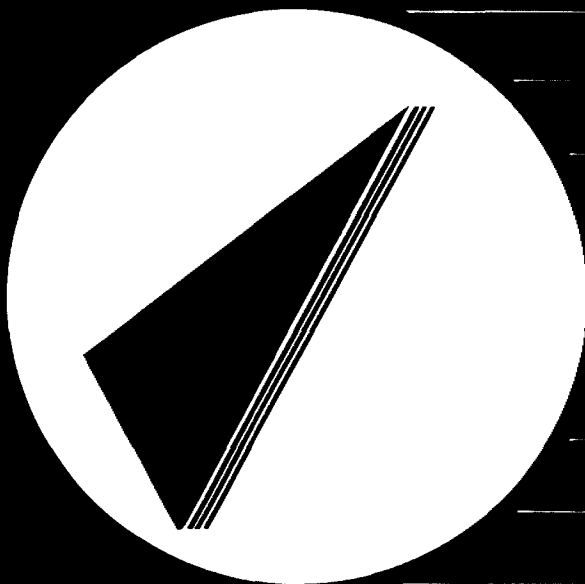


AERODAT



41016SE9058 2.14949 GENOA

010



VLF EM

MAGNETICS

RADIOMETRICS

INTERPRETATION

ELECTROMAGNETICS

RESEARCH & DEVELOPMENT

ELECTRONIC POSITIONING

GRADIENT MAGNETICS

DATA PROCESSING



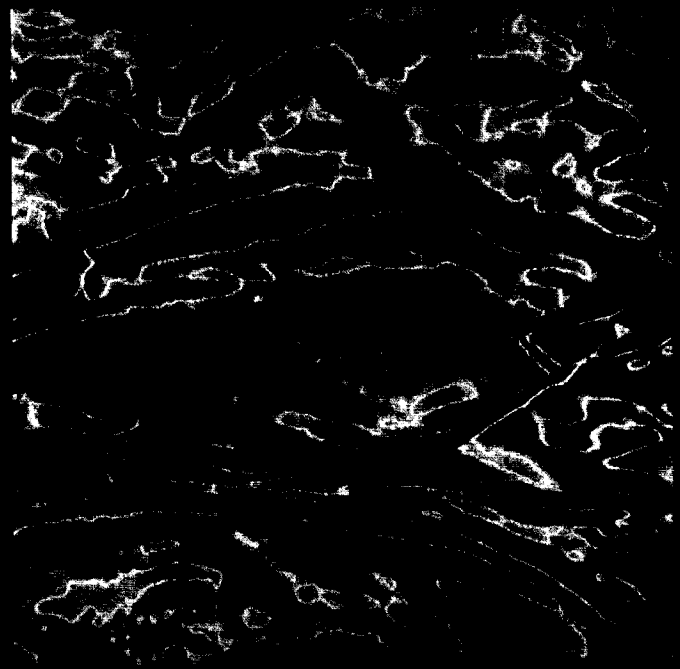
MAGNETIC VERTICAL GRADIENT



APPARENT RESISTIVITY



MAGNETIC TOTAL FIELD



VLF-EM TOTAL FIELD

The above map examples represent just some of the information collected by an Aerodat 3-frequency HEM / 2-frequency VLF-EM / magnetometer survey. The flight line spacing was 100 meters (1/16 mile) accurately controlled by a radar navigation system to a relative accuracy of about 5 meters. Such multisensor, low level, electronic navigation surveys map a variety of geophysical parameters with a resolution and sensitivity comparable to ground surveys at less cost and in shorter time. The above miniature maps each cover 100 square kilometers and contain 1000 line kilometers of geophysical information.

**REPORT ON
COMBINED HELICOPTER-BORNE
MAGNETIC, ELECTROMAGNETIC AND VLF-EM SURVEYS
GENOA TOWNSHIP CLAIMS
RUSH LAKE AREA, ONTARIO**

FOR

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571 MONETA AVENUE, BOX 1140
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BY

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August 7, 1991

J9101G

Qeel 2.7888
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LIST OF MAPS

Maps are labelled according to scale, map type and sheet number. Map scales are 1:5,000 and 1:20,000. All map types are not necessarily presented at both scales. Details on map types, scales and map sheet layout are given in Section 4.

BLACK LINE MAPS:

<u>Map Type</u>	<u>Description</u>
1.	BASE MAP; screened topographic base map with township boundaries and UTM reference corners or grid.
2.	FLIGHT PATH MAP; photocombination of the base map with flight lines, and EM anomaly symbols.
3.	COMPILATION/INTERPRETATION MAP; with base map.
4.	TOTAL FIELD MAGNETIC CONTOURS; with base map.
5.	VERTICAL MAGNETIC GRADIENT CONTOURS; with base map.
6.	APPARENT RESISTIVITY CONTOURS; apparent resistivity calculated for the 935 Hz data, with base map.
7.	VLF-EM TOTAL FIELD CONTOURS; with base map.
8.	HEM OFFSET PROFILES (935 Hz); with base map and flight lines.

COLOUR MAPS:

1. TOTAL FIELD MAGNETICS; with superimposed contours and EM anomaly symbols.
2. VERTICAL GRADIENT MAGNETICS; with superimposed contours and EM anomaly symbols.
3. APPARENT RESISTIVITY; calculated for the 935 Hz data with superimposed contours and EM anomaly symbols.
4. VLF-EM TOTAL FIELD; with superimposed contours, fiducials and EM anomaly symbols.

5A. HEM OFFSET PROFILES; 935 Hz and 850 Hz data with flight lines and EM anomaly symbols.

5B. HEM OFFSET PROFILES; 4175 Hz and 4600 Hz data with flight lines and EM anomaly symbols.

DERIVATIVE COLOUR MAPS:

1-A. TOTAL FIELD MAGNETICS SHADOW MAPS; at illumination directions given by angle A.

**REPORT ON
COMBINED HELICOPTER-BORNE
MAGNETIC, ELECTROMAGNETIC AND VLF-EM
SURVEYS, GENOA TOWNSHIP CLAIMS,
RUSH LAKE AREA, ONTARIO**

1. INTRODUCTION

This report describes an airborne geophysical survey carried out on behalf of Falconbridge Limited - Exploration (Falconbridge) by Aerodat Limited under a contract dated January 4, 1991. Principal geophysical sensors included a four frequency electromagnetic system, a high sensitivity cesium vapour magnetometer and a two frequency VLF-EM system. Ancillary equipment included a radar ranging navigation system, a colour video tracking camera, a radar altimeter, a power line monitor and a base station magnetometer.

The survey was carried out over two areas centered in Marion Township and about 110 km southwest of Timmins. Part of one area is in Genoa Township, immediately east of Marion Township. The two areas are designated areas Marion East and Marion West. Marion East is immediately north west of Rush Lake and covers 10.5 square kilometres. Marion West is centered some 8 km southwest of area A and covers approximately 12 square kilometres. Total survey coverage was approximately 245 line kilometres (area A - 108 km traverse lines plus 10 km magnetic tie lines, area B - 123 km traverse lines plus 4 km magnetic tie lines). The flight line spacing was 100 m. The Aerodat job number is J9101G. ←

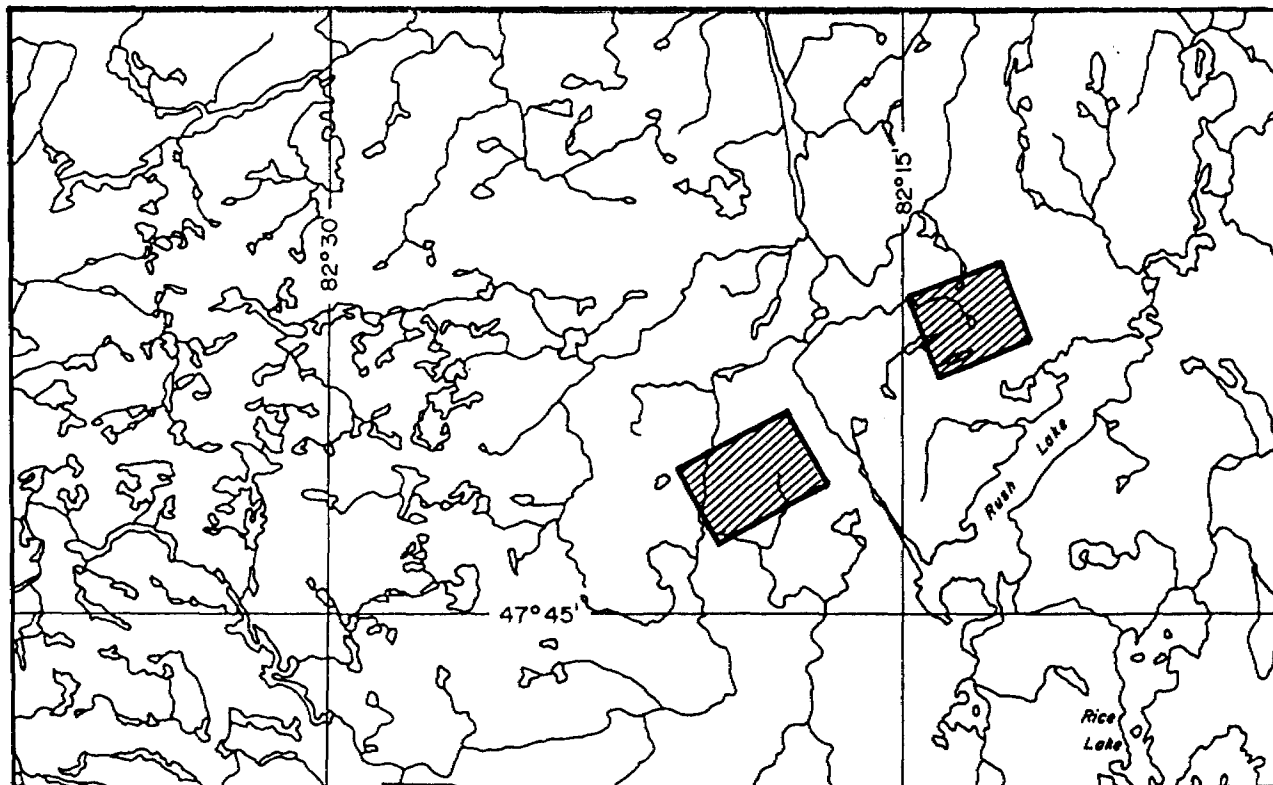
This report describes the survey, the data processing and the data presentation. Electromagnetic anomalies which are thought to be the response to bedrock conductors have been identified and appear on selected map products as EM anomaly symbols with interpreted source characteristics. Where EM and Magnetic results supported it, anomaly centers are joined to form conductor axes. Recommendations concerning areas with favourable geophysical characteristics are made with reference to a compilation/interpretation map.

2. SURVEY AREAS

The survey areas are centred some 110 km southwest of Timmins, Ontario. Area topography is shown on the 1:50,000 scale NTS map sheet - 41O/16 (Rush Lake).

Local relief is minimal - elevations are 1250 ±50 feet. The areas are free of major roads, powerlines, railroads, etc.

