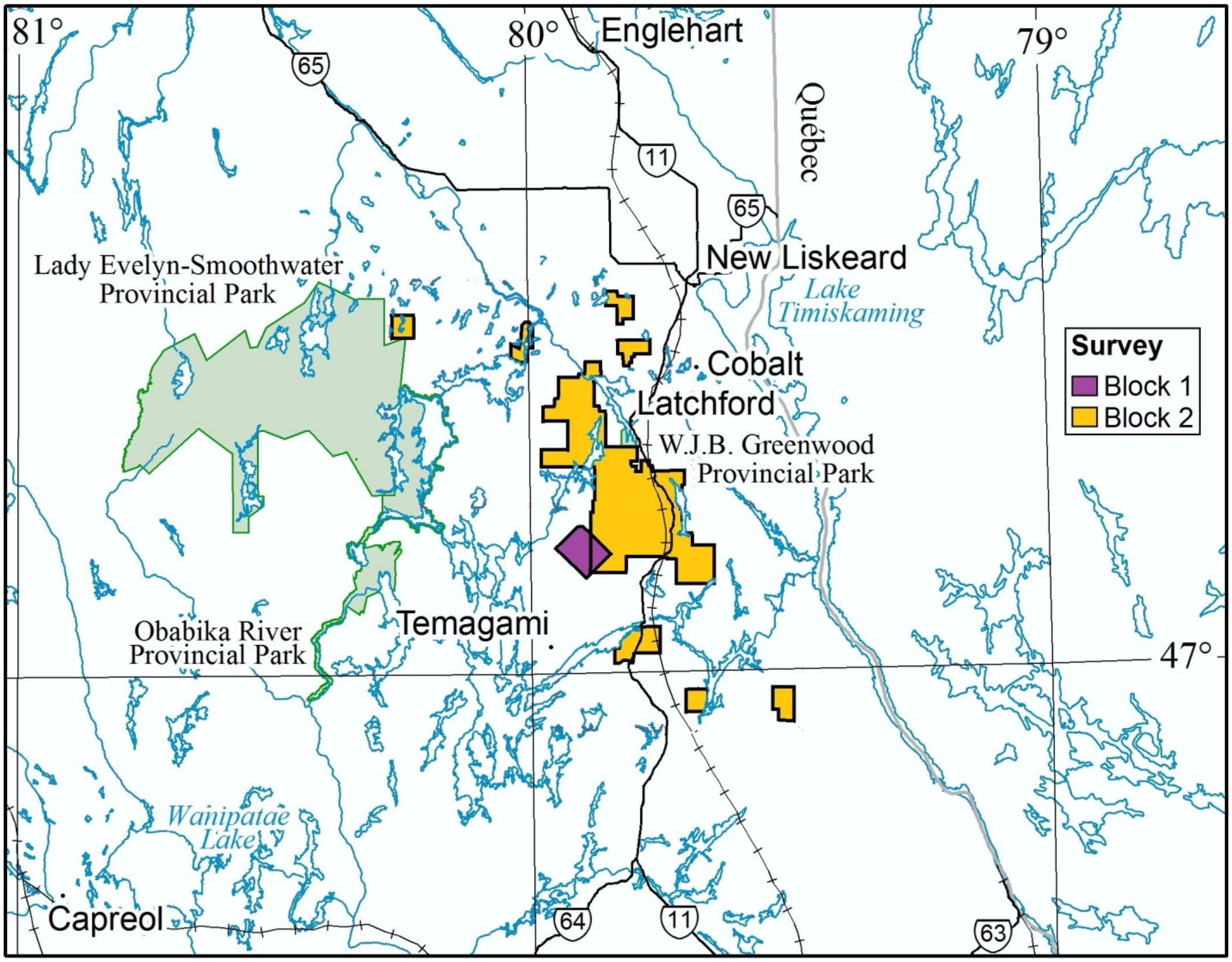

Figure 1. Location of the Latchford Area Surveys. Blocks 1 and 2 show the location of the Banting–Chambers and Cobalt surveys, respectively.

2 ORIGINAL CONTRACTORS REPORTS –Cobalt and Banting–Chambers

The original contractor reports describing the data acquisition and processing for the Cobalt survey and the Banting–Chambers survey are included in this report as Appendixes A and B, respectively.

3 PROCESSING PROCEDURES AND DELIVERABLES

All products delivered under this project were projected in UTM zone 17, NAD83 and conform to the MNDM formatting specifications.

3.1 Flight Path, Terrain Clearance, VTEM, and Magnetic Data Review

Upon receipt of the data from MNDM, the Geosoft® database navigation and geophysics data channels were inspected on a line-by-line basis, the flight path plotted, and the contractor Total Magnetic Intensity (TMI) gridded at the required cell size resolution to ensure completeness of the archive and to reveal any impediments to advancing the processing. All deficiencies were reported to MNDM and corrected.

Examinations included differences between the supplied raw and final TMI channels, sensor terrain clearance consistency, and detection of flight path gaps, back-tracks, or other inconsistencies.

The VTEM channels provided were inspected line-by-line for any spikes or artefacts that could interfere with the preparation of the deliverables. All noted deficiencies were reported to MNDM and corrected where possible.

3.2 Micro-levelling of Magnetic Data and Gradient-Enhanced Gridding

Levelling errors are a major source of noise in aeromagnetic data sets and can be recognized by visual inspection of coloured or shadowed images of the total magnetic field or through similar inspection of computed first and second vertical derivatives of the magnetic field.

Aside from possible processing errors, the main sources of TMI levelling errors are inadequate characterization and removal of diurnal variations and/or insufficient or poor quality tie line intersections and/or inconsistent terrain clearance between adjacent lines. Standard TMI levelling will minimize all of these problems, but cannot completely eliminate them. For this reason, the micro-levelling method was developed (see Minty 1991).

To avoid unpredictable effects during gridding caused by disagreements between magnetic readings on touching and/or overlapping flight lines, several magnetic readings were assigned dummy values on Lines 50740, 51870, 52290, and 52330 in Temex Block 5 and on Line 7226 in the Banting block. All of the original data were retained in a channel called mag_lev_orig.

The method used entailed preparation of a high-accuracy grid of the TMI for each contiguous survey block. Next, via a 2-D FFT operator, noise oriented parallel to the nominal flight path, and only of a wavelength range consistent with levelling differences between adjacent lines, was extracted from the TMI grid. The resulting error grids should contain only the levelling errors plus a variable amount of geological signal that happened to align with the flight path (common in Archean terranes).

The 2-D FFT algorithm above requires a filled, regular shaped grid and a piecewise continuous surface from one edge to its opposite. Therefore, the process includes grid extrapolation and trend removal. The Geosoft® default parameters were altered to employ Inverse Distance Filling on all blocks. For all Temex blocks, the operator was an 8th-order Butterworth 300 m high-pass filter, sharpness = 0.7, removing N-S noise. For the Banting block, the operator was an 8th-order Butterworth 200 m high-pass filter, sharpness = 1.0, removing NE-SW noise.

The error grid was next read into a new channel in the database from which the TMI was created and is inspected for every survey line. The tie lines were not included in the process. In order to avoid removal of genuine geological signal, the error channel was amplitude-limited and filtered to extract only long-wavelength features. Normally, if the data have been properly levelled, a single universal amplitude limit is applicable for the entire block. Some individual lines northeast of a large central topographic feature in the Banting–Chambers block were manually adjusted.

The error amplitude limit used for the Cobalt blocks was +/- 2 nT plus 10% of the excess, except for Cobalt Block 5 which employed a +/- 3 nT limit. The error amplitude limit used for the Banting–Chambers block was +/- 10 nT plus 15% of the excess. Since a standard low-pass filter may introduce artificial ringing in the filtered error channel, a long width (Banting–Chambers 50 fids, Cobalt 40 fids), zero-amplitude non-linear filter was employed. The original error and filtered error channel profiles were inspected for every survey line.

To emphasize the geological sources in the magnetic grids, the International Geomagnetic Reference Field (IGRF) was calculated in a database channel. For the Banting–Chambers block, the IGRF was computed using a mean survey date of December 28, 2005. For the Cobalt blocks, the mean survey date was January 30, 2006. In both cases, the contractor-supplied GPS X, Y, and elevation channels were used, corrected for the magnetic sensor position with respect to the aircraft.

The final error channel and the aforementioned IGRF total magnetic field values were subtracted from the TMI to produce an IGRF corrected micro-levelled (ML) TMI channel. The results were inspected both in profile form and by preparing the ML grid from which shadow images and derivatives were made. Any deficiencies were noted and the process refined and repeated until satisfactory results were obtained.

When magnetic horizontal gradient measurements are available, they can be used during gridding to improve the line to line interpolation of the total or residual magnetic field, especially for narrow structures trending closer to the line direction than across-line. Hardwick (1999) and others have described several techniques, including the Nelson Method (Nelson 1994) and the Pseudo-Line Method. The Pseudo-Line gridding method combines interpolation between magnetic field measurement points along (and on adjacent) survey lines with extrapolation of those point values derived from the known (i.e., measured) horizontal gradients at each data point. A version of this method is available in the Geosoft® gridding menus.

The Cobalt survey data were acquired using a 13.2 m transverse horizontal gradiometer configuration. The horizontal gradients, computed and processed by the contractor, were inspected for quality and were found to be very good. During preparation of final micro-levelled grids for all Cobalt blocks, the Pseudo-Line Method was employed to improve the outcomes. The gradient can introduce ringing in magnetically flat areas, so Geosoft® oasis montaj BIGRID provides a parameter to limit the contribution of the gradient. For all 8 Cobalt blocks, this Gradient Noise Level parameter was set to 0.2, except for Cobalt Blocks 1, 2, and 6, which employed values of 0.0 and used the gradients fully.

The final ML channel data were gridded using high accuracy settings to produce an uncompressed Geosoft® grid in both binary GRD format and ASCII GXF format.

3.3 Levelling Magnetic Data to Ontario Magnetic Master Datum

In 1989, as part of the requirements for the contract with the Ontario Geological Survey (OGS) to compile and level all existing Geological Survey of Canada (GSC) aeromagnetic data (flown prior to 1989) in Ontario, a robust methodology was developed to level the magnetic data of various base levels to a common datum provided by the GSC as 812.8-m grids. The essential theoretical aspects of the levelling methodology are fully discussed in Gupta et al. (1989), and Reford et al. (1990). The method was later applied to the remainder of the GSC data across Canada and the high-resolution AMEM surveys flown by the OGS (Ontario Geological Survey 1996). It has since been applied to all newly acquired OGS aeromagnetic surveys. The current project employed a modified version of the method.

For the 2 Latchford area surveys, the nominal magnetometer sensor heights differed by 35 m and have different line directions. Therefore, each of the 9 blocks was treated as an independent survey.

The Ontario-wide master grid (Ontario Geological Survey 1999) has a native cell size of 200 m. For expediency, a subset of the full grid was windowed out covering the Latchford area plus approximately 2.5 km extra. This grid was prepared with a cell size of 50 m and re-projected to the co-ordinate system used in this project.

To properly compare the block to be levelled and the master, the data to be merged were upward continued via 2-D FFT by the nominal height difference between the 2 data sets (equal to the Ontario master's 305 m minus the new survey's real average sensor terrain clearance). The grid cell size for the survey grids was set at 50 m. Since the wavelengths of level corrections were several kilometres, working with 50 m grids at this stage did not affect the integrity of the levelling method. The un-levelled 50 m grids were also extrapolated by two grid cells beyond the actual survey boundary so that, in the subsequent processing, all data points were covered.

The Upward Continuation amounts employed were as follows:

Banting–Chambers Upward continued by 305-(84.8-15) = 235.2-m
Cobalt Block 1 Upward continued by 305-33.9 = 271.1-m
Cobalt Block 2 Upward continued by 305-36.0 = 269.0-m
Cobalt Block 3 Upward continued by 305-36.1 = 268.9-m
Cobalt Block 4 Upward continued by 305-37.8 = 267.2-m
Cobalt Block 5 Upward continued by 305-36.2 = 268.8-m
Cobalt Block 6 Upward continued by 305-35.2 = 269.8-m
Cobalt Block 7 Upward continued by 305-38.1 = 266.9-m
Cobalt Block 8 Upward continued by 305-33.7 = 271.3-m

Next, the difference between the upward continued survey grids and the Ontario master grid was computed via a grid subtraction. In the resulting "_Diff" grids, the short wavelengths represent the higher resolution of the survey grids. The long wavelengths represent the level differences between the 2 grids.

Each difference grid was low-pass filtered using a 2-D FFT frequency-domain, 8th-order Butterworth filter with a cut-off wavelength of 3 km. This operator was determined to give the best results from a number of tested approaches. For quality control, both the original and filtered difference grids were read into database channels and inspected line-by-line. The low-pass filtered difference channel was then subtracted from the micro-levelled residual magnetic readings to yield the GSC levelled Ontario magnetic levelled (OML) channel.

The OML channels in the individual magnetic databases were gridded using high accuracy settings, and then merged using a Boolean operation to produce an uncompressed Geosoft® grid in both binary GRD format and ASCII GXF format for the area. For the Cobalt blocks, BIGRID gradient enhanced gridding was once again employed. Because some of the Cobalt OML grids now contained less long wavelength content and were therefore flatter, the Gradient Noise Level parameters were optimized as follows: Cobalt blocks 1, 4, 6, and 7 retained the values of 0.2, Block 2 used 0.15, Block 3 used 1.0, Block 5 used 0.8 , and Block 8 used 0.0. A separate Banting–Chambers grid has also been prepared for use in the 1:20 000 scale map products.

3.4 Grid Linking and Calculation of Magnetic 2nd Vertical Derivative Grid

After the multiple blocks of magnetic data were individually micro-levelled, and then levelled to the Ontario Master grid, the overlapping Banting–Chambers and Cobalt Block 5 grids were linked into a seamless single grid for presentation and archiving. At this point, the differences between the two OML grids were already minimal. A simple average of the 2 grids in the area of overlap would not produce a seamless merge. Therefore, a linear combination of the data from the two grids was computed over a 250 m wide stitching zone situated on the west side of Cobalt Block 5. Care was taken not to add extra perimeter cells to the component grids during gridding. Only the Banting–Chambers block grid data were modified.

