REPORT ON A HELICOPTER-BORNE MAGNETIC AND ELECTROMAGNETIC SURVEY

"featuring the AeroQuest IMPULSE© System"

Temagami East Block
Temagami Tres-OR Diamond Project
Sudbury Mining Division, Ontario

for

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Line 2550							
622491.87	5208746.28	6169.3	1	12	281.03	198.09	1.42
622492.61	5208884.18	6172.9	2	12	284.53	197.86	1.44
Line 2560							
622545.70	5208928.51	6239.0	1	12	285.86	198.66	1.44
622540.79	5208801.80	6242.8	2	12	279.74	198.68	1.41
622541.48	5208684.07	6246.6	3	12	288.00	197.66	1.46
622547.72	5207528.88	6281.4	4	6	301.12	198.77	1.51
Line 2570							
622593.55	5208709.63	6394.8	1	12	284.90	199.41	1.43
Line 2580							
622637.75	5208662.85	6467.7	1	12	295.19	198.77	1.49
Line 2590							
622693.50	5208712.00	6604.9	1	12	296.20	205.24	1.44
Line 2600							
622741.27	5207196.46	6711.1	1	12	303.72	198.44	1.53
Line 2610							
622792.34	5207773.12	6776.3	1	6	310.79	197.35	1.57
Line 2640							
622943.85	5207659.84	7145.1	1	12	304.53	197.38	1.54
Line 2650							
622994.95	5207647.75	7223.8	1	12	301.97	197.60	1.53
622996.38	5207785.81	7227.8	2	12	299.41	197.68	1.51
Line 2660							
623044.25	5207740.00	7526.5	1	12	316.82	198.68	1.59
623044.69	5207667.73	7528.5	2	12	314.00	199.31	1.58
623045.66	5207627.84	7529.6	3	1	314.24	199.51	1.58
Line 2670							
623091.95	5207644.14	7605.1	1	12	316.42	199.77	1.58
623094.92	5207739.71	7607.8	2	12	314.01	199.63	1.57
Line 2680							
623145.03	5207611.96	7686.8	1	12	317.82	199.66	1.59
Line 2690							
623191.80	5207647.56	7760.1	1	12	317.04	199.45	1.59
Line 2700							
623247.06	5207645.72	7830.1	1	12	314.09	199.73	1.57
623241.57	5207328.85	7840.1	2	12	319.84	199.71	1.60
Line 2710							
623293.14	5207375.46	7903.7	1	12	324.22	199.52	1.62
623290.81	5207647.23	7911.4	2	12	323.88	199.51	1.62
623292.52	5207741.29	7914.1	3	12	320.92	199.72	1.61
Line 2730							
623391.03	5207630.18	8054.9	1	12	323.59	200.24	1.62
Line 2750							
623496.50	5207439.34	8198.8	1	12	328.60	200.48	1.64
Line 2760							
623543.88	5207394.31	8281.5	1	12	330.52	200.12	1.65
Line 2770							
623594.40	5207378.70	8349.9	1	12	335.23	200.07	1.68
Line 2790							
623698.43	5207072.02	8495.1	1	12	325.66	199.70	1.63
Line 2810							
623791.57	5207301.74	8657.2	1	12	310.69	201.48	1.54
Line 2820							

Maps

The results of the survey are presented in a series if black line and colour maps at a scale of 1:20,000. Map products are as follows:

- Flight path with EM anomalies.
- Total Magnetic Field intensity contours with EM anomalies, colour version.
- Magnetic Vertical Gradient, contours with EM anomalies, colour version.
- Low Frequency EM offset profiles.
- Mid Frequency EM offset profiles.
- High Frequency EM offset profiles.
- Mid Frequency Coplanar Apparent Resistivity contours with EM anomalies, colour version.
- Digital Terrain Model contours with EM anomalies, colour version.

All the maps show the flight path and time reference marks. Any picked bedrock EM anomalies are represented by symbols denoting the anomaly type and the ratio of inphase to quadrature of the source. The ratio of inphase to quadrature is a significant measurement and was used to grade the anomalies into seven categories. An eighth category was dominate in the survey area and represents responses having a negative inphase component. This type of response normally signifies a permeability effect caused by the presence of magnetite. The ratio of inphase to quadrature, peak mid-frequency coplanar inphase amplitude and anomaly number are posted alongside the anomaly symbol. Colour contour maps show colour fill plus superimposed line contours.

Digital Data on CD-ROM

A CD-ROM was prepared to accompany the report. It contains a file of the profile data in GEOSOFT GDB and XYZ formats as well as the geophysical maps and stacked sections in GEOSOFT (*.map) format. The magnetic, second vertical derivative, and high frequency coplanar resistivity grids are also included as well as a text file listing of the picked EM anomalies if applicable. A *readme.txt* file may be found on the CD-ROM which describes the file contents in more detail.

For the reader's convenience, a copy of Geosoft's Oasis Montaj Ver 5.0 Free Interface is included on the CD-ROM. To install the interface, unzip the two files and follow the instructions in the PDF format (Adobe Reader) guide. The Adobe freeware programme called Acrobat Reader Version 5.0, used to read the PDF files, is provided as a convenience.

REPORT ON A HELICOPTER-BORNE MAGNETIC AND ELECTROMAGNETIC SURVEY

Tres-OR Diamond Project
Temagami Area
Northeastern Ontario

1.0 INTRODUCTION

This report describes a helicopter-borne geophysical survey carried out on behalf of Tres-OR Resources Ltd. on the Temagami East Block of the Temagami Diamond Claim Project near Temagami, Northeastern Ontario.

The purpose of the survey was described by Tres-OR as follows: "Previous airborne mag had not given a sufficiently detailed resolution of structure for selection of drill targets in noisy mag areas. Thus Tres-OR elected to detail these noisy areas with high K.I.M. counts using this helicopter mag/em with 50 m line spacing and 30 m bird elevation. The EM portion of the system will detect conductive clays which can develop on the weathered top of a buried kimberlite pipe, and may also help generally with identification of other features, e.g. faults and dykes".

Principal geophysical sensors included are AeroQuest's exclusive IMPULSE© six frequency, electromagnetic system and a high sensitivity, cesium vapour magnetometer. Ancillary equipment included a GPS navigation system with GPS base station, radar altimeter, video recorder and a recording base station magnetometer.

The survey was flown at 50 metre line spacing in the north-south direction. Appendix I lists the UTM corner co-ordinates for the survey block. The total line kilometers flown was 1498.2 km including tie lines. The survey flying took place between April 1st and April 7th, 2004 and was completed in twelve survey flights.

This report describes the survey, the data processing and presentation. Bedrock EM anomalies were picked and graded according to the ratio of inphase to quadrature of the mid frequency, coplanar response. Ratios greater than 1.0 indicate significant conductors. The majority of responses in this area have negative inphase which is normally indicative of the presence of magnetite.

A list of picked EM anomalies may be found in appendix II.

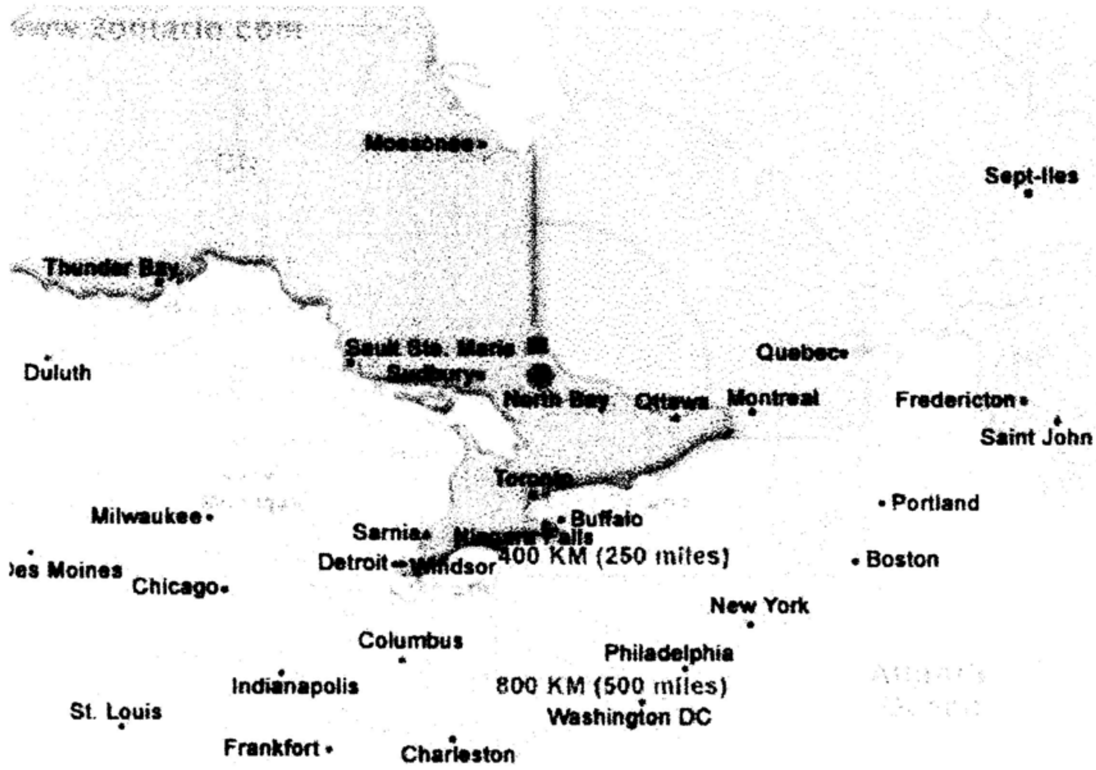

Fig. 1 Survey Location (shown in red)

2.0 SURVEY SPECIFICATIONS AND PROCEDURES

The survey specifications are summarized in the following table:

Block Name	Line Spacing (m)	Total Survey (km)	Survey Line (km)	Tie Lines (km)	Line Direction
Temagami E	**50**	**1498.2**	**1417.2**	**81.0**	**N-S**

Nominal EM bird terrain clearance was 30+ metres (100+ft), however this had to be temporarily increased to avoid high trees, common to this area. The magnetometer sensor was mounted in the EM bird 33.5 metres (110 ft) below the helicopter. Nominal survey speed was less than 120 km/hr or 70 knots. Scan rates for data acquisition was 30 Hz (30 times per second) for the electromagnetics, 10 Hz (10 times per second) for the magnetometer and 2Hz (2 times per second) for the GPS determined position. This translates to a geophysical reading about every 3.3 metres along the flight path, however ground speed does vary depending on the strength and direction of the prevailing wind and topographic relief.

Navigation was assisted by a *WAAS* enabled GPS receiver and the AG-NAV2 flight path guidance system which reports GPS co-ordinates as WGS-84 latitude and longitude and directs the pilot over a pre-programmed survey grid. The x-y-z position of the aircraft, as reported by the GPS, is recorded at 0.5 second intervals.

The operator was responsible for ensuring that the EM instrument was properly warmed up prior to departure and that all sensors operated properly throughout the flight. He also maintained a detailed flight log during the survey, noting the times of the flight as well as any unusual geophysical or topographic features. High altitude zero calibration lines were flown at regular intervals during the flight.