The survey areas are shown in the attached index map which includes local topography and latitude - longitude coordinates.



LOCATION MAP

**HELICOPTERBORNE GEOPHYSICAL SURVEY
GENOA TOWNSHIP CLAIMS
RUSH LAKE AREA, ONTARIO**

**on behalf of
FALCONBRIDGE LIMITED - EXPLORATION**

BY

**AERODAT LIMITED
J9101G**

The local magnetic field has an inclination of 76° and a declination of 8° west of north.

3. SURVEY PROCEDURES

The survey was flown on March 3, 1991. Principal personnel are listed in Appendix IV. Three (3) survey flights were required to complete the project.

The flight line spacing was 100 m. The flight line direction was approximately nnw/ssw for both areas. The aircraft ground speed was maintained at approximately 60 knots (30 metres per second). The nominal EM sensor height was 30 metres, consistent with the safety of the aircraft and crew.

Following equipment installation and testing, the ground based transponders of the radar ranging navigation system were installed at two or more sites or more near the survey area. The UTM coordinates of each site were taken from published 1:50,000 NTS maps. The base line (or line between transponders) was flown to determine their separation. The result is used to check the UTM coordinates assigned to each transponder.

The UTM coordinates of survey area corners were taken from maps provided by Falconbridge. These coordinates are used to program the navigation system. A test flight was used to confirm that area coverage would be as required.

Thereafter the traverse lines are flown under the guidance of the navigation system. The operator entered manual fiducials over prominent topographic features as seen on a 1:10,000 scale topographic map - a 5 times photographic enlargement of the 1:50,000 scale NTS sheet. Survey lines which showed excessive deviation were re-flown.

The magnetic tie lines were flown using visual navigation in areas of low topographic and magnetic relief. Aircraft position was taken from the navigation system. Three magnetic tie lines were flown in Marion East. One magnetic tie line was flown in Marion West.

Calibration lines are flown at the start, middle (if required) and end of every survey flight. These lines are flown outside of ground effects to record electromagnetic zero levels.

4. DELIVERABLES

The results of the survey are presented in a report plus maps. The report is presented in four copies. Folded white print copies of the 1:20,000 scale black line maps are bound with the report.

The black line maps are delivered as cronaflex (or clear acetate) originals. The colour maps are delivered in four copies. The shadow maps are delivered in two copies. All maps are rolled and

delivered in map tube(s).

A full list of all map types is given at the beginning of this report. A summary is given here.

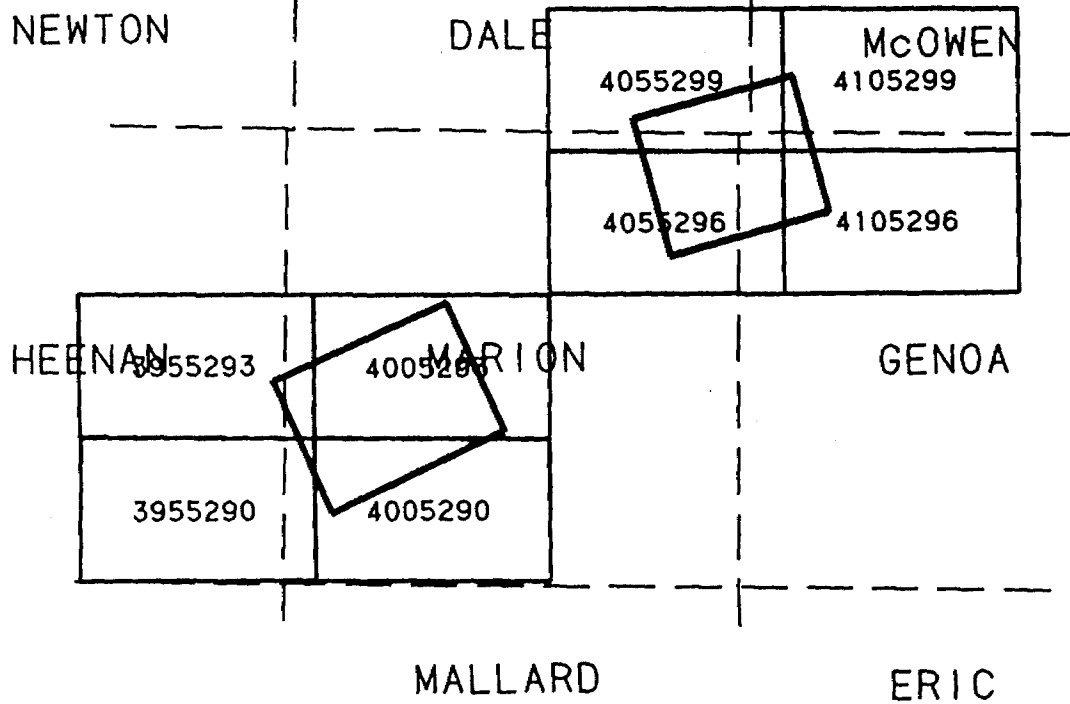
<u>MAP TYPE</u>	<u>DESCRIPTION</u>
1	Base Map (Black line)
2	Flight Path Map (Black line)
3	Compilation/Interpretation Map (Black line)
4	Total Magnetic Field Contours (Black line)
5	Vertical Magnetic Gradient Contours (Black line)
6	Apparent Resistivity - 935 Hz (Black line)
7	VLF-EM Total Field Contours (Black line)
8	HEM Offset Profiles - 935 Hz (Black line)
1	Total Magnetic Field Contours (Colour)
2	Vertical Magnetic Gradient Contours (Colour)
3	Apparent Resistivity Contours - 935 Hz - (Colour)
4	VLF-EM Total Field Contours (Colour)
5A	HEM Offset Profiles - (935 & 850 Hz) (Colour)
5B	HEM Offset Profiles - (4175 & 4600 Hz) (Colour)
1A	Total Field Magnetic Shadow Maps (Colour)

Black line map scales are as follows:

<u>MAP TYPE</u>	<u>1:5,000</u>	<u>1:20,000</u>
1	X	X
2	X	X
3	X	X
4	X	X
5	X	X
6		X
7		X
8		X

All maps, except type 2 (flight path map with anomaly centers), are presented on cronaflex. All type 2 maps are presented on clear acetate.

The colour and shadow maps are presented at the following scales:



**MAP SHEET LAYOUT
 1:50,000 SCALE
 HELICOPTERBORNE GEOPHYSICAL SURVEY
 GENOA TOWNSHIP CLAIMS**

**on behalf of
 FALCONBRIDGE LIMITED - EXPLORATION**

BY

**AERODAT LIMITED
 J9101G**

<u>MAP TYPE</u>	<u>1:5,000</u>	<u>1:20,000</u>
1	X	X
2	X	X
3		X
4		X
5(A&B)	X	
1-A		X

The 1:20,000 scale maps are presented on one map sheet - both areas. These maps show township boundaries and major topographic features. The 1:5,000 scale maps are presented on eight map sheets. The map sheet layout for the 1:5,000 scale maps is shown in the attached figure.

Each 1:5,000 scale map sheet covers an area of 5000 m (east-west) by 3000 m (north-south). Map sheet boundaries are lines of equal UTM grid eastings and northings. Map sheets are labelled using a 7 number code. The first three numbers indicate the UTM easting (in kilometres) of the western boundary of the sheet. The last four numbers indicate the UTM northing (in kilometres) of the southern boundary of the sheet. The 1:5,000 scale map sheet number 4055296 for example covers the area given by

UTM Eastings from 405000 to 410000
UTM Northings from 5296000 to 5199000

The 5,000 scale maps show local topography and a 1 km square UTM grid. A total of eight 1:5,000 scale maps were needed to cover the survey area.

The processed digital data is organized on 9 track archive tape. Both the profile and the gridded data are saved on tape. A full description of the archive tape(s) is delivered with the tape(s).

All gridded data are also provided on diskettes suitable for displaying on IBM compatible 286 or 386 microcomputers using the Aerodat RTI software package.

The Aerodat RTI (Real Time Imaging) program for displaying the gridded data sets from the survey is delivered to Falconbridge.

5. AIRCRAFT AND EQUIPMENT

5.1 Aircraft

An Astar 350B helicopter, (C-GJIX), owned and operated by Questral Helicopters, was

used for the survey. Installation of the geophysical and ancillary equipment was carried out by Aerodat. The survey aircraft was flown at a mean terrain clearance of 60 metres.

5.2 Electromagnetic System

The electromagnetic system was an Aerodat 4-frequency system. Two vertical coaxial coil pairs were operated at 935 Hz and 4,600 Hz and two horizontal coplanar coil pairs at 850 Hz and 4,175 Hz. The transmitter-receiver separation was 7 metres. Inphase and quadrature signals were measured simultaneously for the 4 frequencies with a time constant of 0.1 seconds. The HEM bird was towed 30 metres below the helicopter.

5.3 VLF-EM System

The VLF-EM System was a Herz Totem 2A. This instrument measures the total field and vertical quadrature components of two selected frequencies. The sensor was towed in a bird 15 metres below the helicopter.

VLF transmitters are designated "Line" and "Ortho". The line station is that which is in a direction from the survey area which is ideally normal to the flight line direction. This is the VLF station most often used because of optimal coupling with near vertical conductors running perpendicular to the flight line direction. The ortho station is ideally 90 degrees in azimuth away from the line station.

The transmitters used were NAA, Cutler, Maine broadcasting at 24.0 kHz and NSS, Annapolis, Maryland broadcasting at 21.4 kHz. NAA (24.0 kHz) was used as the line station and NSS (21.4 kHz) was used as the ortho station. Cutler is some 20° south of east from the survey areas.

5.4 Magnetometer

The magnetometer employed was a Scintrex H8 cesium, optically pumped magnetometer sensor. The sensitivity of this instrument is 0.001 nanoTeslas at a 0.2 second sampling rate. The sensor was towed in a bird 15 metres below the helicopter.

5.5 Ancillary Systems

Base Station Magnetometer

An IFG-2 proton precession magnetometer was operated at the base of operations to record diurnal variations of the earth's magnetic field. The clock of the base station was synchronized with that of the airborne system to facilitate later correlation. Recording resolution was 1 nT. The update rate was 4 seconds.

External magnetic field variations were recorded on a 3" wide paper chart and on diskette.

The analog record shows the magnetic field trace plotted on a grid. Each division of the grid (0.25") is equivalent to 1 minute (chart speed) or 5 nT (vertical sensitivity). The date, time and current total field magnetic value are printed every 10 minutes.

Radar Altimeter

A King KRA-10 radar altimeter was used to record terrain clearance. The output from the instrument is a linear function of altitude.

Tracking Camera

A Panasonic colour video camera was used to record flight path on VHS video tape. The camera was operated in continuous mode. The flight number, 24 hour clock time (to .01 second), and manual fiducial number are encoded on the video tape.

Radar Ranging Navigation System

A Motorola Miniranger III positioning system was used to guide the pilot over a programmed grid. The ranges to at least two ground stations were digitally recorded. The output sampling rate is 1 second. Ranges are recorded with a resolution of 0.1 m.