The 15 m cell Cobalt Block 5 OML grid was read into the Banting–Chambers database and inspected in comparison to the Banting–Chambers OML channel. Next, a channel math expression was created to linearly combine the Cobalt data with the Banting–Chambers data on the lines that overlapped. A transition distance of 250 m was found to yield a seamless splice – even on a test 2VD grid – while altering as little of the Banting–Chambers data set as possible. The final Banting–Chambers linked OML channel was gridded using high accuracy settings to produce an uncompressed Geosoft® grid in both binary GRD format and ASCII GXF format.

The second vertical derivative of the residual magnetic field (2VD) was computed to enhance small and weak near-surface anomalies and as an aid to delineate the contacts of the lithologies having contrasting susceptibilities. The location of contacts or boundaries is usually traced by the zero contour of the second vertical derivative map.

Via a 2-D FFT transform, the individual gradient-enhanced trend reinforced (TRF) grids were operated on using a filter designed to calculate the 2nd vertical derivative while minimizing grid aliasing effects in the total residual field which are emphasized in the second vertical derivative. To accomplish this, an upward continuation operator of 100 m was combined with the 2VD operation. The approved 2VD grids were all linked together using a Boolean operation. A single Banting–Chambers 2VD grid was also prepared. All 2VD grids have been delivered as an uncompressed Geosoft® grid in both binary GRD format and ASCII GXF format.

The 2VD grids from the surveys were combined and are presented on 1:50 000 scale project maps using a shadowed colour image with a false Sun angle of 45° in inclination (altitude) and N0°E (N) declination. Only the Banting–Chambers data are presented on 1:20 000 scale maps using a false Sun angle of 45° in inclination (altitude) and N45°E (NE) declination.

3.5 Creation of Keating Co-efficient Anomaly Database

Possible kimberlite targets are identified from the residual magnetic intensity data, based on the identification of roughly circular anomalies. In Geosoft®, this procedure is automated by using a known pattern recognition technique (Keating 1995), which consists of computing, over a moving window, a first-order regression between a vertical cylinder model anomaly and the gridded magnetic data. Only the results where the absolute value of the correlation coefficient is above a threshold (typically 75%) are retained. On the magnetic maps, the results are depicted as circular symbols, scaled to reflect the correlation value. The most favourable targets are those that exhibit a cluster of high amplitude solutions. Correlation coefficients with a negative value correspond to reversely magnetised sources.

Because the two surveys in the Latchford area were flown at different times and heights, an artificial kimberlite anomaly grid was prepared for each survey using parameters provided by MNDM. To reduce aliasing of the correlation solutions, the model and the data grids were both prepared using a 30 m cell size. The cylinder model parameters employed were as follows:

Cylinder diameter:	200 m
Cylinder length:	infinite
Overburden thickness:	6 m (average)
Magnetic inclination:	73.29° N (B-C); 73.31° N (Cobalt)
Magnetic declination:	11.43° W (B-C); 11.51° W (Cobalt)
Window size:	10 x 10 cells (300 m x 300 m)
Magnetization scale factor:	100
Maximum data range:	1000 nT
Number of passes of smoothing filter:	0
Model window grid cell size:	30 m

The resulting models are presented in the figures below.

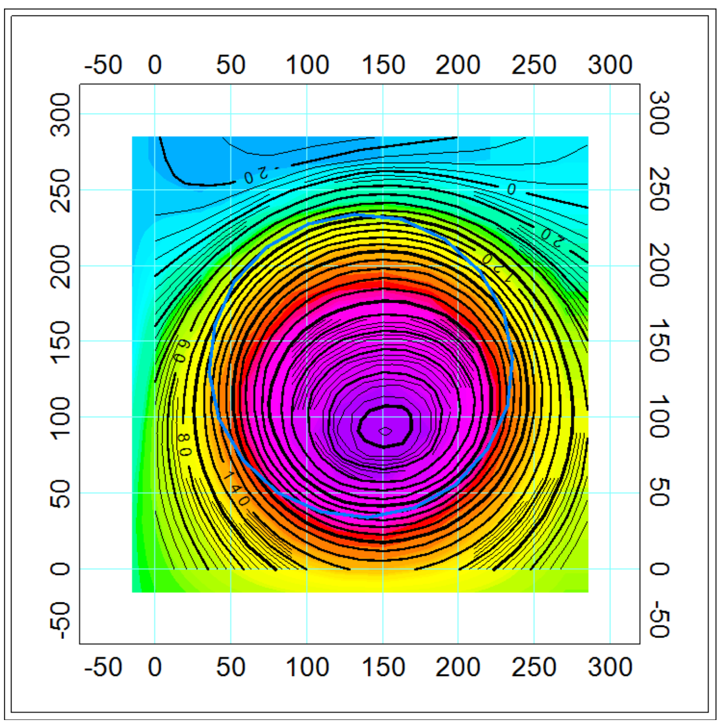

Figure 2. Cobalt survey 200 m diameter infinite vertical cylinder model.

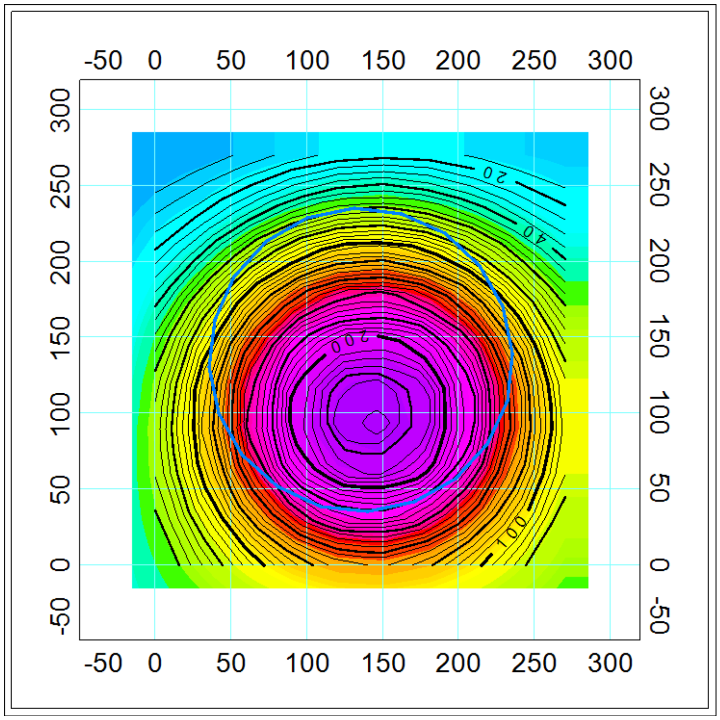

Figure 3. Banting–Chambers survey 200 m diameter infinite vertical cylinder model.

The models were cross-correlated with the final Latchford OML grids and a database of coefficients created for each survey. The coefficients have been plotted in a symbol format superimposed upon the 2VD maps using a cut-off threshold of 0.75.

The databases have been prepared in Geosoft® .GDB format (uncompressed) and comma delimited ASCII .CSV format. The detailed archive description is found in Appendix D of this report.

3.6 Calculation of Apparent Decay Constant (Banting–Chambers only)

The VTEM system used for Banting–Chambers was based on a concentric or central loop design, whereby, the receiver was positioned at the centre of a 26 m diameter transmitter loop that produced a dipole moment up to 420 500 NIA at a peak current of 198 Amperes. The wave form was a bi-polar, modified square wave with a turn-on and turn-off at each end. With a base frequency of 30 Hz, the duration of each pulse was approximately 6.7 milliseconds followed by an off time where no primary field was present (40% duty cycle).

During turn-on and turn-off, a time varying field was produced (dB/dt) and an electromotive force (emf) created as a finite impulse response. A current ring around the transmitter loop moves outward and downward as time progresses. When conductive rocks and mineralization are encountered, a secondary field is created by mutual induction and measured by the receiver at the centre of the transmitter loop. Measurements were made during the off-time, when only the secondary field (representing the conductive targets encountered in the ground) was present. The decay of the measured signal captured by the off-time channels can be approximated by an exponential decay of time constant Tau which is roughly proportional to the conductivity of the terrain below the aircraft, and which is mostly independent of flying height and conductor geometry.

The Banting–Chambers survey recorded the Z-component off-time channels. The basic formulation for the apparent (i.e., single dominant) decay constant (or Tau) using two channels is

$$Tau_{12} = -1 * ((\ln A_2 - \ln A_1)/(t_2 - t_1))^{-1}$$

Where A are the channel amplitudes and t are the channel delay times measured after the end of the transmitter pulse. The resulting Tau values are subject to bias if one or both channels are not levelled and/or noisy.

By expanding the input data to a larger suite of channel amplitudes at a range of off-times, a single dominant decay constant can be determined for each data record – and also a set of Tau Eigen-values determined which, when weighted and summed together, fully define the transient.

A software package called EMFLOW©, released by ENCOM, was designed to produce conductivity-depth sections for TDEM data by deconstructing each transient into a set of weighted Tau Eigen-values. The range of Tau values are chosen by the user across a range that best matches the timing of the waveform of the EM system in question. The number of Tau values is user selectable. The EMFLOW© package offers more robust results by fitting each recorded transient using multiple methods (least squares, L1-norm, etc.) simultaneously and selects the best fit. It also records the error of fit parameter to permit rejection of any low quality fits.

For the Banting–Chambers survey, all the EM channels were inspected line-by-line in stacked profile format to determine noise levels and the reliability of the earliest and latest time channels. The range of channels deemed acceptable for processing were Channels 5 though 24, representing a time range of 220 to 5780 microseconds after the pulse shut-off. Owing to their strong signal and therefore heavy influence on the fitted decay constant, the DC base levels in Channels 5, 6, and 7 were manually adjusted. The original data were retained in a channel called em_Z_orig.

For this data set, the recommended approach was determined to be 20 Eigen-values spaced logarithmically from 50 to 10 000 microseconds. Only positive decays were processed, and a small amount of smoothing was applied to each transient.

Once processed, the EMFLOW data file containing the decay constants was imported into a working Geosoft® database and reviewed line-by-line in comparison to the source Z-channel profiles. The dominant Tau was computed from a weighted combination of the Tau Eigen-values from 60 to 7050 microseconds, then thresholded to eliminate all fits with high errors, and low-pass filtered. It is normal for resistive areas to not yield valid decay constant fits due to low signal amplitudes. In those areas, the Tau was assigned a background value of 0.1 microseconds.

Finally, the approved Tau channel was gridded using high accuracy settings to produce an uncompressed Geosoft® grid in both binary GRD format and ASCII GXF format.

3.7 EM Anomaly Picking and Archiving (Banting–Chambers only)

For the Banting–Chambers VTEM survey, EM conductor locations were manually picked from the profile data noting the latest Z-component channel which retains reasonable signal amplitude above noise levels. The EM anomaly picking procedure took into account the Z-channels, the decay constant, the power line response, and the total field and 2VD magnetic responses. Next, the VTEM EM anomalies were plotted on a base map to check cultural correlation and line-to-line continuity, and manually edited by an experienced geophysicist while viewing all available geophysical parameters. Single anomalies were picked and plotted even when the VTEM system/conductor geometry yielded a double peaked EM response, yielding a single anomaly positioned over the top of the conducting body. Finally, the EM anomalies were each assigned a unique ID designation (A, B, etc.) and classified for thickness and culture.

All work was carried out within the master profile database, and then the required channels exported into a separate EM anomaly database, including the electromagnetic channel data (em_…) in multi-element array channels in the .gdb file, and as individual channels in the .csv file.

The final anomalies were plotted as annotated symbols on the specified map products and exported into a final subset database. The database has been provided in Geosoft® GDB format (uncompressed) and comma delimited .CSV format. The line archive is described in Appendix E in this report.

3.8 Re-formatting of EM and Magnetic Line Archive Database

The supplied line archive data, plus the newly created channels, were reformatted to the MNDM specifications in Geosoft® .GDB format (uncompressed) and comma delimited ASCII .CSV format. The survey number provided by MNDM is 1242. The electromagnetic channel data have been provided in multi-element array channels in the .gdb file, and as individual channels in the .csv file.

The Cobalt and Banting–Chambers surveys contain different sets of parameters and were archived separately. The channels provided in the digital line archive files are described in the 2 tables in Appendix C of this report.

3.9 Compilation of Publication-Ready Digital Maps

The following seven digital maps (in Geosoft® packed map format) have been prepared for the Latchford area Project:

For the Entire Project area:

1) 1:50 000 scale colour-filled contours of the residual magnetic field with flightlines and MNDM supplied planimetric base and map surround in two map sheets, namely M60416 (north) and M60417 (south);
2) 1:50 000 scale shaded colour image of the second vertical derivative of the residual magnetic field with Keating (1995) kimberlite pipe correlation coefficients, and MNDM supplied planimetric base and map surround in two map sheets, namely M60418 (north) and M60419 (south);

For the Banting–Chambers VTEM survey only:

3) 1:20 000 scale colour-filled contours of the residual magnetic field with EM anomalies, flightlines and MNDM supplied planimetric base and map surround, map M60413;
4) 1:20 000 scale shaded colour image of the second vertical derivative of the residual magnetic field with Keating (1995) kimberlite pipe correlation coefficients, and MNDM supplied planimetric base and map surround, map M60415;
5) 1:20 000 scale colour-filled contours of Z-component decay constant with EM anomalies, flightlines and MNDM supplied planimetric base and map surround, map M60414;

3.10 Creation of Georeferenced Geotiff Images

Seamless 200 dpi resolution georeferenced geotiff images of the 5 map themes described in the previous section have been prepared. The geotiffs show all the map elements except for the map surround information, co-ordinate graticule and co-ordinate annotations.

