Report of the Helicopter-Borne Versatile Time Domain Electromagnetic Geophysical Survey: Max and Ox Properties

OXTOBY, VENTON, SAARIMAKI, WOWCHUK, GITTINS, DAINTY LAKE AREAS
Thunder Bay and Porcupine Mining Division
Province of Ontario

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2・42409

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INTRODUCTION

From April 3rd to 13th, 2008, Geotech Ltd of 245 Industrial Parkway North Aurora, Ontario, Canada carried out a helicopter-borne geophysical survey for East West Resource Corporation over two blocks known as the Max and Ox properties located west and northwest of Ogoki Post, Ontario, Canada. The geophysical surveys consisted of helicopter borne EM using the versatile time-domain electromagnetic (VTEM) system and aeromagnetics using a caesium magnetometer. The total area coverage is ~174km^2, and a total of 1344 line-km of geophysical data were acquired during the survey. Data quality control and quality assurance, and preliminary data processing were carried out on a daily basis during the acquisition phase of the project. Preliminary and final data processing, including generation of final digital data products were done at the office of Geotech Ltd. in Aurora, Ontario.

PROPERTY LOCATION AND ACCESS

The Max property consists of 38 claims (571 claim units) with an area of 90.85 km and is located in the Norton-McFaulds Lake Area of Northern Ontario. The property can be found approximately 54 km west of Marten Falls First Nation at Ogoki Post, Ontario. The Ox property consists of 44 claims (618 claim units) with an area of 100.70 km and is located in the Norton-McFaulds Lake Area of Northern Ontario. The property can be found approximately 43 km northwest of Marten Falls First Nation, Ogoki Post, Ontario. Fly in access to both properties can be obtained from air bases in Armstrong, or Nakina, Ontario.

CLAIM STATUS

The geophysical survey was carried out on 84 mining claims that make up the two properties. A complete list of all the mining claims that make up each property is located in Appendix A.

PREVIOUS WORK

Apart from the earlier reconnaissance geology and geophysics performed by the federal and provincial geological surveys, there have been no previous studies on the Max or Ox properties and the properties were unexplored prior to the recent VTEM and magnetic survey flown for this program. However, detailed geology mapped in the Mameigwess-Rowlandson Lake Greenstone and adjacent belts and interpretation of the same magnetic trend on the property as with properties in the greater McFaulds Lake or "Ring of Fire" area have provided previous work in the region in analysis leading up to the planning of this survey. As summarized in Middleton *et al.* (2008):

1962 Bostock, H.H. of the Geological Survey of Canada first did a geological map of the Lansdowne House area delineating the unnamed greenstone belt in the area of Fishtrap Lake including the extent of the hornblende gabbro in the Fishtrap Lake area. Rock units can be outlined by an original aeromagnetic trend that can be seen from the results of the aeromagnetic survey flown from 1959 to 1960.

1963 Duffell, S., MacLaren, A.S. and Holman, R.H.C. of the Geological Survey of Canada wrote a report on bedrock geology, geophysical and geochemical investigations of the Red Lake-Lansdowne House Area, Northwestern Ontario in the interest of the "Roads to Resources" program: the Federal Government's policy to aid the provinces in building roads to northern areas for developing the country's resources. The bedrock geology of the volcanic belt from Wunnummin to Mameigwess Lakes was first described as containing metabasalts that are coarse grained and resembles meta-diorites, suggesting they are metamorphosed lava flows.

1970 Thurston, P.C. and Carter, M.W. of the Ontario Department of Mines did the geological mapping project Operation Fort Hope designed to provide rapid coverage of little known regions of the province for the compilation of geologic maps. Mafic metavolcanics in all the belts of the Fort Hope area have been described as representing andesitic to basaltic flows metamorphosed to greenschist, almandine-amphibolite or hornblende hornfels facies.

1970-1974 Canadian Nickel Company (Canico, now INCO) carried out geophysics and 47 diamond drill holes in the Lavoie-Springer Lakes Areas to the NW. A mineralized body was delineated comprising 14.6Mt grading 0.58% Cu, 0.37% Ni, 0.03% Co (Novak, 1992) and began further exploration in that area in the future in the intrusion that was later defined as the Lansdowne House Igneous Complex (LHIC) by Mazur and Osmani (2002).

1979 Thurston, P.C., Sage, R.P., and Siragusa, G.M. of the Ontario Geological Survey wrote a report along with maps on the Geology of the Winisk Lake Area, further outlined the extent of the Wunnummin Lake Belt and also described outcrops of hornblende gabbro and serpentinized peridotite in the Fishbasket Lake area of the eastern section of the belt.

1984-1985 Bryndon Ventures Inc. performed a VLF-EM survey in Benjamin Lake Township to the north of the property. Five EM conductors were found and thought to represent sulphide accumulations along a contact between feldspar porphyry and metavolcanics.

1985-1986 Blue Falcon Mines Ltd. performed an airborne magnetic and VLF-EM survey over a large area near Lansdowne House including Benjamin Lake Township. VLF-EM conductors identified are believed to represent sulphide accumulations.

2001-2003 Superior Diamonds Inc. did overburden sampling for diamond indicator minerals over a 16ha block that included Benjamin Lake Township and BMA 523 871 Area. The heavy mineral data indicates that the magnetic signature associated with its property is not related to kimberlites.

2002 Masur and Osmani of Aurora Platinum Corporation wrote a report on the exploration program on the Lansdowne House Property that consisted of geophysics, reconnaissance mapping, diamond drilling. In his report, he outlined the stratigraphy of the Lansdowne House Igneous Complex and results from mapping, geochemistry, and drilling point out the Complex is a lopolith/sill-like body with a basal ultramafic, middle mafic and mafic to intermediate upper/roof zone. PGE-dominated mineralization occurs in a plagioclase-rich gabbro reef within the middle zone with values of 1.1g/t Pd+Pt over 4.5m and 1.04g/t Pd+Pt over 25.5m in holes LH01-02 and LH01-20 respectively. Cu-Ni±PGE is associated with disseminated and net-textured semi-massive to massive sulphide hosted by gabbros in the middle zone with values of 0.23% Cu-Ni, 0.32g/t Pd+Pt+Au over 220.6m including 0.4% Cu+Ni, 0.3g/t Pd+Pt+Au over 39.0m and other significant zones defined in 4 drill holes (Mazur and Osmani, 2002). Also, he further described and mapped the geology of the Mameigwess-Rowlandson Lake Greenstone Belt (first named in Osmani & Stott, 1988), specifically the metavolcanic rocks in the vicinity of the Lansdowne House Igneous Complex. Along with describing primary textures of aphyric, plagioclase-phyric massive and pillowed flows, breccias, amygdaloidal lavas and tuffs, he noted the rocks are amphibolitized which places the rocks in upper greenschist-amphibolite facies metamorphism.

2002-2007 Spider Resources Inc.-KWG Resources Inc.-De Beers Canada Inc. joint venture in diamond drill exploration for kimberlite bodies discovered the McFauld's #1 VMS occurrence to the NE of the property in rock units of the same stratigraphic package as the Fishhook property and along an arcuate magnetic feature seen from a provincial airborne magnetic survey. The McFauld's #1 occurrence returned values of average 1.6% Cu over 8 meters. In subsequent five field seasons, 10 individual VMS occurrences were discovered by Spider and joint venture partners with the widest intersection of 8.02% Cu over 18.8 meters at the McFauld's #3 occurrence. Since then more drill programs have been conducted with massive sulphide intersections (www.spiderresources.com).

2003 The Ontario Geological Survey performed an airborne magnetics survey of the Attawapiskat area that provided an accurate depiction of subsurface geology displaying an arcuate belt of highly magnetic rocks of the "Ring of Fire" in the McFauld's Lake area.

2006-2007 Northern Shield Resources Inc. did geological assessment and diamond drilling of the Highbank Lake Property and along with using data from the high resolution airborne magnetic survey performed by them in 2003, have reinterpreted the Fishtrap Igneous Complex to extend eastward covering the area of Highbank Lake giving the intrusion a total of 500 square kilometer area. Results of drilling performed in 2007 include discovery of a vanadium-bearing magnetite reef with a width of 4.9 meters, from 174.75 to 179.68 m, averaging 0.75% V_2O_5, 7.56% TiO_2 and >40.2% Fe, including a high-grade interval of 0.97% V_2O_5, 9.45% TiO_2 and >50% Fe over 2.2 meters (February 12, 2007 press release: www.northern-shield.com/press-releases.html). These reefs have been found in the upper sequences of some layered intrusions such as the Bushveld complex in South Africa. Further drilling that year have yielded results of PGE-bearing zones with 0.53g/t Pt+Pd over 0.34 meters in hole 07HB-05 and 0.124g/t Pt over 1.09 meters in hole 07HB-01 (November 6, 2007 press release: www.northern-shield.com/press-releases.html).

2007 Noront Resources Ltd. discovered high grade Ni, Cu, Pt, Pd and indications of Rh in drill core over significant widths on the Eagle One deposit. Their Double Eagle property, is also located along the arcuate feature with the McFauld's VMS occurrences. Drill results include a 117 meter section grading 4.1% Ni, 2.2% Cu, 2.1g/t Pt and 7.1g/t Pd (September 19, 2007 press release: www.norontresources.com/projects/ double-eagle/index.html).

HELICOPTER TIME-DOMAIN ELECTROMAGNETIC SURVEY

This survey was flown over both the Max and Ox properties totalling 1344 line-kilometres, 1246.8km of which were on the Max property and 123.7km of which were on the Ox property. The survey covered an area of 160.5 km^2 on the Max property and 13.3 km^2 on the Ox property. The survey was flown at various line spacing on the Max property (Line numbers L2000-3310 were flown in a N90°E direction with 150m line spacing, line numbers T5000-5040 were flown in a N0°E direction with 1500m line spacing, line numbers L4010-4230 were flown at N0°E direction with a line spacing of 200m, while the lines flown in a N90°E direction had line spacing of 2000m).
On the Ox property the survey line numbers L1000-1240 were flown in a N0°E direction with line spacing of 100m. Tie lines were flown perpendicular to traverse lines in a north-south direction with traverse line spacing of 1500m. Where possible, the helicopter maintained a mean terrain clearance of 74m, which translated into an average height of 39m above ground for the bird-mounted VTEM system and 59m for the magnetic sensor.

Nominal survey speed was 80km/hour. The data recording rates of the data acquisition was 0.1 second for the electromagnetics and magnetometer, 0.2 seconds for altimeter and GPS. This translates to a geophysical reading about every 2 meters along flight track. Navigation was assited 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 survey was flown using a Eurocopter Aerospatiale 350 B3 helicopter, registration C-GEOZ, owned and operated by Gateway Helicopters Ltd. Installation of the geophysical and ancillary equipment was carried out by Geotech Ltd. The electromagnetic system was a Geotech Time Domain EM (VTEM) system. The magnetic sensor utilized for the survey was a Geometrics optically pumped cesium vapour magnetic field sensor, mounted in a separated bird, towed 15m 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. A Terra TRA 3000/TRI 40 radar altimeter was used to record terrain clearance. See Appendix C for full details in Geotech's survey report.

CONCLUSIONS AND RECOMMENDATIONS

A versatile time-domain electromagnetic survey has been completed over the Max and Ox properties covering a total of 1344 line-km. The principle sensors used included a time-domain electromagnetic system and a caesium magnetometer. The results have been presented in Appendix D as electromagnetic profiles, a time gate gridded EM channel, and a colour magnetic contour map. The digital data provided includes all electromagnetic and magnetic products as well as positional, altitude and raw data.

This survey highlighted two VTEM anomalies on the north portion of the Max property, one associated with a dike-like feature extending south from a mafic intrusion called Wabassi II. A more interesting 700 m long conductor was found in the centre of a discrete magnetic body interpreted to be a layered ultramafic body. This conductor was deep, being 200-400 m below surface. A strong formational conductor was found at the south end of the property with 2, 200 m long sections being thick and having high conductivity massive sulphide characteristics. These sit on the south margin of a large zoned intrusion, in a Norton style setting (iron formation and gabbro in contact). Drilling is recommended to test these targets for mineralization.

A total of six conductors have been identified from this survey on the Ox property. These conductors warrant diamond drilling to test for mineralization. The drill targets are Nickel-Copper-Platinum deposits such as the Norton and the recently discovered Double Eagle by Noront.

REFERENCES

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Mazur, R.J. and Osmani, I.A., 2002. Lansdowne House Property, Bartman Lake Area, Northwestern Ontario for Aurora Platinum Corp., 45 p.

Middleton, R.S., Nielsen, P. and Bennett, N. 2008. Drill report and Prospecting report: Fishhook Property: BMA 523863, BMA 524864, BMA 523864 and BMA 524863 Areas, Thunder Bay and Porcupine Mining Divisions, Ontario, Canada. 15p.