The integrated magnetics and GPS base station was located beside the north wing of the Temagami Shores Motel where it could be continuously monitored. The mag sensor and GPS antenna were installed on poles located metres away from any potential magnetic interference or any obstructions to the GPS signals. The magnetics data was counted and converted internally in the magnetometer, then serial ported to a laptop computer where it was merged with GPS time and transferred to the processing field station daily.
On return of the aircrew to the helicopter base, the RMS DGRS acquisition system survey data was transferred to Zip Disk and then down loaded onto the field data processing work station.

In-field processing included data archiving and flight path reconstruction, quality control checks and preliminary processing of the EM and magnetic data. Generation of a Geosoft GDB database and production of preliminary EM, magnetic contour and flight path maps were done on the field data processing computer. Any data exhibiting either poor flight control or technical problems with the control or geophysical instrumentation or acquisition systems were rejected, scheduled for refight and re-encorporated into the database.

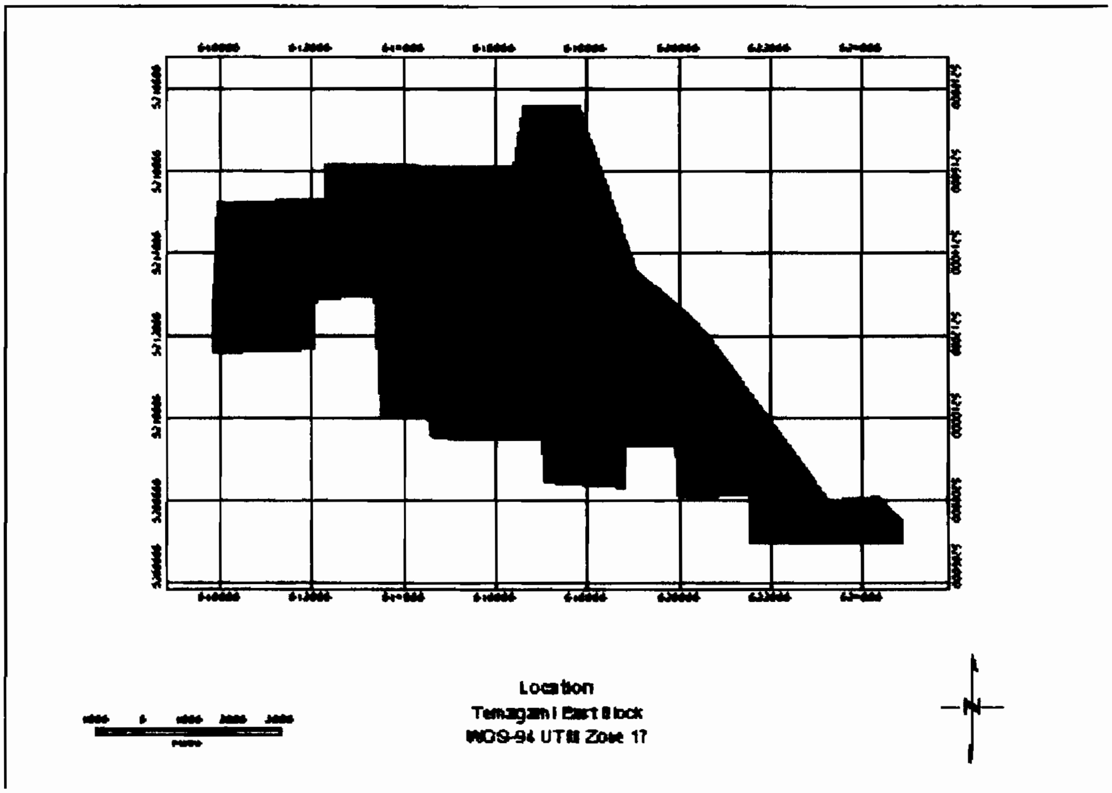

Fig 2. Block Location

3. AIRCRAFT AND EQUIPMENT

3.1 Aircraft

An Eurocopter ASTAR 350 B+ – registration C-GCYE – owned and operated by Expedition Helicopters Ltd., Cochrane, Ont. (705 272-8854) was used as the survey platform. Installation of the geophysical and ancillary equipment was carried out by AeroQuest Limited at the Expedition hanger in Cochrane and then flown to Temagami to begin the survey project. The helicopter and EM bird were parked at the motel landing area, at night. The survey aircraft was flown at a nominal terrain clearance of 200-250 ft (61-76 m).

3.2 Electromagnetic System

The electromagnetic system employed was an AeroQuest IMPULSE© 6 channel frequency domain towed bird system. The wideband frequency-domain system utilizes a single computer-controlled, high output transmitter drive to power separate horizontal coplanar and coaxial transmitter coils, producing a total of six frequencies (three in each coil orientation). The common coil approach used in the IMPULSE system has the potential to minimize system baseline drift and the often seen disparate performance of many superimposed coil sets found in traditional frequency-domain systems. The IMPULSE system uses a larger diameter tubular coil platform (30 inches as opposed to the traditional 20 inch diameter) which permits the system to generate larger dipole moments by accommodating a 50 percent increase in the TX coil cross-sections and thereby resulting in an approved signal to noise ratio.

Calibration of the IMPULSE system conforms to the 4:1 convention for coplanar to coaxial response. Furthermore, although the coil separations of the coplanar and coaxial coils are 5.8 and 6.3 metres respectively, the calibration is configured to give the equivalent response of a 6.5 metre coil separation system.

Calibration of the system is conducted with an external coil which when placed at a certain distance from the bird gives rise to an anomaly of known amplitude. The gain of the system is then adjusted such that the measured response in both the analog and digital records matches the known quantity. The calibration and phasing were checked with the external coils and ferrite bar respectively in Cochrane prior to the start of the survey to ensure the system was properly set-up. Further checking of the system gain wasis carried out with an internal "Q-coil" mounted in the bird itself. The operator will close the internal coils at regular intervals, normally at the start, mid point and end of each flight, which will generate an anomaly which should have a consistent amplitude. The data from the regular in-flight checks are included in the survey archive database.

3.3 Magnetometer

The AeroQuest airborne survey system employed the Geometrics G-823A cesium vapour magnetometer sensor installed in the EM bird, 39 metres below the helicopter. The "bench" sensitivity of the magnetometer is 0.001 nanoTesla at a 0.1 second sampling rate. The nominal ground clearance of the magnetometer bird was 30 metres (100 ft).

3.4 Ancillary Systems

Magnetometer and GPS Base Station

An integrated GPS and magnetometer base station was set up at the Temagami Shores Motel near the helicopter base to monitor the static position GPS errors and time and to record diurnal variations of the earth's magnetic field. Each sensor, GPS and magnetic sensor/signal processor was attached to a dedicated laptop computer for purposes of real-time data and visual recording. The laptops were, in turn, linked together to provide a common recording time reference using the GPS clock.

The magnetometer was a Scintrex CS-2 split beam, optically pumped, cesium vapour magnetometer sensor and preamplifier counted by a Picodas MEP-710 Larmar frequency counter/decoupler. The digital record was recorded in a daily file and visually displayed in real time on the laptop screen using Picodas *basemag.exe* software. The logging was configured to measure at 0.5 second intervals with a resolution of 0.1 nT. The sensor and GPS antenna were placed on poles behind the north wing of the motel. A continuously updated profile plot of the base station values was available for viewing on the base station display.

The GPS base station employed a Leica MX9212-12 channel GPS receiver with external antenna. Data from the static antenna was recorded at one second intervals to permit differential corrections to be made to the helicopter GPS recorded flight path if required. GPS time was merged with the base station magnetometer record in order that basemag values could be imported into the data base.

Radar Altimeter

A Terra TRA 3000/TRI-40 radar altimeter was used to record terrain clearance. The antenna was mounted on the outside of the helicopter beneath the cockpit. The recorded data represented height of the antenna, i.e. helicopter, above the ground. The Terra altimeter has an altitude accuracy of +/- 1.5 meters.

During the survey, a calibration check of the altimeter was performed at various fixed altitudes (determined by vertical accention of the bird, tow cable and helicopter with a calibrated rope attached to the bird). Radar altimeter values together with coincident height values measured by the rope were used to establish the correct relationship between altimeter values and height above the ground. The digital record was corrected for any departures from the true height above ground.

Video Tracking and Recording System

A high resolution colour video camera was used to record the helicopter ground track of the fight path along the survey lines. The video, in VHS format, is digitally annotated with GPS position and time and can be used to verify ground positioning information and cultural causes of anomalous geophysical data.

GPS Navigation System

The navigation system consisted of an Ag-Nav Inc. AG-NAV2 GPS navigation system comprising a PC based acquisition system, navigation software, a deviation indicator in front of the pilot to direct the flight, a full screen display with controls in front of the operator, and a *WAAS* enabled Trimble GPS and antenna mounted on the cabin roof.

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 WGS-84 UTM Projection, Zone 17. The raw pseudorange (C/A-code) calculated GPS positional data and recorded WGS-84 latitude and longitude at one second intervals directly in the geophysical data file.

Digital Acquisition System

The RMS DGR-33 data acquisition system was used to collect and record the geophysical and positional data. The data was recorded on an Omega (100 Mb) Zip Drive and the data disk was transferred to the processing computer after the flight. An RMS analog chart recorder produced real time profiles on paper which are used for quality control both in-flight and post-flight and these are archived for later reference.

4. PERSONNEL

The following AeroQuest Limited field personnel were involved in the project:

Field Data Processing:	Roger Barlow
Operator:	Viktor Shevchenko
Data Processing & Report:	Neil Fiset and Roger Barlow

The survey pilot, Steeve Gros-Louis, was contracted by the helicopter operator, Expedition Helicopters Ltd., Cochrane, Ontario.

5. DELIVERABLES

The survey is described in a report which is provided in three copies including a set of 1:20,000 scale flight path/ geophysical maps.

Map products are as follows:

- Plate 1. Flight Path with EM anomalies.
- Plate 2. Total Magnetic Intensity contours with EM anomalies, colour.
- Plate 3. Magnetic Derivative, contours with EM anomalies, colour.
- Plate 4. Low Frequency EM offset profiles.
- Plate 5. Mid Frequency EM offset profiles.
- Plate 6. High Frequency EM offset profiles.
- Plate 7. Mid Frequency Coplanar Apparent Resistivity with EM anomalies, colour.
- Plate 8. Digital Terrain Model with EM anomalies, colour.

All of the maps show the flight path trace with time reference fiducials marked at a 10 second interval.

The basic map coordinate/projection system used is WGS-84 Universal Transverse Mercator Zone 17. This projection differs **only** at sub meter accuracy with NAD83. For reference, the latitude and longitude are also noted on the maps.

The EM anomalies are plotted beneath the flight path. The same symbols are found on the plan maps and described in the plan map legend.

The digital profile raw and processed data are archived on CD-ROM in Geosoft GDB and XYZ format. In addition, the geophysical maps and profiles in Geosoft format are included. A description of the file format may be found in the appendices of this report.

6. DATA PROCESSING AND PRESENTATION

All of the in-field and post-field data processing was carried out using Geosoft Montaj as well as AeroQuest proprietary data processing software. Plotting was carried out using a 36 inch wide HP2500C ink-jet plotter.