3.11 Creation of Linework (Vector) Archives

Seamless AutoCad® DXF format files of the Flight lines, Banting–Chambers survey EM anomalies, Keating coefficient symbols, contours of residual total magnetic field, and Banting–Chambers EM Decay Constant have been prepared.

4 REFERENCES

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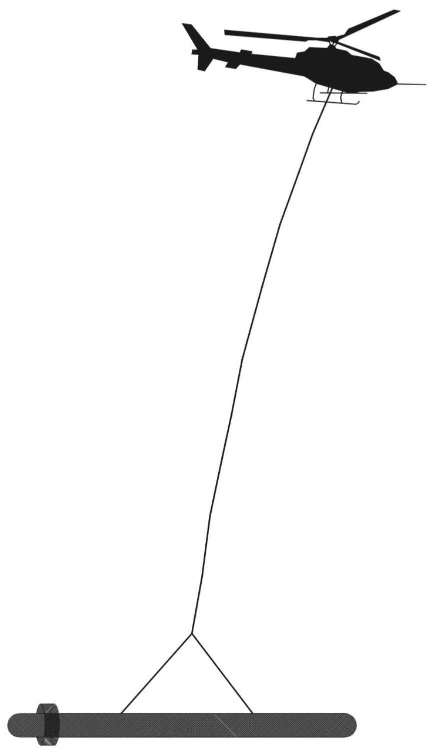
APPENDIX A

TEMEX–COBALT FUGRO MIDAS REPORT

Report #06003

**MIDAS HIGH RESOLUTION MAGNETIC
GEOPHYSICAL SURVEY
FOR
TEMEX RESOURCES CORP.
COBALT AREA
ONTARIO**

NTS: 31L/13, 31M/4,5,12, and 41P/8



Fugro Airborne Surveys Corp.
Mississauga, Ontario

Elizabeth Bowslaugh
Geophysicist

May 9, 2006

SUMMARY

This report describes the logistics, data acquisition and processing of results of a MIDAS airborne geophysical survey carried out for Temex Resources Corp. over eight properties located near New Liskeard, Ontario. Total coverage of the survey blocks amounted to 6,148 km. The survey was flown from February 10th to March 6th, 2006.

The survey data were processed and compiled in the Fugro Airborne Surveys Toronto office. Map products and digital data were provided in accordance with the scales and formats specified in the Survey Agreement.

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APPENDICES

1. INTRODUCTION

A MIDAS magnetic survey was flown for Temex Resources Corp., from February 10th to March 6th, over eight survey blocks located near New Liskeard, Ontario. The survey areas can be located on NTS map sheets 31L/13, 31M/4,5,12, and 41P/8.

Survey coverage consisted of approximately 6,148 line-km, including 434 line-km of tie lines. Flight lines were flown in an azimuthal direction of 0° with a line separation of 75 metres. Tie lines were flown orthogonal to the traverse lines with a line separation of 1000 metres.

The survey employed the MIDAS magnetic system. Ancillary equipment consisted of two magnetometers, radar, laser and barometric altimeter, digital video, digital recorder, and an electronic navigation system. The instrumentation was installed in an AS350B turbine helicopter (Registration C-FDYS) that was provided by Questral Helicopters Ltd. The helicopter flew at an average airspeed of 120 km/h with a sensor height of approximately 30 metres.

2. SURVEY OPERATIONS

The base of operations for the survey was established at New Liskeard, Ontario.
The survey areas can be located on NTS map sheets 31L/13, 31M/4,5,12, and 41P/8 (Figure 1-4).

Table 2-1 lists the corner coordinates of the survey areas in NAD27, UTM Zone 17N, central meridian 81°W.

Table 2-1

	Block	X-UTM (E)	Y-UTM (N)
1	**06003-1**	554600	5257709
2	**Van Nostrand Property**	557837	5257709
3		557837	5254472
4		554600	5254472
1	**06003-2**	572213	5253483
2	**Mattawapika Property**	572868	5252890
3		573338	5252808
4		573400	5252808
5		573397	5253751
6		573789	5253751
7		573789	5256255
8		574139	5256255
9		574135	5256663
10		574960	5256663

11		574960	5256261
12		575409	5256261
13		575409	5253001
14		574618	5253001
15		574618	5250996
16		573336	5250813
17		572854	5250895
18		572213	5251483
1	**06003-3**	586167	5261267
2	**FB Property**	587785	5261287
3		587799	5260487
4		589402	5260521
5		590266	5260521
6		590266	5257307
7		588678	5257295
8		588678	5256509
9		587799	5256509
10		587799	5259267
11		586167	5259267
1	**06003-4**	587900	5254078
2	**FB Property**	592739	5254125
3		592739	5252117
4		590350	5252120
5		590350	5251686
6		590000	5251686
7		590000	5250867
8		589593	5250866
9		589593	5250453
10		588732	5250453
11		588732	5252078
12		587900	5252078
1	**06003-5**	576648	5237941
2	**KJD, Brigstocke, Brett,**	580636	5237951
3	**Snare Creek, BH, Ram,**	580637	5242274
4	**Caniptau, and Castle**	576925	5242250
5	**Properties**	576925	5244250
6		578596	5244250
7		578596	5245437
8		579179	5245437

9		579179	5248642
10		582238	5248642
11		582238	5249151
12		583115	5249151
13		583115	5250821
14		585506	5250821
15		585506	5248821
16		584740	5248821
17		584740	5248096
18		584409	5248096
19	**06003-5**	584409	5244382
20	**KJD, Brigstocke, Brett,**	585131	5244382
21	**Snare Creek, BH, Ram,**	585131	5243640
22	**Caniptau, and Castle**	586088	5243640
23	**Properties**	586088	5238404
24		590872	5238388
25		590872	5236388
26		589815	5236388
27		589815	5235555
28		590617	5235555
29		590617	5234724
30		591410	5234742
31		591410	5236383
32		592609	5236383
33		592609	5235573
34		593029	5235573
35		593029	5234781
36		597763	5234889
37		597763	5232889
38		597494	5232889
39		597494	5231689
40		597069	5231683
41		597069	5229214
42		597376	5229223
43		597376	5227550
44		597659	5227550
45		597659	5225673
46		598876	5225673
47		598876	5223916
48		602191	5223916
49		602191	5218379
50		596584	5218307

51		596584	5221951
52		595261	5221951
53		595261	5222174
54		594442	5222174
55		594439	5222324
56		589178	5222308
57		589166	5219958
58		583938	5219950
59		583938	5228736
60		584329	5228736
61		584329	5230350
62		584511	5230350
63		584511	5235552
64		576648	5235512
65		576648	5237941
1	**06003-6**	587494	5206589
2	**Wilson Lake Property**	587494	5208589
3		588158	5208589
4		588158	5209809
5		588260	5209810
6		588260	5211290
7		589122	5211303
8		590415	5211679
9		591182	5211679
10		591987	5211842
11		594306	5211849
12		594306	5208736
13		594164	5208722
14		594164	5208057
15		590222	5208001
16		590222	5206684
17		589924	5206684
18		589924	5206651
19		589748	5206641
20		589748	5206847
21		589530	5206921
22		588792	5206955
23		588168	5206589
1	**06003-7**	597987	5202617
2	**Lapin Property**	601243	5202705

3		601243	5199395
4		597987	5199395
1	**06003-8**	610799	5203037
2	**Hartle Lake Property**	613955	5203013
3		613955	5198047
4		611586	5198047
5		611586	5199830
6		610799	5199830

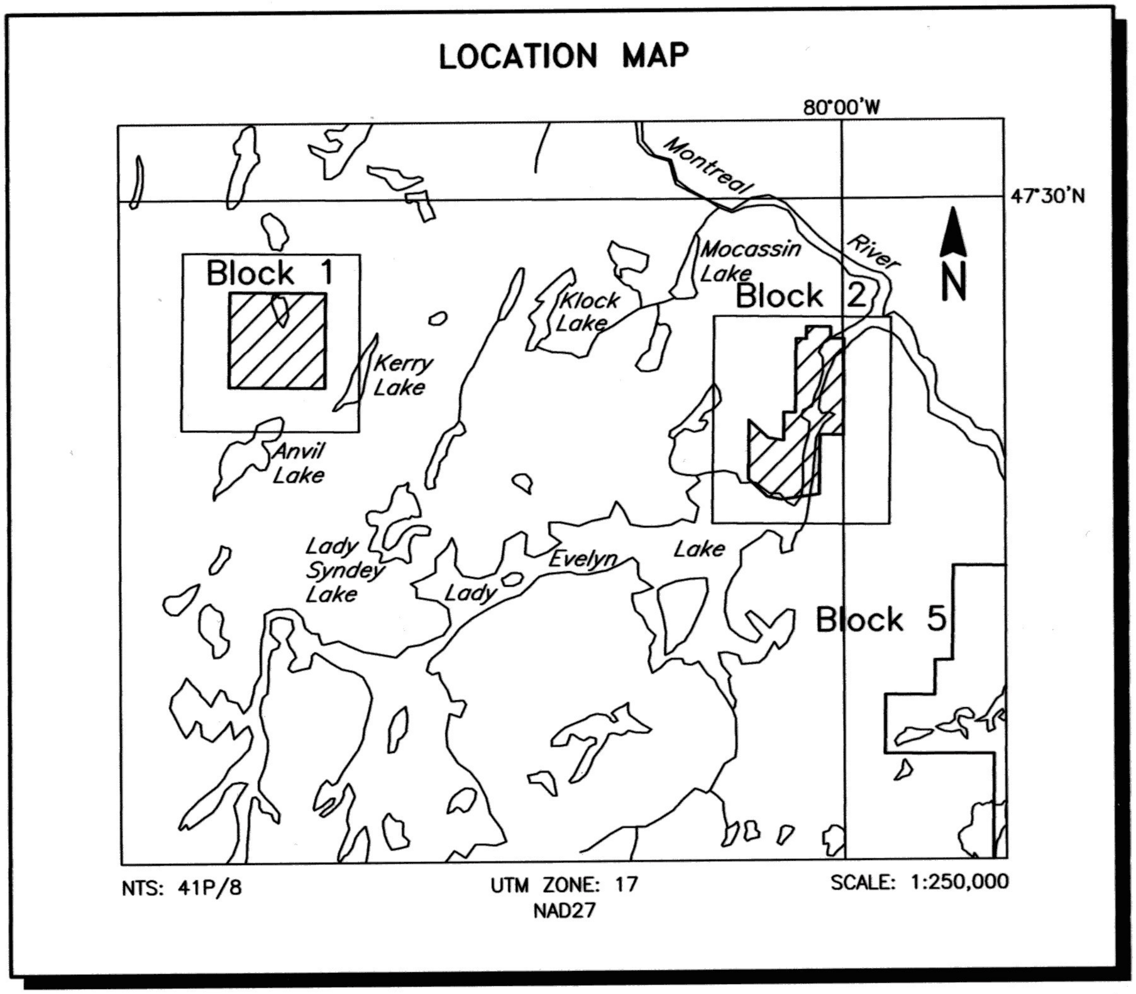


Figure 1
Location Map and Sheet Layout
Van Nostrand and Mattawapika Properties
Job # 06003