Analog Recorder

A RMS dot matrix recorder was used to display the data during the survey. Record contents are as follows:

<u>Label</u>	<u>Contents</u>	<u>Scale</u>
GEOPHYSICAL SENSOR DATA		
MAGF	Total Field Magnetics, Fine	2.5 nT/mm
MAGC	Total Field Magnetics, Course	25 nT/mm
VLT	VLF-EM, Total Field, Line Station	2.5 %/mm
VLQ	VLF-EM, Vertical Quadrature, Line Station	2.5 %/mm
VOT	VLF-EM, Total Field, Ortho Station	2.5 %/mm
VOQ	VLF-EM, Vertical Quadrature, Ortho Station	2.5 %/mm
X09I	935 Hz, Coaxial, Inphase	2.5 ppm/mm
X09Q	935 Hz, Coaxial, Quadrature	2.5 ppm/mm
X4KI	4600 Hz, Coaxial, Inphase	2.5 ppm/mm
X4KQ	4600 Hz, Coaxial, Quadrature	2.5 ppm/mm
P09I	850 Hz, Coplanar, Inphase	5 ppm/mm
P09Q	850 Hz, Coplanar, Quadrature	5 ppm/mm
P4KI	4175 Hz, Coplanar, Inphase	10 ppm/mm
P4KQ	4175 Hz, Coplanar, Quadrature	10 ppm/mm

ANCILLARY DATA

RALT	Radar Altimeter	10 ft/mm
PWRL	60 Hz Power Line Monitor	-

The zero of the radar altimeter is 5 cm (5 large divisions) from the top of the analog chart. The full analog range for the radar altimeter is therefore 500 feet. A flying height of 60 m (197 feet) gives an analog trace which is three large divisions (3 cm) below the top of the analog record.

All but the VLF data are shown on the analog records as positive up. The VLF channels are reversed - positive anomalies are seen as downward excursion and negative anomalies are seen as upward excursions.

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

Vertical lines crossing the record are operator activated manual fiducial markers. The start of any survey line is identified by two closely spaced manual fiducials. The end of any survey line is identified by three closely spaced manual fiducials. Manual fiducials are numbered in order. Every tenth manual fiducial is indicated by its number, printed at the bottom of the record.

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

Digital Recorder

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

<u>DATA TYPE</u>	<u>SAMPLING</u>	<u>RESOLUTION</u>
Magnetometer	0.2 s	0.001 nT
VLF-EM (4 Channels)	0.2 s	0.03 %
HEM (8 Channels)	0.1 s	0.03 ppm (coaxial), 0.06 ppm (coplanar)
Position (2 Channels)	0.2 s	0.1 m
Altimeter	0.2 s	0.05 m
Power Line Monitor	0.2 s	-
Manual Fiducial		
Clock Time		

6. DATA PROCESSING AND PRESENTATION

6.1 Base Map

The 1:20,000 scale base maps were prepared from 1:20,000 scale maps of township boundaries provided by Falconbridge. Local topography - a 2.5 times enlargement of the 1:50,000 scale NTS sheet - was added. The 1:5,000 scale base maps were made as a ten times photographic enlargement of the 1:50,000 scale NTS map sheet.

6.2 Flight Path Map

The flight path is drawn using linear interpolation between x,y positions from the navigation system. These positions are updated every second (or about 6mm at a scale of 1:5,000). These positions are expressed as UTM eastings (x) and UTM northings (y).

The manual fiducials are shown as a small circle and labelled by fiducial number. The 24 hour clock time is shown as a small square, plotted every 30 seconds. Small tick marks are plotted every 2 seconds. Larger tick marks are plotted every 10 seconds.

The block, line and flight numbers are given at the start and end of each survey line. The number 70340 32 indicates area A (block 7), line 34, flight 32. For area B, the block number is 8. The high block and flight numbers are due to the fact that this survey followed a larger project for Falconbridge which was done under the same Aerodat job number.

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

6.3 Electromagnetic Survey Data

The electromagnetic data were recorded digitally at a sample rate of 10 per second with a time constant of 0.1 seconds. A two stage digital filtering process was carried out to reject major spheric events and the reduce system noise.

Local spheric 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 spheric events.

The signal to noise ratio was further enhanced by the application of a low pass 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 0.25 seconds. This low effective time constant gives minimal profile distortion.

Following the filtering process, a base level correction was made using EM zero levels determined during high altitude calibration sequences. The correction applied is a linear function of time that ensures the corrected amplitude of the various inphase and quadrature components is zero when no conductive or permeable source is present. The filtered and levelled data were used in the determination of apparent resistivity (see below).

The HEM offset profiles are plotted at vertical scales of 2 ppm/mm (935 and 4600 Hz) and 8 ppm/mm (850 and 4175 Hz).

6.4 Total Field Magnetics

The aeromagnetic data were corrected for diurnal variations by adjustment with the recorded base station magnetic values. Where needed, the magnetic tie line results were used to further level the magnetic data. No corrections for regional variations were applied. The corrected profile data were interpolated on to a regular grid using an Akima spline technique. The grid provided the basis for threading the presented contours. The minimum contour interval is 2 nT. Grid cell sizes of 25 m (1:20,000 scale maps) and 10 m (1:5,000 scale maps) were used.

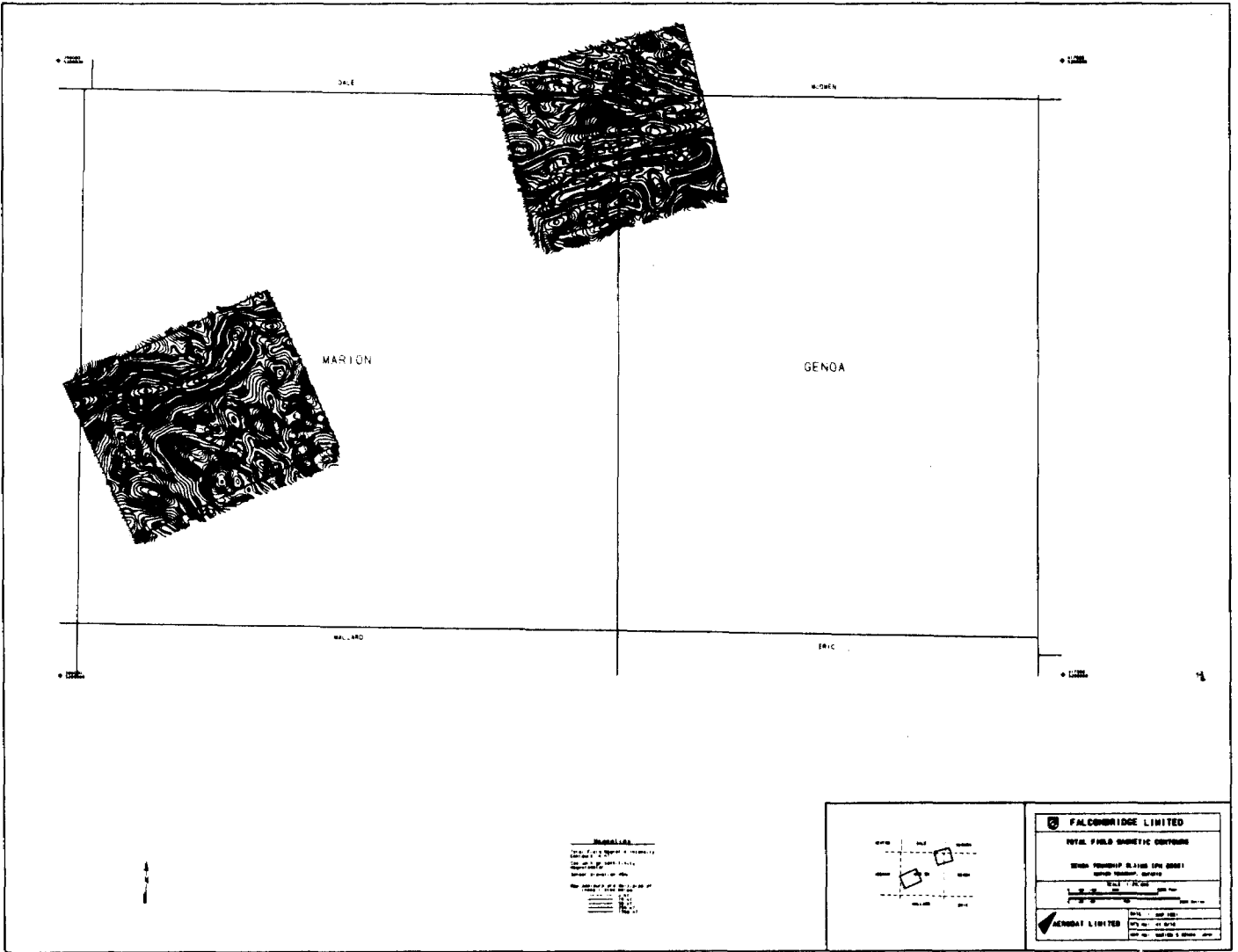
A page size copy of the 1:20,000 scale black line contoured total magnetic field map is attached.

6.5 Vertical Magnetic Gradient

The vertical magnetic gradient was calculated from the gridded total field magnetic data. The calculation is based on a 17 x 17 point convolution in the space domain. The results are contoured using a minimum contour interval of 0.2 nT/m. Grid cell sizes are the same as those used in processing the total field data.

6.6 Apparent Resistivity

The apparent resistivity is calculated by assuming a 200 metre thick conductive layer over resistive bedrock. The computer determines the resistivity that would be consistent with the sensor elevation and recorded inphase and quadrature response amplitudes at the selected frequency. The apparent resistivity profile data were interpolated onto a regular grid at a 25 metres (or 10 metres) true scale interval using an Akima spline technique and contoured using logarithmically arranged contour intervals. The contour interval is 0.1 log(ohm.m). This translates to contour lines at 100, 126, 158, 200, 251, 316, 398, 501, 631 and 794 ohm.m and multiples of 10. Thicker contour lines are used for 100 and 316 ohm.m and multiples of 10.



DALE

ALDEN

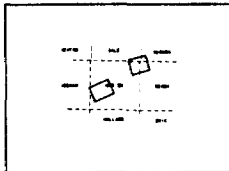
MARION

GENOA

MALARD

ERIC

NOTES:
 1. This drawing is a preliminary drawing and is not to be used for construction purposes.
 2. All dimensions are in feet and inches.
 3. The drawing is not to scale.
 4. The drawing is not to be used for construction purposes.
 5. The drawing is not to be used for construction purposes.
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 7. The drawing is not to be used for construction purposes.
 8. The drawing is not to be used for construction purposes.
 9. The drawing is not to be used for construction purposes.
 10. The drawing is not to be used for construction purposes.



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WWW.FALCONBRIDGE.COM	

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

6.7 VLF-EM

The VLF Total Field data from the Line Station is levelled such that a response of 0% is seen in non-anomalous regions. The corrected profile data are interpolated onto a regular grid using an Akima spline technique. The grid provided the basis for threading the presented contours. The minimum contour interval is 0.5 %. Grid cell size is 25 m (or 10 m).