6.1 **Base Map**

The geophysical maps accompanying this report are based on positioning using the UTM zone 17 projection with the WGS-84 datum ellipse.

A summary of the map datum and projection specifications are as follows:

Ellipse: WGS-84
Ellipse major axis: 6378137.0 m eccentricity: 0.081819191
Datum Shifts (x,y,z): 0,0,0 metres
Map Projection: Universal Transverse Mercator, Zone 17 (Central Meridian 81°W)
Central Scale Factor: 0.9996
False Easting, Northing: 500,000 m, 0 m

6.2 Flight Path & Terrain Clearance

The position of the survey helicopter was directed by use of the Global Positioning System (GPS). Positions were updated every second and expressed as WGS latitude and longitude calculated from the raw pseudorange data derived from the C/A code signal. Since selective availability was disabled, position accuracies using *WAAS* enabled GPS's are normally in the range of +/- 5 metres.

The instantaneous GPS flight path, after conversion to the local datum UTM co-ordinates, is drawn using linear interpolation between the x and y positions. The time reference fiducials are drawn on the map at appropriate intervals and are used to reference the data file to the plan map.

The planned survey area outline is plotted on the Flight Path Map (Plate 1) as a thick red line.

The Digital Terrain Model (DTM) was derived by taking the satellite position altitude and subtracting the radar altimeter value. The calculated values are relative and are not tied into any surveyed geodetic heights.

6.3 Electromagnetic Data

A two stage digital filtering process using both non linear and recursive filtering to reject major sferic events and to reduce system and noise generated by turbulence induced vibrations.

Local sferic activity can produce sharp, large amplitude events that cannot be removed by conventional filtering procedures. Smoothing 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 0.4 second 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 2 seconds. This filter is refered to as a 20 point linear filter.

The EM channels have been leveled to remove the residual zero offset by the use of a short background line at the beginning, middle and end of each flight. The background line is flown at high altitude (>800 ft), theoretically far enough away from any ground conductivity response. Any residual response is therefore due to a system drift and can be removed from the data by virtue of a linear interpolation between the start and end of flight calibrations. If any non-linear drift remains in the data, then local leveling techniques were employed. Any remaining long wavelength response of around 1 ppm or less may be considered background low amplitude error and may be disregarded.

During the high elevation checks, an internal (Q-coil) calibration pulse in all EM channels was generated in order to ensure that the gain of the system remained constant and within specifications.

The EM profiles, viewed as stacked sections were examined and a number of distinctive bedrock anomalies were noted. They are listed in Appendix III. Some responses are ubiquitous and if related to overburden, typically feature a very strong and broad quadrature response in conjunction with a poor or negligible in phase response.

A pseudo-layer half space model was employed to derive an apparent resistivity plan map. Given an active response was observed on the mid frequency coplanar data, that data was chosen to generate the apparent resistivity map. It was generated by using an analytic solution to determine the resistivity for a given inphase and quadrature response. In the presence of an inherent leveling error of 1-4 ppm , the threshold response for determining the resistivity was set to 4 ppm.

6.4 Magnetic Data

The Total Magnetic Intensity (TMI) data were corrected for diurnal variations by adjustment using the base station and tie line data. No corrections for the regional reference field (IGRF) were applied. The corrected profile data were interpolated on a grid using a random gridding technique. The cell size was 10 metres. Leveling errors caused by the rapidly alternating terrain clearance were removed by micro-leveling the grids. The final leveled grid provided the base for threading the present contours. The minimum contour interval varies to accommodate the magnetic relief in a given map.

A derivative map of the magnetic field was calculated using Geosoft's MAGMAP programme. Basically, the algorithm takes the Fourier transform of the spatial domain total field magnetic grid and then applies a derivative operator and an upward continuation operator to remove high frequency noise. The frequency domain data is then transformed back to the spatial domain and plotted as a colour image and contoured.

Respectfully submitted,

AEROQUEST LIMITED

Neil Fiset, B.Sc. & Roger Barlow, M.Sc.
August 20, 2004

APPENDIX I Survey Boundary in WGS-84 UTM Zone 17

Easting	Northing
616380.0	5216086.0
616586.0	5217575.0
617850.0	5217575.0
619068.0	5213604.0
620625.0	5212047.0
623242.0	5208008.0
624348.0	5208099.0
625318.0	5206993.0
621527.0	5207016.0
621527.0	5208166.0
619948.0	5208099.0
619880.0	5209340.0
618842.0	5209340.0
618820.0	5208324.0
617037.0	5208460.0
616970.0	5209475.0
614600.0	5209520.0
614555.0	5209971.0
613472.0	5209994.0
613337.0	5212950.0
612096.0	5212905.0
612073.0	5211664.0
609794.0	5211573.0
609907.0	5215229.0
612299.0	5215296.0
612276.0	5216176.0

APPENDIX II Description of Survey GDB/XYZ file contents

Column	Description
x	Zone 17 UTM Easting in metres
y	Zone 17 UTM Northing in metres
fid	Time reference in seconds
gtime	GPS time in seconds of the week
date	Date in YY/MM/DD
fltno	Flight number
lat	WGS84 Latitude in decimal degrees
long	WGS84 Longitude in decimal degrees
galt	GPS elevation in metres
ralt	Radar altimeter in metres
basemag	Smoothed magnetic base station value in nanoTesla
rawmag	Raw total magnetic intensity in nano Tesla
mag	Diurnal and lag corrected total magnetic intensity in nano Tesla
magtie	Tie line leveled total magnetic intensity in nano Tesla
mag2vd	Calculated 2nd vertical derivative in nT/m/m
ai1flev, aq1flev	Leveled EM 870Hz Coaxial inphase and quadrature in ppm
ai2flev, aq2flev	Leveled EM 4350Hz Coaxial inphase and quadrature in ppm
ai3flev, aq3flev	Leveled EM 21750Hz Coaxial inphase and quadrature in ppm
pi1flev, pq1flev	Leveled EM 930Hz Coplanar inphase and quadrature in ppm
pi2flev, pq2flev	Leveled EM 4650Hz Coplanar inphase and quadrature in ppm
pi3flev, pq3flev	Leveled EM 23250Hz Coplanar inphase and quadrature in ppm
res2	Mid frequency coplanar resistivity in ohm-metres
bheight	Terrain clearance of EM bird
dtm	Digital Terrain Model in metres

APPENDIX III Anomaly Listing

UTM E	UTM N	Fid	ID	Type	Cx2IP	Cx2Q	Ratio
Line 30							
609851.90	5211548.90	2925.4	1	12	124.99	209.61	0.60
609899.18	5211553.64	8139.9	1	12	153.35	200.45	0.77
609903.12	5211785.34	8149.2	2	12	153.71	200.02	0.77
609894.66	5215003.32	8273.6	3	12	153.63	208.56	0.74
Line 40							
609940.39	5211776.82	8432.7	1	12	154.26	199.75	0.77
609936.52	5211531.59	8438.9	2	12	155.41	199.72	0.78
Line 50							
609989.57	5211572.86	8496.8	1	12	152.10	201.10	0.76
609985.25	5211781.25	8505.3	2	12	153.49	200.19	0.77
Line 60							
610042.10	5211786.52	8782.0	1	12	154.62	199.15	0.78
610032.99	5211544.09	8786.3	2	12	154.86	200.10	0.77
Line 70							
610107.18	5211592.06	8859.1	1	12	153.46	200.39	0.77
610100.49	5211772.77	8866.4	2	12	152.64	200.55	0.76
610096.78	5214705.61	8995.8	3	12	155.81	198.84	0.78
Line 80							
610143.93	5214625.41	9088.0	1	12	157.96	198.96	0.79
610144.17	5211529.77	9179.2	2	12	155.50	200.40	0.78
Line 90							
610193.02	5211545.51	9232.7	1	12	152.43	201.94	0.75
610196.43	5213008.65	9288.2	2	1	161.60	226.61	0.71
610197.03	5214670.13	9363.0	3	12	156.41	200.40	0.78
Line 100							
610245.00	5214569.34	9448.2	1	12	157.47	204.84	0.77
610235.32	5213741.71	9472.7	2	1	161.12	198.83	0.81
610235.71	5212946.58	9496.6	3	1	162.23	226.47	0.72
Line 110							
610301.77	5211541.58	9599.1	1	12	155.14	202.25	0.77
610296.14	5212213.90	9624.6	2	1	162.33	214.80	0.76
610298.72	5212915.44	9649.0	3	1	161.84	223.97	0.72
610291.18	5214483.75	9718.2	4	12	155.80	206.35	0.75
610291.90	5214594.39	9722.7	5	12	156.13	201.58	0.77
Line 120							
610343.98	5212837.77	9937.9	1	1	161.26	216.62	0.74
610343.80	5212197.92	9954.7	1	1	161.31	214.32	0.75
Line 130							
610396.53	5213946.39	10123.3	1	1	155.97	199.57	0.78
610394.27	5214294.86	10140.4	2	12	153.52	201.22	0.76
Line 150							
610492.00	5214072.01	10712.3	1	12	145.65	200.45	0.73
Line 160							
610547.20	5213986.91	10916.2	1	12	148.10	200.18	0.74
Line 170							
610592.55	5212006.23	11061.9	1	12	147.30	200.75	0.73
610589.96	5212156.36	11067.3	2	12	148.26	200.49	0.74

610606.08	5213954.50	11137.5	3	12	137.93	201.44	0.68
Line 180							
610636.10	5213899.49	11335.0	1	12	148.80	200.51	0.74
610643.84	5212140.88	11391.1	2	12	145.27	200.26	0.73
610641.82	5211951.14	11396.1	3	12	147.68	199.97	0.74
Line 190							
610690.52	5212039.49	11480.1	1	12	146.32	200.18	0.73
610687.38	5212171.79	11485.0	2	12	145.22	201.45	0.72
Line 200							
610750.78	5213641.99	11711.0	1	12	145.49	199.60	0.73
Line 210							
610798.60	5213520.89	11900.0	1	12	144.73	199.84	0.72
610797.20	5213636.72	11904.5	2	12	144.23	200.29	0.72
Line 220							
610842.54	5214031.90	12066.0	1	12	144.82	200.06	0.72
610847.04	5213430.99	12091.4	2	12	143.50	199.44	0.72
610846.48	5212704.32	12115.2	3	12	144.79	200.33	0.72
610845.70	5212173.79	12130.0	4	12	143.73	199.84	0.72
Line 230							
610900.24	5213875.77	1662.9	1	3	208.21	212.64	0.98
610890.47	5212453.80	1699.3	2	3	208.65	214.04	0.97
610888.57	5212359.00	1701.7	3	3	208.79	214.29	0.97
610888.97	5212264.96	1704.1	4	3	207.10	213.83	0.97
610894.89	5212020.70	1710.4	5	12	202.94	213.93	0.95
Line 270							
611098.41	5212722.51	2421.4	1	12	217.41	213.82	1.02
611097.37	5212584.15	2425.4	2	12	216.71	214.18	1.01
611095.32	5212446.41	2429.4	3	12	217.24	213.72	1.02
611092.22	5212233.81	2435.3	4	12	218.34	213.55	1.02
Line 280							
611142.30	5212307.32	2532.0	1	12	217.18	213.98	1.01
611141.80	5212651.96	2543.7	2	12	216.29	214.39	1.01
Line 290							
611199.09	5212703.50	2758.7	1	12	224.27	215.86	1.04
Line 310							
611295.83	5212739.74	3093.1	1	12	236.79	216.43	1.09
611293.69	5212383.43	3102.2	2	12	236.88	214.99	1.10
611294.03	5212258.29	3105.4	3	5	239.38	214.43	1.12
Line 350							
611493.97	5212806.94	4072.9	1	12	255.30	215.40	1.19
611493.22	5212273.36	4087.2	2	12	257.89	215.64	1.20
Line 360							
611543.06	5212299.26	4170.8	1	12	257.93	216.81	1.19
611546.10	5212501.06	4178.7	2	12	258.00	217.00	1.19
611542.90	5212731.64	4187.2	3	12	257.55	215.84	1.19
611545.82	5214866.33	4262.3	4	3	276.77	282.01	0.98
Line 370							
611598.57	5215115.42	4325.4	1	12	263.17	220.00	1.20
611594.76	5214865.10	4332.7	2	5	271.06	247.75	1.09
Line 380							
611643.83	5212283.22	4494.5	1	12	265.29	214.96	1.23
611644.27	5212792.54	4511.1	2	12	266.63	214.90	1.24
611642.16	5214905.53	4583.9	3	5	278.71	261.87	1.06
Line 390							