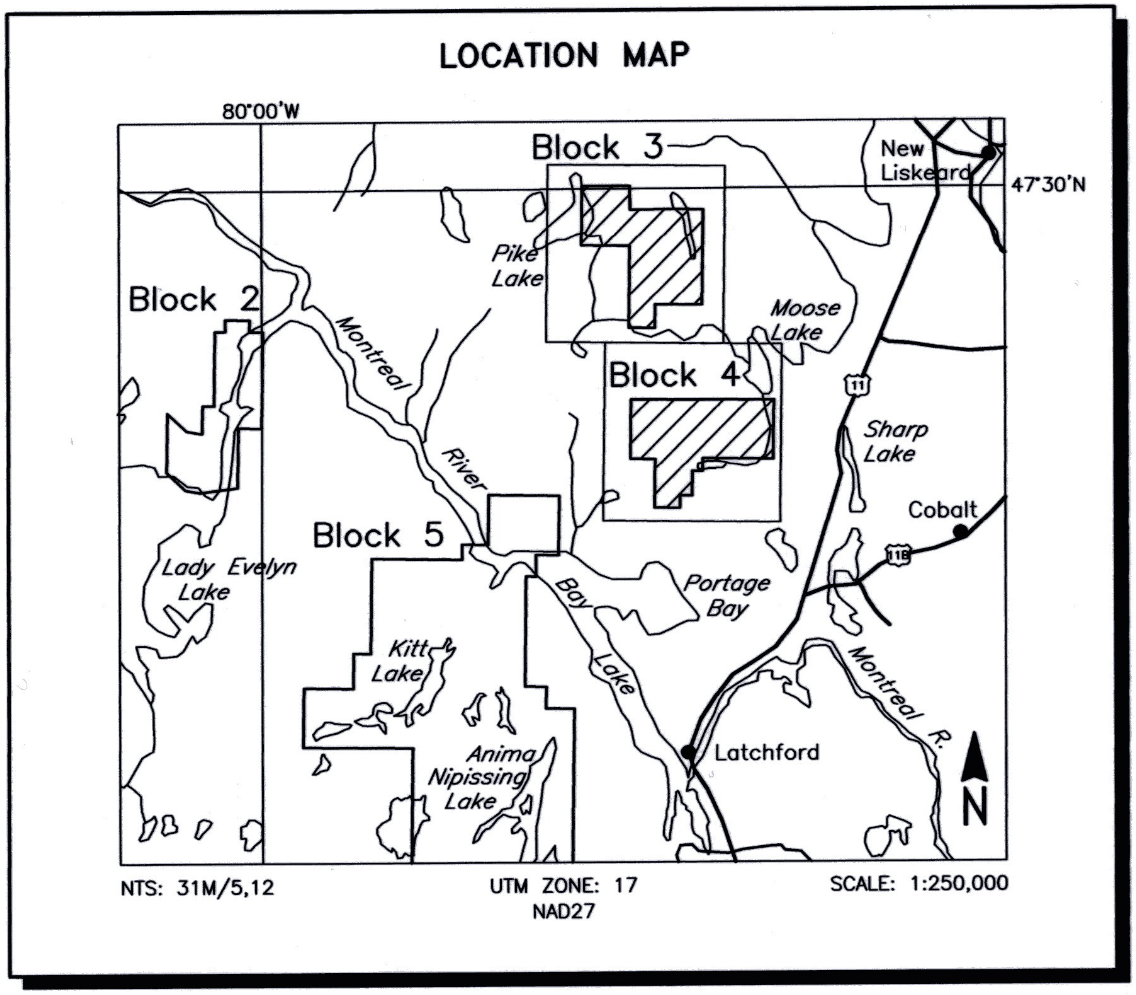


Figure 2
Location Map and Sheet Layout
FB Property
Job # 06003

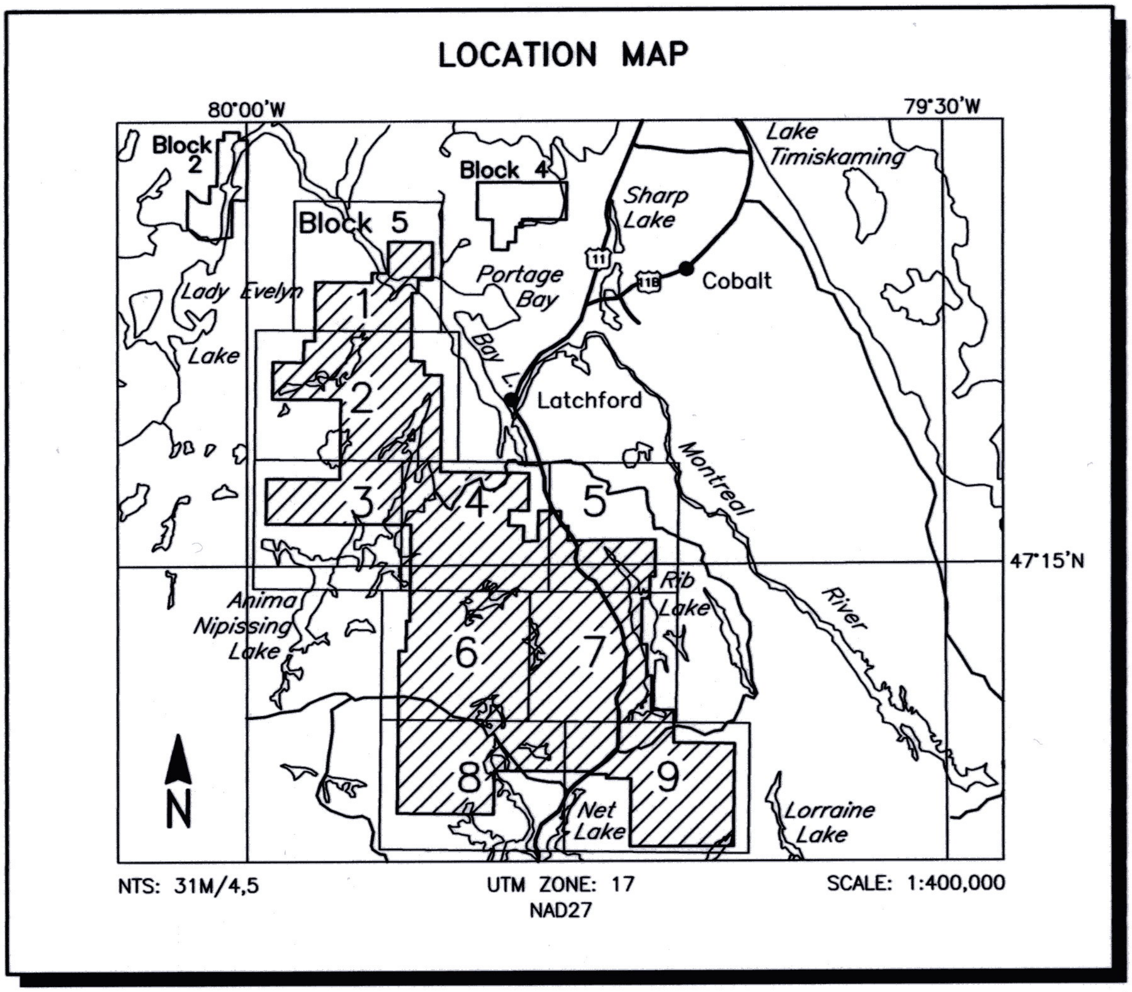


Figure 3
Location Map and Sheet Layout
KJD, Brigstocke, Brett, Snare Creek, BH, Ram, Caniptau and Castle Properties
Job # 06003

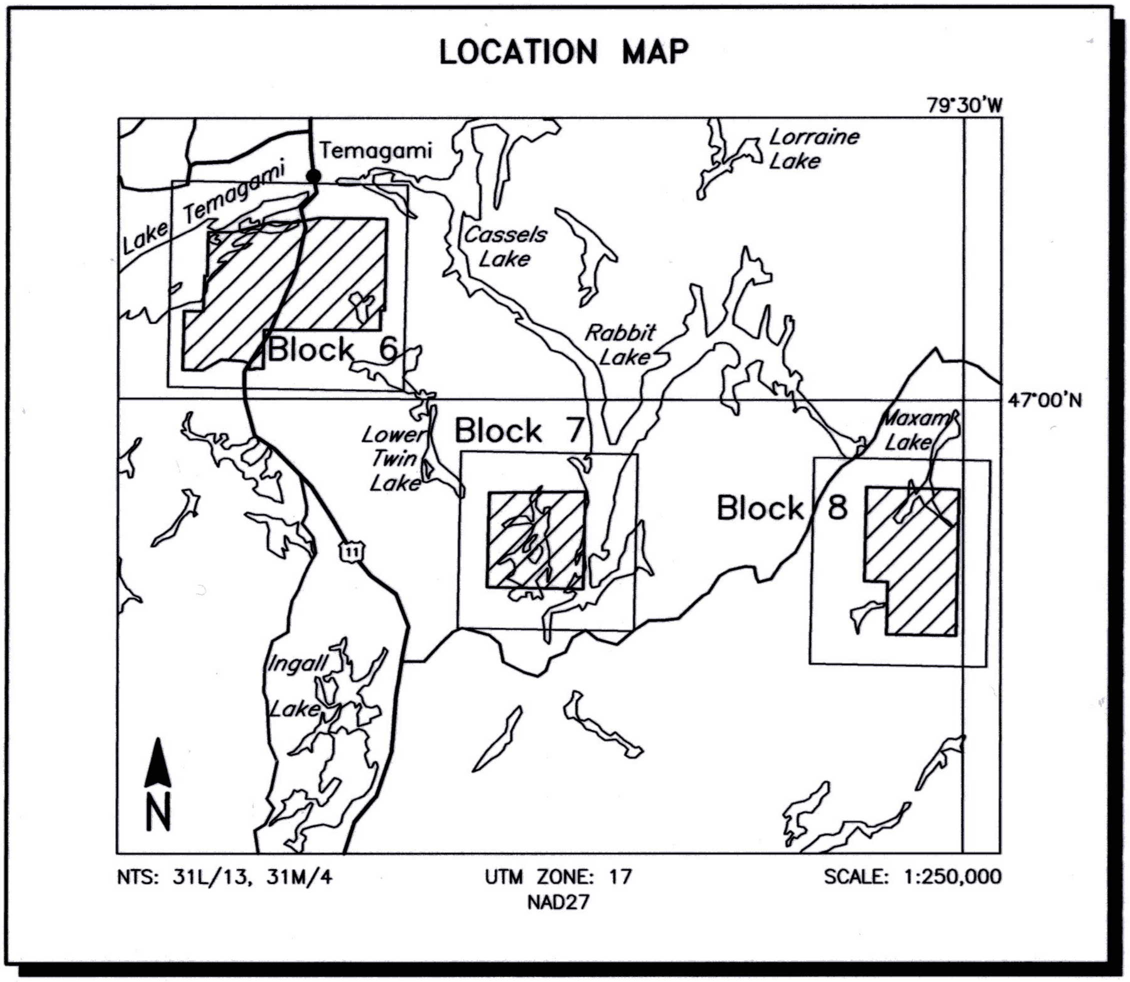


Figure 4
Location Map and Sheet Layout
Wilson Lake, Lapin and Hartle Lake Properties
Job # 06003

The survey specifications were as follows:

Parameter	Specifications
Traverse line direction	NS
Traverse line spacing	75 m
Tie line direction	EW
Tie line spacing	1000 m
Sample interval	10 Hz, 3.3 m @ 120 km/h
Aircraft mean terrain clearance	30 m
Mag sensor mean terrain clearance	30 m
Average speed	120 km/h
Navigation (guidance)	±5 m, Real-time GPS
Post-survey flight path	±2 m, Differential GPS

3. SURVEY EQUIPMENT

This section provides a brief description of the geophysical instruments used to acquire the survey data and the calibration procedures employed. The geophysical equipment was installed in an AS350B helicopter. This aircraft provides a safe and efficient platform for surveys of this type.

Airborne Magnetometer

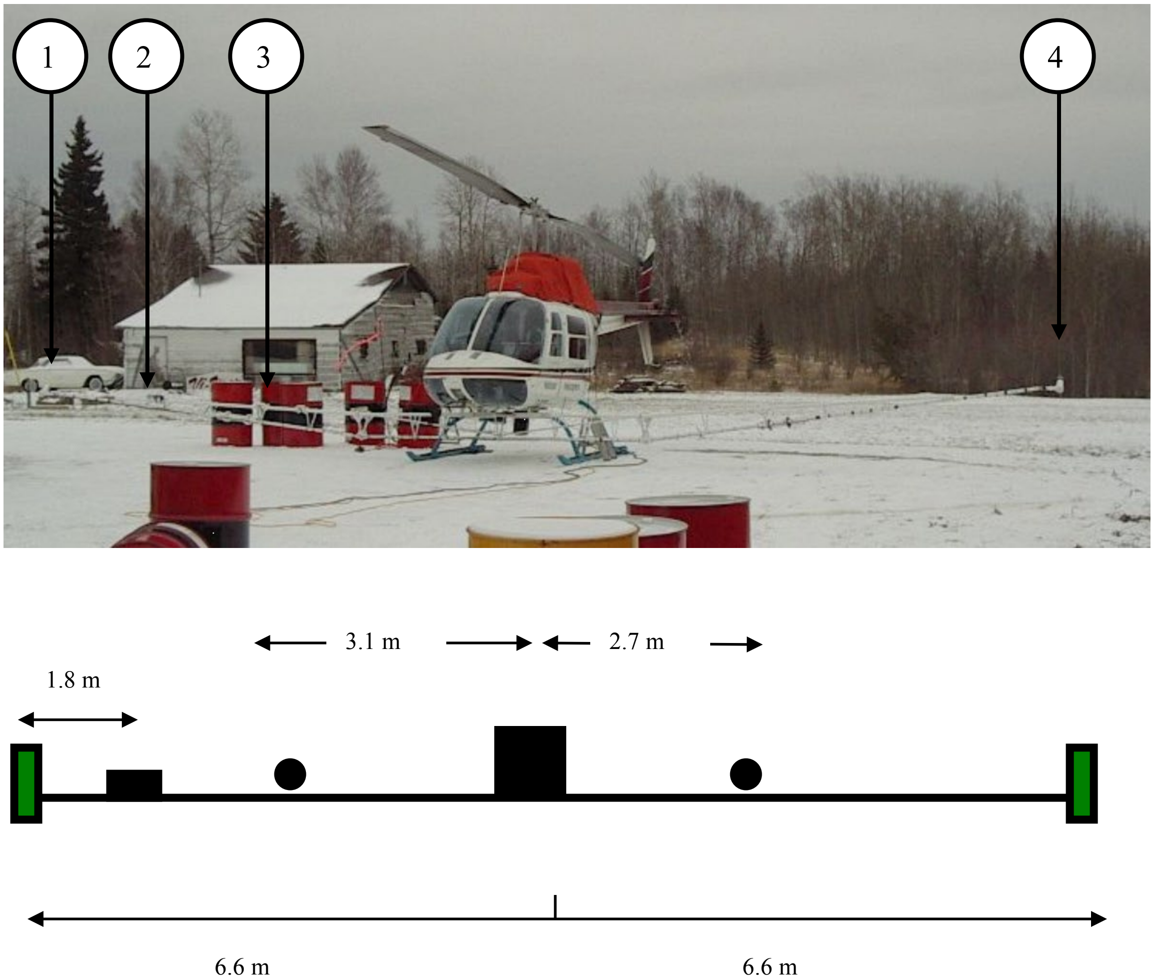
Model: Fugro dual-sensor horizontal gradiometer with two Scintrex CS2 sensors and AM102 counters.

Type: Optically pumped cesium vapour

Sensitivity: 0.01 nT

Sample rate: 10 per second

The magnetometer sensors are housed in booms attached to the helicopter. The sensor separation is 13.2 m.



1 Starboard Magnetic Sensor
2 Fluxgate
3 Dual Frequency GPS antenna
4 Port Magnetic Sensor

Figure 5: FUGRO MIDAS system layout.

Fluxgate

Manufacturer: Billingsley
Model: TMF100 Triaxial Fluxgate Magnetometer
Axial Alignment: Orthogonality better than ±1 degree
Sensitivity: 100 µV per nT
Sample rate: 10 per second

A three-axis fluxgate magnetometer measures the orientation and rates of change of the aircraft's magnetic field with respect to the earth's magnetic field. A compensation algorithm is applied to generate a correction factor to compensate for permanent, induced and eddy current magnetic noise generated by the aircraft.