7. INTERPRETATION

7.1 Area Geology

The following notes have been taken from Ontario Division of Mines, Geoscience Report 157, "Geology of the Chapleau Area, Districts of Algoma, Sudbury and Cochrane", 1977 by P.C. Thurston, G.M. Siragusa and R.P. Sage. Additional information has been taken from ODM Map number 2067 which shows the geology of Heenan, Marion and Genoa Townships at a scale of 1" = 1/2 mile.

- * In Marion and Heenan Townships, felsic to intermediate metavolcanics form a wedge-shaped unit some 16 km long and up to 5 km wide. It has an estimated maximum stratigraphic thickness of 3 km.
- * This felsic to intermediate metavolcanic unit is bordered on the southeast by younger granitic and dioritic rocks and on the northwest by the Woman River Iron Formation and overlying metavolcanics of intermediate to mafic composition.
- * The iron formation and adjoining metavolcanics (felsic to the southeast and mafic to the northwest) lie along the northwest limb of the Woman River anticline.
- * The occurrence of iron formation in a zone of transition from felsic to mafic volcanics, the presence of massive base metal sulphides in the iron formation and the association of these features with a major fold present a picture which is unique within the map area.
- * The Woman River iron formation consists of thin bands intercalated with metavolcanics. Typically, oxide-facies iron formation consists of interbedded magnetite layers, chert and pyritic graphitic slate. Occurrences of sulphide minerals (pyrite, pyrrhotite and rare sphalerite), along with disseminated magnetite are sporadic and not extensive.

The Woman River Iron Formation is seen on the GSC Aeromagnetic map (7077G) as a long arcuate magnetic anomaly with peak amplitudes more than 2000 nT. This anomaly crosses through the northern part of Genoa Township, curves to the southwest through Marion Township, ending in the southeast corner of Heenan Township for a total strike length of over 20 km. The survey areas are centered over 3.5 and 4 km segments of this iron formation.

Area geology maps show nnw/sse trending regional faults and diabase dykes.

7.2 Exploration Target

The following notes have been taken from ODM Geoscience Report 157 cited above.

- * The iron formation of Genoa, Heenan and Marion Townships has been intermittently examined for iron and base metals since shortly after 1900. This formation consists of two or more parallel bands composed of magnetite, siderite, chert, pyrite and pyrrhotite and contains local concentrations of base metal sulphides.
- * there is a change in the iron formation facies from west to east. Oxide facies dominate in the west and sulphide facies dominate in the east. A vertical transition is also present - the iron formation gradually changes from siliceous magnetite - siderite at the base to light grey banded chert having negligible iron content at the top of the formation.
- * initial mineral exploration for iron in Heenan, Marion and Genoa Townships over the Woman River Iron Range was conducted prior to 1910. This activity failed to indicate an iron deposit of economic importance but some base metal mineralization was uncovered. Exploration for iron along this belt remained dormant until the early 1960's. Indicated reserves are about 5 million tons of ore grading nearly 40% iron.

A Lead-Zinc occurrence in the northwest corner of Genoa Township is shown on the 1" = 1/2 mile geology map - 2067. The ODM Geoscience Report Number 157 shows this to be an active base metals exploration are beginning in 1929. Reported mineral occurrences have been pyrite, pyrrhotite, chalcopyrite, galena, sphalerite, bornite, magnetite and graphite.

Most of the Woman River Iron Formation is shown as being covered by surveyed mining properties.

The purpose of the helicopter-borne geophysical survey was to define the airborne geophysical character of the iron formation in as much detail as is currently possible and

to suggest possible base metals targets.

7.3 EM Anomaly Selection and Analysis

A. Anomaly Selection

The purpose of EM anomaly selection is to identify possible bedrock conductors. The principal characteristic for most anomalies picked is a positive anomaly in the 935 Hz inphase channel with a coincident low in the 850 Hz inphase channel. The same behaviour in the 935/850 Hz quadrature channels, the 4600/4175 Hz inphase and/or quadrature channels will support picking a weak 935 Hz inphase anomaly or may be used in some cases as selection criteria on their own.

These criteria reject EM anomalies due to gradual changes in overburden thickness or resistivity. For such anomalies, the coaxial and coplanar channels (either inphase or quadrature) for the same operating frequency move together and no separation is seen. This information is best seen in the contour plan maps of apparent resistivity.

The width of an anomaly from a thin sheet conductor will depend principally on depth of burial, dip and orientation with respect to flight line direction. A near vertical conductor running normal to the flight lines will yield a coaxial EM anomaly whose width is about 2.5 times the source-sensor separation (measured from 20% of the anomaly peak). The anomaly from such conductors at surface is about 80 m (4 mm at 1:20,000 or 1.6 cm at 1:5,000). The comparable figures for a conductor under 50 m of overburden is 220 m (1.1 cm at 1:20,000 or 4.4 cm at 1:5,000).

Special care is taken in areas of negative inphase response (due to magnetite). The quadrature channels may be the only indicators of a coincident conductor.

EM anomalies due to cultural sources are so judged if there is a coincident response in the power line monitor as seen on the analog records. If present, they are shown on maps as open squares. Conductance range estimates and inphase response amplitudes are not plotted with the anomaly symbol.

B. Analysis

The EM anomaly response amplitudes at 935 Hz are used to determine the conductance and depth of burial of a vertical thin sheet conductor model. These data appear in Appendix II.

The inphase anomaly amplitude and the thin sheet conductance range as determined from the 935 Hz response amplitudes are shown with the plotted anomaly symbols. Each anomaly is identified by flight line number and letter label.

Where the 935 and/or 850 Hz inphase channels are clearly negative, an "M" is printed inside the anomaly symbol and MAGN is shown in the anomaly listings.

Conductance estimates are only valid when working with sufficient anomaly amplitudes. Where the anomaly has been picked from the 4600 and 4175 Hz responses and there is no clear 935 Hz inphase anomaly, the conductance estimates derived from the 935 Hz responses are unreliable. The true conductance is probably quite low however (i.e. less than 1 mho) and in a range where conductance differences are not distinguishable.

Conductive overburden will generally reduce thin sheet conductance estimates because of elevated background levels in the quadrature channels. Depth of burial estimates will in general be too small.

7.4 General Comments

EM

Both survey areas show generally high resistivities - greater than 5000 ohm-m. Relatively thin and/or non-conducting overburden is indicated. Away from the obvious bedrock conductors in the Woman River Iron Formation, the exception is the southwest corner of Marion West - apparent resistivities are less than 600 ohm-m over a broad region. An area of thicker overburden is expected.

Both survey areas show narrow bands of strong bedrock conductors. These bands are composed of up to four parallel conductors with a total width of 300 m or less. In Marion East, the EM anomalies are those of a near vertical thin sheet conductors - 935 Hz inphase high and coincident 850 Hz inphase low. Negative inphase anomalies are rare. Conductance estimates are uniformly high - more than 8 mhos.

The EM anomalies in Marion West are much different. The coaxial and coplanar channels track each other - a flatlying or tabular source is indicated. Discrete near vertical thin sheet conductors are not expected. The anomaly center representation is misleading - the apparent resistivity map is probably a more realistic representation. Negative inphase anomalies are common in Marion West. Conductance estimates of less than 1 mho in the conductor band are probably too low.

Both areas show scattered weak EM anomalies away from the central conductor bands. Responses are often seen in the 4600/4175 Hz quadrature channels and on the border of a resistivity low - edge effects are a concern.

Magnetics

Both areas show the total field magnetic high expected over the Woman River Iron

Formation. Peak amplitudes in Marion East are over 5000 nT. The contrast with low magnetic gradient and amplitude areas immediately north of the iron formation is striking. A magnetic source which is vertical or with a moderate southern dip is expected.

In Marion West peak amplitudes exceed 3000 nT with values over 6000 nT near the border of Marion and Heenan Townships. Total field anomalies appear broader than those seen in Marion East.

The vertical gradient data shows the high amplitude responses expected over the iron formation - 200 to 400 nT/m. The total field high in Marion East now appears as three parallel magnetic anomalies over a width of 600 to 800 m. In Marion West, the VG contour map shows only one source with an average width of some 200 m. The idea of a flat lying or wide tabular source, first proposed with the EM responses, persists.

Three nnw/sse trending faults have been inferred in Marion West from the contoured vertical gradient maps. The eastern most fault is the most definite. A nnw/ssw trending fault has been proposed in Marion East. The evidence is taken from a combination of breaks in the VG and VLF data. In both cases it is difficult to discern possible faults given the small survey areas.

In Marion East, the region of the Woman River Iron Formation is seen as three parallel bands with a total width less than 1000 m. The center band has high magnetic and conductance values. The northern band is less so. The southern band is magnetic only and negative inphase responses are common. Magnetic anomaly amplitudes are not as strong as those in the center band.

VLF

The contoured VLF data shows strong linear anomalies with the expected bias towards the transmitter - Cutler at about 20° south of east. Responses are particularly strong in Marion East with peak amplitudes over 20 to 30%. A weak nnw/sse trending VLF anomaly has been used as evidence of a possible fault.

Response amplitudes in Marion West are weaker over the iron formation - peak amplitudes are generally less than 10%. This may be due to a number of possible breaks in the conductor band and occasionally unfavourable strike directions. The absence of clear VLF conductors in the southwest corner of Marion West is probably due to thicker and/or more conductive overburden.

7.5 Compilation/Interpretation Map

The compilation/interpretation maps show the following features

- EM conductor axes
- the +5 and +25 nT/m VG contour lines

- possible faults
- VLF conductor axes
- favourable area labels

A page size copy of the 1:20,000 scale compilation map is attached.

EM conductor axes are drawn through EM anomalies of like character. Consistency with local magnetic strike is often a factor.

The +5 nT/m vertical gradient contour line is used to indicate the possible outline of moderately strong magnetic sources. The additional +25 nT/m contour line indicates a strong magnetic source.

Possible faults have been taken from the contoured vertical gradient maps. In Marion East, the VLF data has been used as well.

VLF conductor axes have been drawn through the peaks of prominent VLF anomalies.

Interesting geophysical responses have been selected for discussion (see below). These are identified on the compilation maps by letter/number labels.