611693.78	5214811.72	4653.3	1	5	276.28	246.38	1.12
Line 400							
611744.96	5214737.66	4915.6	1	4	286.10	277.65	1.03
Line 410							
611795.98	5214723.98	5008.6	1	4	288.70	285.21	1.01
611794.23	5212228.23	5086.5	2	12	278.22	213.86	1.30
Line 420							
611835.80	5214701.27	5275.4	1	2	298.47	337.25	0.89
Line 430							
611905.49	5214655.79	5607.7	1	5	294.85	238.15	1.24
Line 440							
611942.88	5211952.35	5768.9	1	12	290.51	218.28	1.33
611939.09	5214637.23	5861.5	2	5	300.05	253.68	1.18
Line 450							
611995.94	5214621.03	5963.8	1	5	299.52	240.37	1.25
611993.15	5213510.18	6002.6	2	5	299.22	233.85	1.28
611993.43	5213084.79	6013.8	3	12	293.94	211.57	1.39
611994.63	5212880.12	6019.0	4	12	294.93	213.30	1.38
611996.79	5211814.75	6046.2	5	12	295.99	213.43	1.39
Line 460							
612043.46	5211851.49	6114.5	1	12	292.28	219.98	1.33
612043.26	5211968.86	6118.3	2	5	299.94	238.39	1.26
612043.51	5213590.27	6169.7	3	5	302.98	236.41	1.28
612044.95	5214583.09	6208.4	5	5	305.41	254.88	1.20
Line 470							
612095.37	5214569.42	6310.0	1	5	305.42	234.31	1.30
612094.91	5213592.10	6341.6	2	6	304.54	225.45	1.35
612094.44	5211940.33	6386.7	3	6	305.95	228.88	1.34
Line 480							
612144.78	5213576.99	6507.2	1	6	307.02	215.99	1.42
612144.57	5213694.38	6511.0	2	6	308.75	217.37	1.42
612138.86	5214521.24	6544.2	3	6	309.46	236.52	1.31
Line 500							
612241.42	5213252.90	6769.7	1	12	304.88	212.93	1.43
612236.46	5214356.06	6809.7	2	6	311.05	222.59	1.40
Line 510							
612294.34	5213232.10	7209.3	1	12	312.27	212.18	1.47
Line 520							
612350.68	5213319.40	7286.4	1	12	310.82	214.07	1.45
Line 550							
612495.01	5213448.35	7838.9	1	12	319.12	214.33	1.49
612494.92	5212934.76	7852.9	2	12	322.47	234.38	1.38
Line 560							
612544.61	5213532.15	7925.6	1	12	316.51	218.71	1.45
Line 570							
612594.78	5213882.36	8119.8	1	12	326.18	213.88	1.53
612590.82	5213413.27	8132.6	2	6	333.05	221.07	1.51
Line 580							
612643.12	5213820.59	8225.5	1	12	325.73	215.63	1.51
612639.93	5215384.31	8282.4	2	7	331.86	207.95	1.60
612639.45	5215434.55	8284.0	3	7	334.34	208.18	1.61
Line 590							
612693.38	5215701.39	8358.5	1	12	331.01	209.18	1.58
612690.73	5214164.68	8402.5	2	12	331.72	209.49	1.58

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   612697.87  5213994.93   8407.2 3 12 332.95      211.73    1.57
   612695.75  5213671.38   8416.4 3  6 336.22      218.98    1.54
   612694.41  5213506.95   8421.1 4  6 337.80      222.85    1.52
Line  600
   612746.55  5213174.14   8496.4 1  6 341.14      252.32    1.35
   612744.97  5214232.63   8535.9 2  7 335.29      208.74    1.61
   612743.28  5214414.61   8543.5 3  7 335.91      208.24    1.61
   612741.80  5216072.51   8607.5 4  7 336.90      208.09    1.62
Line  610
   612798.49  5216007.05   8656.9 1  7 338.99      208.12    1.63
   612796.66  5215622.42   8667.4 2 12 335.61      209.73    1.60
   612799.24  5213891.26   8714.4 3 12 335.14      213.46    1.57
   612796.00  5213700.34   8719.4 4  6 342.17      222.44    1.54
   612791.96  5213531.44   8723.8 5  6 343.00      224.65    1.53
Line  620
   612841.98  5215576.34   8885.5 1 12 336.15      208.99    1.61
Line  630
   612898.54  5215510.25   8959.9 1 12 339.28      208.24    1.63
   612894.76  5214095.35   8997.0 2 12 339.50      209.05    1.62
   612895.04  5213655.51   9008.0 3 12 343.55      225.28    1.52
   612897.52  5213378.14   9015.3 4  6 348.87      224.80    1.55
Line  640
   612943.24  5213951.48   9111.9 1  7 343.74      210.34    1.63
Line  650
   612991.92  5214222.99   9474.7 1 12 335.94      208.97    1.61
Line  660
   613045.27  5214252.26   9600.9 1 12 339.98      207.92    1.64
   613045.18  5215395.00   9642.6 2 12 342.94      208.07    1.65
Line  670
   613091.50  5214136.27   9772.0 1 12 337.71      209.49    1.61
Line  680
   613143.11  5214233.77   9904.1 1 12 341.97      208.16    1.64
Line  690
   613195.65  5213478.26  10080.2 1  7 354.21      217.99    1.62
Line  700
   613239.81  5215085.33  10227.1 1  7 351.21      208.40    1.69
   613239.84  5215144.41  10229.3 2  7 352.42      209.45    1.68
   613240.06  5216002.64  10262.3 3  7 351.72      207.26    1.70
   613240.10  5216066.50  10264.5 4  7 352.60      207.08    1.70
Line  710
   613292.98  5215147.28  10336.5 1 12 348.98      211.98    1.65
Line  730
   613397.38  5214377.02  10674.1 1 12 350.41      208.50    1.68
Line  740
   613441.59  5214419.07  10952.4 1 12 348.51      209.44    1.66
Line  750
   613491.33  5214422.92  11326.0 1 12 344.90      209.11    1.65
Line  760
   613541.47  5214472.95  11685.7 1 12 348.96      208.46    1.67
Line  770
   613591.71  5211342.47  11934.8 1 12 346.53      210.59    1.65
Line  780
   613641.00  5210365.89  12059.1 1 12 355.83      209.48    1.70
Line  790
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613700.14	5214037.23	1482.5	1	12	171.43	203.31	0.84
Line 830							
613892.11	5214290.36	2680.2	1	12	166.39	204.27	0.81
Line 860							
614041.34	5210477.06	3373.6	1	12	167.03	203.55	0.82
Line 880							
614149.35	5210842.69	3905.1	1	12	172.66	204.93	0.84
Line 890							
614190.43	5213856.81	4426.0	1	12	172.60	202.86	0.85
614191.61	5210847.83	4512.3	2	12	167.30	207.70	0.81
Line 900							
614245.03	5210878.22	4622.1	1	12	171.29	208.84	0.82
Line 930							
614398.26	5210946.47	5517.5	1	12	179.29	248.56	0.72
Line 940							
614443.45	5210932.53	5643.0	1	12	171.13	231.96	0.74
614449.99	5211426.36	5664.3	2	12	176.15	204.55	0.86
Line 950							
614494.25	5212963.09	5970.0	1	12	181.15	221.52	0.82
614490.38	5210939.09	6029.8	2	12	179.59	219.75	0.82
Line 960							
614551.67	5210190.75	6128.1	1	12	165.74	203.66	0.81
614545.90	5212674.53	6234.2	2	12	172.87	208.89	0.83
Line 970							
614594.68	5209585.51	6803.5	1	12	167.31	203.91	0.82
Line 980							
614643.04	5212656.28	6997.0	1	12	178.89	207.97	0.86
Line 990							
614695.83	5212062.17	7281.2	1	12	181.26	206.75	0.88
Line 1010							
614796.97	5211909.15	7841.2	1	12	187.62	207.73	0.90
614795.39	5211243.61	7858.4	2	12	190.63	204.84	0.93
614796.76	5211088.52	7862.4	3	12	190.93	207.09	0.92
Line 1020							
614845.37	5211111.40	8016.9	1	12	181.66	222.60	0.82
614843.79	5211938.09	8045.2	2	12	188.62	207.74	0.91
614845.07	5212808.72	8076.5	3	12	188.52	203.69	0.93
Line 1030							
614900.97	5214666.41	8269.9	1	1	239.43	321.63	0.74
Line 1040							
614943.39	5214717.25	8641.6	1	1	248.45	311.59	0.80
Line 1050							
614992.78	5214707.73	9016.6	1	1	268.59	326.12	0.82
Line 1060							
615051.78	5214790.66	9396.8	1	2	250.77	299.53	0.84
Line 1070							
615098.78	5214701.49	9524.6	1	1	247.56	321.37	0.77
Line 1080							
615146.24	5211768.47	9792.4	1	12	185.53	205.41	0.90
615144.01	5214751.48	9897.3	1	1	232.93	313.56	0.74
615143.26	5214977.30	9905.2	1	1	217.18	292.92	0.74
Line 1090							
615185.50	5215373.46	10014.9	1	2	200.09	236.56	0.85
615180.09	5214990.10	10026.6	1	1	213.87	280.89	0.76