Magnetic Base Station

Primary

Model: Fugro CF1 base station with timing provided by integrated GPS

Sensor type: Scintrex CS-2

Counter specifications: Accuracy: ±0.1 nT
Resolution: 0.01 nT
Sample rate 1 Hz

GPS specifications: Model: Marconi Allstar
Type: Code and carrier tracking of L1 band, 12-channel, C/A code at 1575.42 MHz
Sensitivity: -90 dBm, 1.0 second update
Accuracy: Manufacturer's stated accuracy for differential corrected GPS is 2 metres

Environmental
Monitor specifications: Temperature:

- Accuracy: ±1.5ºC max
- Resolution: 0.0305ºC
- Sample rate: 1 Hz
- Range: -40ºC to +75ºC

Barometric pressure:

- Model: Motorola MPXA4115A
- Accuracy: ±3.0º kPa max (-20ºC to 105ºC temp. ranges)
- Resolution: 0.013 kPa
- Sample rate: 1 Hz
- Range: 55 kPa to 108 kPa

A digital recorder is operated in conjunction with the base station magnetometer to record the diurnal variations of the earth's magnetic field. The clock of the base station is synchronized with that of the airborne system, using GPS time, to permit subsequent removal of diurnal drift. The Fugro CF1 was the primary magnetic base station.

Navigation (Global Positioning System)

Airborne Receiver for Real-time Navigation & Guidance

Model: Ashtech Glonass GG24 with PNAV 2100 interface
Type: SPS (L1 band), 24-channel, C/A code at 1575.42 MHz, S code at 0.5625 MHz, Real-time differential.
Sensitivity: -132 dBm, 0.5 second update
Accuracy: Manufacturer's stated accuracy is better than 5 metres real-time

Antenna: Mounted on tail of aircraft

Airborne Receiver for Flight Path Recovery

Model: Aero Antenna AT2775

Type: Code and carrier tracking of L1 band, 24-channel, dual frequency C/A code at 1575.2 MHz, and L2 P-code 1227 MHz.

Sample rate: 0.5 second update.

Accuracy: Manufacturer's stated accuracy for differential corrected GPS is better than 1 metre.

Antenna: Mounted on starboard and port booms.

Primary Base Station for Post-Survey Differential Correction

Model: Aero Antenna AT2775

Type: Code and carrier tracking of L1 band, 12-channel, dual frequency C/A code at 1575.2 MHz, and L2 P-code 1227 MHz

Sample rate: 0.5 second update

Accuracy: Manufacturer's stated accuracy for differential corrected GPS is better than 1 metre

Secondary GPS Base Station

Model: Marconi Allstar OEM, CMT-1200

Type: Code and carrier tracking of L1 band, 12-channel, C/A code at 1575.42 MHz

Sensitivity: -90 dBm, 1.0 second update

Accuracy: Manufacturer's stated accuracy for differential corrected GPS is 2 metres.

The Ashtech GG24 is a line of sight, satellite navigation system that utilizes time-coded signals from at least four of forty-eight available satellites. Both Russian GLONASS and American NAVSTAR satellite constellations are used to calculate the position and to provide real time guidance to the helicopter. For flight path processing two Aero Antenna AT2775 were used as the mobile receivers. A similar system was used as the primary base station receiver. The mobile and base station raw XYZ data were recorded, thereby permitting post-survey differential corrections for theoretical accuracies of better than 2 metres. A Marconi Allstar GPS unit, part of the CF-1, was used as a secondary (back-up) base station.

Each base station receiver is able to calculate its own latitude and longitude. For this survey, the primary GPS station was located at latitude 47° 32' 17.72090", longitude -79 ° 40' 39.02594" at an elevation of 169.820 metres above the ellipsoid. The GPS records data relative to the WGS84 ellipsoid, which is the basis of the revised North American Datum (NAD83). Conversion software is used to transform the WGS84 coordinates to the NAD27 UTM system displayed on the maps.

Radar Altimeter

Manufacturer:	Honeywell/Sperry
Model:	AA 330 or RT220
Type:	Short pulse modulation, 4.3 GHz
Sensitivity:	0.3 m
Sample rate:	2 per second

The radar altimeter measures the vertical distance between the helicopter and the ground.

Barometric Pressure and Temperature Sensors

Model:	DIGHEM D 1300	
Type:	Motorola MPX4115AP analog pressure sensor	
	AD592AN high-impedance remote temperature sensors	
Sensitivity:	Pressure:	150 mV/kPa
	Temperature:	1 00 mV/°C or 10 mV/°C (selectable)

Sample rate: 10 per second

The D1300 circuit is used in conjunction with one barometric sensor and up to three temperature sensors. Two sensors are installed in the console in the aircraft, to monitor pressure and internal operating temperatures.

Laser Altimeter

Manufacturer: Optech
Model: ADMGPA100
Type: Fixed pulse repetition rate of 2 kHz
Sensitivity: ±5 cm from 10ºC to 30ºC
±10 cm from -20ºC to +50ºC

Sample rate: 2 per second

The laser altimeter measures the distance from the helicopter to ground, except in areas of dense tree cover.

Digital Data Acquisition System

Manufacturer: Fugro
Model: HELIDAS
Recorder: Compact Flash Card

The stored data are downloaded to the field workstation PC at the survey base, for verification, backup and preparation of in-field products.

Video Flight Path Recording System

Type: Axis 2420 Digital
Recorder: Tablet Computer

Fiducial numbers are recorded continuously and are displayed on the margin of each image. This procedure ensures accurate correlation of data with respect to visible features on the ground.

4. QUALITY CONTROL AND IN-FIELD PROCESSING

Digital data for each flight were transferred to the field workstation, in order to verify data quality and completeness. A database was created and updated using Geosoft Oasis Montaj and proprietary Fugro Atlas software. This allowed the field personnel to calculate, display and verify both the positional (flight path) and geophysical data on a screen or printer. Records were examined as a preliminary assessment of the data acquired for each flight.

In-field processing of Fugro survey data consists of differential corrections to the airborne GPS data, spike rejection and filtering of all geophysical and ancillary data, verification of flight videos, diurnal correction, and preliminary leveling of magnetic data.

All data, including base station records, were checked on a daily basis, to ensure compliance with the survey contract specifications. Reflights were required if any of the following specifications were not met.

Navigation	-Positional (x,y) accuracy of better than 10 m, with a CEP (circular error of probability) of 95%.
Flight Path	-No lines to exceed 25 m departure from nominal line spacing over a continuous distance of more than 1 km, except for reasons of safety.
Clearance	-Mean terrain sensor clearance of 30 m, except where precluded by safety considerations, e.g., restricted or populated areas, severe topography, obstructions, tree canopy, aerodynamic limitations, etc.
Airborne Mag	-Figure of Merit for the magnetometers will be no greater than 2.0 nT. The non-normalized 4th difference will not exceed 1.6 nT over a continuous distance of 1 km excluding areas where this specification is exceeded due to natural anomalies.
Base Mag	-Non-linear variations not to exceed 10 nT over a time of 1 minute.

5. DATA PROCESSING

Flight Path Recovery

The raw range data from at least four satellites are simultaneously recorded by both the base and mobile GPS units. The geographic positions of both units, relative to the model ellipsoid, are calculated from this information. Differential corrections, which are obtained from the base station, are applied to the mobile unit data to provide a post-flight track of the aircraft, accurate to within 2 m. Speed checks of the flight path are also carried out to determine if there are any spikes or gaps in the data.

The corrected WGS84 latitude/longitude coordinates are transformed to the coordinate system used on the final maps. Images or plots are then created to provide a visual check of the flight path.

Total Magnetic Field

A fourth difference was calculated from the raw total magnetic intensity data (TMI). The raw TMI was examined in profile form along with the fourth difference. Spikes were manually defaulted and interpolated with an Akima spline. The lag in the magnetic data was determined empirically by analysis of the grids and applied to the survey data. A lag of 1.8 seconds for the port and starboard magnetometers was applied. The diurnal variations recorded by the base station were edited for any cultural contamination and filtered to remove high-frequency noise. This diurnal magnetic data was then subtracted from the despiked, lagged TMI to provide a first order diurnal correction. The diurnal removed magnetic field data were then gridded and compared to a grid of the despiked, lagged magnetic data to ensure that the data quality was improved by diurnal removal.

The lagged, diurnal corrected magnetic data for the two sensors were averaged to create a data set centered on the flight path. Tie line leveling corrections were calculated using tie and traverse line intercepts. Manual adjustments were applied to any lines that required leveling, as indicated by shadowed images of the gridded magnetic data. To remove any short wavelength residual line-to-line discrepancies in the total field magnetics, a microleveling technique was used to remove errors of less than 5.0 nT striking parallel to the line direction to produce the final total magnetic field.

Measured Magnetic Gradient

The diurnally-corrected total magnetic field data for the two magnetic sensors were used to calculate the transverse measured magnetic gradient. The transverse gradient is calculated with respect to the flight line direction. The median was removed from the gradient on a line-by-line basis. To remove any short wavelength residual line-to-line discrepancies in horizontal gradient, a microleveling technique was used to remove errors of less than 0.05 nT/m striking parallel to the line direction to produce the final transverse horizontal magnetic gradient.

Enhanced Total Magnetic Field

Bidirectional gridding with the transverse gradient should produce a surface that correctly renders both the measured data and the measured horizontal gradient at each survey line. This can be an advantage when gridding data that include features approaching the line-separation in size and also for rendering features that are not perpendicular to the line direction, particularly those which are sub-parallel to the line direction. Direct results of the application of Horizontal Gradient Enhanced (HGE) gridding are:

- Increased resolution and continuity of magnetic features parallel or sub-parallel to the flight line direction
- Correct spatial positioning of finite source magnetic bodies between lines.
- Improved resolution of analytical signal and enhanced analytic signal products.

- Final transverse magnetic gradient data were used in conjunction with the total magnetic field to create a Horizontal Gradient Enhanced grid of the total magnetic field. This grid was created using the enhanced bi-directional gridding tool in proprietary Fugro Atlas software.

Calculated Vertical Magnetic Gradient

The diurnally-corrected total magnetic field data were subjected to a processing algorithm that enhances the response of magnetic bodies in the upper 500 m and attenuates the response of deeper bodies. The resulting vertical gradient map provides better definition and resolution of near-surface magnetic units. It also identifies weak magnetic features that may not be evident on the total field map. However, regional magnetic variations and changes in lithology may be better defined on the total magnetic field map.

Magnetic Derivatives (optional)

The total magnetic field data can be subjected to a variety of filtering techniques to yield maps or images of the following:

second vertical derivative
reduction to the pole/equator
magnetic susceptibility with reduction to the pole
upward/downward continuations
analytic signal

All of these filtering techniques improve the recognition of near-surface magnetic bodies, with the exception of upward continuation. Any of these parameters can be produced on request.

Digital Elevation (optional)

The radar altimeter values (ALTR – aircraft to ground clearance) are subtracted from the differentially corrected and de-spiked GPS-Z values to produce profiles of the height above the ellipsoid along the survey lines. These values are gridded to produce contour maps showing approximate elevations within the survey area. The calculated digital terrain data are then tie-line leveled. Any remaining subtle line-to-line discrepancies are manually removed. After the manual corrections are applied, the digital terrain data are filtered with a microleveling algorithm.

The accuracy of the elevation calculation is directly dependent on the accuracy of the two input parameters, ALTR and GPS-Z. The ALTR value may be erroneous in areas of heavy tree cover, where the altimeter reflects the distance to the tree canopy rather than the ground. The GPS-Z value is primarily dependent on the number of available satellites. Although post-processing of GPS data will yield X and Y accuracies in the order of 1-2 metres, the accuracy of the Z value is usually much less, sometimes in the ±10 metre range. Further inaccuracies may be introduced during the interpolation and gridding process.

Because of the inherent inaccuracies of this method, no guarantee is made or implied that the information displayed is a true representation of the height above sea level. Although this product may be of some use as a general reference, THIS PRODUCT MUST NOT BE USED FOR NAVIGATION PURPOSES.

Contour, Colour and Shadow Map Displays

The geophysical data are interpolated onto a regular grid using a modified Akima spline technique. The resulting grid is suitable for image processing and generation of contour maps. The grid cell size is 20% of the line interval.

Colour maps are produced by interpolating the grid down to the pixel size. The parameter is then incremented with respect to specific amplitude ranges to provide colour "contour" maps.

Monochromatic shadow maps or images are generated by employing an artificial sun to cast shadows on a surface defined by the geophysical grid. There are many variations in the shadowing technique. These techniques can be applied to total field or enhanced magnetic data, magnetic derivatives, resistivity, etc. The shadowing technique is also used as a quality control method to detect subtle changes between lines.

6. PRODUCTS

This section lists the final maps and products that have been provided under the terms of the survey agreement. Other products can be prepared from the existing dataset, if requested. Most parameters can be displayed as contours, profiles, or in colour.

Base Maps

Base maps of the survey area were produced from digital topography (.dxf files) supplied by Temex Resources Corp. This process provides a relatively accurate, distortion-free base that facilitates correlation of the navigation data to the map coordinate system. The topographic files were combined with geophysical data for plotting the final maps. All maps were created using the following parameters:

Projection Description:
Datum: NAD 27 Manitoba & Ontario
Ellipsoid: Clarke 1866
Projection: UTM (Zone: 17)
Central Meridian: 81° W
False Northing: 0
False Easting: 500000
Scale Factor: 0.9996
WGS84 to Local Conversion: Molodensky
Datum Shifts: DX: 9 DY: -157 DZ: -184

The following parameters are presented at a scale of 1:10,000. All maps include flight lines and topography, unless otherwise indicated. Preliminary products are not listed.

Final Products

	No. of Map Sets		
	Mylar	Blackline	Colour
Total Magnetic Field			6
Horizontal Gradient Enhanced TMF			6
Calculated Vertical Magnetic Gradient			6
Transverse Horizontal Gradient			6

Additional Products

Digital Archive (see Archive Description) 1 CD-ROM
Survey Report 6 copies

7. CONCLUSION

This report describes the equipment, data processing procedures and logistics of the survey over the eight blocks.