7.6 Favourable Areas

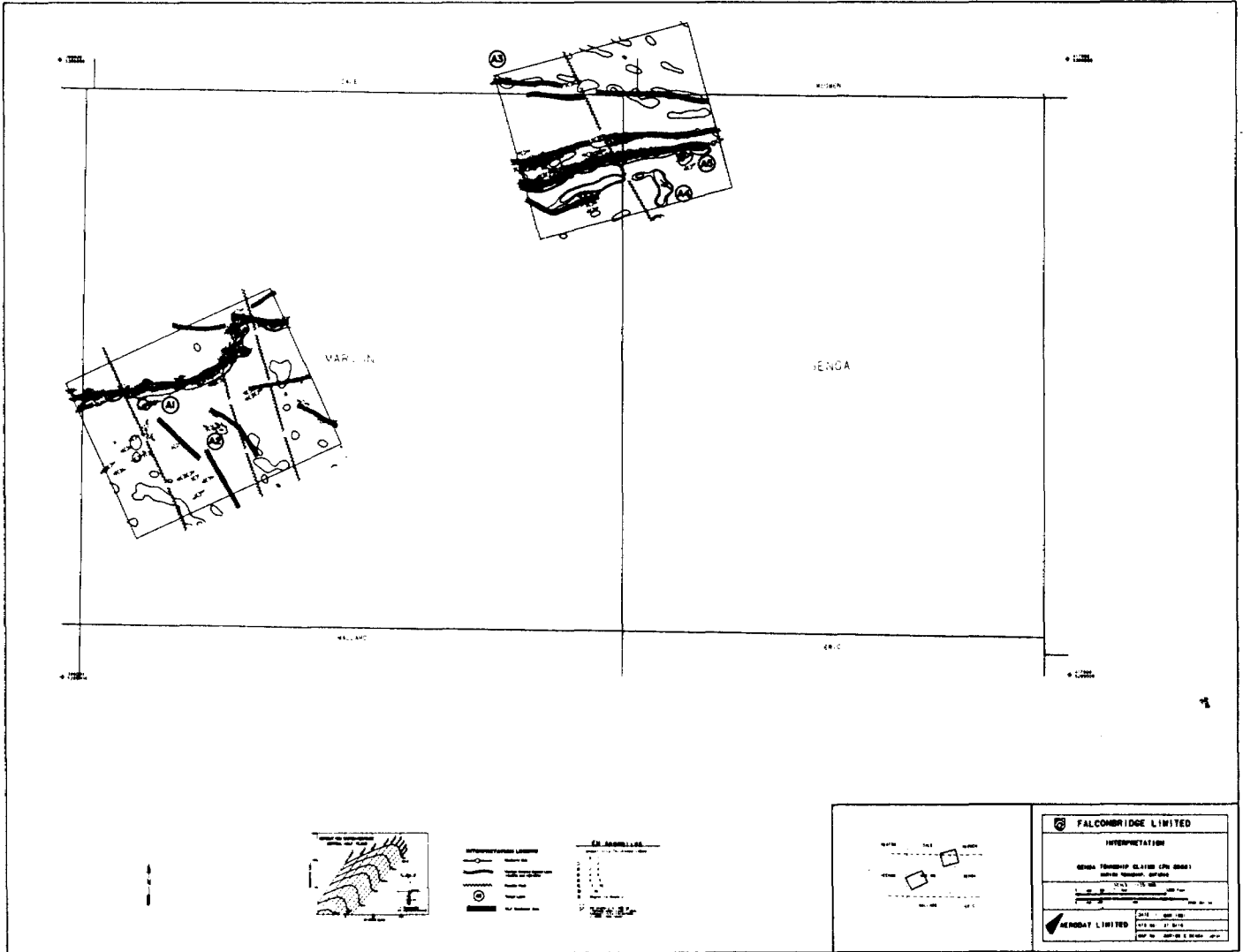
Geophysical targets of special interest are based on promising bedrock conductors in a favourable setting. Weak conductors on the edge of resistivity lows and in an uninteresting geophysical setting are usually passed over. All high conductance EM anomalies, unless part of a long formational conductor, are considered worthy of comment.

Within the conductive bands in both survey areas, the airborne geophysical data alone does not provide enough information to select one part of the conductor over another. A detailed study of the airborne geophysical results by a geologist with more discriminating exploration models is needed.

Outside these conductive bands, a number of isolated bedrock conductors show reasonable conductance estimates and promising EM anomaly shapes. These are labelled A1 to A5. In the discussion below, each target is identified by the area, survey line and 24 hour clock time of the most promising EM anomaly in the conductor.

A1: Marion West: Line 80290 (17:03:08)

A three line conductor about 100 m south of the iron formation. The EM anomalies have been picked based on the behaviour of the inphase channels - the 850 Hz inphase channel is largely negative, the 935 Hz inphase anomaly is more



SYMBOLS		EXPLANATION	
[Symbol]	[Symbol]	[Symbol]	[Symbol]
[Symbol]	[Symbol]	[Symbol]	[Symbol]
[Symbol]	[Symbol]	[Symbol]	[Symbol]
[Symbol]	[Symbol]	[Symbol]	[Symbol]
[Symbol]	[Symbol]	[Symbol]	[Symbol]
[Symbol]	[Symbol]	[Symbol]	[Symbol]

FALCONBRIDGE LIMITED	
INTERPRETATION	
ORE TENDENCY CLASSIFICATION (SEE REVERSE SIDE)	
SCALE: 1:50,000 1:50,000	
MENDO LIMITED	

positive. There are no anomalies in the 4600/4175 Hz quadrature channels.

A coincident magnetic anomaly has amplitudes almost as high as those over the iron formation immediately to the north. This target appears to be a small segment broken off from the iron formation. The EM responses from the conductor are weaker than those from the coincident (or neighbouring) magnetite.

A2: Marion West: Line 80200 (16:35:55)

A two line conductor 800 m south of the iron formation. Conductance estimates are 2 to 4 mhos. There is a coincident 150 nT magnetic anomaly. EM peak amplitudes are 3 ppm in the 935 and 4600 Hz inphase channels. As the coaxial and coplanar anomalies are the same shape, a flat lying or wide tabular source is expected.

The coincident quadrature anomalies are less than 3 ppm and the conductance may be higher than shown.

A3: Marion East: Line 70360 (14:11:48)

A three line conductor in the northwest corner of the survey area. The conductor forms part of an east/west trending magnetic (200 nT) and VLF (10 to 20%) feature.

Although the conductance estimates are low - less than 1 mho - the 4600/4175 Hz anomalies clearly indicate a thin sheet near vertical bedrock conductor at or near surface.

A4: Marion East: Line 70120 (13:30:39)

A one line anomaly 500 m south of the iron formation. The conductance estimate - less than 1 mho - is unfair. The conductor is surrounded by negative inphase responses. A much higher conductance estimate should apply.

The conductor is located at the center of a relatively broad, n/s trending magnetic anomaly (1500 nT). The 4600/4175 Hz data suggest a dip to the south.

A5: Marion East: Line 70080 (13:40:48)

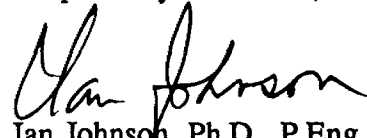
Like A1 in Marion West, this appears as a small segment broken off from the iron formation. Conductance estimates are moderate - 4 to 8 mhos. A higher value is possible given the nearby effects of magnetite.

8. CONCLUSIONS

High resolution helicopterborne geophysical surveys have been completed over two areas with a total area of about 22.5 square kilometres centered in Marion and Genoa Townships, just northwest of Rush Lake and some 110 km southwest of Timmins. Total coverage is approximately 235 line kilometres (231 km traverse plus 14 km magnetic tie lines). Results are presented on black line and colour maps at scales of 1:5,000 and 1:20,000. Map types include EM anomaly centres, apparent resistivity, contoured magnetic field, contoured vertical magnetic gradient and contoured VLF-EM Total Field data.

Preferred geophysical characteristics have been built up from a model geological target. These characteristics have been extracted from various map products and transferred to a compilation/interpretation map. Favourable areas are discussed with reference to this compilation map.