Novak, N.D., 1992. The Blue Heron Project - Geological evaluation report prepared for Blue Falcon Mines Limited covering Springer - Lavoie Lake anomaly and Copping Lake anomaly, Assessment Files, Thunder Bay Resident Geologist Office.

Osmani, I.A., and Stott, G.M., 1988. Regional-scale shear zones in Sachigo Subprovince and their economic significance; Ontario Geological Survey, Miscellaneous Paper 141, pp. 53 - 67.

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CERTIFICATE OF AUTHOR

I, Paul Nielsen, do hereby certify that:

1. I am the Exploration Manager of East West Resource Corporation.
2. I hold the following academic qualifications:
   B.Sc. (Hons) Geology (1974), Lakehead University, Thunder Bay, Ontario, Canada
3. I am a member of the Association of Professional Geoscientists of Ontario (Member #1130).
4. I have worked in the mineral exploration industry throughout Canada including New Brunswick , Ontario, Manitoba, British Columbia and the Northwest Territories for more than 30 years as a geologist.
5. I am not aware of any material fact or material changes with respect to the subject matter of this report, the omission of which would make this report misleading.

Dated this 18th Day of August, 2009.

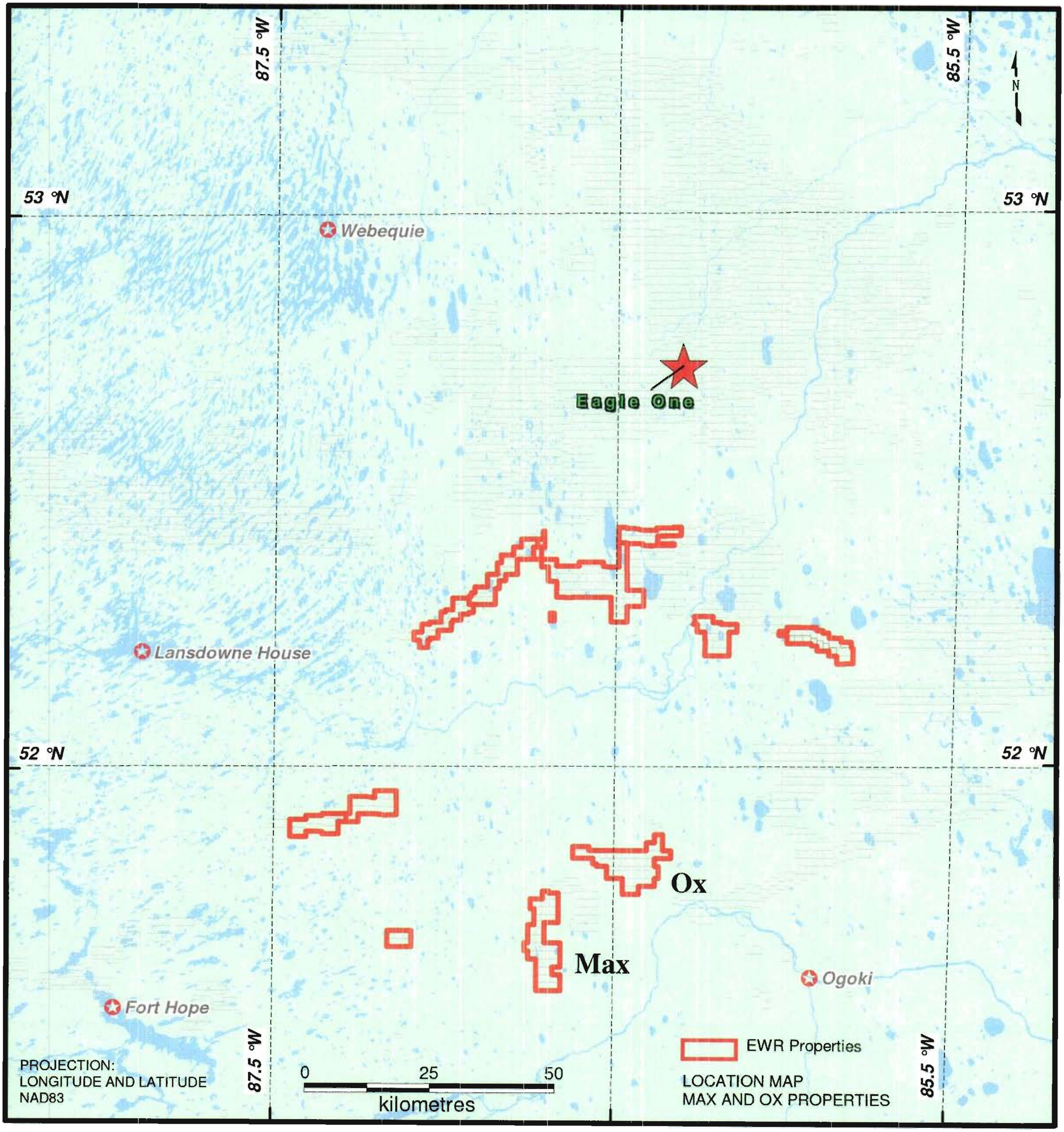
Respectfully Submitted:

PAUL ERIK NIELSEN
PRACTISING MEMBER
1130
ONTARIO

Paul E. Nielsen, P.Geo.
Exploration Manager, East West Resource Corporation

Appendix A

Property Location Map, Claim Continuity Map and Claim Status List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85.5 °W
N
53 °N
53 °N
Webequie
Eagle One
Lansdowne House
52 °N
52 °N
Ox
Max
Ogoki
Fort Hope
PROJECTION:
LONGITUDE AND LATITUDE
NAD83
87.5 °W
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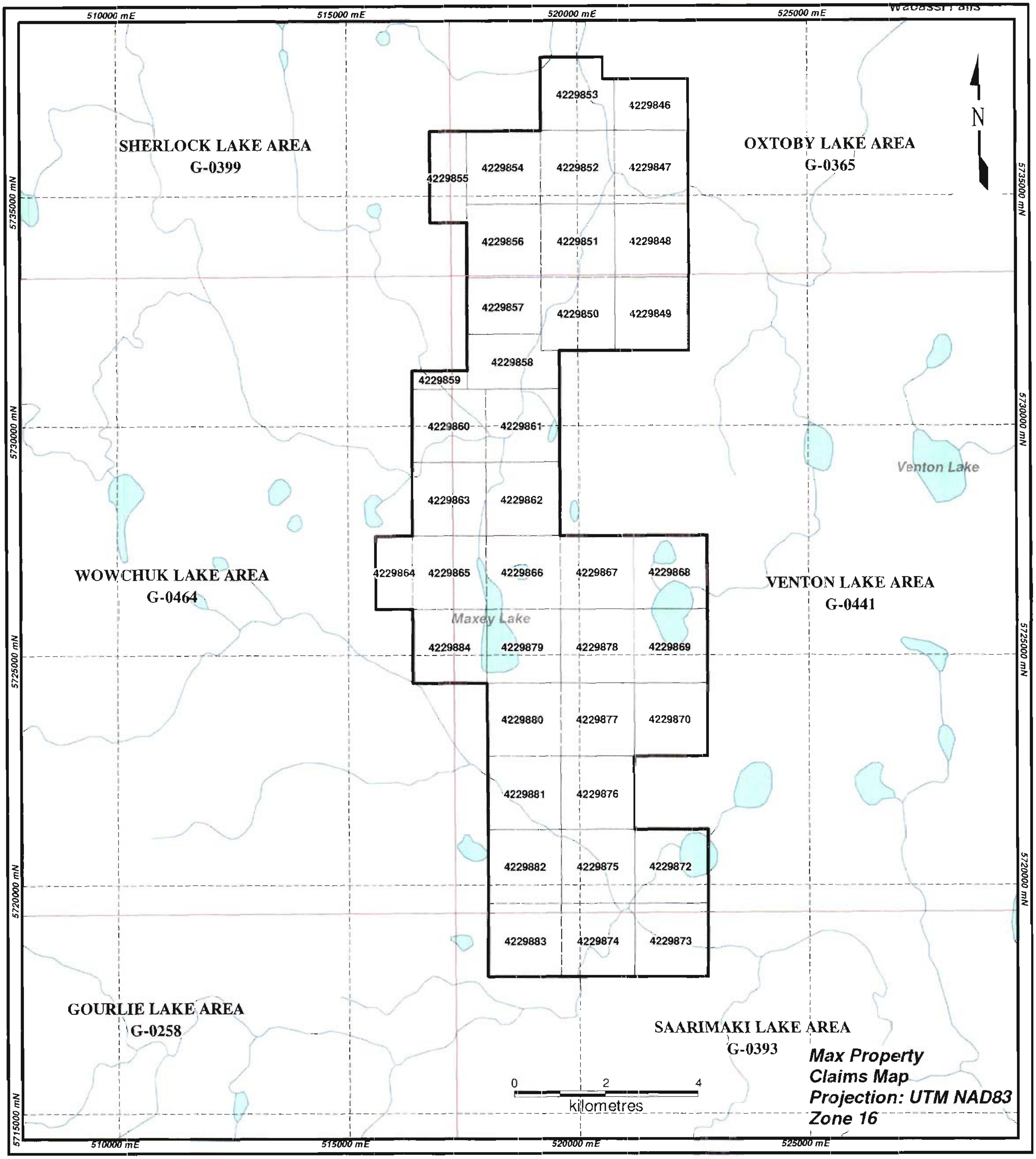
25
50
kilometres
EWR Properties
LOCATION MAP
MAX AND OX PROPERTIES
85.5 °W



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OXTOBY LAKE AREA
G-0365
WOWCHUK LAKE AREA
G-0464
VENTON LAKE AREA
G-0441
GOURLIE LAKE AREA
G-0258
SAARIMAKI LAKE AREA
G-0393
Venton Lake
Maxey Lake
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4229869
4229880
4229877
4229870
4229881
4229876
4229882
4229875
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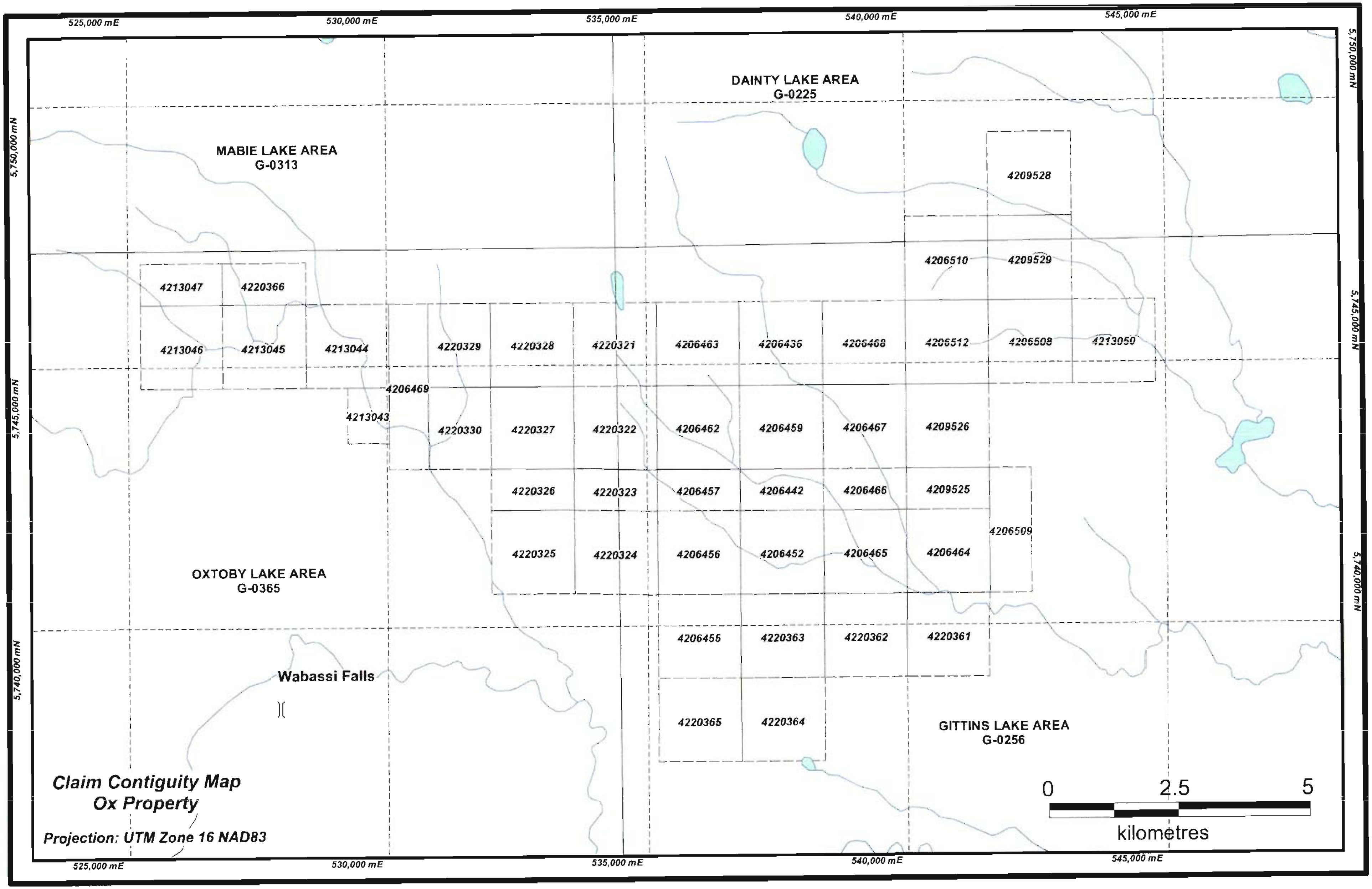
2
4
kilometres
Max Property
Claims Map
Projection: UTM NAD83
Zone 16