It is recommended that additional processing of existing geophysical data be considered, in order to extract the maximum amount of information from the survey results. Current software and imaging techniques often provide valuable information on structure and lithology, which may not be clearly evident on the current colour maps. These techniques can yield images that define subtle, but significant, structural details.

Respectfully submitted,

FUGRO AIRBORNE SURVEYS CORP.

Elizabeth Bowslaugh
Geophysicist

APPENDIX A1

LIST OF PERSONNEL

The following personnel were involved in the acquisition, processing, interpretation and presentation of data, relating to a MIDAS airborne geophysical survey carried out for Temex Resources Corp., near New Liskeard, Ontario.

David Miles	Manager, Helicopter Operations
Emily Farquhar	Manager, Data Processing and Interpretation
Jazz Bola	Senior Geophysical Operator
Amir Soltanzadeh	Field Geophysicist
Mark Cusack	Pilot (Questral Helicopters Ltd.)
Elizabeth Bowslaugh	Geophysical Data Processor
Lyn Vanderstarren	Drafting Supervisor
Susan Pothiah	Word Processing Operator
Albina Tonello	Secretary/Expeditor

The survey consisted of 6,148 km of coverage, flown from February 10th to March 6th, 2006.

All personnel are employees of Fugro Airborne Surveys, except for the pilot who is an employee of Questral Helicopters Ltd.

APPENDIX B1

ARCHIVE DESCRIPTION

Reference: CDVD00129 to CDVD00132
# of DVD's: 4
Archive Date: 2006-May-09

This archive contains final data archives and grids of an airborne geophysical survey conducted by FUGRO AIRBORNE SURVEYS CORP. on behalf of Temex Resources Corp. during February and March, 2006.

Job # 06003

This DVD set consists of 206 files contained in 5 directories

******* CDVD00129 *******

\GRIDS
Grids in Geosoft binary float (.GRD) format

CVG_HGE_BLK* - Calculated Vertical Magnetic Gradient
MAG_BLK* - Total Magnetic Field
MAG_HGE_BLK* - Horizontal Gradient Enhanced Total Magnetic Field
MHG_BLK* - Measured Horizontal Magnetic Gradient

where * is block number 1-8

\LINEDATA
06003_BLK*.XYZ - Final linedata archive in Geosoft XYZ format
TEMEX_COBALT.TXT - Documentation for linedata archive file

where * is block number 1-8

\PDF
files created with PDF995 Creator v5.2

CVG_HGE_*.PDF - Calculated Vertical Magnetic Gradient at 1:10,000
MAG_*.PDF - Total Magnetic Field at 1:10,000
MAG_HGE_*.PDF - Horizontal Gradient Enhanced Total Magnetic Field at 1:10,000
MHG_*.PDF - Measured Horizontal Magnetic Gradient at 1:10,000

where * is block number 1-8, block 5 is further named by sheet number 1-9

\REPORT
TEMEX_COBALT.PDF - Logistics and Interpretation Report

\VIDEO
Binary collection of JPEG's (.BIN and .BDX)

FLT*_0 - Digital Video

where * is the flight number 1-12

******* CDVD00130 *******
\VIDEO
Binary collection of JPEG's (.BIN and .BDX)

FLT*_0 - Digital Video

where * is the flight number 13-26

******* CDVD00131 *******

\VIDEO
Binary collection of JPEG's (.BIN and .BDX)

FLT*_0 - Digital Video

where * is the flight number 27-41

******* CDVD00132 *******

\VIDEO
Binary collection of JPEG's (.BIN and .BDX)

FLT*_0 - Digital Video

where * is the flight number 42-45

The coordinate system for all grids and the data archive is projected as follows

Datum	NAD27 (Man & Ont)
Spheroid	Clarke 1866
Projection	UTM
Central meridian	81 West (Z17N)
False easting	500000
False northing	0
Scale factor	0.9996
Northern parallel	N/A
Base parallel	N/A
WGS84 to local conversion method	Molodensky
Delta X shift	9
Delta Y shift	-157
Delta Z shift	-184

If you have any problems with this archive please contact

Processing Manager
FUGRO AIRBORNE SURVEYS CORP.
2270 Argentia Road, Unit 2
Mississauga, Ontario
Canada L5N 6A6
Tel (905) 812-0212
Fax (905) 812-1504
E-mail toronto@fugroairborne.com

Geosoft XYZ ARCHIVE SUMMARY

JOB # : 06003
TYPE OF SURVEY : Magnetics
AREA : Temex Resources Corp.
CLIENT : Cobalt Area, Ontario

****

NUMBER OF DATA FIELDS : 18

# CHANNAME	TIME	UNITS	DESCRIPTION
1 X	0.10	m	UTME NAD27 Zone 17
2 Y	0.10	m	UTMN NAD27 Zone 17
3 FID	1.00	n/a	Synchronization Counter
4 DATE	1.00	YYYY/MM/DD	Flight Date
5 FLIGHT	1.00	n/a	Flight Number
6 ALTLASER	0.10	m	Helicopter to Earth-Surface, Laser Altimeter
7 ALTM	0.10	m	Helicopter to Earth-Surface, Radar Altimeter
8 GALT	0.10	m	Height above ellipsoid
19 BARO	0.10	m	Barometric Altitude
10 DTM	0.10	m	Digital Terrain Model
11 MAG2C	0.1	nT	Compensated Total Magnetic Field, Starboard Sensor
12 MAG3C	0.1	nT	Compensated Total Magnetic Field, Port Sensor
13 DIURNAL_COR	0.1	nT	Daily Variations of Magnetic Field, Base Value Removed
14 MAG2CLD	0.1	nT	Total Magnetic Field, Lagged and Diurnal Corrected, Starboard Sensor
15 MAG3CLD	0.1	nT	Total Magnetic Field, Lagged and Diurnal Corrected, Port Sensor
16 MAG_AVG	0.1	nT	(MAG2CLD+MAG3CLD)/2 average TMI at center of helicopter
17 MAG	0.1	nT	Final Leveled Total Magnetic Field
18 MHG	0.1	nT	Measured Horizontal Gradient

****

ISSUE DATE : May 9, 2006
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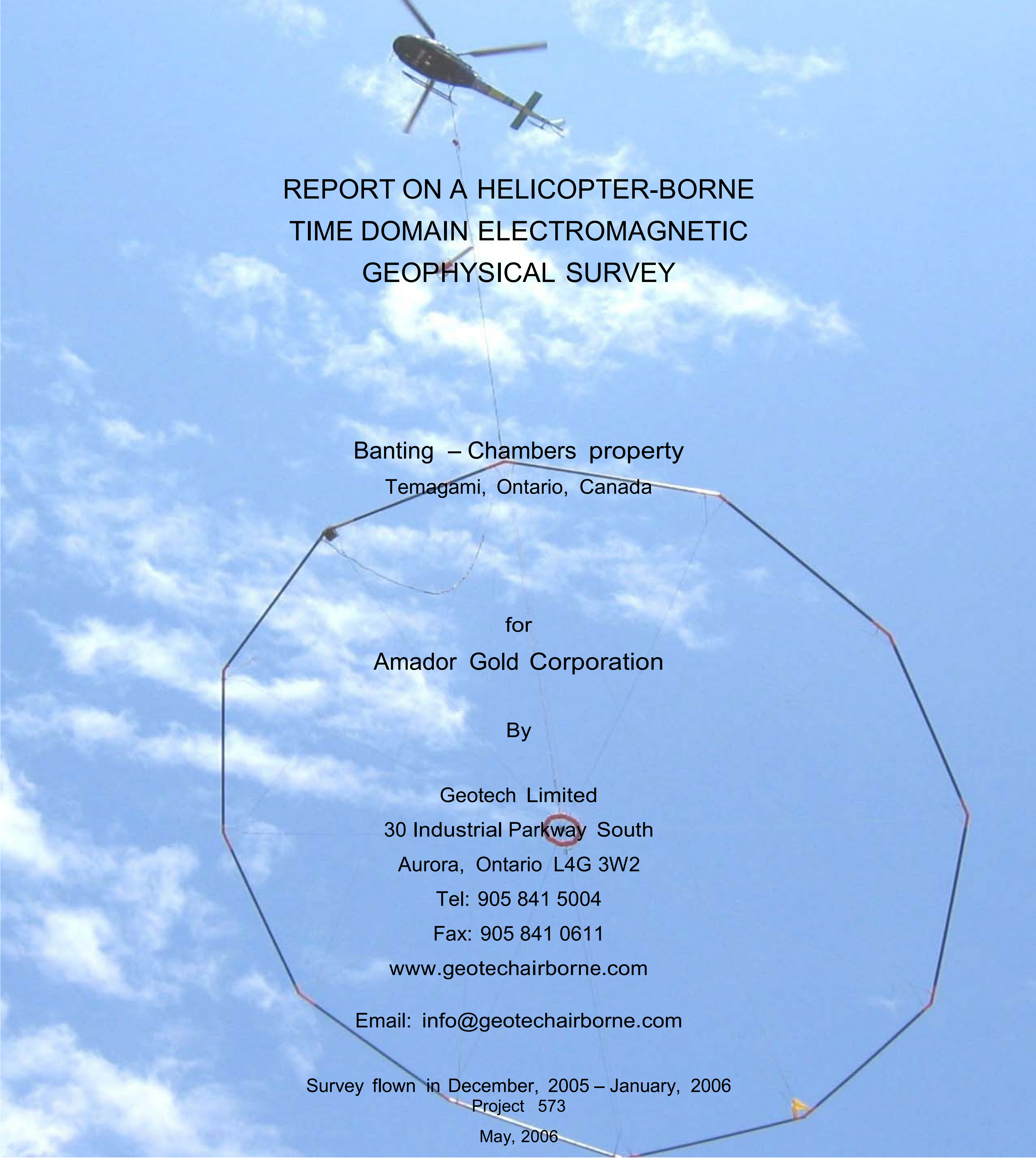
APPENDIX B

BANTING–CHAMBERS GEOTECH VTEM REPORT



REPORT ON A HELICOPTER-BORNE TIME DOMAIN ELECTROMAGNETIC GEOPHYSICAL SURVEY

Banting – Chambers property

Temagami, Ontario, Canada

for

Amador Gold Corporation

By

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Survey flown in December, 2005 – January, 2006

Project 573

May, 2006

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REPORT ON A HELICOPTER-BORNE TIME
DOMAIN ELECTROMAGNETIC SURVEY

Banting – Chambers property, Temagami, Ontario,
Canada

Executive Summary

During the period of December 16th, 2005 to January 6th, 2006, Geotech Limited carried out a helicopter-borne geophysical survey for Amador Gold Corporation over one block north-west of Temagami, Ontario, Canada.

Principal geophysical sensors included a time domain electromagnetic system (VTEM) and a cesium magnetometer. Ancillary equipment included a GPS navigation system and a radar altimeter. A total of 560 line-km were flown.

In-field data processing involved quality control and compilation of data collected during the acquisition stage, using the in-field processing centre established at Temagami, Ontario. Preliminary and final data processing, including generation of final digital data products were done at the office of Geotech Limited in Aurora, Ontario.

The processed survey results are presented as total magnetic field grids and stacked profiles at logarithmic scale.

Digital data includes all electromagnetic and magnetic products plus positional, altitude and raw data.

1. INTRODUCTION

1.1 General Considerations

These services are the result of the Agreement signed between Geotech Limited and Amador Gold Corporation, to perform a helicopter-borne geophysical survey over one blocks north-west of Temagami, Ontario, Canada.

560 line-km of geophysical data were acquired during the survey.

Mr. John Keating acted on behalf of Amador Gold Corp. during data acquisition and processing phases of this project.

The survey block is as shown in the OGS portion of this report, *see* Figure 1.

The crew was based in Temagami, Ontario for the acquisition phase of survey, as shown in Section 2 of this report.

The helicopter was based at Temagami, Ontario for the duration of the survey. Survey flying was completed by January 6th, 2006. Preliminary data processing was carried out daily during the acquisition phase of the project. Final data presentation and data archiving was completed in the Aurora office of Geotech Limited by May, 2006.

1.2. Survey and System Specifications

The survey block was flown at nominal traverse line spacing of 50 metres. Tie lines were flown perpendicular to traverse lines.

Where possible, the helicopter maintained a mean terrain clearance of 80 metres, which translated into an average height of 40 meters above ground for the bird-mounted VTEM system and 65 meters above ground for the magnetic sensor.

The block was flown using an Astar BA+ helicopter, registration C-GHSM, operated by Abitibi Helicopters Inc. Details of the survey specifications are found in Section 2 of this report.

1.3. Data Processing and Final Products

Data compilation and processing were carried out by the application of Geosoft OASIS Montaj and programs proprietary to Geotech Limited. Database, grid and maps of final products were presented to Amador Gold Corp.

The survey report describes the procedures for data acquisition, processing, final image presentation and the specifications for the digital data set.

1.4. Topographic Relief

Benting – Chambers block is located approximately 10 kilometres north-west of Temagami, Ontario. Topographically, the block exhibits a moderate relief, with elevation range from 310 metres to 400 metres above sea level.

Several rivers and lakes are observed in the survey block.

2. DATA ACQUISITION

2.1. Survey Area

The survey block (*see* location map, Figure 1, in the OGS portion of this report) and general flight specifications are as follows:

Survey Block	Line Spacing (m)	Area (Km^2)	Line-km	Flight Direction	Line Number
Banting Chambers	50	26.2	523.8	N44°E	L7001-7560
	500	58.2		N134°E	T6900-6945

Table 1 – Survey block

Survey block boundaries are shown in location map, *see* Figure 1, in the OGS portion of this report.

2.2. Survey Operations

Survey operations were based in Temagami, Ontario for the acquisition phase of the survey. The crew was housed at Temagami Shores Inn and Resort for the survey period, as shown on table 2.

The following table shows the timing of the survey.