Respectfully submitted,



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Consulting Geophysicist

for

AERODAT LIMITED

August 7, 1991

J9101G



APPENDIX I

GENERAL INTERPRETIVE CONSIDERATIONS

Electromagnetic

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

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

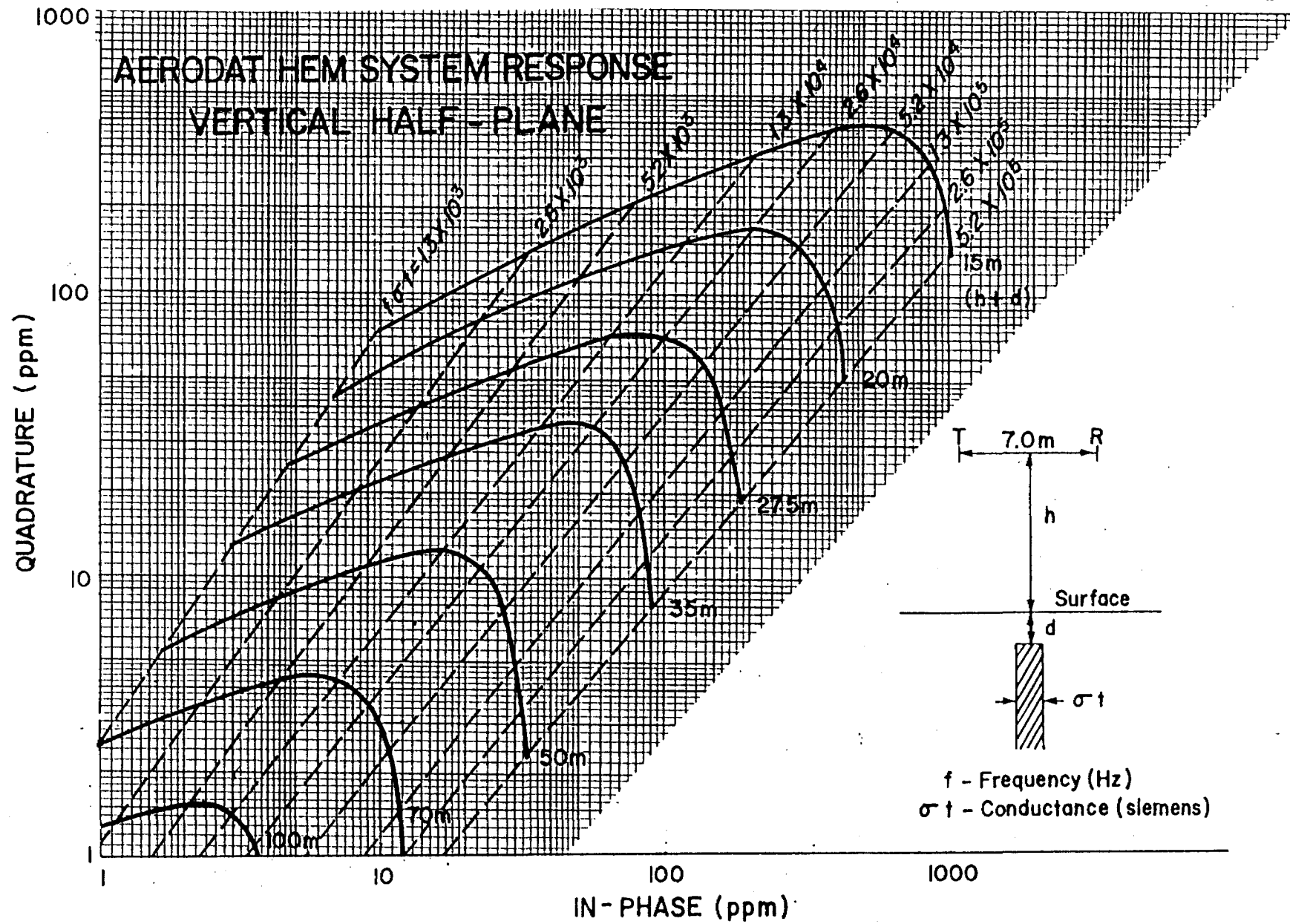
Electrical Considerations

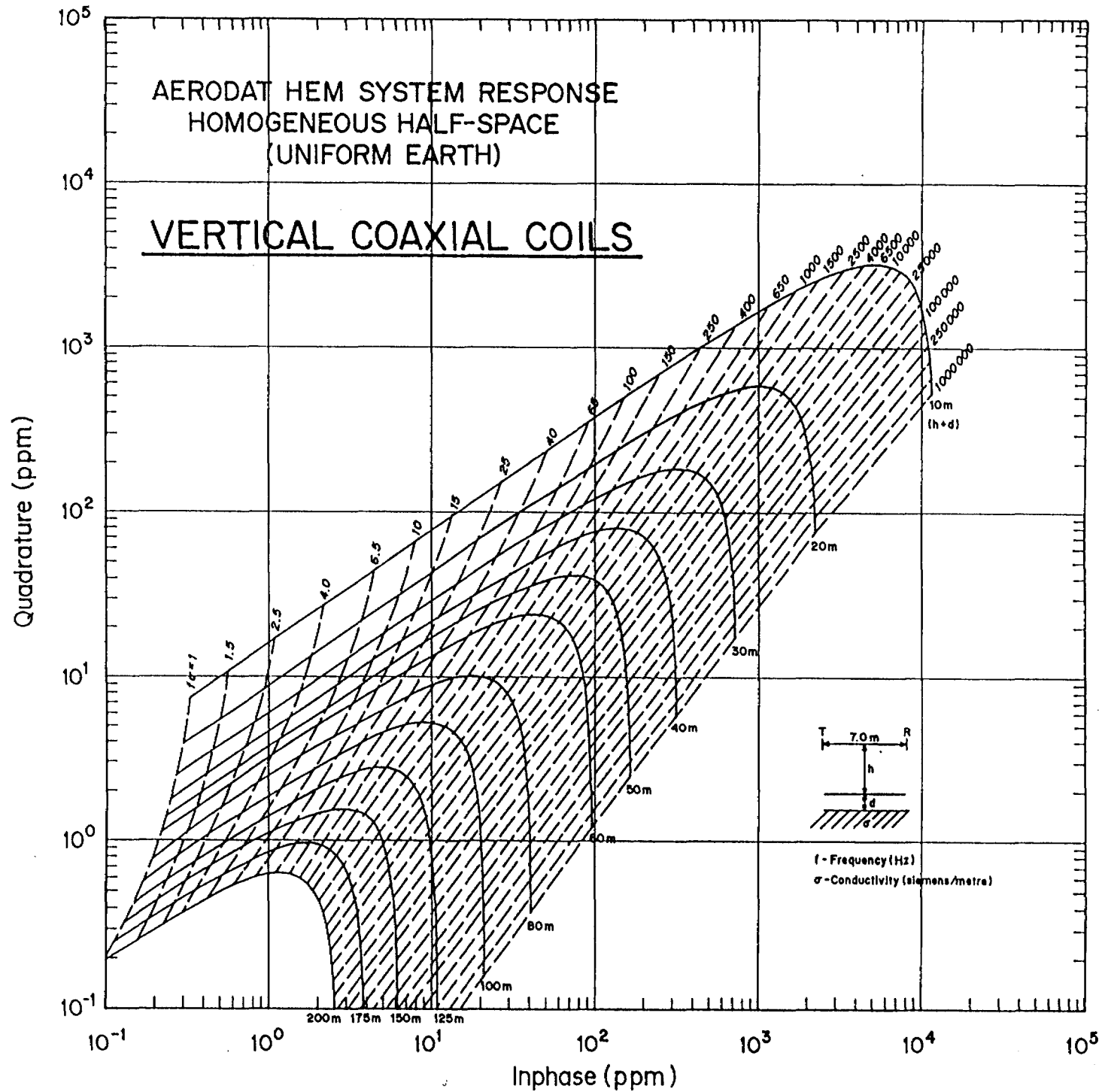
For a given conductive body the measure of its conductivity or conductance is closely related to the measured phase shift between the received and transmitted electromagnetic field. A small phase shift indicates a relatively high conductance, a large phase shift lower conductance. A small phase shift results in a large inphase to quadrature ratio and a large phase shift a low ratio. This relationship is shown quantitatively for non-magnetic vertical half-plane and half-space models on the accompanying phasor diagrams. Other physical models will show the same trend but different quantitative relationships.

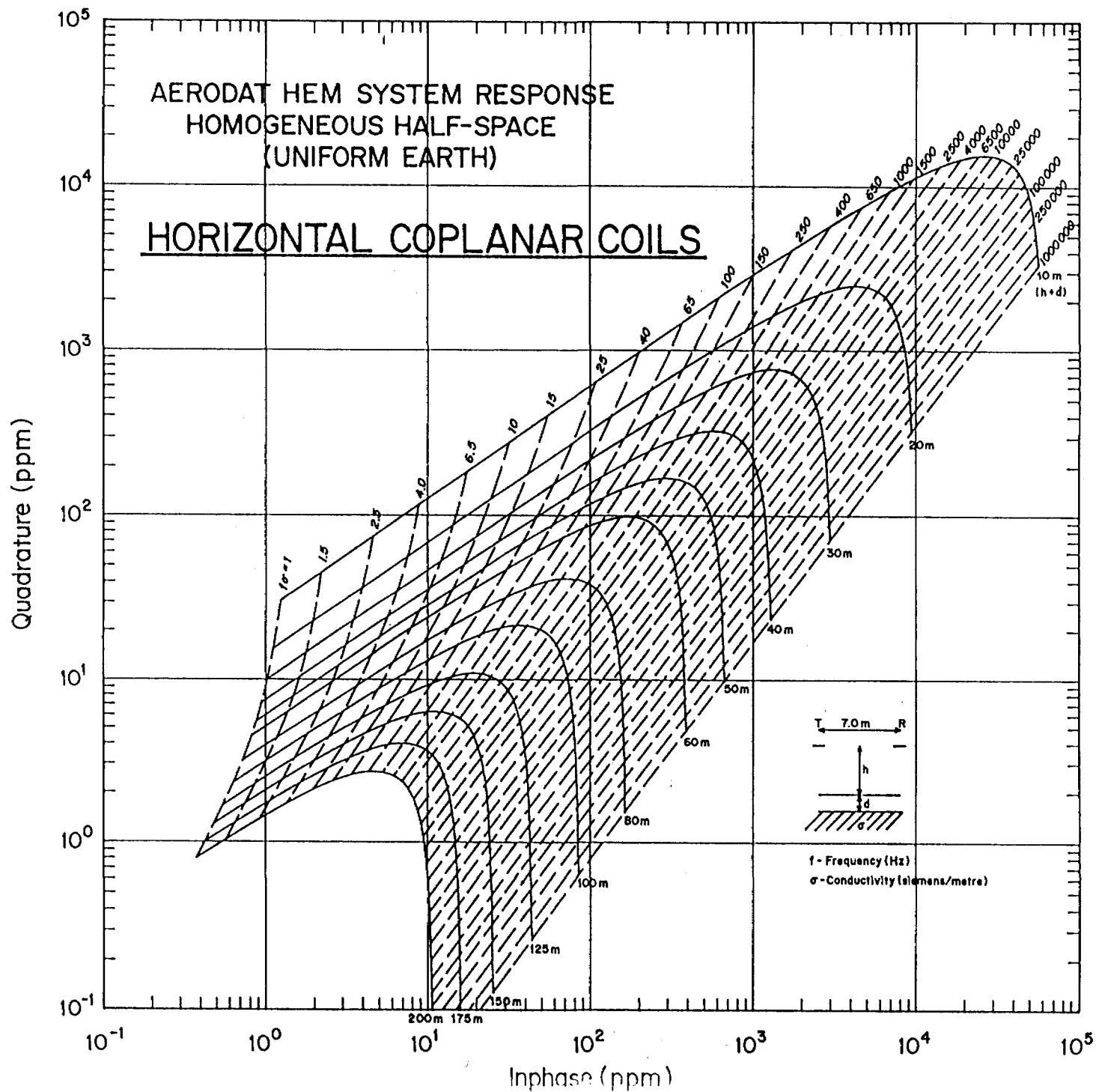
The phasor diagram for the vertical half-plane model, as presented, is for the coaxial coil configuration with the amplitudes in parts per million (ppm) of the primary field as measured at the response peak over the conductor. To assist the interpretation of the survey results the computer is used to identify the apparent conductance and depth of selected anomalies. The results of this calculation are presented in anomaly listings included in the survey report and the conductance and inphase amplitude are presented in symbolized form on the map presentation.

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

The conductance and depth values as presented are correct only as far as the model approximates the real geological situation. The actual geological source may be of limited length, have significant dip, or may be strongly magnetic. Its conductivity and thickness may vary with depth







and/or strike and adjacent bodies and overburden may have modified the response. In general the conductance estimate is less affected by these limitations than is the depth estimate, but both should be considered as relative rather than absolute guides to the anomaly's properties.

Conductance in mhos is the reciprocal of resistance in ohms and in the case of narrow slab-like bodies is the product of electrical conductivity and thickness.

The higher ranges of conductance, greater than 2-4 mhos, indicate that a significant fraction of the electrical conduction is electronic rather than electrolytic in nature. Materials that conduct electronically are limited to certain metallic sulphides and to graphite. High conductance anomalies, roughly 10 mhos or greater, are generally limited to massive sulphides or graphites.

Sulphide minerals, with the exception of such ore minerals as sphalerite, cinnabar and stibnite, are good conductors. Sulphides may occur in a disseminated manner that inhibits electrical conduction through the rock mass. In this case the apparent conductance can seriously underrate the quality of the conductor in geological terms. In a similar sense the relatively non-conducting sulphide minerals noted above may be present in significant concentrations in association with minor conductive sulphides, and the electromagnetic response will only relate to the minor associated mineralization. Indicated conductance is also of little direct significance for the identification of gold mineralization. Although gold is highly conductive, it would not be expected to exist in sufficient quantity to create a recognizable anomaly. Minor accessory sulphide mineralization may however provide a useful indirect indication.