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G-0225
MABIE LAKE AREA
G-0313
OXTOBY LAKE AREA
G-0365
GITTINS LAKE AREA
G-0256
Wabassi Falls
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4206465
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4206455
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4220364
0
2.5
5
kilometres
Claim Contiguity Map
Ox Property
Projection: UTM Zone 16 NAD83

LIST OF CLAIMS
OX AND MAX
PROPERTIES

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4229849	Feb 4, 2008	Feb 4, 2010	6400	0	16	Max	255.23	0	VENTON LAKE
4229850	Feb 4, 2008	Feb 4, 2010	6400	0	16	Max	255.23	0	VENTON LAKE
4229851	Feb 4, 2008	Feb 4, 2010	6400	0	16	Max	255.23	0	OXTOBY LAKE (TB)
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LIST OF CLAIMS
OX AND MAX
PROPERTIES

CLAIM_NUMBER	RECORDING_DATE	DUE_DATE	WORK_REQUIRED	TOTAL_RESERVE	UNIT_SIZE	PROPERTY	AREA_HA	TOTAL_APPLIED	TOWNSHIP_AREA
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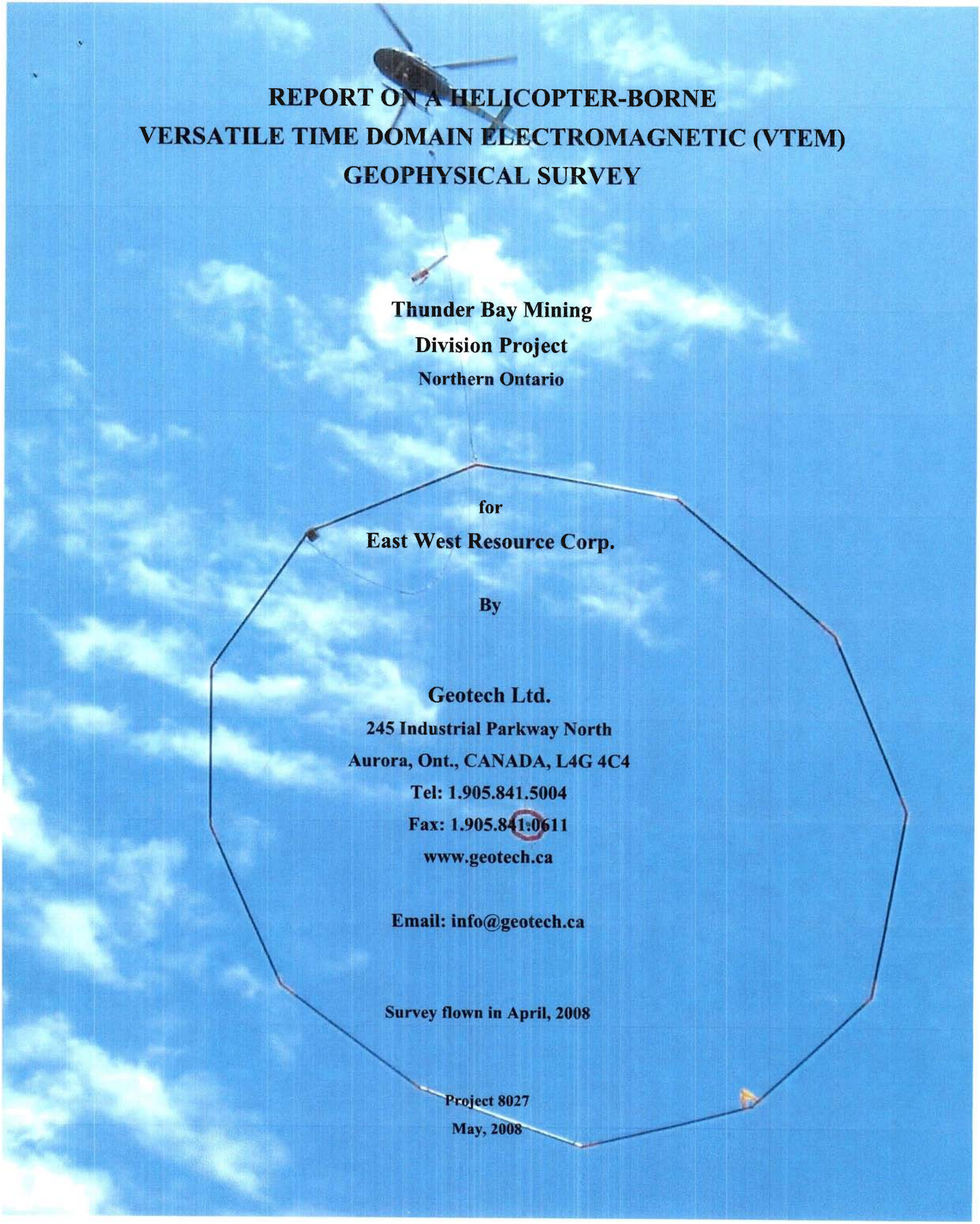
4220330	Jan 9, 2008	Jan 9, 2010	4800	0	12	Ox	187.29	0	OXTOBY LAKE (PORC)
4220361	Jan 30, 2008	Jan 30, 2010	6400	0	16	Ox	250.88	0	GITTINS LAKE
4220362	Jan 30, 2008	Jan 30, 2010	400	0	16	Ox	255.22	0	GITTINS LAKE
4220363	Jan 30, 2008	Jan 30, 2010	6400	0	16	Ox	255.22	0	GITTINS LAKE
4220364	Jan 30, 2008	Jan 30, 2010	6400	0	16	Ox	255.21	0	GITTINS LAKE
4220365	Jan 30, 2008	Jan 30, 2010	6400	0	16	Ox	255.22	0	GITTINS LAKE

LIST OF CLAIMS
OX AND MAX
PROPERTIES

CLAIM_NUMBER	RECORDING_DATE	DUE_DATE	WORK_REQUIRED	TOTAL_RESERVE	UNIT_SIZE	PROPERTY	AREA_HA	TOTAL_APPLIED	TOWNSHIP_AREA
4220366	Jan 30, 2008	Jan 30, 2010	3200	0	8	Ox	127.77	0	OXTOBY LAKE (TB)

Appendix B

Geotech Ltd. Report on Helicopter-Borne VTEM Geophysical Survey



REPORT ON A HELICOPTER-BORNE VERSATILE TIME DOMAIN ELECTROMAGNETIC (VTEM) GEOPHYSICAL SURVEY

Thunder Bay Mining

Division Project

Northern Ontario

for

East West Resource Corp.

By

Geotech Ltd.

245 Industrial Parkway North

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www.geotech.ca

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Survey flown in April, 2008

Project 8027

May, 2008

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REPORT ON A HELICOPTER-BORNE VERSATILE TIME DOMAIN ELECTROMAGNETIC SURVEY

Thunder Bay Mining Division Project, Northern Ontario, Canada

Executive Summary

During April 3 – 13th, 2008, Geotech Ltd. carried out a helicopter-borne geophysical survey for East West Resource Corp. over two blocks near Ogoki, Ontario, Canada.

Principal geophysical sensors included a versatile time domain electromagnetic (VTEM) system and a cesium magnetometer. Ancillary equipment included a GPS navigation system and a radar altimeter. A total of 1344 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 the Ogoki Team House in Ogoki, Ontario. Preliminary and final data processing, including generation of final digital data products were done at the office of Geotech Ltd. in Aurora, Ontario.

The processed survey results are presented as electromagnetic stacked profiles and the following grids;

- Total magnetic intensity
- B-Field Time Gate 1.151 ms

1. INTRODUCTION

1.1 General Considerations

These services are the result of the Agreement made between Geotech Ltd. and East West Resource Corp. to perform a helicopter-borne geophysical survey over two blocks near Ogoki, Ontario.

1344 line-km of geophysical data were acquired during the survey.

Robert Middleton, acted on behalf of East West Resource Corp. during data acquisition and data processing phases of this project.

Survey blocks are as shown in Appendix A.

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

Survey flying was completed on April 13th, 2008. 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 Ltd. in May, 2008.

1.2 Survey and System Specifications

The main survey block flown was at a nominal traverse line spacing of 150 meters, at an east-west direction (90° Azimuth). Tie lines were flown perpendicular to traverse lines in a north-south direction at a traverse line spacing of 1500 meters.

Where possible, the helicopter maintained a mean terrain clearance of 74 meters, which translated into an average height of 39 meters above ground for the bird-mounted VTEM system and 59 meters for the magnetic sensor.

The survey was flown using a Eurocopter Aerospatiale 350 B3 helicopter, registration C-GEOZ. The helicopter was operated by Gateway Helicopters Ltd. Details of the survey specifications may be 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 Ltd.

Databases, grids and maps of final products are presented to East West Resource 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 and Cultural Features

The survey block is located in Northern Ontario approximately 50km west of Ogoki, Ontario. Access by road is restricted.

Topographically, the survey area exhibits a shallow relief, with an elevation range of 186 meters to 236 meters above sea level. The area exhibits many lakes, rivers and wetlands. Appendix A depicts the flight path over the topology.

Special care is recommended in identifying cultural features that might be detected in the survey area.

2. DATA ACQUISITION

2.1 Survey Area

The survey block (see location map, Appendix A) and general flight specifications are as follows:

Table 1 - Survey block

<table>
<tr><th>Survey block</th><th>Line spacing (m)</th><th>Area (Km^2)</th><th>Line-km's</th><th>Flight direction</th><th>Line numbers</th></tr>
<tr><td rowspan="2">MAX I</td><td>150</td><td rowspan="4">160.5</td><td rowspan="4">1246.8</td><td>N90°E</td><td>L2000 – 3310</td></tr>
<tr><td>1500</td><td>N0°E</td><td>T5000 – 5040</td></tr>
<tr><td rowspan="2">MAX II</td><td>200</td><td>N0°E</td><td rowspan="2">L4010 – 4230</td></tr>
<tr><td>2000</td><td>N90°E</td></tr>
<tr><td>OX</td><td>100</td><td>13.3</td><td>123.7</td><td>N0°E</td><td>L1000 – 1240</td></tr>
</table>

Survey block boundaries co-ordinates are provided in Appendix B.

2.2 Survey Operations

Survey operations were based in Ogoki, Ontario for the acquisition phase of the survey.

The following table shows the timing of the flying.

Table 2 - Survey schedule

Date	Flight #	Flown KM	Block	Crew location	Comments
03-Apr-08				Ogoki, Ontario	Mobilization
04-Apr-08				Ogoki, Ontario	No production – low ceiling
05-Apr-08	1 - 3	198	MAX	Ogoki, Ontario	No production – helicopter engine technicalities
06-Apr-08	4	26	MAX	Ogoki, Ontario	Limited production – technical issues
07-Apr-08				Ogoki, Ontario	No production – snow flurries, high winds
08-Apr-08				Ogoki, Ontario	No production – low ceiling
09-Apr-08	5, 6	16	MAX	Ogoki, Ontario	Production aborted in a.m. – low ceiling Production aborted in p.m. – technical issues

Date	Flight #	Flown KM	Block	Crew location	Comments
10-Apr-08	7, 8	348	MAX	Ogoki, Ontario	Production
11-Apr-08	9, 10	192	MAX	Ogoki, Ontario	Production
12-Apr-08	11 - 13	394	MAX	Ogoki, Ontario	Production
13-Apr-08	14	160	MAX	Ogoki, Ontario	Production – COMPLETE

2.3 Flight Specifications

The nominal EM sensor terrain clearance was 39 m (EM bird height above ground, i.e. helicopter is maintained 74 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 meters 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

A Eurocopter Aerospatiale 350 B3 helicopter (registration C-GEOZ), owned and operated by Gateway Helicopters Ltd., was used for the survey. 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 configuration is as indicated in Figure 1 below.