615196.34	5211743.05	10115.0	1	12	189.06	205.11	0.92
Line 1100							
615242.90	5214737.49	10423.2	1	1	224.40	330.73	0.68
Line 1110							
615284.70	5214831.23	10556.8	1	2	211.93	245.62	0.86
615288.14	5214715.94	10559.9	2	1	210.67	257.18	0.82
Line 1120							
615345.00	5214783.96	10954.1	1	2	205.78	234.81	0.88
Line 1130							
615386.96	5209574.86	11440.8	1	3	200.87	216.78	0.93
Line 1140							
615444.43	5209550.93	11501.6	1	2	202.39	242.21	0.84
Line 1230							
615897.18	5214450.24	3187.5	1	12	187.38	208.27	0.90
Line 1250							
615996.69	5212728.49	3946.7	1	12	189.20	208.44	0.91
615994.24	5210190.26	4013.9	2	12	191.20	207.49	0.92
Line 1260							
616041.75	5210179.52	4103.3	1	12	191.56	208.11	0.92
616042.29	5212498.41	4174.3	2	12	191.00	208.77	0.91
616040.23	5212713.40	4181.3	3	12	184.84	208.70	0.89
616044.40	5212902.49	4187.3	4	12	187.60	208.64	0.90
616042.53	5213990.90	4219.8	5	12	191.48	209.78	0.91
Line 1270							
616092.98	5212879.37	4414.5	1	12	181.59	209.00	0.87
616093.05	5212490.71	4425.0	2	12	175.07	211.00	0.83
616095.76	5210081.62	4492.6	4	12	191.25	208.27	0.92
Line 1280							
616142.14	5210051.17	4580.9	1	12	179.07	210.13	0.85
616141.27	5212463.66	4653.1	2	12	187.87	208.70	0.90
616142.57	5212970.37	4669.3	3	12	188.97	209.18	0.90
616144.88	5214694.34	4720.6	4	12	189.96	208.46	0.91
616144.73	5214852.53	4725.3	5	12	189.85	209.66	0.91
Line 1290							
616190.39	5215933.40	4815.2	1	12	191.55	209.65	0.91
616199.55	5213008.57	4895.3	2	12	192.18	209.32	0.92
616194.65	5212362.40	4911.7	3	12	180.02	209.99	0.86
616195.46	5209932.23	4974.1	4	12	191.31	208.08	0.92
Line 1300							
616241.69	5209822.68	5284.5	1	12	187.90	208.98	0.90
616241.58	5209926.99	5287.6	2	12	181.34	209.95	0.86
616241.47	5212407.42	5360.1	2	12	187.88	208.45	0.90
616243.86	5212735.86	5370.7	3	12	186.79	208.99	0.89
616241.92	5213083.13	5381.6	4	12	188.79	211.01	0.89
Line 1310							
616302.43	5213250.35	5606.3	1	12	184.95	213.04	0.87
616299.16	5212749.81	5619.7	2	12	187.42	209.10	0.90
616291.25	5212312.23	5631.6	3	12	186.89	210.18	0.89
616301.58	5211814.22	5645.2	4	12	192.97	209.96	0.92
616295.87	5210964.25	5668.3	5	12	195.18	207.96	0.94
616298.03	5209600.66	5703.5	6	12	193.42	208.75	0.93
Line 1320							
616341.45	5209665.34	5777.3	1	12	184.77	210.07	0.88
Line 1330							

616397.42	5213651.06	6089.2	1	12	196.35	208.72	0.94
616397.59	5213412.89	6095.8	2	12	190.57	207.60	0.92
616396.00	5213330.53	6098.1	3	12	193.49	208.17	0.93
616394.08	5209686.42	6192.4	4	12	190.99	208.97	0.91
Line 1340							
616444.32	5210133.40	6272.6	1	12	191.05	210.98	0.91
616444.06	5210261.25	6276.6	2	12	190.27	210.19	0.91
616447.15	5213476.12	6376.2	3	12	188.12	207.63	0.91
Line 1350							
616497.37	5210247.97	6793.6	1	12	185.90	213.92	0.87
Line 1360							
616543.29	5210297.36	6890.6	1	12	191.52	214.83	0.89
616541.92	5212246.72	6956.9	2	12	189.81	208.09	0.91
616543.30	5213082.58	6985.5	3	12	189.96	209.41	0.91
616543.61	5213418.09	6996.5	4	12	191.80	208.64	0.92
616553.18	5217209.42	7114.1	5	5	256.58	244.70	1.05
Line 1370							
616594.17	5216445.51	7206.3	1	3	214.16	224.70	0.95
616595.59	5216187.36	7213.5	2	3	219.86	224.05	0.98
Line 1420							
616839.70	5217589.86	9044.9	1	2	216.32	255.47	0.85
Line 1430							
616894.74	5217523.87	9093.1	1	2	210.48	254.62	0.83
616887.74	5216419.46	9124.4	2	1	211.25	257.29	0.82
Line 1440							
616942.38	5214717.75	9509.1	1	12	191.20	208.02	0.92
616944.86	5216446.32	9558.9	2	2	212.20	255.40	0.83
Line 1450							
616993.89	5216382.29	9673.3	1	2	208.83	238.53	0.88
616992.65	5211391.14	9805.3	2	12	183.00	211.94	0.86
616990.29	5209579.53	9853.3	4	12	188.46	207.94	0.91
Line 1460							
617043.11	5210231.25	10204.2	1	12	188.88	209.07	0.90
617037.75	5216456.96	10401.0	2	2	211.62	250.13	0.85
Line 1470							
617095.49	5216355.61	10520.3	1	2	210.97	246.73	0.86
Line 1480							
617144.84	5210213.29	10842.7	1	12	188.53	207.54	0.91
617144.14	5211468.79	10885.3	2	12	190.43	208.31	0.91
617144.04	5216440.10	11045.8	3	2	215.42	249.34	0.86
Line 1490							
617193.92	5216368.77	11166.0	1	2	219.35	262.37	0.84
Line 1500							
617246.56	5210164.41	11487.7	1	12	182.58	208.44	0.88
617246.03	5216467.70	11697.5	2	2	218.99	255.77	0.86
Line 1510							
617297.08	5217253.70	11794.2	1	2	207.09	241.66	0.86
617294.13	5216506.19	11813.5	2	2	217.65	253.00	0.86
617295.70	5216215.48	11820.9	3	1	212.85	260.20	0.82
617298.14	5213680.10	11887.8	4	12	192.62	207.67	0.93
617292.65	5211920.92	11934.5	5	12	192.51	207.86	0.93
617298.08	5211252.20	11952.6	6	12	190.32	208.86	0.91
Line 1520							
617347.08	5217238.52	1128.0	1	2	201.82	243.74	0.83

617343.62	5216582.79	1144.7	2	2	206.14	239.36	0.86
617343.24	5216181.42	1154.8	3	2	199.66	240.10	0.83
617345.78	5213684.74	1227.1	4	12	179.59	189.38	0.95
617339.88	5211929.48	1276.2	5	12	175.86	189.90	0.93
Line 1530							
617391.63	5216198.16	1683.2	1	1	189.42	233.10	0.81
617390.16	5216580.67	1696.2	2	2	194.63	233.89	0.83
617397.06	5217272.33	1719.6	3	1	202.84	276.16	0.73
Line 1540							
617444.81	5217196.61	1789.3	1	1	197.06	255.70	0.77
Line 1550							
617492.17	5217110.42	2602.6	1	2	187.56	222.18	0.84
Line 1560							
617539.27	5217018.65	2684.9	1	1	190.13	239.41	0.79
Line 1570							
617593.33	5210141.28	3025.1	1	12	168.77	188.85	0.89
617591.61	5215972.49	3214.4	2	2	180.37	207.71	0.87
617591.80	5217114.37	3252.9	3	2	185.63	220.25	0.84
Line 1580							
617638.56	5217028.10	3333.1	1	2	183.53	209.23	0.88
617644.88	5215991.71	3360.3	2	2	182.63	211.40	0.86
Line 1590							
617693.38	5210102.88	3665.1	1	12	169.21	190.93	0.89
617691.54	5210968.10	3694.5	2	12	165.67	193.28	0.86
617694.76	5214993.84	3829.1	3	12	169.66	187.15	0.91
617689.97	5216012.71	3861.2	4	3	182.70	202.17	0.90
Line 1600							
617743.02	5211155.90	4135.6	1	12	165.47	189.89	0.87
617743.70	5210039.00	4164.9	2	12	168.81	191.43	0.88
Line 1610							
617796.71	5210071.97	4516.3	1	12	166.32	196.54	0.85
Line 1620							
617837.38	5216051.69	4859.5	1	2	182.34	210.03	0.87
617845.84	5215619.30	4872.8	2	2	180.77	213.86	0.85
617842.85	5211102.71	4992.3	3	12	169.04	189.35	0.89
617840.95	5210168.78	5017.6	4	2	180.37	210.11	0.86
Line 1630							
617894.55	5210186.51	5174.9	1	1	184.53	244.09	0.76
617894.77	5211151.52	5211.7	2	12	159.51	189.87	0.84
617892.66	5215636.62	5365.1	3	2	184.63	216.90	0.85
Line 1640							
617942.69	5215547.03	5588.8	1	2	184.12	209.20	0.88
617944.47	5210190.57	5722.7	2	2	182.63	213.13	0.86
Line 1650							
617992.73	5210242.35	5893.6	1	1	184.07	239.97	0.77
617993.26	5211184.12	5928.7	2	12	158.33	190.61	0.83
617989.85	5215591.90	6076.5	3	3	184.75	204.00	0.91
617991.33	5216180.83	6096.7	4	2	193.90	232.66	0.83
Line 1660							
618043.59	5215512.57	6207.6	1	3	181.88	199.26	0.91
618042.57	5211171.23	6324.1	2	12	169.30	189.35	0.89
618046.56	5210218.96	6348.1	3	3	182.45	201.16	0.91
Line 1670							
618093.79	5209913.29	6493.4	1	12	174.57	189.27	0.92

618095.48	5210253.08	6504.0	2	2	186.27	219.63	0.85
618098.05	5211213.61	6536.5	3	12	165.27	191.57	0.86
Line 1680							
618145.38	5215477.02	7034.4	1	3	182.16	195.86	0.93
618145.09	5211143.60	7158.3	2	12	172.65	190.72	0.91
618145.04	5210219.28	7184.1	3	3	183.86	201.09	0.91
618138.71	5208835.53	7222.3	4	3	183.58	203.96	0.90
Line 1710							
618292.41	5215101.78	8084.0	1	12	164.75	190.38	0.87
Line 1740							
618444.28	5209548.88	8883.5	1	12	190.14	189.33	1.00
Line 1750							
618492.69	5213292.81	9135.3	1	12	183.95	187.73	0.98
618493.31	5213479.31	9142.0	2	12	186.50	188.36	0.99
Line 1760							
618541.09	5214228.12	9522.1	1	12	191.46	186.22	1.03
618540.60	5214095.20	9525.8	2	12	193.33	186.55	1.04
618546.46	5213355.85	9546.1	3	12	192.79	186.59	1.03
618544.51	5209376.92	9653.2	4	12	196.33	187.20	1.05
Line 1770							
618594.40	5209391.38	9757.3	1	12	195.80	188.62	1.04
618594.17	5212761.85	9874.0	2	12	188.16	195.51	0.96
618591.06	5213063.37	9885.5	3	12	194.87	188.00	1.04
618593.99	5213321.38	9894.3	4	12	194.90	187.06	1.04
618590.88	5214194.40	9925.7	5	12	185.30	186.86	0.99
618592.77	5214664.71	9943.2	6	12	195.24	187.53	1.04
Line 1780							
618636.01	5214652.31	10028.0	1	12	196.62	187.76	1.05
618646.29	5212135.17	10101.2	2	12	200.34	186.43	1.07
Line 1790							
618697.92	5209194.26	10280.7	1	12	198.39	187.67	1.06
618691.07	5212186.35	10378.6	2	12	202.73	187.15	1.08
Line 1800							
618740.57	5213927.96	10556.7	1	12	200.16	186.61	1.07
618746.43	5209367.67	10674.7	2	12	206.04	187.47	1.10
618745.89	5209085.50	10681.6	2	12	206.20	186.90	1.10
Line 1810							
618785.00	5209377.15	10981.6	3	12	207.77	187.11	1.11
618797.66	5214367.47	11150.7	4	12	200.24	188.85	1.06
Line 1850							
618991.24	5211131.92	1939.5	1	12	122.75	191.06	0.64
618990.17	5213571.41	2026.7	2	12	116.59	194.19	0.60
Line 1860							
619047.34	5213400.91	2098.2	1	12	123.15	198.64	0.62
619043.98	5211971.38	2141.0	2	12	122.87	190.85	0.64
619047.01	5210988.72	2166.1	3	12	122.26	190.43	0.64
Line 1870							
619093.19	5211026.80	2322.6	1	12	111.88	191.48	0.58
619091.91	5211999.41	2360.2	2	12	109.11	192.52	0.57
Line 1880							
619145.42	5210992.67	2539.8	1	12	114.73	190.43	0.60
Line 1890							
619192.48	5211032.27	2695.0	1	12	106.61	191.51	0.56
619187.89	5211860.46	2723.5	2	12	111.48	191.88	0.58