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

Geometrical Considerations

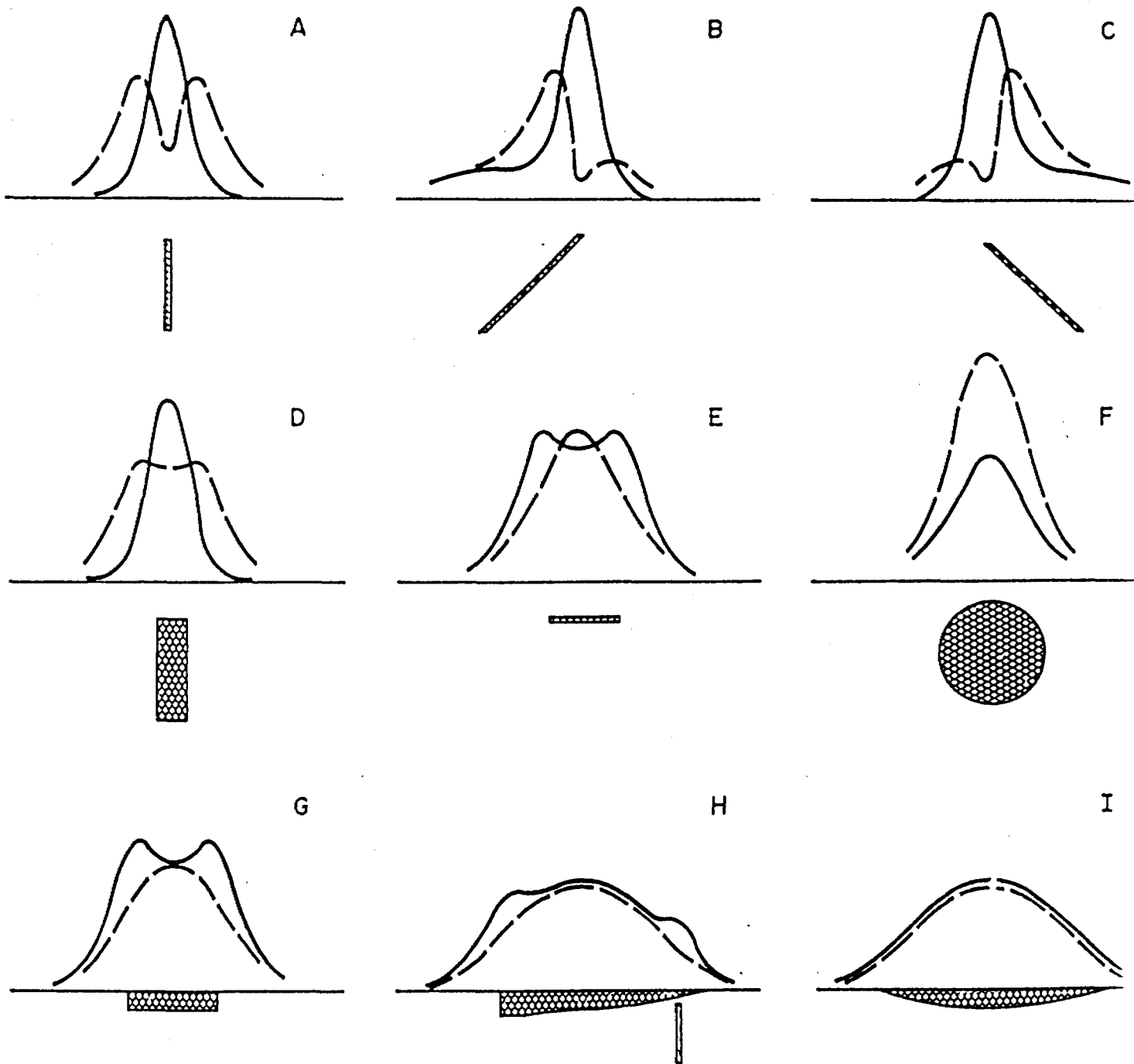
Geometrical information about the geologic conductor can often be interpreted from the profile shape of the anomaly. The change in shape is primarily related to the change in inductive coupling among the transmitter, the target, and the receiver. The accompanying figure shows a selection of HEM response profile shapes from nine idealized targets. Response profiles are labelled A through I. These labels are used in the discussion which follows.

In the case of a thin, steeply dipping, sheet-like conductor, the coaxial coil pair will yield a near symmetric peak over the conductor. On the other hand, the coplanar coil pair will pass through a null couple relationship and yield a minimum over the conductor, flanked by positive side lobes.(Profile A) As the dip of the conductor decrease from vertical, the coaxial anomaly shape changes only slightly, but in the case of the coplanar coil pair the side lobe on the down dip side strengthens relative to that on the up dip side.(Profiles B and C).

As the thickness of the conductor increases, induced current flow across the thickness of the

HEM RESPONSE PROFILE SHAPE AS AN INDICATOR OF CONDUCTOR GEOMETRY

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



conductor becomes relatively significant and complete null coupling with the coplanar coils is no longer possible.(Profile D) As a result, the apparent minimum of the coplanar response over the conductor diminishes with increasing thickness, and in the limiting case of a fully 3 dimensional body or a horizontal layer or half-space, the minimum disappears completely.

A horizontal conducting layer such as a horizontal thin sheet or overburden will produce a response in the coaxial and coplanar coils that is a function of altitude (and conductivity if not uniform). The profile shape will be similar in both coil configurations with an amplitude ratio (coplanar:coaxial) of about 4:1*(Profiles E and G).

In the case of a spherical conductor, the induced currents are confined to the volume of the sphere, but not relatively restricted to any arbitrary plane as in the case of a sheet-like form. The response of the coplanar coil pair directly over the sphere may be up to 8* times greater than that of the coaxial pair.(Profile F)

In summary, a steeply dipping, sheet-like conductor will display a decrease in the coplanar response coincident with the peak of the coaxial response. The relative strength of this coplanar null is related inversely to the thickness of the conductor. A pronounced null indicates a relatively thin conductor. The dip of such a conductor can be inferred from the relative amplitudes of the side-lobes.

Massive conductors that could be approximated by a conducting sphere will display a simple single peak profile form on both coaxial and coplanar coils, with a ratio between the coplanar to coaxial response amplitudes as high as 8*.

Overburden anomalies often produce broad poorly defined anomaly profiles.(Profile I) In most cases, the response of the coplanar coils closely follows that of the coaxial coils with a relative amplitude ratio of 4*.

Occasionally, if the edge of an overburden zone is sharply defined with some significant depth extent, an edge effect will occur in the coaxial coils. In the case of a horizontal conductive ring or ribbon, the coaxial response will consist of two peaks, one over each edge; whereas the coplanar coil will yield a single peak.(Profile H)

* It should be noted at this point that Aerodat's definition of the measured ppm unit is related to the primary field sensed in the receiving coil without normalization to the maximum coupled (coaxial configuration). If such normalization were applied to the Aerodat units, the amplitude of the coplanar coil pair would be halved.

Magnetics

The Total Field Magnetic Map shows contours of the total magnetic field, uncorrected for regional variation. Whether an EM anomaly with a magnetic correlation is more likely to be

caused by a sulphide deposit than one without depends on the type of mineralization. An apparent coincidence between an EM and a magnetic anomaly may be caused by a conductor which is also magnetic, or by a conductor which lies in close proximity to a magnetic body. The majority of conductors which are also magnetic are sulphides containing pyrrhotite and/or magnetite. Conductive and magnetic bodies in close association can be, and often are, graphite and magnetite. It is often very difficult to distinguish between these cases. If the conductor is also magnetic, it will usually produce an EM anomaly whose general pattern resembles that of the magnetics. Depending on the magnetic permeability of the conducting body, the amplitude of the inphase EM anomaly will be weakened, and if the conductivity is also weak, the inphase EM anomaly may even be reversed in sign.

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

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

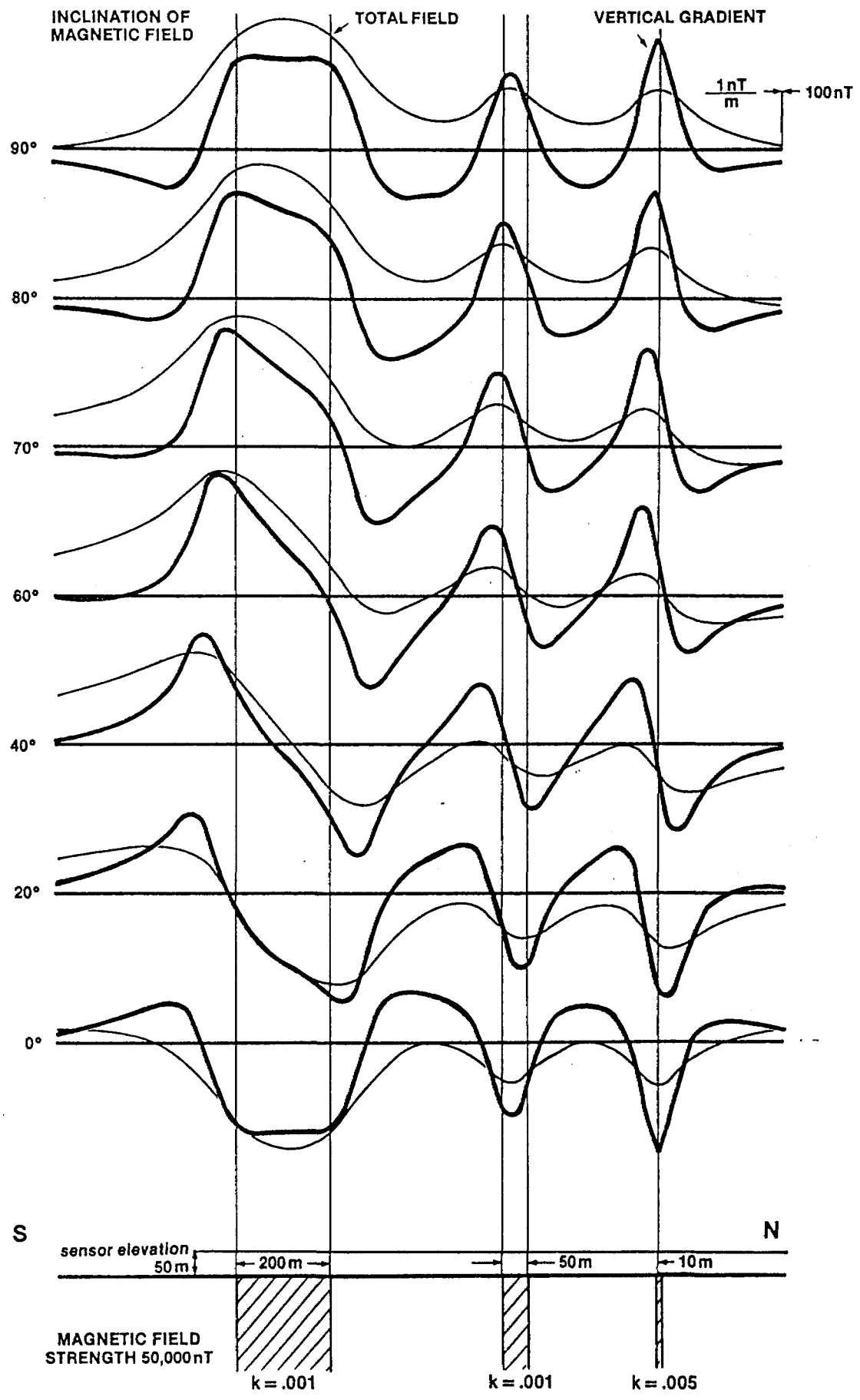
Theoretical profiles of total field and vertical gradient anomalies from tabular sources at a variety of magnetic inclinations are shown in the attached figure. Sources are 10, 50 and 200 m wide. The source-sensor separation is 50 m. The thin line is the total field profile. The thick line is the vertical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

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

Outline

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

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



Dip

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

Depth of Burial

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

VLF Electromagnetics

The VLF-EM method employs the radiation from powerful military radio transmitters as the primary signals. The magnetic field associated with the primary field is locally horizontal and normal to a line pointing at the transmitter.