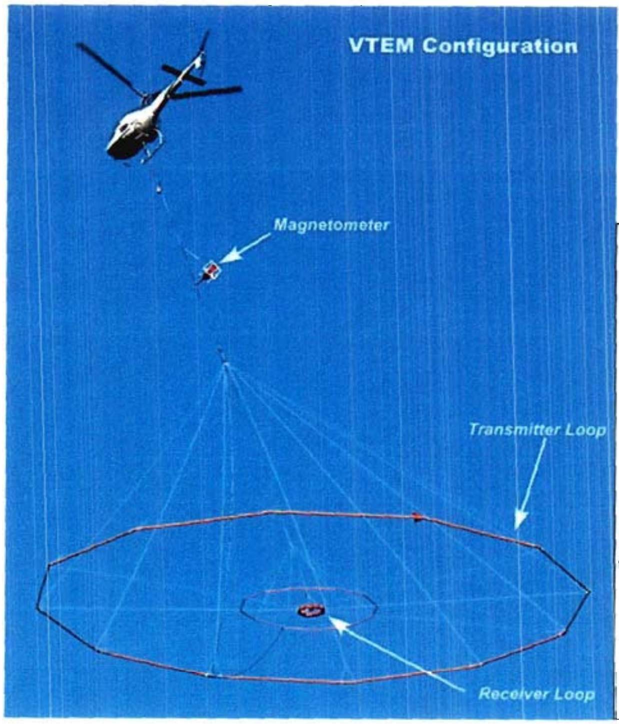


Figure 1 - VTEM Configuration

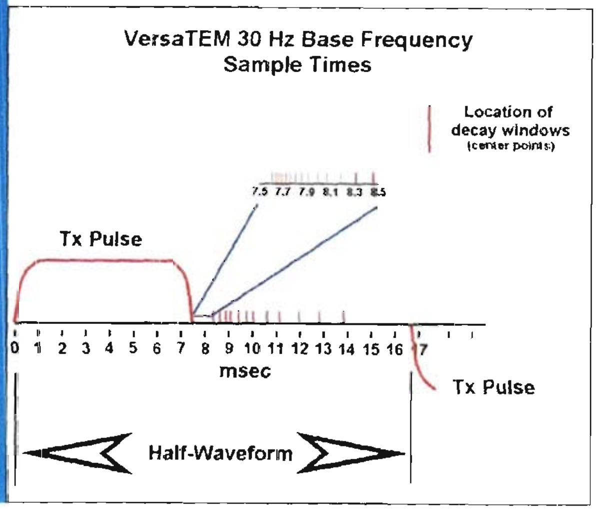


Figure 2 - VTEM Waveform & Sample Times

Receiver and transmitter coils are concentric and Z-direction oriented. The receiver decay recording scheme is shown diagrammatically in Figure 2.

VTEM system parameters

Transmitter Coil

- Transmitter coil diameter: 26 m
- Number of turns: 4
- Transmitter frequency: 30 Hz
- Peak current: 205 A
- Pulse width: 7.6 ms
- Duty cycle: 46%
- Peak dipole moment: 436,200 NIA

Receiver Coil

- Receiver coil diameter: 1.2 m
- Number of turns: 100.
- Effective coil area: 113.1 m^2
- Wave form shape: trapezoid.
- Sampling frequency: 10 Hz

The EM bird was towed 42 m below the helicopter.

2.4.3 Airborne magnetometer

The magnetic sensor utilized for the survey was a Geometrics optically pumped cesium vapour magnetic field sensor, mounted in a separated bird, towed 15 meters below the helicopter, as shown in Figure 1. 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 Radar Altimeter

A Terra TRA 3000/TRI 40 radar altimeter was used to record terrain clearance. The antenna was mounted beneath the bubble of the helicopter cockpit.

2.4.5 GPS Navigation System

The navigation system used was a Geotech PC based navigation system utilizing a NovAtel's CDGPS enabled 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 block were set-up prior to the survey and the information was fed into the airborne navigation system.

Twenty-four measurement gates were used in the range from 120 μs to 6578 μs, as shown in Table 3.

Table 3 – Decay Sampling Scheme

VTEM Decay Sampling scheme				
Array Index	(Microseconds)			
	Time Gate	Start	End	Width
10	120	110	131	21
11	141	131	154	24
12	167	154	183	29
13	198	183	216	34
14	234	216	258	42
15	281	258	310	53
16	339	310	373	63
17	406	373	445	73
18	484	445	529	84
19	573	529	628	99
20	682	628	750	123
21	818	750	896	146
22	974	896	1063	167
23	1151	1063	1261	198
24	1370	1261	1506	245
25	1641	1506	1797	292
26	1953	1797	2130	333
27	2307	2130	2526	396
28	2745	2526	3016	490
29	3286	3016	3599	583
30	3911	3599	4266	667
31	4620	4266	5058	792
32	5495	5058	6037	979
33	6578	6037	7203	1167

2.4.6 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. The data type and sampling interval as provided in table 4.

Table 4 – Acquisition Sampling Rates

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

2.4.7 Base Station

A combined 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 in Ogoki, Ontario away from electric transmission lines and moving ferrous objects such as motor vehicles. The base station 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.

<u>Field</u>

Project Manager:	Shawn Grant
Data QC:	Richard Yee
Engineer:	Igor Tsirkot
Crew chief:	Jim Buchanan
Operator:	Robert Henneberry

The survey pilot and the mechanic engineer were employed directly by the helicopter operator –Gateway Helicopters Ltd.

Pilot:	Francois Brisebois
Mechanical Engineer:	Mike Zonon

<u>Office</u>

QC Geophysicist:	Alexander Prikhodko
Data Processing / Reporting:	Milica Marich

Data acquisition was carried out under the supervision of Andrei Bagrianski, P. Geo., Surveys Manager and the processing phase was carried out under the supervision of Jean Legault, P. Geo., Manager of Data Processing and Interpretation. Overall management of the project was undertaken by Edward Morrison, President, Geotech Ltd.

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 sferics events and to reduce system noise. Local sferics 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 sferics events. The filter used was a 4 point non-linear filter.

The signal to noise ratio was further improved by the application of a 15 point, low pass linear digital filter. This filter has zero phase shift, which prevents any lag or peak displacement from occurring. It suppresses only variations with a wavelength less than about 1 second or 20 meters. This filter is a symmetrical 1 sec linear filter.

The results are presented as stacked profiles of EM voltages for the gate times on preliminary maps at linear-logarithmic scale on the final EM profiles.

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 aeromagnetic data was corrected for diurnal variations by subtracting the observed magnetic base station deviations.

The corrected magnetic line 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 WGS 84, UTM zone 16 north. All maps show the flight path trace and topographic data. Latitude and longitude are also noted on maps.

The preliminary and final results of the survey are presented as EM profiles, a time gate gridded EM channel, and a colour magnetic contour map. The following maps are presented on paper;

- VTEM B-field profiles, Time Gates 0.234 – 6.578 ms in linear - logarithmic scale.
- VTEM dBdt profiles, Time Gates 0.234 – 6.578 ms in linear – logarithmic scale.
- Total Magnetic intensity colour image and contours.
- VTEM B-Field Time Gate 1.151 ms colour image and contours.

5.3 Digital Data

- Two copies of the data and Maps on CD-ROM were prepared to accompany the report. Each CD -ROM contains a digital file of the line data in GDB Geosoft Montaj format as well as the maps in Geosoft Montaj Map format. A *readme.txt* file may be found on the CD -ROM that describes the contents in more detail.

- Two copies of CD-ROMs were prepared.

  There are two (2) main directories,

  Data contains databases, grids and maps, as described below.

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

Databases in Geosoft GDB format, containing the channels listed in Table 5.

Table 5 – Geosoft GDB Data Format

Channel Name	Description
X:	X positional data (meters – WGS84, UTM zone 16 north)
Y:	Y positional data (meters – WGS84, UTM zone 16 north)
Z:	GPS antenna elevation (meters - ASL)
Radar:	Helicopter terrain clearance from radar altimeter (meters - AGL)
Mag1:	Raw Total Magnetic field data (nT)
Mag2:	Total Magnetic field diurnal variation corrected data (nT)
Basemag:	Magnetic diurnal variation data (nT)
SF[10]:	dB/dt 120 microsecond time channel ($pV/A/m^4$)
SF[11]:	dB/dt 141 microsecond time channel ($pV/A/m^4$)
SF[12]:	dB/dt 167 microsecond time channel ($pV/A/m^4$)
SF[13]:	dB/dt 198 microsecond time channel ($pV/A/m^4$)
SF[14]:	dB/dt 234 microsecond time channel ($pV/A/m^4$)
SF[15]:	dB/dt 281 microsecond time channel ($pV/A/m^4$)
SF[16]:	dB/dt 339 microsecond time channel ($pV/A/m^4$)
SF[17]:	dB/dt 406 microsecond time channel ($pV/A/m^4$)
SF[18]:	dB/dt 484 microsecond time channel ($pV/A/m^4$)
SF[19]:	dB/dt 573 microsecond time channel ($pV/A/m^4$)
SF[20]:	dB/dt 682 microsecond time channel ($pV/A/m^4$)
SF[21]:	dB/dt 818 microsecond time channel ($pV/A/m^4$)
SF[22]:	dB/dt 974 microsecond time channel ($pV/A/m^4$)
SF[23]:	dB/dt 1151 microsecond time channel ($pV/A/m^4$)
SF[24]:	dB/dt 1370 microsecond time channel ($pV/A/m^4$)
SF[25]:	dB/dt 1641 microsecond time channel ($pV/A/m^4$)
SF[26]:	dB/dt 1953 microsecond time channel ($pV/A/m^4$)
SF[27]:	dB/dt 2307 microsecond time channel ($pV/A/m^4$)
SF[28]:	dB/dt 2745 microsecond time channel ($pV/A/m^4$)
SF[29]:	dB/dt 3286 microsecond time channel ($pV/A/m^4$)
SF[30]:	dB/dt 3911 microsecond time channel ($pV/A/m^4$)
SF[31]:	dB/dt 4620 microsecond time channel ($pV/A/m^4$)
SF[32]:	dB/dt 5495 microsecond time channel ($pV/A/m^4$)
SF[33]:	dB/dt 6578 microsecond time channel ($pV/A/m^4$)
BF[10]:	B-field 120 microsecond time channel ($(pV*ms)/(A*m^4)$)
BF[11]:	B-field 141 microsecond time channel ($(pV*ms)/(A*m^4)$)
BF[12]:	B-field 167 microsecond time channel ($(pV*ms)/(A*m^4)$)
BF[13]:	B-field 198 microsecond time channel ($(pV*ms)/(A*m^4)$)
BF[14]:	B-field 234 microsecond time channel ($(pV*ms)/(A*m^4)$)

Channel Name	Description
BF[15]:	B-field 281 microsecond time channel (pV*ms)/(A*m^4)
BF[16]:	B-field 339 microsecond time channel (pV*ms)/(A*m^4)
BF[17]:	B-field 406 microsecond time channel (pV*ms)/(A*m^4)
BF[18]:	B-field 484 microsecond time channel (pV*ms)/(A*m^4)
BF[19]:	B-field 573 microsecond time channel (pV*ms)/(A*m^4)
BF[20]:	B-field 682 microsecond time channel (pV*ms)/(A*m^4)
BF[21]:	B-field 818 microsecond time channel (pV*ms)/(A*m^4)
BF[22]:	B-field 974 microsecond time channel (pV*ms)/(A*m^4)
BF[23]:	B-field 1151 microsecond time channel (pV*ms)/(A*m^4)
BF[24]:	B-field 1370 microsecond time channel (pV*ms)/(A*m^4)
BF[25]:	B-field 1641 microsecond time channel (pV*ms)/(A*m^4)
BF[26]:	B-field 1953 microsecond time channel (pV*ms)/(A*m^4)
BF[27]:	B-field 2307 microsecond time channel (pV*ms)/(A*m^4)
BF[28]:	B-field 2745 microsecond time channel (pV*ms)/(A*m^4)
BF[29]:	B-field 3286 microsecond time channel (pV*ms)/(A*m^4)
BF[30]:	B-field 3911 microsecond time channel (pV*ms)/(A*m^4)
BF[31]:	B-field 4620 microsecond time channel (pV*ms)/(A*m^4)
BF[32]:	B-field 5495 microsecond time channel (pV*ms)/(A*m^4)
BF[33]:	B-field 6578 microsecond time channel (pV*ms)/(A*m^4)
PLM:	60 Hz Power line monitor

Electromagnetic B-field and dB/dt data is found in array channel format between indexes 10 – 33, as described above.

- Database VTEM_waveform.gdb in Geosoft GDB format, containing the following channels:

Rx_volt: output voltage of the receiver coil (volt)
Time: Sampling rate interval, 10.416 microseconds
Tx_curr: output current of transmitters (amps)

- Grids in Geosoft GRD format, as follow,

mag2: Total magnetic intensity (nT)
BF23MAX: B-Field Time Gate 1.151 ms.
BF23OX: B-Field Time Gate 1.151 ms.
SF23: dB/dt Time Gate 1.151 ms.

A Geosoft .GRD file has a .GI metadata file associated with it, containing grid projection information. A grid cell size of 40 meters was used.