Date	Crew Location	Flight #	Km flown	Comments
16-Dec-05	Temagami		0.0	Crew mobilization.
17-Dec-05	Temagami		0.0	Test Flight.
18-Dec-05	Temagami	3	50.9	
19-Dec-05	Temagami	4	79.8	Heavy wind.
20-Dec-05	Temagami	6, 7	228.5	
21-Dec-05	Temagami		0.0	Low visivility. Heavy snow.
22-Dec-05	Temagami		0.0	Crew demobilization.
27-Dec-05	Temagami		0.0	Crew mobilization, low ceiling.
28-Dec-05	Temagami		0.0	Low ceiling, fog all day.
29-Dec-05	Temagami	9, 10	55.5	
30-Dec-05	Temagami	11	93.0	
31-Dec-05	Temagami	12	46.4	Crew demobilization.
3-Jan-06	Temagami		0.0	Crew mobilization.
4-Jan-06	Temagami		0.0	System troubleshooting.
5-Jan-06	Temagami		0.0	System troubleshooting.
6-Jan-06	Temagami	13	27.7	Survey completed.

Table 2 – Survey schedule

2.3. Flight Specifications

The nominal EM sensor terrain clearance was 40 m (EM bird height above ground, i.e. helicopter is maintained 80 m above ground). Nominal survey speed was 80 km/hour. The data recording rates of the data acquisition was 0.1 second for electromagnetics and magnetometer, 0.2 second for altimeter and GPS. This translates to a geophysical reading about every 2 metres along flight track. Navigation was assisted by a GPS receiver and data acquisition system, which reports GPS co-ordinates as latitude/longitude and directs the pilot over a pre-programmed survey grid.

The operator was responsible for monitoring of the system integrity. He also maintained a detailed flight log during the survey, tracking the times of the flight as well as any unusual geophysical or topographic feature.

On return of the aircrew to the base camp the survey data was transferred from a compact flash card (PCMCIA) to the data processing computer.

2.4. Aircraft and Equipment

2.4.1. Survey Aircraft

An Astar BA+ helicopter, registration C-GHSM - owned and operated by Abitibi Helicopters Inc. was used. Installation of the geophysical and ancillary equipment was carried out by Geotech Ltd.

2.4.2. Electromagnetic System

The electromagnetic system was a Geotech Time Domain EM (VTEM) system. The layout is as indicated in Figure 1 below.

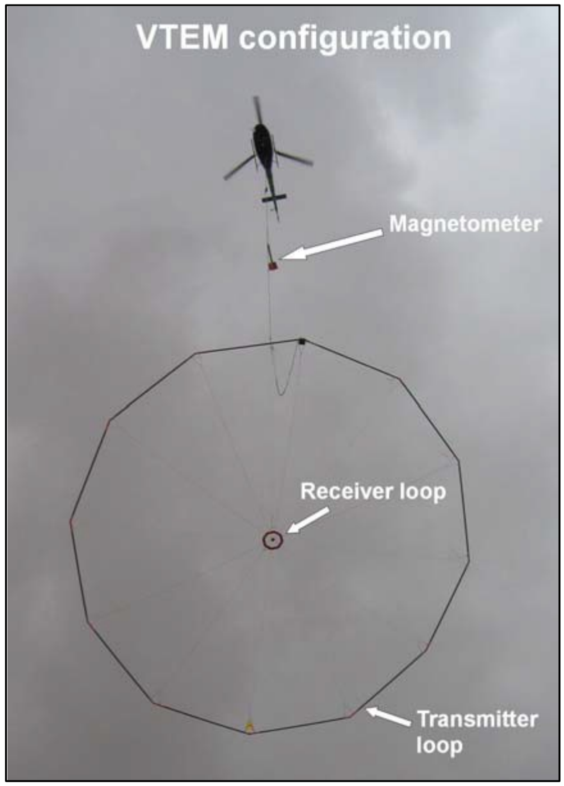

Figure 1. Receiver and transmitter coils are concentric and Z-direction oriented.

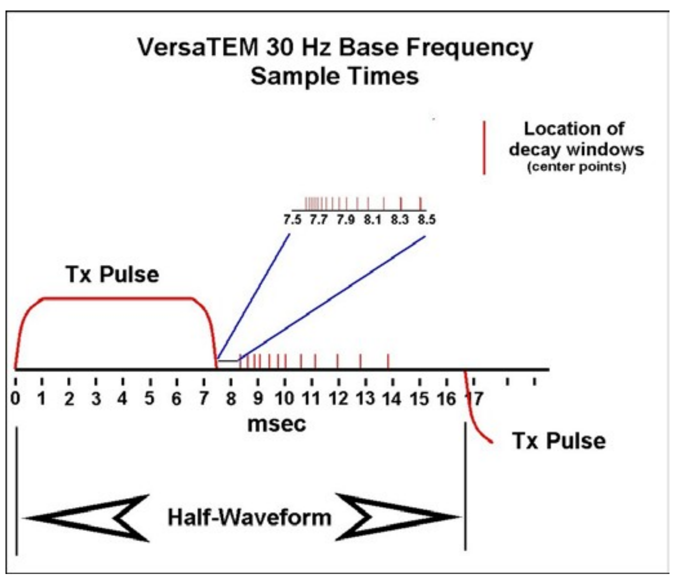

Figure 2. The receiver decay recording scheme is shown diagrammatically above.

Twenty-five measurement gates were used in the range from 130 µs to 6340 µs, as shown in the following table.

Table 3. VTEM decay sampling scheme.

VTEM Decay Sampling scheme (Microseconds)			
Time gate	Start	End	Width
130	120	140	20
150	140	160	20
170	160	180	20
190	180	205	25
220	205	240	35
260	240	280	40
300	280	325	45
350	325	380	55
410	380	445	65
480	445	525	80
570	525	625	100
680	625	745	120
810	745	885	140
960	885	1045	160
1130	1045	1235	190
1340	1235	1470	235
1600	1470	1750	280
1900	1750	2070	320
2240	2070	2450	380
2660	2450	2920	470
3180	2920	3480	560
3780	3480	4120	640
4460	4120	4880	760
5300	4880	5820	940
6340	5820	6860	1040

Transmitter coil diameter was 26 metres, the number of turns was 4. Transmitter pulse repetition rate was 30 Hz.
Peak current was 198 Amp. Duty cycle was 40%.
Peak dipole moment was 420,500 NIA.

Receiver coil diameter was 1.1 metre, the number of turns was 60. Receiver effective area was 57 m^2 Wave form – trapezoid.
Recording sampling rate was 10 samples per second. The EM bird was towed 40 m below the helicopter.

2.4.3. Airborne magnetometer

The magnetic sensor utilized for the survey was a Geometrics optically pumped cesium vapor magnetic field sensor, mounted in a separate bird towed 15 m below the helicopter. The sensitivity of the magnetic sensor is 0.02 nanoTesla (nT) at a sampling interval of
0.1 seconds. The magnetometer sends the measured magnetic field strength as nanoTeslas to the data acquisition system via the RS-232 port.

2.4.4. Ancillary Systems

2.4.4.1. Radar Altimeter

A Terra TRA 3000/TRI 30 radar altimeter was used to record terrain clearance. The antenna was mounted beneath the bubble of the helicopter cockpit.

2.4.4.2. GPS Navigation System

The navigation system used was a Geotech PC based navigation system utilizing a NovAtel's WAAS enable OEM4-G2-3151W GPS receiver, Geotech navigate software, a full screen display with controls in front of the pilot to direct the flight and an NovAtel GPS antenna mounted on the helicopter tail.
The co-ordinates of the blocks were set-up prior to the survey and the information was fed into the airborne navigation system.

2.4.4.3. Digital Acquisition System

A Geotech data acquisition system recorded the digital survey data on an internal compact flash card. Data is displayed on an LCD screen as traces to allow the operator to monitor the integrity of the system. Contents and update rates were as follows:

Table 4 - Sampling Rates

DATA TYPE	SAMPLING
TDEM	0.1 sec
Magnetometer	0.1 sec
GPS Position	0.2 sec
RadarAltimeter	0.2 sec

2.4.5. Base Station

A combine magnetometer/GPS base station was utilized on this project. A Geometrics Cesium vapour magnetometer was used as a magnetic sensor with a sensitivity of 0.001 nT. The base station was recording the magnetic field together with the GPS time at 1 Hz on a base station computer.

The base station magnetometer sensor was installed where the crew was housed, away from electric transmission lines and moving ferrous objects such as motor vehicles.

The magnetometer base station's data was backed-up to the data processing computer at the end of each survey day.

3. PERSONNEL

The following Geotech Ltd. personnel were involved in the project

Field Crew

Operators: Vladimir Kutosov
Alex Dumyn
System Engineer: Pavel Tishin

The survey pilots and the mechanic engineers were employed directly by the helicopter operator – Abitibi Helicopters Inc.

Pilots: Joel Breton
Michel Frigon
Engineers: Marco Blais

Office

Data Processing: Neil Fiset
Data Processing / Reporting: Marta Orta

Final data processing at the office of Geotech Limited in Aurora, Ontario was carried out under the supervision of Andrei Bagrianski, Data Processing Manager.

Overall management of the survey was carried out from the Aurora office of Geotech Ltd. by Edward Morrison, President.

4. DATA PROCESSING AND PRESENTATION

4.1. Flight Path

The flight path, recorded by the acquisition program as WGS 84 latitude/longitude, was converted into the UTM coordinate system in Oasis Montaj.

The flight path was drawn using linear interpolation between x,y positions from the navigation system. Positions are updated every second and expressed as UTM eastings (x) and UTM northings (y).

4.2. Electromagnetic Data

A three stage digital filtering process was used to reject major sferic events and to reduce system noise. Local sferic activity can produce sharp, large amplitude events that cannot be removed by conventional filtering procedures. Smoothing or stacking will reduce their amplitude but leave a broader residual response that can be confused with geological phenomena. To avoid this possibility, a computer algorithm searches out and rejects the major sferic events. The filter used was a 16 point non-linear filter.

The signal to noise ratio was further improved by the application of a low pass linear digital filter. This filter has zero phase shift which prevents any lag or peak displacement from occurring, and it suppresses only variations with a wavelength less than about 1 second or 20 metres. This filter is a symmetrical 1 sec linear filter.

The results are presented as stacked profiles of EM voltages for the gate times, in logarithmic scale.

Generalized modeling results of the VTEM system, written by Geophysicist Roger Barlow, can be made available upon request to the Ontario Geological Survey.

The VTEM output voltage of the receiver coil is shown in Appendix J.

4.3. Magnetic Data

The processing of the magnetic data involved the correction for diurnal variations by using the digitally recorded ground base station magnetic values. The base station magnetometer data was edited and merged into the Geosoft GDB database on a daily basis. The aero magnetic data was corrected for diurnal variations by subtracting the observed magnetic base station deviations.

Tie line levelling was carried out by adjusting intersection points along the traverse lines. A microlevelling procedure was then applied. This technique is designed to remove persistent low-amplitude components of flight-line noise remaining after tie line levelling.

The corrected magnetic data from the survey was interpolated between survey lines using a random point gridding method to yield x-y grid values for a standard grid cell size of approximately 0.2 cm at the mapping scale. The Minimum Curvature algorithm was used to interpolate values onto a rectangular regular spaced grid.

5. DELIVERABLES

5.1. Survey Report

The survey report describes the data acquisition, processing, and final presentation of the survey results.

The survey report is provided in two paper copies and digitally in PDF format.

5.2. Maps

Final maps were produced at a scale of 1:20,000. The coordinate/projection system used was NAD83, UTM zone 17 north. For reference the latitude and longitude are also noted on the maps. All maps show the flight path trace and topographic data.

The following maps are presented to Amador Gold Corp. on paper,

- Total Magnetic Field contours and colour image
- Logarithmic scale Time Gates 0.22 – 6.34 profiles

5.3. Gridded Data

Total magnetic field grid is provided to Amador Gold Corp. in Geosoft GRD format. Grid cell size of 10 metres was used.

5.4. Digital Data

Two copies of CDs were prepared. There are two (2) main directories,
Data contains database, grid and maps, as described below.

Report contains a copy of the report and appendixes in PDF format.