Line 1900							
619242.15	5211828.59	3162.1	1	12	103.94	191.74	0.54
619240.63	5210977.41	3185.5	2	12	103.65	191.71	0.54
Line 1910							
619291.74	5210998.47	3336.4	1	12	97.57	191.87	0.51
619289.47	5211888.54	3364.0	2	12	98.63	191.89	0.51
Line 1920							
619340.68	5211357.41	3538.4	1	12	88.45	192.90	0.46
619341.94	5210924.42	3550.3	2	12	92.25	192.93	0.48
619343.30	5210661.20	3557.2	3	12	94.81	193.29	0.49
Line 1930							
619393.39	5210641.27	3686.0	1	12	92.23	193.31	0.48
619395.83	5210754.16	3689.9	2	12	89.08	193.37	0.46
619392.98	5210963.89	3697.7	3	12	91.15	192.41	0.47
619391.53	5211851.80	3728.9	4	12	90.56	193.04	0.47
619392.32	5212639.98	3756.7	5	12	93.37	192.37	0.49
619395.05	5212798.96	3762.5	6	12	91.70	192.29	0.48
Line 1940							
619441.72	5212775.25	3849.6	1	12	90.13	192.37	0.47
619442.54	5210882.21	3902.1	2	12	87.20	192.76	0.45
619442.29	5210808.02	3904.1	3	12	89.73	192.74	0.47
619440.59	5210607.66	3909.5	4	12	91.93	192.72	0.48
Line 1950							
619497.62	5210667.28	4029.3	1	12	89.82	193.76	0.46
619494.65	5210871.26	4036.5	2	12	89.56	192.55	0.47
619495.10	5212800.12	4101.5	3	12	87.60	192.28	0.46
Line 1960							
619543.30	5210670.52	4233.0	1	12	88.66	193.02	0.46
619549.54	5209758.43	4257.5	1	12	90.42	198.88	0.45
Line 1970							
619594.55	5209792.23	4333.7	1	12	86.43	202.30	0.43
619593.32	5210711.47	4366.8	2	12	82.90	193.99	0.43
619595.29	5211494.51	4394.3	3	12	84.29	193.09	0.44
Line 1980							
619651.13	5210706.86	4809.0	1	12	79.55	193.13	0.41
619642.00	5209813.86	4833.1	2	12	80.45	195.90	0.41
619644.65	5209728.59	4835.4	1	12	78.38	197.74	0.40
Line 1990							
619692.70	5209751.79	4907.9	1	12	72.31	200.06	0.36
619694.67	5210797.76	4945.2	2	12	71.75	193.95	0.37
Line 2000							
619745.30	5210792.58	5134.9	1	12	75.01	193.30	0.39
619741.24	5209708.75	5162.1	2	12	75.61	195.34	0.39
Line 2010							
619793.32	5209759.81	5232.8	1	12	68.97	196.96	0.35
619793.42	5210841.40	5271.4	2	12	72.87	193.44	0.38
Line 2020							
619842.04	5210936.50	5439.7	1	12	73.66	193.52	0.38
619842.95	5210828.80	5442.9	2	12	72.24	193.42	0.37
619843.54	5209715.26	5472.9	3	12	71.59	196.87	0.36
619843.63	5209646.84	5474.7	4	12	71.04	198.52	0.36
Line 2030							
619891.06	5209687.33	5615.7	1	12	67.44	197.74	0.34
619894.51	5210985.09	5661.7	2	12	71.03	193.59	0.37

Line 2040							
619938.33	5210890.91	5829.2	1	12	64.93	194.51	0.33
619942.77	5209653.31	5864.5	2	12	67.86	196.06	0.35
619943.76	5209556.15	5867.1	3	12	69.72	198.46	0.35
619946.58	5208183.69	5905.8	4	12	66.57	194.60	0.34
Line 2050							
619995.65	5208288.93	5964.1	1	12	67.11	195.26	0.34
619997.05	5209567.58	6007.9	1	12	65.45	197.50	0.33
619988.19	5210126.98	6028.8	3	1	65.36	194.16	0.34
619994.52	5210945.76	6059.4	4	12	65.33	194.30	0.34
Line 2060							
620038.37	5210916.48	6460.6	1	12	58.76	194.90	0.30
620043.14	5210122.80	6483.1	2	12	64.64	193.58	0.33
620042.80	5209528.99	6498.2	3	12	56.30	200.54	0.28
Line 2070							
620094.57	5209540.94	6638.0	1	12	54.66	199.34	0.27
620089.61	5210197.03	6661.8	2	12	59.74	193.66	0.31
620093.84	5210937.68	6687.9	3	12	57.68	194.89	0.30
Line 2080							
620144.26	5210922.25	6839.9	1	12	56.69	194.39	0.29
620143.55	5210192.05	6859.7	2	12	56.65	193.38	0.29
620143.39	5209886.09	6867.8	3	12	62.16	195.29	0.32
620144.61	5209449.10	6879.9	4	12	57.26	197.48	0.29
Line 2090							
620196.15	5209378.80	7009.6	1	12	49.03	199.28	0.25
620192.04	5209925.61	7028.7	2	12	59.96	198.54	0.30
620195.85	5210979.17	7065.5	3	12	56.71	195.09	0.29
620193.38	5211119.97	7070.2	4	12	57.07	196.53	0.29
Line 2100							
620244.21	5211059.37	7212.5	1	12	56.93	195.64	0.29
620244.95	5210959.38	7215.1	2	12	56.44	195.48	0.29
620240.24	5209882.98	7243.7	3	12	59.18	197.32	0.30
620239.69	5209370.13	7258.3	4	12	53.03	197.81	0.27
Line 2110							
620293.53	5208225.59	7345.7	1	12	58.15	200.36	0.29
620293.33	5209312.87	7383.0	2	12	47.59	198.35	0.24
620292.59	5211064.49	7443.0	3	12	54.74	195.26	0.28
Line 2120							
620348.72	5212213.00	7550.6	1	12	55.90	194.61	0.29
620342.20	5209869.04	7617.1	2	12	56.53	194.70	0.29
620345.90	5209175.11	7635.2	3	12	54.25	195.92	0.28
620344.62	5208210.83	7660.2	4	12	55.93	197.08	0.28
Line 2130							
620392.18	5208273.25	7714.7	1	12	51.98	196.38	0.26
620393.93	5209207.06	7747.0	2	12	44.43	198.27	0.22
620391.03	5209915.21	7771.4	3	12	51.76	194.72	0.27
Line 2140							
620445.23	5209872.24	7966.5	1	12	54.04	193.96	0.28
620444.51	5208998.20	7989.9	2	12	55.21	194.56	0.28
620444.76	5208264.10	8009.6	3	12	53.68	194.73	0.28
Line 2150							
620490.17	5208334.43	8067.6	1	12	47.96	196.06	0.24
620491.40	5208998.05	8090.1	2	12	50.02	196.94	0.25
620493.07	5209904.71	8120.3	3	12	48.20	194.91	0.25

Line 2160							
620549.73	5209862.67	8574.6	1	12	51.61	193.46	0.27
620550.05	5208286.79	8616.2	2	12	48.12	194.65	0.25
Line 2170							
620587.16	5208347.56	8676.8	1	12	46.32	194.94	0.24
620587.08	5209084.18	8701.2	2	12	46.53	195.35	0.24
620593.61	5209908.45	8729.7	3	12	45.61	193.76	0.24
Line 2180							
620646.22	5209887.19	8905.4	1	12	47.35	193.42	0.24
620642.74	5208326.85	8944.6	2	12	46.10	194.18	0.24
Line 2190							
620693.87	5208398.54	9005.4	1	12	46.44	194.75	0.24
620691.13	5208950.87	9023.8	2	12	43.45	195.99	0.22
620692.65	5209923.08	9056.1	3	12	42.11	194.12	0.22
Line 2200							
620743.65	5209875.55	9224.7	1	1	44.10	193.38	0.23
620746.45	5208831.59	9252.4	2	12	45.64	195.07	0.23
620746.27	5208733.21	9254.9	3	12	45.26	195.47	0.23
620747.72	5208383.12	9264.5	4	12	44.05	195.09	0.23
Line 2210							
620790.09	5209932.27	9388.8	1	12	33.42	194.48	0.17
Line 2220							
620849.04	5209907.04	9654.1	1	12	42.25	194.13	0.22
620838.37	5208403.51	9691.9	2	12	43.29	196.82	0.22
Line 2230							
620894.09	5208821.88	9779.7	1	12	41.23	197.04	0.21
620893.54	5209946.74	9819.5	2	12	26.70	195.94	0.14
Line 2240							
620944.73	5209919.57	9982.7	1	12	38.91	195.49	0.20
620942.55	5208735.32	10012.8	2	12	40.24	197.72	0.20
620946.90	5208154.19	10027.2	3	12	30.52	197.96	0.15
Line 2250							
620998.72	5208199.17	10082.3	1	12	9.90	200.88	0.05
620992.99	5209942.48	10143.9	2	12	32.50	196.50	0.17
Line 2260							
621042.65	5209892.41	10294.9	1	12	36.97	195.67	0.19
621041.16	5208143.52	10341.5	2	12	31.37	199.04	0.16
Line 2270							
621094.71	5208460.15	10401.9	1	12	34.82	199.83	0.17
621094.51	5209908.14	10450.9	2	12	27.65	197.00	0.14
Line 2280							
621140.66	5209926.88	1613.7	1	12	190.32	197.23	0.96
Line 2290							
621192.58	5209935.76	1774.6	1	12	191.42	196.82	0.97
Line 2300							
621247.25	5209913.45	1914.3	1	12	189.59	196.97	0.96
Line 2310							
621292.84	5209967.17	2058.5	1	12	193.70	196.99	0.98
Line 2360							
621543.77	5208381.23	3000.5	1	1	219.83	196.08	1.12
621543.23	5208274.91	3003.4	2	12	221.06	197.29	1.12
621545.48	5207684.46	3019.9	3	12	219.74	196.40	1.12
Line 2370							
621594.64	5207718.47	3102.5	1	12	220.81	197.36	1.12