- Maps at 1:20,000 scale in Geosoft MAP format, as follow,

8027_OX_TMI:	Total magnetic intensity contours and colour image
8027_OX_Bf23:	B-field time gate 1.151 ms contours and colour image
8027_OX_Bfield:	B-field profiles in linear logarithmic scale
8027_OX_dBdt:	dB/dt profiles in linear logarithmic scale

8027_MAX_TMI:	Total magnetic intensity contours and colour image
8027_MAX_Bf:	B-field time gate 1.151 ms contours and colour image
8027_MAX_Bfield:	B-field profiles in linear logarithmic scale
8027_MAX_dBdt:	dB/dt profiles in linear logarithmic scale

1:250k topographic vectors were taken from the NRCAN Geogratis database at, http://geogratis.gc.ca/geogratis/en/index.html. These files are unedited and may have artefacts and inconsistencies where two adjacent map sheets join.

- Google Earth files *MAX_Flight.kmz* and *OX_Flight.kmz* showing the flight path of the block.

Free version of Google Earth software can be downloaded from, http://earth.google.com/download-earth.html

6. CONCLUSIONS

A helicopter-borne versatile time domain electromagnetic (VTEM) geophysical survey has been completed over the MAX and OX properties in Northern Ontario, Canada.

The total area coverage is ~174 km^2. Total survey line coverage is 1344 line kilometres. The principal sensors included a Time Domain EM system and a magnetometer. Results have been presented as stacked profiles and contour colour images at a scale of 1:20,000.

Final data processing at the office of Geotech Ltd. in Aurora, Ontario was carried out under the supervision of Jean Legault, P. Geo., Manager of Data Processing and Interpretation.

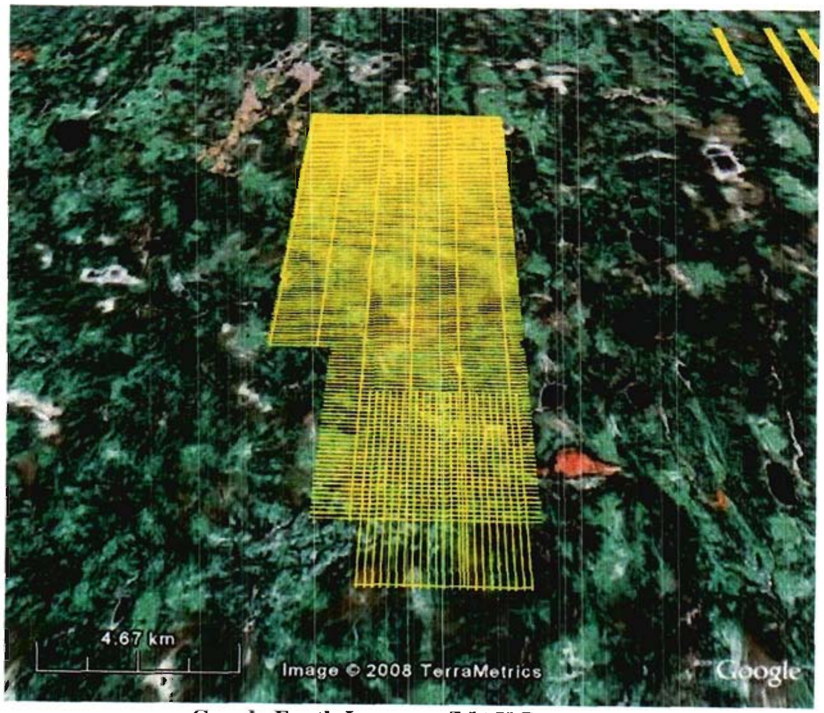
Respectfully submitted,

Alexander Prikhodko
Geotech Ltd.
May 2008

APPENDIX A

SURVEY BLOCKS LOCATION MAP

Google Earth Imagery



Google Earth Imagery (MAX Property)

Google Earth Imagery (OX Property)

APPENDIX B

SURVEY BLOCK COORDINATES

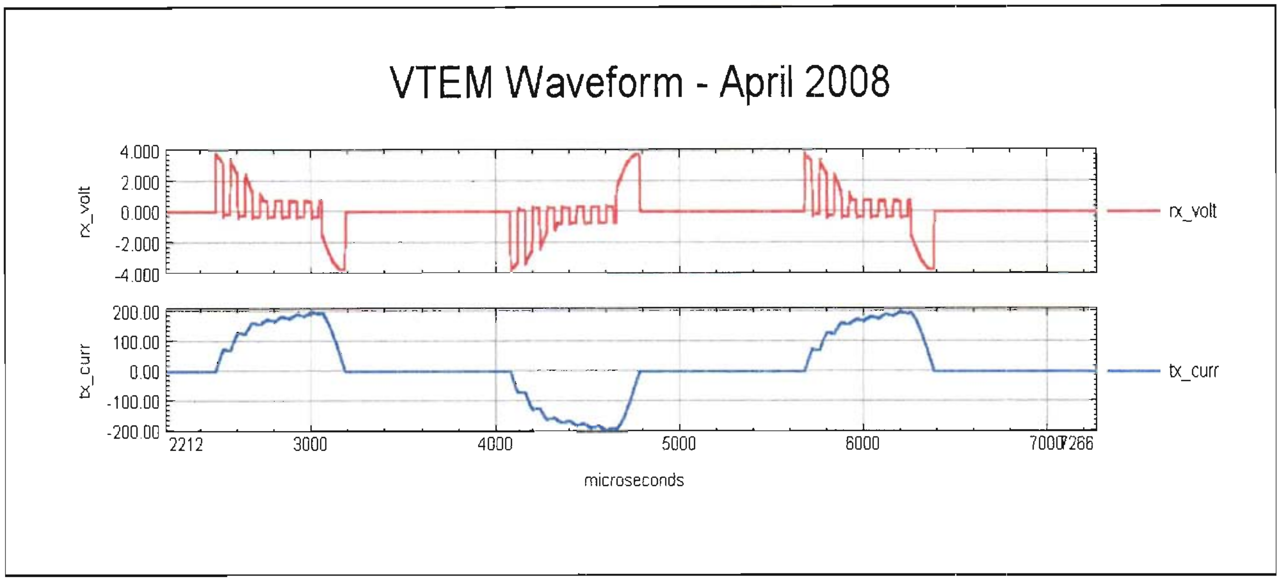
(WGS84, UTM zone 16 north)

OX Property	
X	Y
532000	5749900
544000	5749900
544000	5738000
532000	5738000

MAX Property	
X	Y
523000	5737500
523000	5717800
517000	5717800
517000	5724000
515000	5724000
515000	5737500
522750	5722000
522750	5716000
518000	5716000
518000	5722000