- Database in Geosoft format, containing the following channels:

X:	X positional data (meters – NAD83, UTM zone 17N)
Y:	Y positional data (meters – NAD83, UTM zone 17N)
Z:	GPS antenna elevation (meters - ASL)(on the tail of the helicopter)
Gtime1:	GPS time (seconds of the day)

Radar:	Helicopter terrain clearance from radar altimeter (meters)
Mag1:	Raw Total Magnetic field data (nT)
Basemag:	Magnetic diurnal variation data (nT)
Mag2:	Total Magnetic field diurnal variation corrected data (nT)
Mag3:	Leveled Total Magnetic field data (nT)
C130f:	Raw 130 microsecond time channel ($pV/A/m^4$)
C150f:	Raw 150 microsecond time channel ($pV/A/m^4$)
C170f:	Raw 170 microsecond time channel ($pV/A/m^4$)
C190f:	Raw 190 microsecond time channel ($pV/A/m^4$)
C220f:	Raw 220 microsecond time channel ($pV/A/m^4$)
C260f:	Raw 260 microsecond time channel ($pV/A/m^4$)
C300f:	Raw 300 microsecond time channel ($pV/A/m^4$)
C350f:	Raw 350 microsecond time channel ($pV/A/m^4$)
C410f:	Raw 410 microsecond time channel ($pV/A/m^4$)
C480f:	Raw 480 microsecond time channel ($pV/A/m^4$)
C570f:	Raw 570 microsecond time channel ($pV/A/m^4$)
C680f:	Raw 680 microsecond time channel ($pV/A/m^4$)
C810f:	Raw 810 microsecond time channel ($pV/A/m^4$)
C960f:	Raw 960 microsecond time channel ($pV/A/m^4$)
C1130f:	Raw 1130 microsecond time channel ($pV/A/m^4$)
C1340f:	Raw 1340 microsecond time channel ($pV/A/m^4$)
C1600f:	Raw 1600 microsecond time channel ($pV/A/m^4$)
C1900f:	Raw 1900 microsecond time channel ($pV/A/m^4$)
C2240f:	Raw 2240 microsecond time channel ($pV/A/m^4$)
C2660f:	Raw 2660 microsecond time channel ($pV/A/m^4$)
C3180f:	Raw 3180 microsecond time channel ($pV/A/m^4$)
C3780f:	Raw 3780 microsecond time channel ($pV/A/m^4$)
C4460f:	Raw 4460 microsecond time channel ($pV/A/m^4$)
C5300f:	Raw 5300 microsecond time channel ($pV/A/m^4$)
C6340f:	Raw 6340 microsecond time channel ($pV/A/m^4$)
D130f:	Deconvolved 130 microsecond time channel ($pV/A/m^4$)
D150f:	Deconvolved 150 microsecond time channel ($pV/A/m^4$)
D170f:	Deconvolved 170 microsecond time channel ($pV/A/m^4$)
D190f:	Deconvolved 190 microsecond time channel ($pV/A/m^4$)
D220f:	Deconvolved 220 microsecond time channel ($pV/A/m^4$)
D260f:	Deconvolved 260 microsecond time channel ($pV/A/m^4$)
D300f:	Deconvolved 300 microsecond time channel ($pV/A/m^4$)
D350f:	Deconvolved 350 microsecond time channel ($pV/A/m^4$)
D410f:	Deconvolved 410 microsecond time channel ($pV/A/m^4$)

D480f: Deconvolved 480 microsecond time channel ($pV/A/m^4$)
D570f: Deconvolved 570 microsecond time channel ($pV/A/m^4$)
D680f: Deconvolved 680 microsecond time channel ($pV/A/m^4$)
D810f: Deconvolved 810 microsecond time channel ($pV/A/m^4$)
D960f: Deconvolved 960 microsecond time channel ($pV/A/m^4$)
D1130f: Deconvolved 1130 microsecond time channel ($pV/A/m^4$)
D1340f: Deconvolved 1340 microsecond time channel ($pV/A/m^4$)
D1600f: Deconvolved 1600 microsecond time channel ($pV/A/m^4$)
D1900f: Deconvolved 1900 microsecond time channel ($pV/A/m^4$)
D2240f: Deconvolved 2240 microsecond time channel ($pV/A/m^4$)
D2660f: Deconvolved 2660 microsecond time channel ($pV/A/m^4$)
D3180f: Deconvolved 3180 microsecond time channel ($pV/A/m^4$)
D3780f: Deconvolved 3780 microsecond time channel ($pV/A/m^4$)
D4460f: Deconvolved 4460 microsecond time channel ($pV/A/m^4$)
D5300f: Deconvolved 5300 microsecond time channel ($pV/A/m^4$)
D6340f: Deconvolved 6340 microsecond time channel ($pV/A/m^4$)
PLinef: Power line monitor

- Grids in Geosoft .GRD format, as follow,

Mag: Total Magnetic field
A Geosoft .GRD file has a .GI metadata file associated with it, containing grid projection information.

- Maps in Geosoft .MAP format, as follow,

Mag: Total Magnetic Field contours and colour image
LogProf: Logarithmic scale Time Gates 0.22 – 6.34 profiles. Maps are also provided in Adobe Acrobat PDF format.

- ASCII file VTEM_WaveForm.xyz in Geosoft format contains the following channel:

Volt: output voltage of the receiver coil
(volts, sampling rate 20 microseconds)

- A readme.txt file describing the content of digital data, as described above.

6. CONCLUSIONS

A time domain electromagnetic helicopter-borne geophysical survey has been completed over Banting – Chambers property north-west of Temagami, Ontario, Canada.

The total area coverage is 26.2 km^2. Total survey line coverage is 560 line kilometres. The principal sensors included a Time Domain EM system and a magnetometer. Results have been presented as colour contour maps and stacked profiles at a scale of 1:20,000.

Final data processing at the office of Geotech Limited in Aurora, Ontario was carried out under the supervision of Andrei Bagrianski, Data Processing Manager.

A number of EM anomaly groupings were identified. Ground follow-up of those anomalies should be carried out if favourably supported by other geoscientific data.

Respectfully submitted,

Marta Orta, Geotech Limited

APPENDIX C – PROFILE ARCHIVE DESCRIPTION

The line data archives were prepared in Geosoft .GDB format (uncompressed) and comma delimited ASCII XYZ format. The electromagnetic channel data have been provided in multi-element array channels in the .gdb file, and as individual channels in the .xyz file.

The Cobalt and Banting-Chambers surveys contain different sets of parameters and have been archived separately. The channels provided in the digital line archive files are listed in the two tables below.

The filenames are Latchford_C.gdb and Latchford_C.xyz, and contain the following fields:

Cobalt Magnetic/GPS Line Data Archive

Channel Name	Description	Units
x_nad83	easting in UTM co-ordinates using NAD83 datum	metres
y_nad83	northing in UTM co-ordinates using NAD83 datum	metres
lon_nad83	longitude using NAD83 datum	decimal-degrees
lat_nad83	latitude using NAD83 datum	decimal-degrees
gps_z_final	differentially corrected GPS Z (NAD83 datum)	metres above sea level
radar_final	corrected radar altimeter	metres above terrain
laser_final	corrected laser altimeter	metres above terrain
baro_final	corrected barometric altimeter	metres above sea level
dem	digital elevation model	metres above sea level
fiducial	fiducial	
flight	flight number	
line	flightline number	
date	local date	YYYYMMDD
diurnal_cor	diurnal correction, base value removed	nanoteslas
star_mag_comp	compensated total magnetic field, starboard sensor	nanoteslas
port_mag_comp	compensated total magnetic field, port sensor	nanoteslas
star_mag_diurn	lagged & diurnal corrected, total magnetic field, starboard sensor	nanoteslas
port_mag_diurn	lagged & diurnal corrected total magnetic field, port sensor	nanoteslas
mag	diurnally corrected average tmi from port and starboard sensors	nanoteslas
igrf	local IGRF field	nanoteslas
mag_igrf	IGRF-corrected magnetic field	nanoteslas
mag_lev	levelled magnetic field	nanoteslas
mag_final	micro-levelled magnetic field	nanoteslas
mag_gsclevel	GSC levelled magnetic field	nanoteslas
hgrad	calculated transverse horizontal gradient	nanoteslas/m

For the Banting-Chambers survey, the electromagnetic channel data (em_...) have been provided in multi-element array channels in the .gdb file, and as individual channels in the .xyz file.

The filenames are Latchford_B.gdb and Latchford_B.xyz, and contain the following fields:

Banting-Chambers Time-domain Electromagnetic/Magnetic/GPS Line Data Archive

Channel Name	Description	Units
x_nad83	easting in UTM co-ordinates using NAD83 datum	metres
y_nad83	northing in UTM co-ordinates using NAD83 datum	metres
lon_nad83	longitude using NAD83 datum	decimal-degrees
lat_nad83	latitude using NAD83 datum	decimal-degrees
gps_z_final	differentially corrected GPS Z (NAD83 datum)	metres above sea level
radar_final	corrected radar altimeter	metres above terrain
dem	digital elevation model	metres above sea level
fiducial	fiducial	
flight	flight number	
line_number	full flightline number (flightline and part numbers)	
line	flightline number	
line_part	flightline part number	
time_utc	UTC time	seconds
date	local date	YYYYMMDD
mag_base_final	corrected magnetic base station data	nanoteslas
mag_raw	raw magnetic field	nanoteslas
mag_diurn	diurnally-corrected magnetic field	nanoteslas
igrf	local IGRF field	nanoteslas
mag_igrf	IGRF-corrected magnetic field	nanoteslas
mag_lev_orig	Contractor-supplied levelled magnetic field	nanoteslas
mag_lev	levelled magnetic field	nanoteslas
mag_final	micro-levelled magnetic field	nanoteslas
mag_final_igrf	Igrf removed micro-levelled magnetic field	nanoteslas
mag_gsclevel	GSC levelled magnetic field	nanoteslas
em_z_raw	raw (stacked) dB/dT, Z-component	$pV/A/m^4$
em_z_orig	Contractor-supplied dB/dT, Z-component	$pV/A/m^4$
em_z_final	filtered dB/dT, Z-component	$pV/A/m^4$
power	60 Hz power line monitor	microvolts
tau_z	decay constant (tau) for Z-component	microseconds

APPENDIX D – KEATING CORRELATION COEFFICIENT ARCHIVE DESCRIPTION

The Keating Correlation Coefficient databases have been prepared in Geosoft .GDB format (uncompressed) and comma delimited ASCII .CSV format. The filenames are LAKC_B.gdb/csv and LAKC_C.gdb/csv for the Banting-Chambers and Cobalt surveys respectively and contain the following fields:

Keating Correlation Coefficient Archive

Channel Name	Description	Units
x_nad83	easting in UTM co-ordinates using NAD83 datum	metres
y_nad83	northing in UTM co-ordinates using NAD83 datum	metres
lon_nad83	longitude using NAD83 datum	decimal-degrees
lat_nad83	latitude using NAD83 datum	decimal-degrees
corr_coeff	correlation coefficient	percent x 10
pos_coeff	positive correlation coefficient	percent
neg_coeff	negative correlation coefficient	percent
norm_error	standard error normalized to amplitude	percent
amplitude	peak-to-peak anomaly amplitude within window	nanoteslas

APPENDIX E – EM ANOMALY ARCHIVE DESCRIPTION

The VTEM EM anomaly database (Banting-Chambers only) has been provided in Geosoft® GDB format (uncompressed) and comma delimited .CSV format. The electromagnetic channel data (em_...) have been provided in multi-element array channels in the .gdb file, and as individual channels in the .csv file.

The filenames are laanomaly.gdb and laanomaly.csv, and contain the following fields:

Banting-Chambers VTEM Electromagnetic Anomaly Archive

Channel Name	Description	Units
x_nad83	easting in UTM co-ordinates using NAD83 datum	metres
y_nad83	northing in UTM co-ordinates using NAD83 datum	metres
lon_nad83	longitude using NAD83 datum	decimal-degrees
lat_nad83	latitude using NAD83 datum	decimal-degrees
gps_z_final	differentially corrected GPS Z (NAD83 datum)	metres above sea level
radar_final	corrected radar altimeter	metres above terrain
dem	digital elevation model	metres above sea level
fiducial	fiducial	
line_number	full flightline number (flightline and part numbers)	
line	flightline number	
line_part	flightline part number	
time_utc	UTC time	seconds
em_z_final	filtered dB/dT, Z-component	picovolts per ampere-metre[4]
anom_tau_z	nearest maximum decay constant (tau) for Z-component	microseconds
anomaly_no_letter	anomaly along the survey line (A,B,C …)	
anomaly_no	anomaly along the survey line (1,2,3 …)	
anomaly_id	unique anomaly identifier	
survey_number	MNDM unique survey number	
anomaly_type_letter	anomaly classification	
anomaly_mag	anomaly association with magnetic anomaly	
heading	direction of flight	degrees azimuth

APPENDIX F –DIGITAL MAPS

The following seven digital maps (in Geosoft packed map format) have been prepared for the Latchford Area Project and may be obtained separately either from the OGS online data warehouse—GeologyOntario http://www.ontario.ca/geology or ordered through MNDM Publication Sales (telephone: 1-888-415-9845, ext. 5691).

m60413.map	Banting-Chambers survey - 1:20,000 scale colour-filled contours of the residual magnetic field with EM anomalies, flightlines and planimetric base
m60414.map	Banting-Chambers - 1:20,000 scale colour-filled contours of Z-component decay constant with EM anomalies, flightlines and planimetric base
m60415.map	Banting-Chambers survey - 1:20,000 scale shaded colour image of the second vertical derivative of the residual magnetic field with Keating (1995) kimberlite pipe correlation coefficients, and planimetric base
m60416.map	Latchford Area north half - 1:50,000 scale colour-filled contours of the residual magnetic field with flightlines and planimetric base
m60417.map	Latchford Area south half - 1:50,000 scale colour-filled contours of the residual magnetic field with flightlines and planimetric base
m60418.map	Latchford Area north half - 1:50,000 scale shaded colour image of the second vertical derivative of the residual magnetic field with Keating (1995) kimberlite pipe correlation coefficients, and planimetric base
m60419.map	Latchford Area south half - 1:50,000 scale shaded colour image of the second vertical derivative of the residual magnetic field with Keating (1995) kimberlite pipe correlation coefficients, and planimetric base

APPENDIX G – GEO-REFERENCED GEOTIFF IMAGES

The following seamless 200 dpi resolution geo-referenced geotiff images of the three map themes described in the previous section have been prepared:

LAMAG88.tif	Latchford Area - residual magnetic field colour image and planimetric base
LA2VD83.tif	Latchford Area - scale shaded colour image of the second vertical derivative of the residual magnetic field with Keating (1995) kimberlite pipe correlation coefficients and planimetric base
LADCZ83.tif	Banting-Chambers only - Z-component decay constant colour image and planimetric base

APPENDIX H – LINEWORK ARCHIVE ARCHIVES

The following seamless AutoCad® DXF format files have been prepared:

LAPATH83.dxf	Flight lines and labels
LAKC83.dxf	Keating coefficient symbols
LAMAG83.dxf	Contours of residual total magnetic field
LAEM83.dxf	EM anomalies (Banting-Chambers only)
LADCZ83.dxf	EM Decay Constant (Banting-Chambers only)

APPENDIX I – GRIDS

The following uncompressed Geosoft grids in both binary GRD format and ASCII GXF format have been prepared:

LAMAG83.grd	Residual GSC levelled magnetic field [nT]
LA2VD83.grd	2nd vertical derivative of the residual magnetic field [nT/m^2]
LADCZ83.grd	Z-component decay constant [microseconds] (Banting-Chambers only)

APPENDIX J – VTEM REFERENCE WAVEFORM

The Geotech VTEM TDEM reference waveform (Banting-Chambers VTEM survey only) has been prepared as a Geosoft® GDB format (uncompressed) file named BC_waveform.gdb. The waveform is plotted below.