621592.96	5208024.85	3111.6	2	12	222.83	202.14	1.10
Line 2380							
621641.50	5208424.20	3333.2	1	12	228.62	196.13	1.17
621646.67	5207996.79	3345.0	2	12	223.39	200.32	1.12
Line 2390							
621693.66	5208030.91	3447.9	1	12	229.92	197.39	1.16
621693.30	5208511.50	3461.2	2	12	231.92	195.99	1.18
621703.24	5210224.05	3514.4	3	12	234.03	196.24	1.19
Line 2400							
621748.56	5208483.39	3656.7	1	12	237.40	195.46	1.21
621742.95	5208014.89	3669.6	2	12	237.01	197.13	1.20
621744.26	5207680.83	3678.6	3	12	237.35	197.71	1.20
Line 2410							
621794.88	5207704.54	3759.6	1	12	239.05	198.99	1.20
621793.10	5208507.58	3782.4	2	12	239.84	196.39	1.22
621792.43	5209944.46	3824.5	3	12	238.80	196.22	1.22
Line 2420							
621843.02	5209414.72	4205.5	1	12	248.95	196.38	1.27
621840.60	5208850.39	4223.5	2	12	248.66	196.74	1.26
Line 2430							
621894.20	5209810.45	4418.0	1	12	249.71	196.41	1.27
Line 2440							
621946.27	5208015.75	4543.2	1	12	254.18	197.15	1.29
Line 2450							
621995.22	5208054.06	4656.5	1	12	257.83	197.57	1.30
621996.34	5208113.03	4658.2	2	12	256.06	198.08	1.29
621993.91	5208773.02	4677.8	2	12	256.27	197.27	1.30
Line 2460							
622047.27	5209276.52	4792.5	1	12	256.59	196.40	1.31
Line 2470							
622093.04	5208766.51	4957.3	1	12	258.84	197.80	1.31
622093.58	5208829.50	4959.2	2	12	257.87	198.20	1.30
622091.59	5209341.73	4975.6	3	12	253.33	196.41	1.29
Line 2480							
622146.33	5209443.55	5054.7	1	12	264.47	196.47	1.35
622145.26	5209270.76	5059.5	2	12	262.50	196.42	1.34
Line 2490							
622194.08	5208740.12	5215.9	1	12	259.76	198.35	1.31
622192.87	5208842.00	5219.0	2	12	259.39	198.85	1.30
622190.72	5209289.48	5233.2	3	12	266.86	197.40	1.35
622189.66	5209484.50	5239.4	4	12	259.62	197.57	1.31
Line 2500							
622242.77	5208716.84	5324.3	1	12	258.26	198.18	1.30
Line 2510							
622292.37	5208715.43	5464.4	1	12	255.00	198.02	1.29
Line 2520							
622345.22	5209220.64	5775.8	1	12	280.77	198.00	1.42
622342.90	5209015.62	5781.4	2	12	277.33	198.30	1.40
622346.78	5208670.32	5790.9	3	12	270.92	199.00	1.36
622346.46	5207599.19	5820.7	4	12	286.60	199.21	1.44
Line 2530							
622389.28	5208765.41	5937.0	1	12	269.14	199.02	1.35
Line 2540							
622444.48	5208712.08	6021.4	1	12	269.01	199.08	1.35

623847.62	5207310.02	8756.5	1	12	340.53	200.94	1.69
Line 2830							
623891.89	5207594.74	8830.5	1	12	340.71	203.64	1.67
Line 2840							
623944.69	5207555.52	9139.4	1	12	349.26	200.01	1.75
623942.75	5207396.19	9144.2	2	12	349.27	202.86	1.72
Line 2850							
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Line 2910							
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624295.00	5207095.41	9773.0	2	12	350.74	199.99	1.75
Line 2930							
624389.62	5207814.90	10019.1	1	12	365.49	200.99	1.82
624392.88	5207057.64	10045.8	2	12	365.34	199.01	1.84
Line 2940							
624441.40	5207758.64	10118.1	1	12	367.55	202.04	1.82
Line 2970							
624589.77	5207416.58	10336.1	1	12	372.36	200.67	1.86
Line 2980							
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Line 2990							
624692.26	5207340.35	10476.0	1	12	370.21	200.41	1.85
Line 3000							
624740.88	5207244.15	10539.7	1	12	373.84	201.19	1.86
624741.86	5207319.93	10542.0	2	12	374.20	200.39	1.87

APPENDIX IV Impulse Instrumentation Specification Sheet

Impulse Helicopter Electromagnetic System
DESCRIPTION

The Impulse EM is a digital helicopter-borne frequency-domain electromagnetic system developed by Aeroquest and introduced into the commercial geophysical survey market at the beginning of 1997. This innovative wideband frequency-domain system utilizes a single computer-controlled, high-output transmitter driver to power single horizontal coplanar and vertical coaxial transmitter coils, producing a total of six frequencies (three in each coil orientation). This differs significantly from conventional multi-frequency systems currently used in the industry in that the conventional systems use a multitude of independent coils (e.g. a separate and independent coil set for each frequency). As a result, the Impulse approach can avoid many of the pitfalls associated with a plethora of coils, all interacting with each other. Furthermore, the common coil approach used in Impulse has the potential to minimize system baseline drift and the often seen disparate performance of the many superimposed coil sets found in traditional frequency-domain systems. In addition, the Impulse system uses a larger diameter tubular coil platform (30" as opposed to the traditional 20") which permits the system to generate larger dipole moments, thereby resulting in an improved signal-to-noise ratio, all of which quickly translates to better integrity of the measured inphase and quadrature data and an improved depth of exploration.

SPECIFICATIONS

Number of operating frequencies: 6 total (3 coaxial, 3 coplanar)

Typical operating frequencies (software selectable):

Coplanar: 930 Hz, 4650 Hz, 23250 Hz

Coil orientations: Horizontal coplanar and vertical coaxial

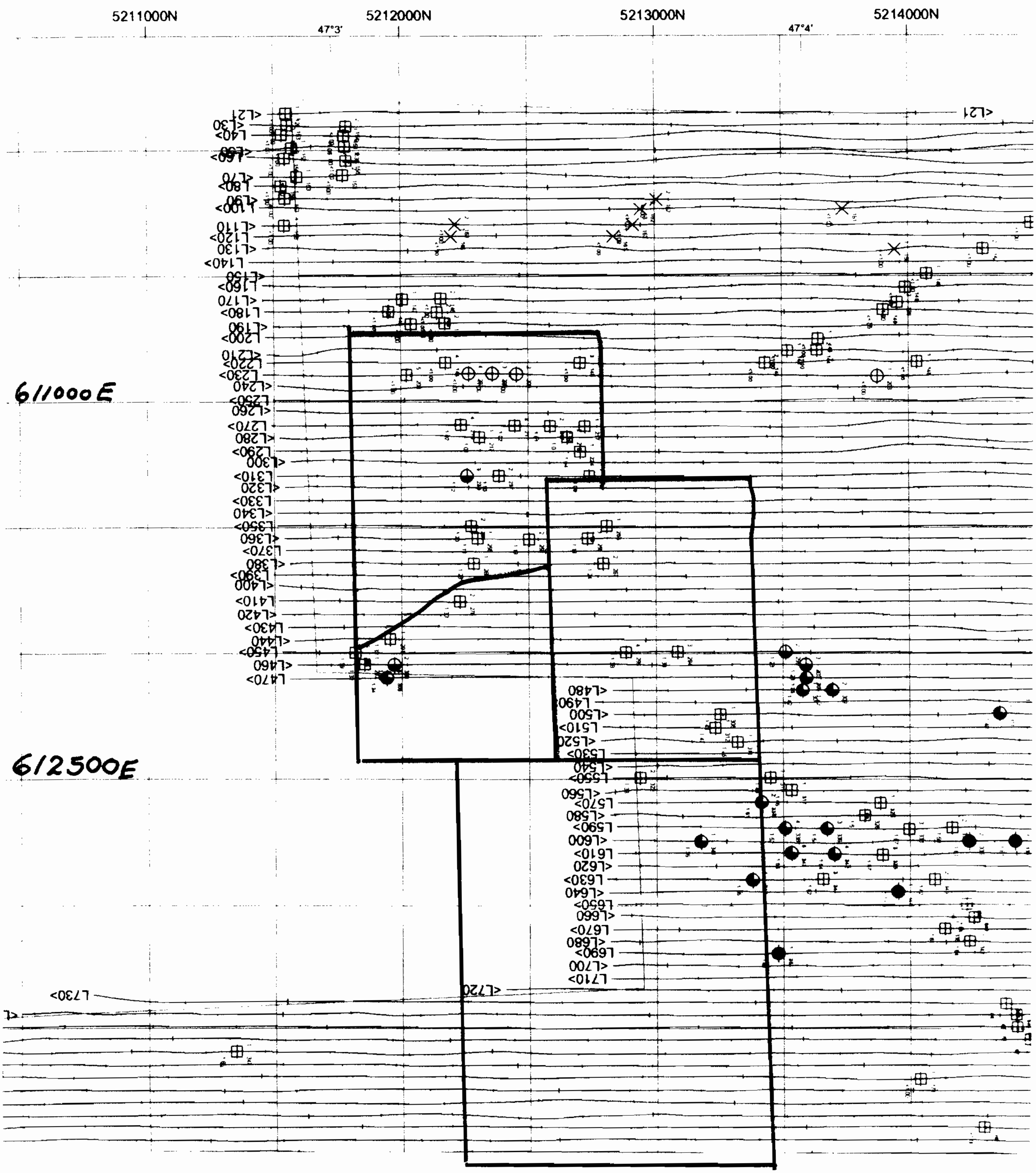
Tx-Rx coil separation: 6.5 m

Typical transmitter dipole moments:

	870 Hz	150 Am^2
Coaxial:	4350 Hz	150 Am^2
	21750 Hz	15 Am^2
	930 Hz	200 Am^2
Coplanar:	4650 Hz	100 Am^2
	23250 Hz	15 Am^2

Outputs:	6 in-phase and 6 quadrature channels, calibrated in ppm
Noise levels:	Less than 1 ppm rms under ideal conditions
Base-Line drift:	Less than 15 ppm per hour after initial warm-up
Output time constant:	0.033 seconds
Output sampling rate:	30 per second
System power:	30 Amps maximum at 22-28 VDC
Tow cable:	40 meters long with Kevlar strain member and weak-link
Temperature range:	-30 to +35 degrees Celsius
Overall bird dimensions:	76 cm diameter, 7 m length
Overall bird weight:	200 kg