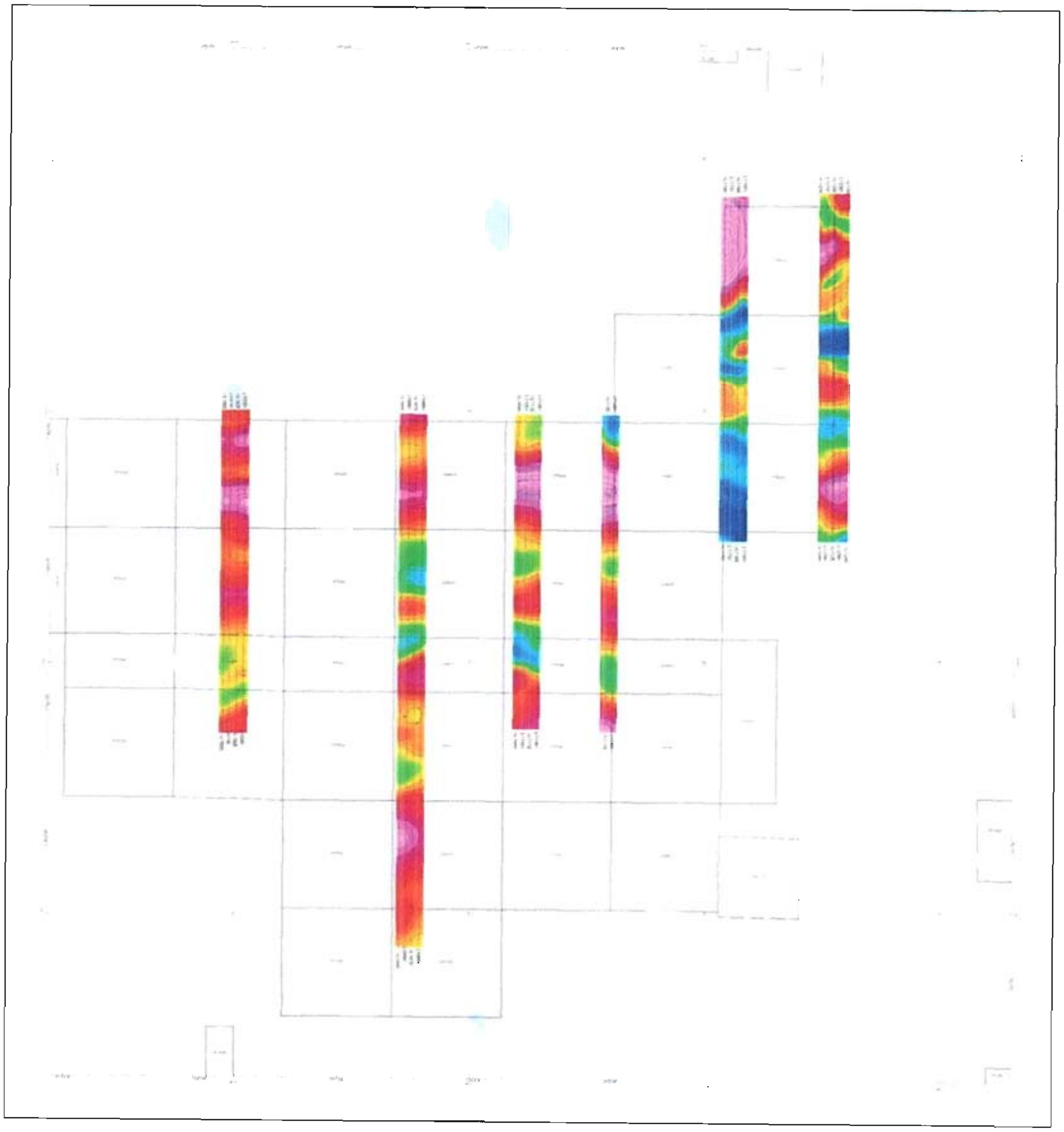
APPENDIX C

VTEM WAVEFORM

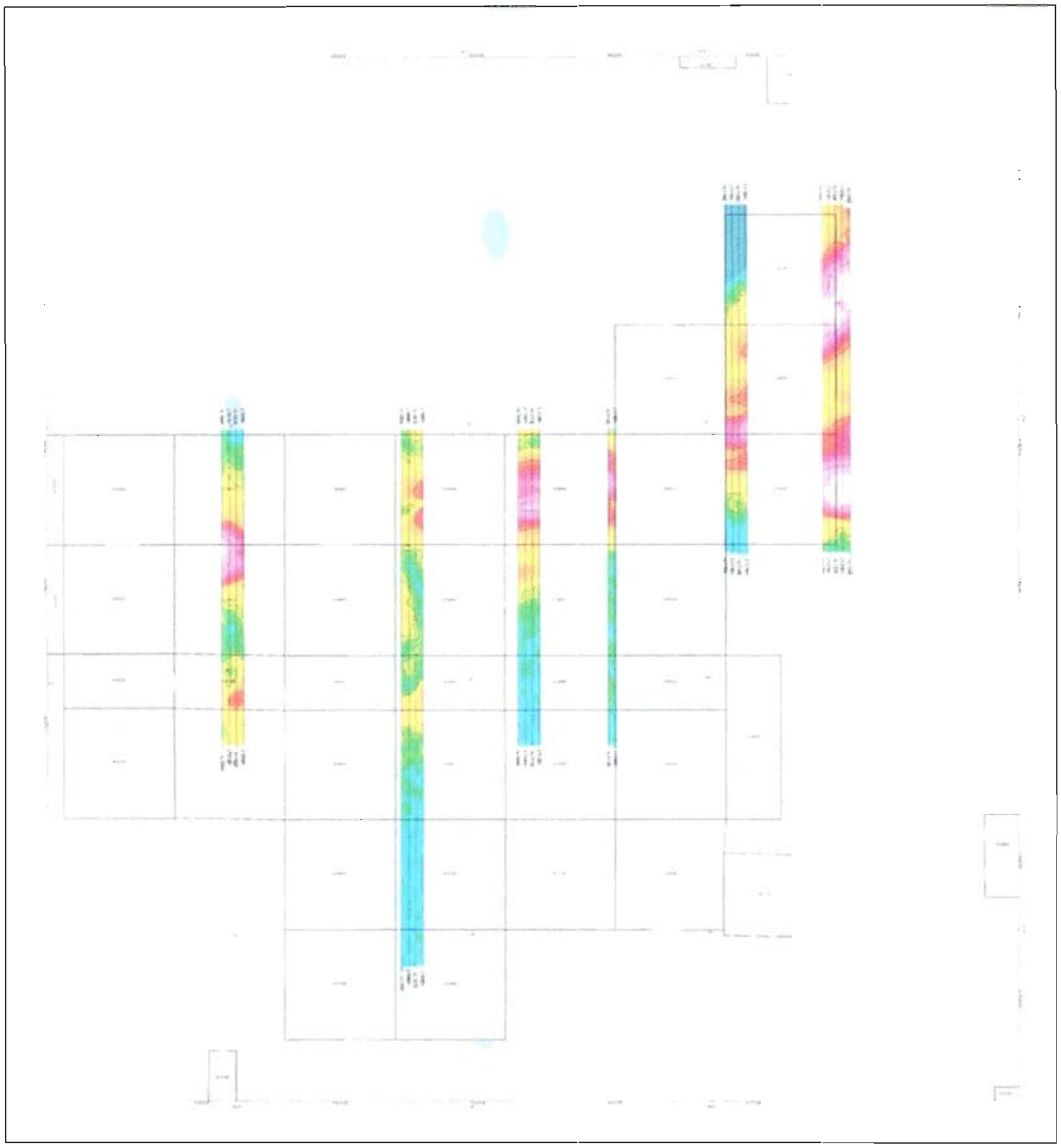


APPENDIX D

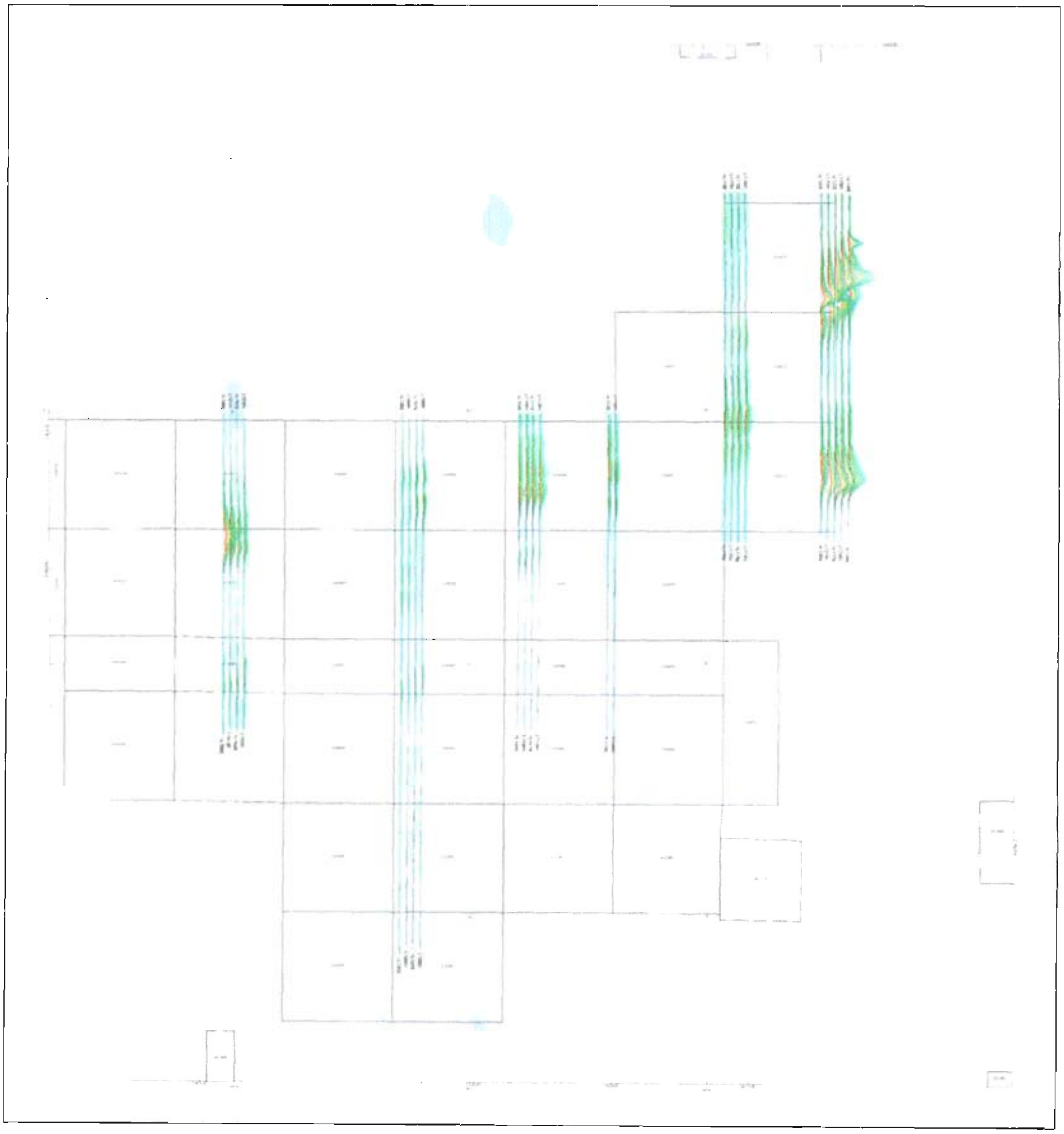
GEOPHYSICAL MAPS



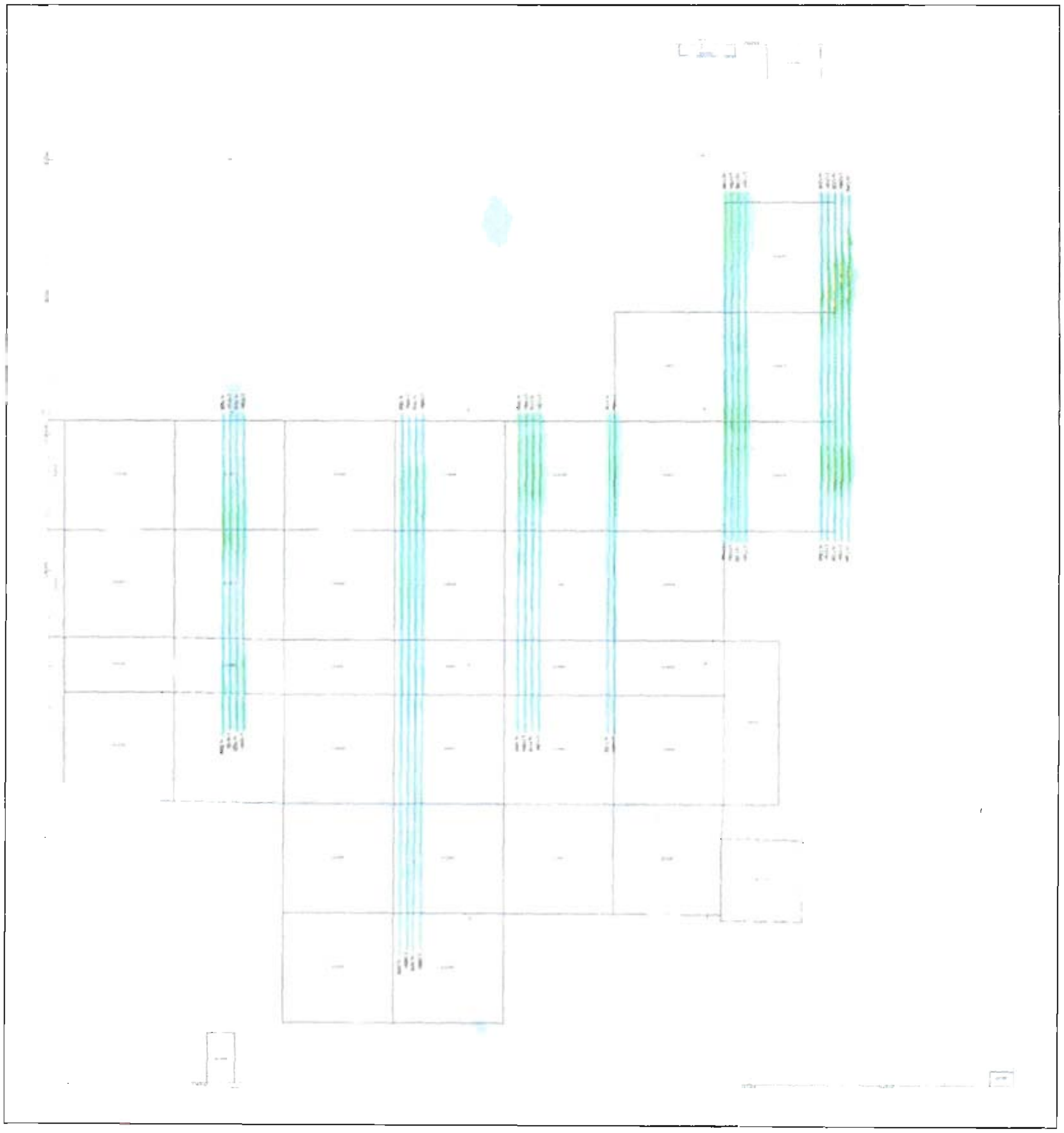
Total Magnetic Intensity: OX Property



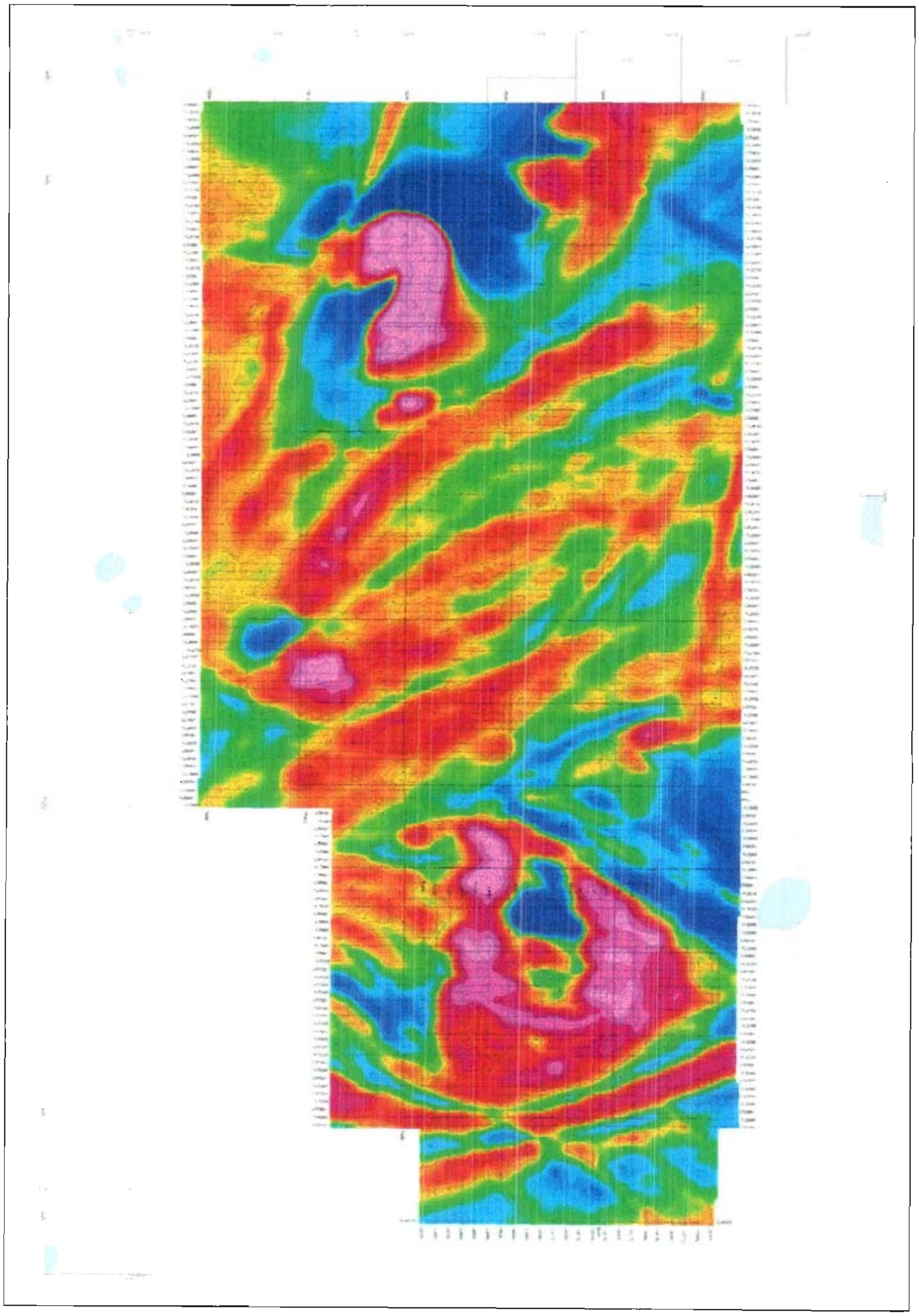
B-Field Time Gate 1.151 ms: OX Property



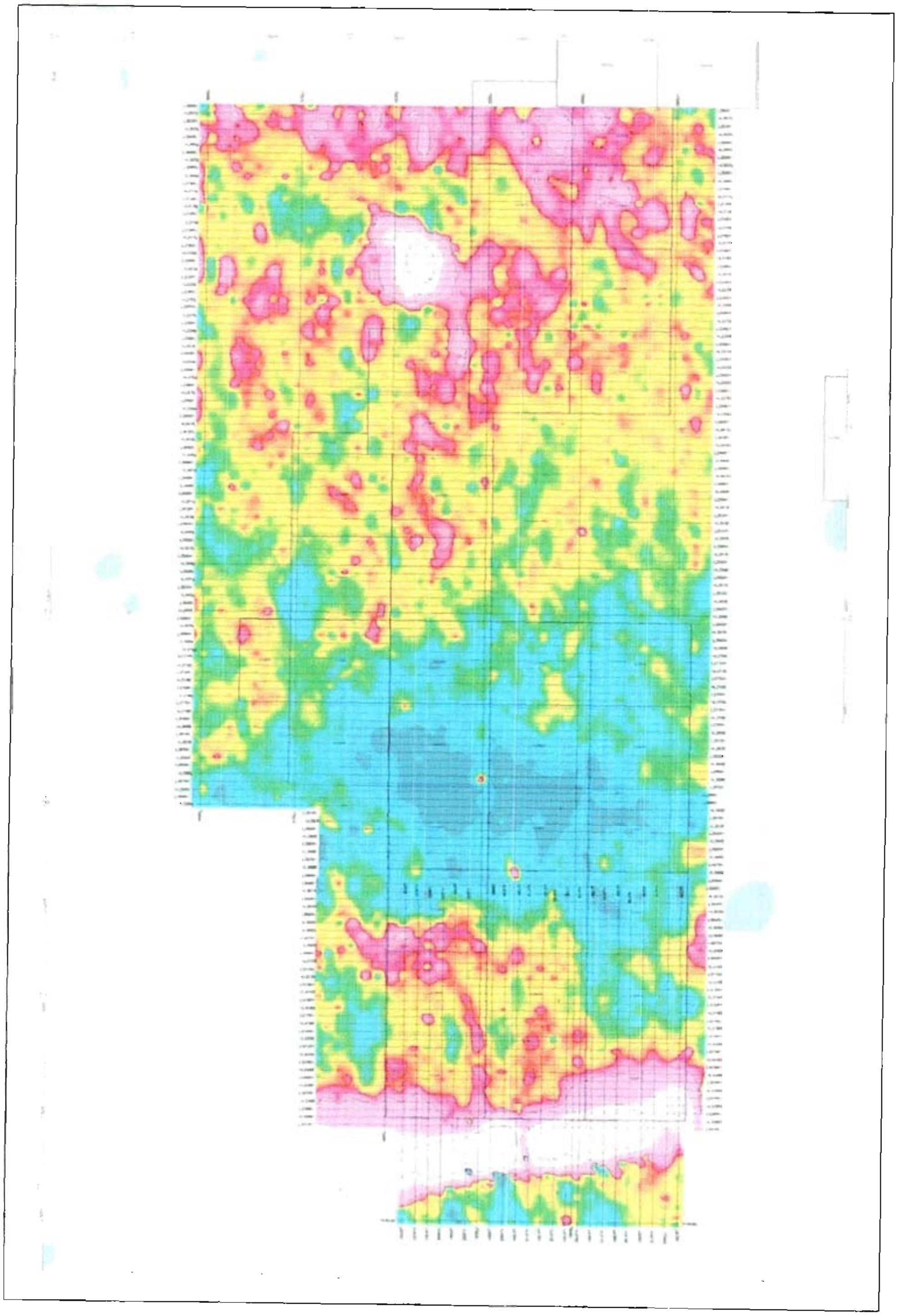
B-Field Profiles, Time Gates 0.234 – 6.578 ms: OX Property



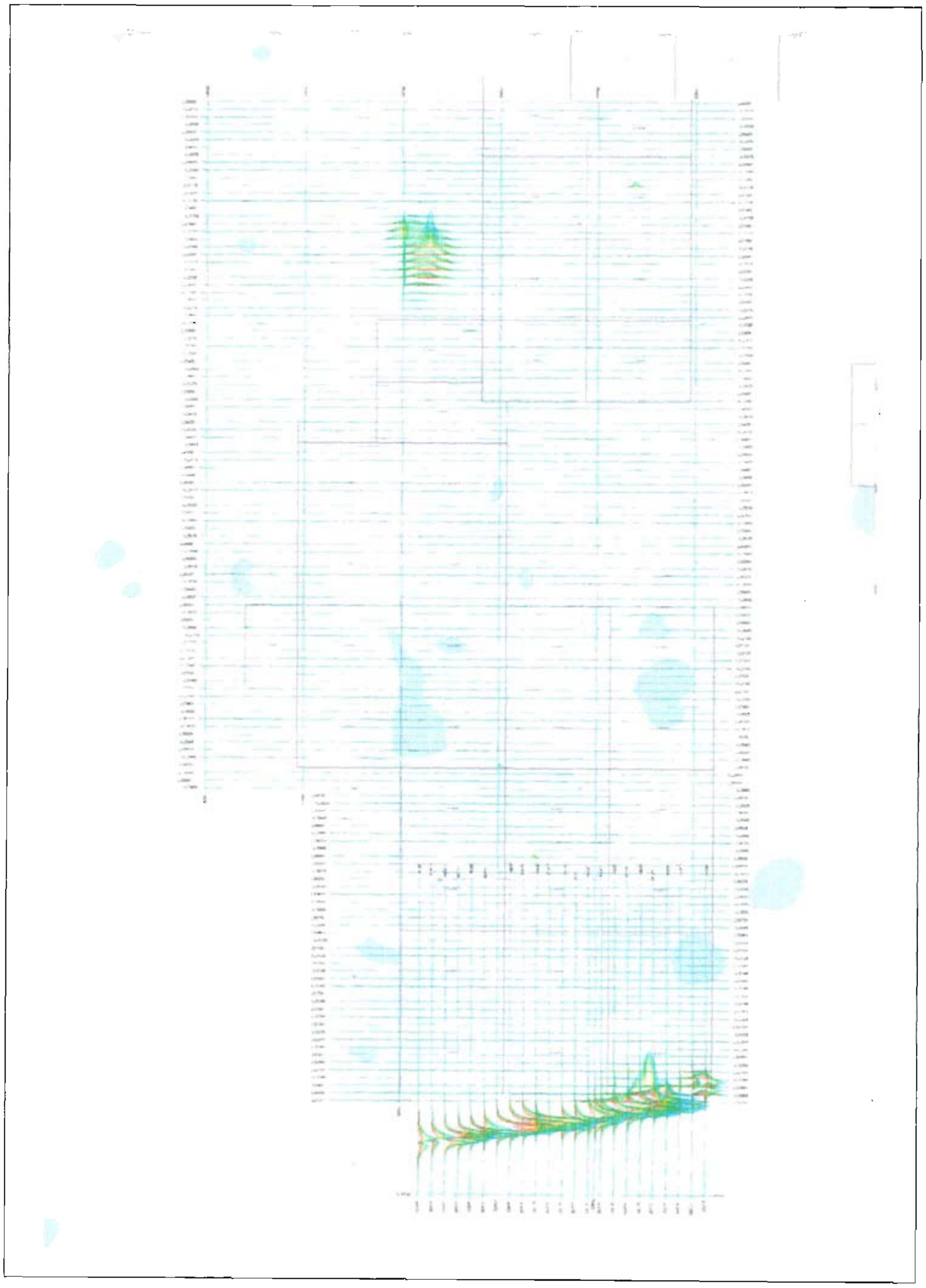
dB/dt Profiles, Time Gates 0.234 – 6.578 ms: OX Property



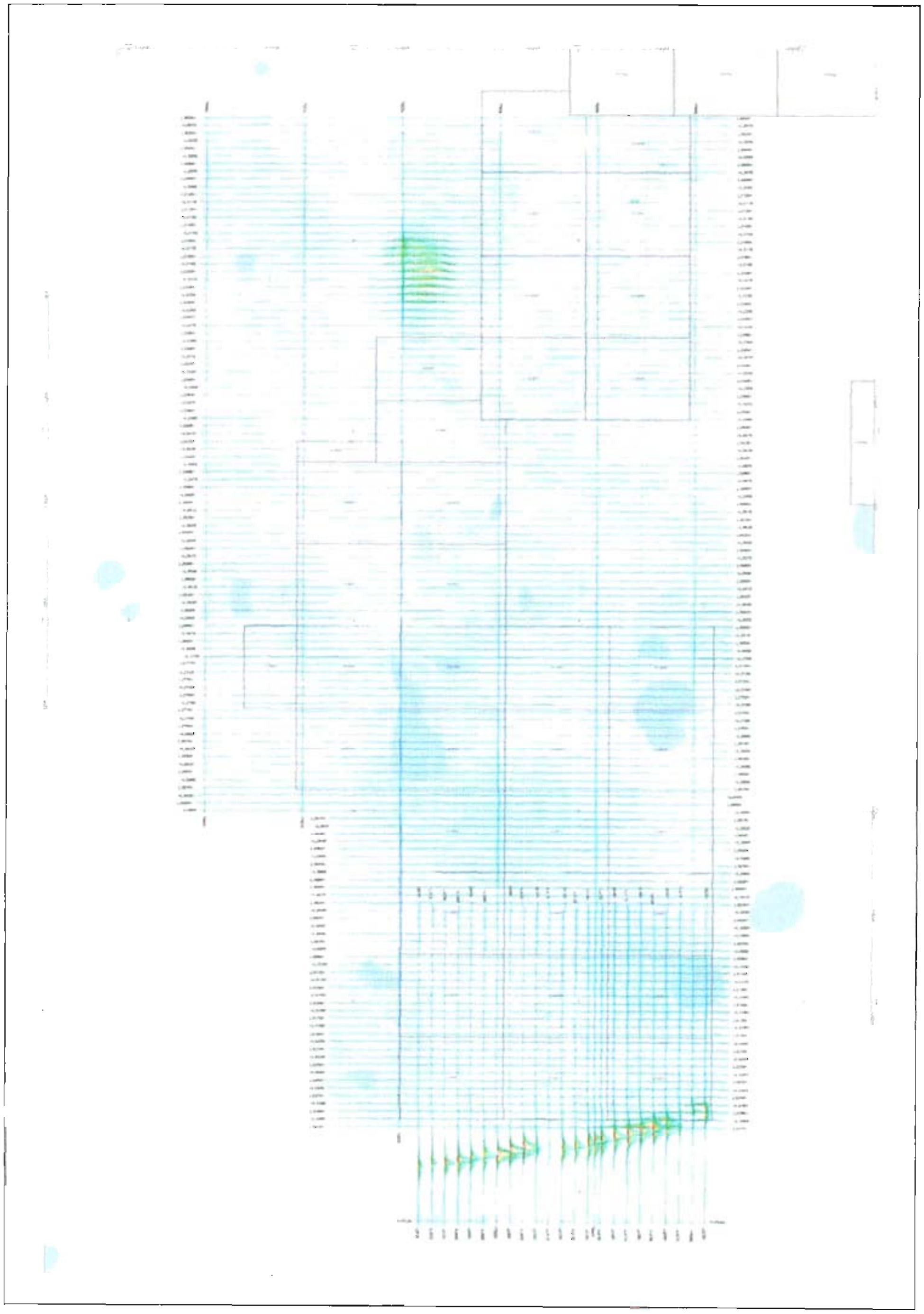
Total Magnetic Intensity: MAX Property



B-Field Time Gate 1.151 ms: MAX Property



B-Field Profiles, Time Gates 0.234 – 6.578 ms: MAX Property



dB/dt Profiles, Time Gates 0.234 – 6.578 ms: MAX Property

APPENDIX E

GENERALIZED MODELING RESULTS OF THE VTEM SYSTEM

Introduction

The VTEM system is based on a concentric or central loop design, whereby, the receiver is positioned at the centre of a 26.1 meters diameter transmitter loop that produces a dipole moment up to 625,000 NIA at peak current. The wave form is 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 is approximately 7.5 milliseconds followed by an off time where no primary field is present.

During turn-on and turn-off, a time varying field is produced (dB/dt) and an electro-motive force (emf) is 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 are made during the off-time, when only the secondary field (representing the conductive targets encountered in the ground) is present.

Efficient modeling of the results can be carried out on regularly shaped geometries, thus yielding close approximations to the parameters of the measured targets. The following is a description of a series of common models made for the purpose of promoting a general understanding of the measured results.