(Specifications are subject to change without notice.)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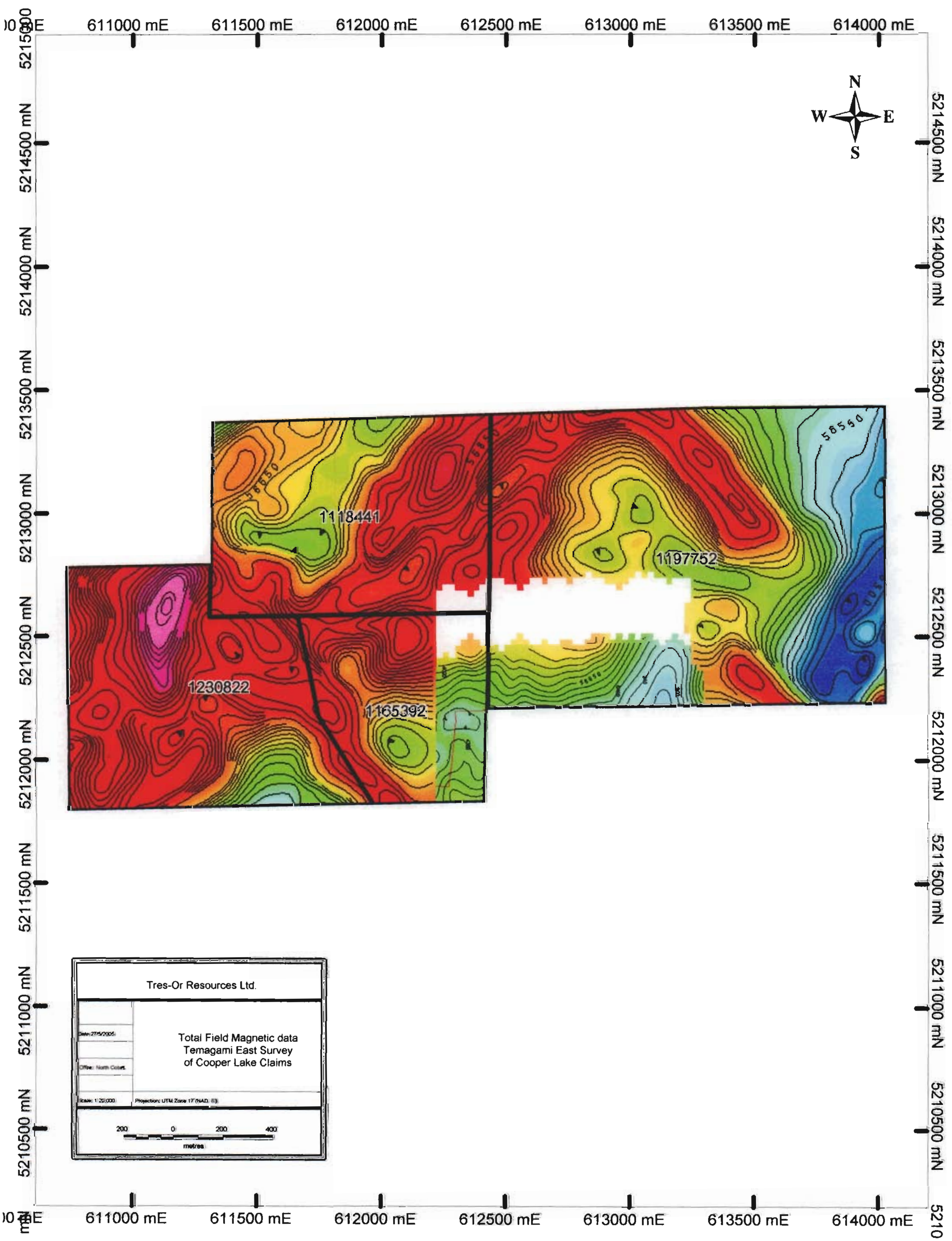

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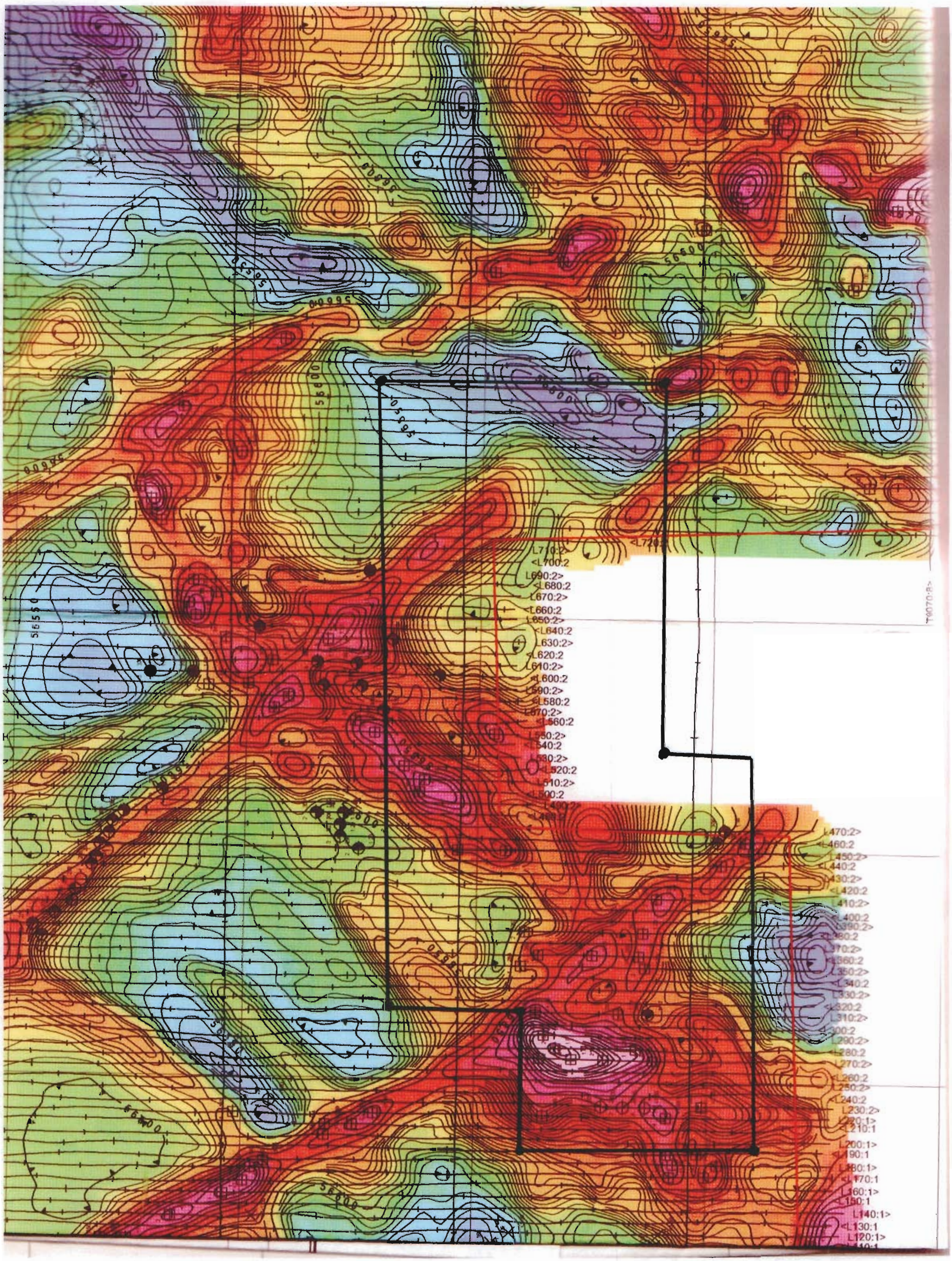
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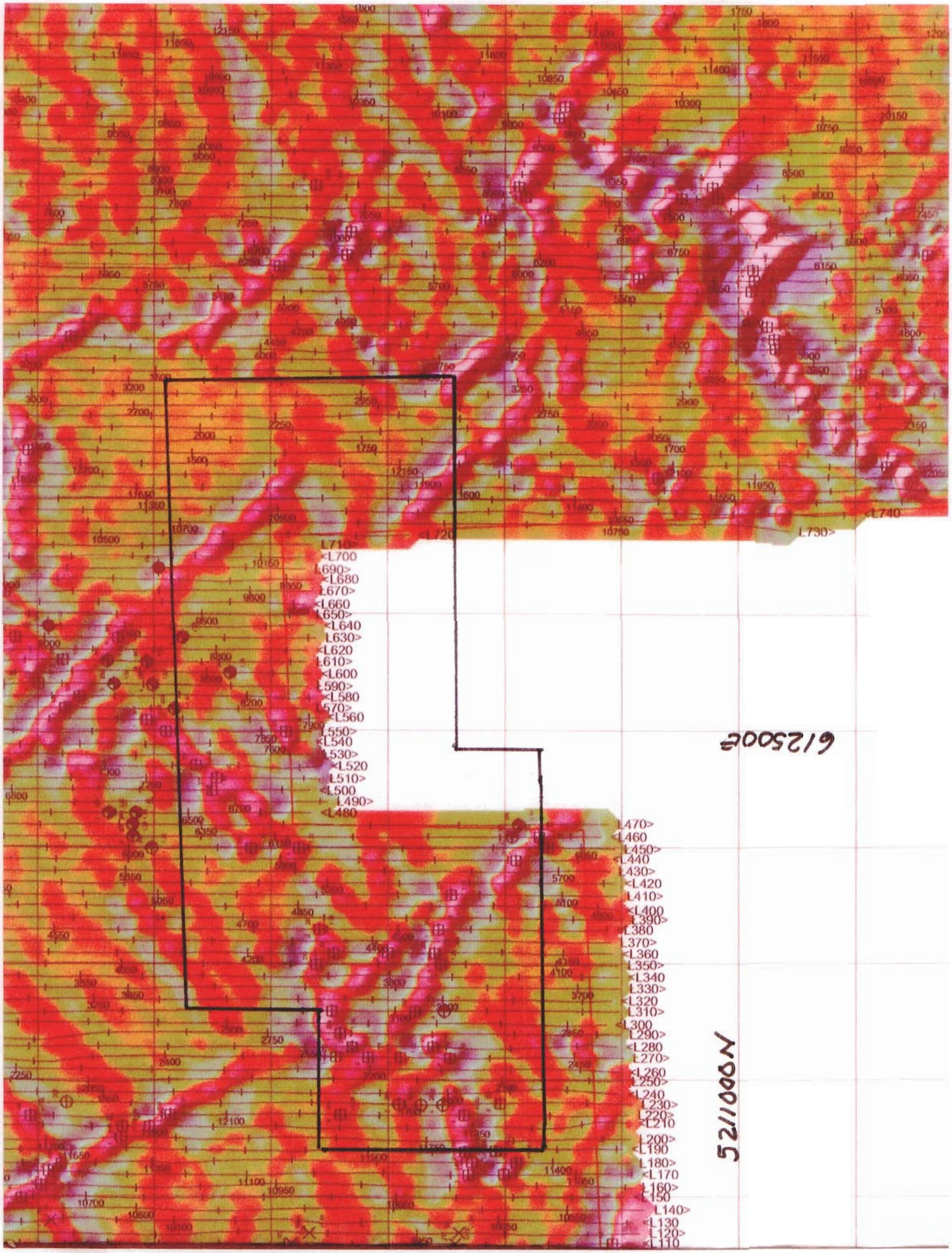

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