Variation of Plate Depth

Geometries represented by plates of different strike length, depth extent, dip, plunge and depth below surface can be varied with characteristic parameters like conductance of the target, conductance of the host and conductivity/thickness and thickness of the overburden layer.

Diagrammatic models for a vertical plate are shown in figures A and G at two different depths, all other parameters remaining constant. With this transmitter-receiver geometry, the classic **M** shaped response is generated. Figure A shows a plate where the top is near surface. Here, amplitudes of the duel peaks are higher and symmetrical with the zero centre positioned directly above the plate. Most important is the separation distance of the peaks. This distance is small when the plate is near surface and widens with a linear relationship as the plate (depth to top) increases. Figure G shows a much deeper plate where the separation distance of the peaks is much wider and the amplitudes of the channels have decreased.

Variation of Plate Dip

As the plate dips and departs from the vertical position, the peaks become asymmetrical. Figure B shows a near surface plate dipping 80°. Note that the direction of dip is toward the high shoulder of the response and the top of the plate remains under the centre minimum.

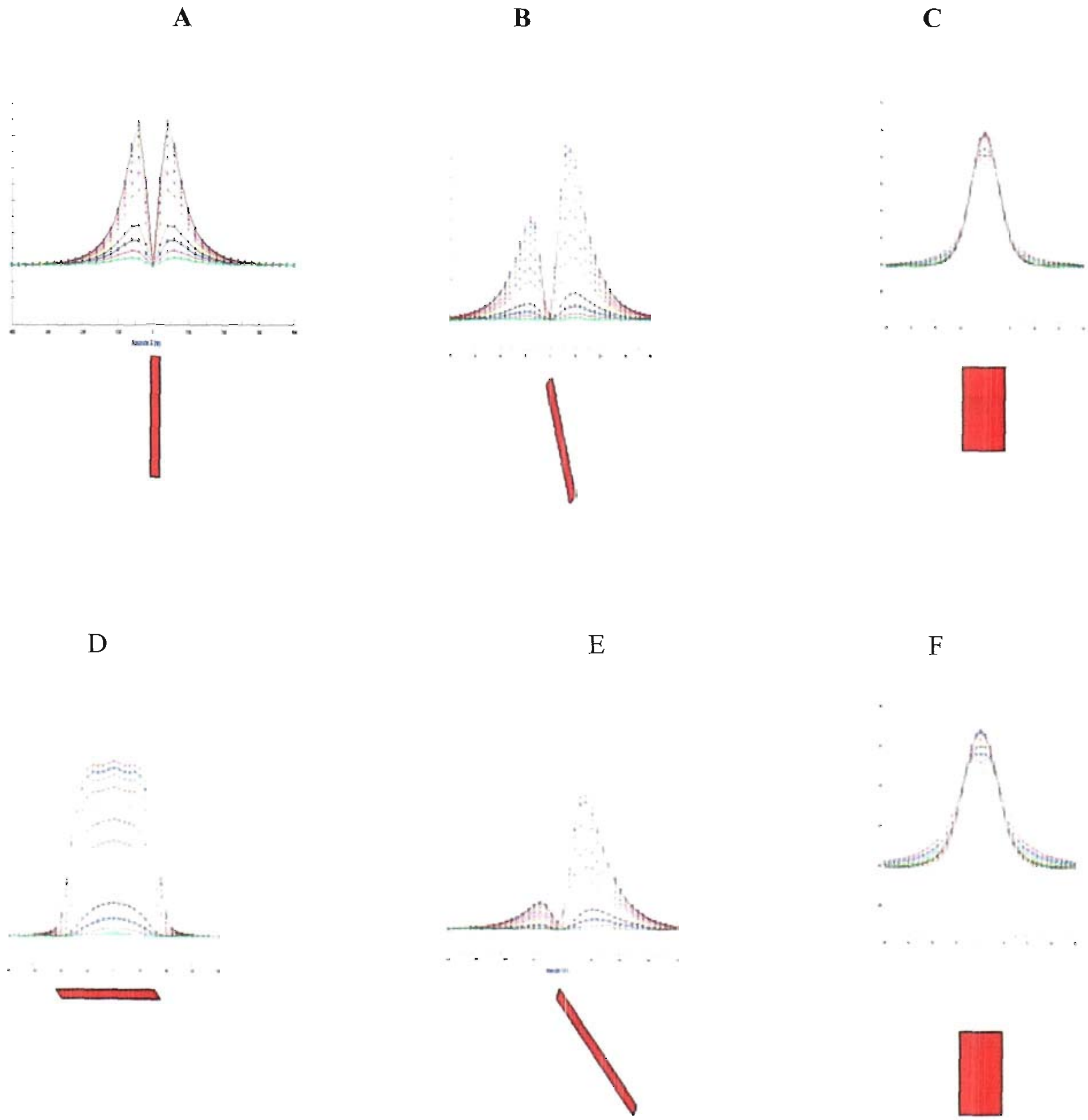
As the dip increases, the aspect ratio (Min/Max) decreases and this aspect ratio can be used as an empirical guide to dip angles from near 90° to about 30°. The method is not sensitive enough where dips are less than about 30°. Figure E shows a plate dipping 45° and, at this angle, the minimum shoulder starts to vanish. In Figure D, a flat lying plate is shown, relatively near surface. Note that the twin peak anomaly has been replaced by a symmetrical shape with large, bell shaped, channel amplitudes which decay relative to the conductance of the plate.

Figure H shows a special case where two plates are positioned to represent a synclinal structure. Note that the main characteristic to remember is the centre amplitudes are higher (approximately double) compared to the high shoulder of a single plate. This model is very representative of tightly folded formations where the conductors were once flat lying.

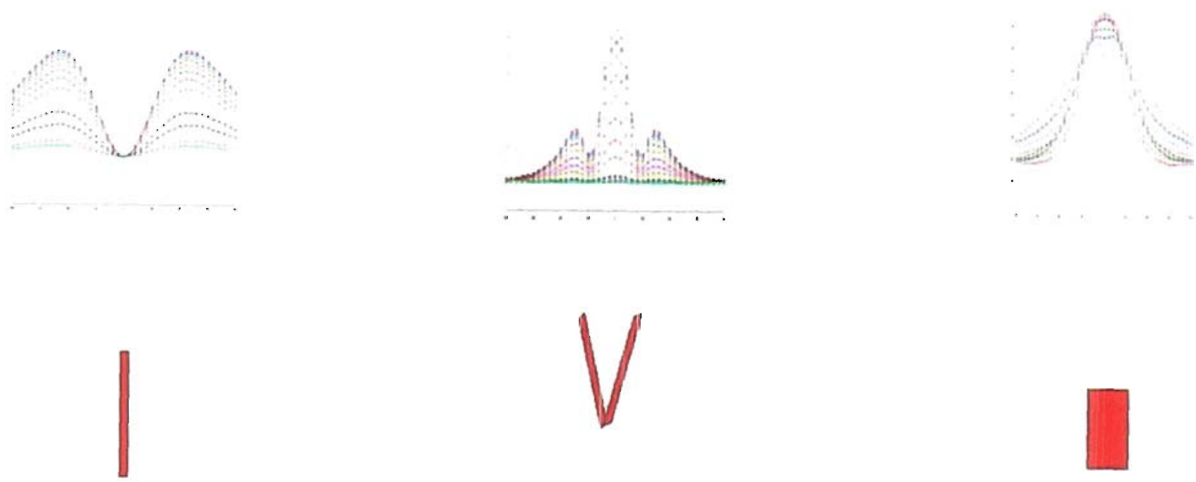
Variation of Prism Depth

Finally, with prism models, another algorithm is required to represent current on the plate. A plate model is considered to be infinitely thin with respect to thickness and incapable of representing the current in the thickness dimension. A prism model is constructed to deal with this problem, thereby, representing the thickness of the body more accurately.

Figures C, F and I show the same prism at increasing depths. Aside from an expected decrease in amplitude, the side lobes of the anomaly show a widening with deeper prism depths of the bell shaped early time channels.


A
B
C
D
E
F

G H I



General Modeling Concepts

A set of models has been produced for the Geotech VTEM® system with explanation notes (see models A to I above). The reader is encouraged to review these models, so as to get a general understanding of the responses as they apply to survey results. While these models do not begin to cover all possibilities, they give a general perspective on the simple and most commonly encountered anomalies.

When producing these models, a few key points were observed and are worth noting as follows:

- For near vertical and vertical plate models, the top of the conductor is always located directly under the centre low point between the two shoulders in the classic **M** shaped response.
- As the plate is positioned at an increasing depth to the top, the shoulders of the **M** shaped response, have a greater separation distance.
- When faced with choosing between a flat lying plate and a prism model to represent the target (broad response) some ambiguity is present and caution should be exercised.
- With the concentric loop system and Z-component receiver coil, virtually all types of conductors and most geometries are most always well coupled and a response is generated (see model H). Only concentric loop systems can map this type of target.

The modelling program used to generate the responses was prepared by PetRos Eikon Inc. and is one of a very few that can model a wide range of targets in a conductive half space.

General Interpretation Principals

Magnetics

The total magnetic intensity responses reflect major changes in the magnetite and/or other magnetic minerals content in the underlying rocks and unconsolidated overburden. Precambrian rocks have often been subjected to intense heat and pressure during structural and metamorphic events in their history. Original signatures imprinted on these rocks at the time of formation have, it most cases, been modified, resulting in low magnetic susceptibility values.

The amplitude of magnetic anomalies, relative to the regional background, helps to assist in identifying specific magnetic and non-magnetic rock units (and conductors) related to, for example, mafic flows, mafic to ultramafic intrusives, felsic intrusives, felsic volcanics and/or sediments etc. Obviously, several geological sources can produce the same magnetic response. These ambiguities can be reduced considerably if basic geological information on the area is available to the geophysical interpreter.
In addition to simple amplitude variations, the shape of the response expressed in the wave length and the symmetry or asymmetry, is used to estimate the depth, geometric parameters and magnetization of the anomaly. For example, long narrow magnetic linears usually reflect mafic flows or intrusive dyke features. Large areas with complex magnetic patterns may be produced by intrusive bodies with significant magnetization, flat lying magnetic sills or sedimentary iron formation. Local isolated circular magnetic patterns often represent plug-like igneous intrusives such as kimberlites, pegmatites or volcanic vent areas.

Because the total magnetic intensity (TMI) responses may represent two or more closely spaced bodies within a response, the second derivative of the TMI response may be helpful for distinguishing these complexities. The second derivative is most useful in mapping near surface linears and other subtle magnetic structures that are partially masked by nearby higher amplitude magnetic features. The broad zones of higher magnetic amplitude, however, are severely attenuated in the vertical derivative results. These higher amplitude zones reflect rock units having strong magnetic susceptibility signatures. For this reason, both the TMI and the second derivative maps should be evaluated together.

Theoretically, the second derivative, zero contour or colour delineates the contacts or limits of large sources with near vertical dip and shallow depth to the top. The vertical gradient map also aids in determining contact zones between rocks with a susceptibility contrast, however, different, more complicated rules of thumb apply.

Concentric Loop EM Systems

Concentric systems with horizontal transmitter and receiver antennae produce much larger responses for flat lying conductors as contrasted with vertical plate-like conductors. The amount of current developing on the flat upper surface of targets having a substantial area in this dimension, are the direct result of the effective coupling angle, between the primary magnetic field and the flat surface area. One therefore, must not compare the amplitude/conductance of responses generated from flat lying bodies with those derived from near vertical plates; their ratios will be quite different for similar conductances.

Determining dip angle is very accurate for plates with dip angles greater than 30°. For angles less than 30° to 0°, the sensitivity is low and dips can not be distinguished accurately in the presence of normal survey noise levels.

A plate like body that has near vertical position will display a two shoulder, classic **M** shaped response with a distinctive separation distance between peaks for a given depth to top.

It is sometimes difficult to distinguish between responses associated with the edge effects of flat lying conductors and poorly conductive bedrock conductors. Poorly conductive bedrock conductors having low dip angles will also exhibit responses that may be interpreted as surfacial overburden conductors. In some situations, the conductive response has line to line continuity and some magnetic correlation providing possible evidence that the response is related to an actual bedrock source.
The EM interpretation process used, places considerable emphasis on determining an understanding of the general conductive patterns in the area of interest. Each area has different characteristics and these can effectively guide the detailed process used.

The first stage is to determine which time gates are most descriptive of the overall conductance patterns. Maps of the time gates that represent the range of responses can be very informative.

Next, stacking the relevant channels as profiles on the flight path together with the second vertical derivative of the TMI is very helpful in revealing correlations between the EM and Magnetics.

Next, key lines can be profiled as single lines to emphasize specific characteristics of a conductor or the relationship of one conductor to another on the same line. Resistivity Depth sections can be constructed to show the relationship of conductive overburden or conductive bedrock with the conductive anomaly.