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

The relatively high frequency of VLF (15-25) kHz provides high response factors for bodies of low conductance. Relatively "disconnected" sulphide ores have been found to produce measurable VLF signals. For the same reason, poor conductors such as sheared contacts, breccia zones, narrow faults, alteration zones and porous flow tops normally produce VLF anomalies. The method can therefore be used effectively for geological mapping. The only relative disadvantage of the method lies in its sensitivity to conductive overburden. In conductive ground the depth of exploration is severely limited.

The effect of strike direction is important in the sense of the relation of the conductor axis relative to the energizing electromagnetic field. A conductor aligned along a radius drawn from a transmitting station will be in a maximum coupled orientation and thereby produce a stronger response than a similar conductor at a different strike angle. Theoretically, it would be possible for a conductor, oriented tangentially to the transmitter to produce no signal. The most obvious effect of the strike angle consideration is that conductors favourably oriented with respect to the transmitter location and also near perpendicular to the flight direction are most clearly rendered and usually dominate the map presentation.

The total field anomaly is an indicator of the existence and position of a conductor. The response will be a maximum over the conductor, without any special filtering, and strongly favour the upper edge of the conductor even in the case of a relatively shallow dip.

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

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

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

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

The vertical quadrature component over steeply dipping sheet-like conductor will be a cross-over type response with the cross-over closely associated with the upper edge of the conductor.

The response is a cross-over type due to the fact that it is the vertical rather than total field quadrature component that is measured. The response shape is due largely to geometrical rather than conductivity considerations and the distance between the maximum and minimum on either side of the cross-over is related to target depth. For a given target geometry, the larger this distance the greater the depth.

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

AERODAT LIMITED

June, 1991.

APPENDIX II
ANOMALY LISTINGS

J9101 - FALCONBRIDGE LIMITED ANOMALY LIST - GENOA TOWNSHIP CLAIMS

FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM)		CONDUCTOR		BIRD
				INPHASE	QUAD.	CTP DEPTH	HEIGHT	
						MHOS	MTRS	MTRS
33	70010	A	1	0.6	0.7	1.0	100	31
33	70010	B	0	0.0	1.7	0.0	0	37
33	70020	A	0	0.4	2.7	0.0	20	30
33	70020	B	3	3.3	1.9	6.9	58	34
33	70030	A	0	-0.2	2.3	0.0	0	34
33	70040	A	1	0.8	0.8	1.5	99	27
33	70040	B	3	2.3	1.6	4.5	69	31
33	70040	C	3	3.1	2.4	4.4	54	34
33	70050	A	4	14.5	7.3	14.4	32	25
33	70050	B	0	0.6	2.7	0.0	30	27
33	70060	A	0	1.1	2.4	0.5	45	29
33	70060	B	4	7.0	4.4	8.2	40	30
33	70070	A	0	-0.5	0.4	0.0	0	28
33	70070	B	3	6.8	5.5	5.7	37	28
33	70070	C	5	18.8	7.1	23.1	28	27
33	70070	D	0	1.3	3.9	0.3	26	31
33	70080	A	0	1.6	3.3	0.7	33	34
33	70080	B	6	18.2	4.4	41.8	27	30
33	70080	C	4	3.9	1.9	9.4	57	33
33	70080	D	3	8.0	5.8	7.1	37	27
33	70090	A	5	13.4	5.5	18.5	33	27
33	70090	B	0	1.2	3.0	0.4	28	38
33	70100	A	1	1.9	2.9	1.2	39	37
33	70100	B	5	19.6	8.1	20.8	25	27
33	70110	A	5	22.5	7.8	27.5	20	31
33	70110	B	4	13.5	7.4	12.5	24	33
33	70110	C	0	1.6	4.2	0.4	27	31
33	70120	A	1	2.3	3.6	1.3	35	35
33	70120	B	4	8.2	5.3	8.4	35	30
33	70120	C	5	18.7	6.5	25.8	24	31
33	70120	D MAGN	1	2.2	3.9	1.0	38	28
33	70130	A	5	16.4	7.2	18.1	24	32

Estimated depth may be unreliable because the stronger part of the conductor may be deeper or to one side of the flight line, or because of a shallow dip or overburden effects.

J9101 - FALCONBRIDGE LIMITED ANOMALY LIST - GENOA TOWNSHIP CLAIMS

FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM)		CONDUCTOR		BIRD
				INPHASE	QUAD.	CTP DEPTH	HEIGHT	
						MHOS	MTRS	MTRS
33	70130	B	4	13.1	8.8	9.4	24	30
33	70130	C	1	2.8	4.9	1.2	24	37
33	70140	A	1	2.4	3.1	1.8	40	36
33	70140	B	4	15.6	7.5	15.7	31	25
33	70140	C	5	11.0	4.3	18.6	35	30
33	70150	A	5	12.3	4.7	19.9	33	29
33	70150	B	4	11.8	5.8	13.9	31	30
33	70150	C	0	1.2	3.4	0.3	28	33
33	70160	A	0	0.4	1.2	0.1	50	36
33	70160	B	3	8.8	6.3	7.5	33	29
33	70160	C	5	11.4	4.3	19.7	32	32
33	70170	A	4	10.5	5.4	12.5	34	30
33	70170	B	3	4.7	4.0	4.5	45	28
33	70170	C	3	4.7	3.6	5.3	45	30
33	70170	D MAGN	0	-0.4	2.0	0.0	0	30
33	70170	E	0	0.3	2.2	0.0	22	31
33	70180	A	0	0.6	2.0	0.1	35	35
33	70180	B MAGN	0	-1.2	0.8	0.0	0	29
33	70180	C	3	7.3	5.5	6.5	37	28
33	70180	D	4	10.6	5.7	11.8	31	32
33	70190	A	5	16.9	7.8	17.1	24	31
33	70190	B	2	4.3	5.2	2.6	39	25
33	70190	C MAGN	0	-0.7	1.8	0.0	0	33
33	70190	D	0	0.2	2.1	0.0	12	35
33	70200	A	0	0.5	3.6	0.0	17	28
33	70200	B	2	3.2	4.1	2.1	36	33
33	70200	C	2	3.0	3.4	2.4	41	34
33	70210	A	4	4.6	1.8	13.7	55	33
33	70210	B	4	8.2	3.4	15.5	40	32
33	70210	C	0	-0.3	3.1	0.0	0	29
33	70220	A	0	0.2	2.3	0.0	13	32
33	70220	B	2	2.4	2.7	2.2	53	29
33	70220	C	5	18.2	6.0	27.5	23	32
33	70220	D	4	7.1	3.1	13.7	40	35
32	70230	A	4	5.6	2.9	9.9	48	31

Estimated depth may be unreliable because the stronger part of the conductor may be deeper or to one side of the flight line, or because of a shallow dip or overburden effects.

J9101 - FALCONBRIDGE LIMITED ANOMALY LIST - GENOA TOWNSHIP CLAIMS

FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM)		CONDUCTOR		BIRD
				INPHASE	QUAD.	CTP DEPTH	MTRS	HEIGHT
						MHOS	MTRS	MTRS
32	70230	B	4	6.7	3.8	9.3	44	28
32	70230	C	3	6.4	4.1	7.7	38	34
32	70230	D	1	0.9	1.0	1.3	83	33
32	70240	A	0	0.0	0.7	0.0	0	34
32	70240	B	0	1.7	3.2	0.8	38	31
32	70240	C	4	8.3	5.1	9.0	34	32
32	70240	D	5	8.8	3.3	18.2	39	32
32	70250	A	0	0.2	0.9	0.0	52	33
32	70250	B	6	17.0	3.9	43.9	30	29
32	70250	C	5	5.1	1.6	19.4	55	32
32	70260	A	0	0.3	1.9	0.0	29	29
32	70260	B	4	6.5	3.4	10.3	43	31
32	70260	C	5	12.9	3.6	30.9	32	32
32	70260	D	0	-0.5	0.8	0.0	0	26
32	70260	E	0	-0.3	1.1	0.0	0	27
32	70260	F	0	0.3	0.3	0.8	148	30
32	70270	A	0	-0.5	0.9	0.0	0	28
32	70270	B	4	9.4	4.8	12.2	36	30
32	70270	C	4	7.0	3.7	10.4	44	29
32	70270	D	0	0.2	2.0	0.0	22	27
32	70280	A	0	1.5	4.0	0.4	31	27
32	70280	B	4	4.9	2.2	11.5	52	32
32	70280	C	5	8.3	2.8	20.7	41	32
32	70280	D	0	0.0	1.7	0.0	0	27
32	70290	A	5	8.5	3.1	18.7	41	31
32	70290	B	3	2.6	1.7	5.2	65	32
32	70290	C	0	0.6	3.2	0.0	22	29
32	70290	D	1	3.0	5.1	1.3	32	28
32	70300	A	1	3.1	4.2	1.9	38	30
32	70300	B	3	4.6	3.4	5.5	41	36
32	70300	C	3	4.2	2.7	6.5	49	34
32	70300	D	5	13.6	3.9	30.3	30	32
32	70310	A	5	14.9	6.5	17.7	30	28
32	70310	B	3	3.4	2.2	5.9	57	32
32	70310	C	3	2.0	1.2	5.3	73	36
32	70310	D	3	4.2	3.4	4.7	45	32
32	70310	E	0	0.8	2.1	0.2	43	30

Estimated depth may be unreliable because the stronger part of the conductor may be deeper or to one side of the flight line, or because of a shallow dip or overburden effects.

J9101 - FALCONBRIDGE LIMITED ANOMALY LIST - GENOA TOWNSHIP CLAIMS

FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM)		CONDUCTOR		BIRD
				INPHASE	QUAD.	CTP	DEPTH	HEIGHT
-----	-----	-----	-----	-----	-----	MHOS	MTRS	MTRS
32	70320	A	2	1.4	1.2	2.6	80	31
32	70320	B	3	7.6	5.5	6.9	35	30
32	70320	C	1	2.9	4.1	1.7	38	30
32	70320	D	0	0.7	1.4	0.4	59	33
32	70320	E	6	21.6	6.6	32.1	24	29
32	70330	A	5	17.5	7.3	19.8	28	27
32	70330	B	0	1.3	2.2	0.8	53	28
32	70330	C	3	7.7	5.4	7.3	36	29
32	70330	D	3	9.2	6.4	7.9	33	28
32	70330	E	2	3.6	4.9	2.0	37	27
32	70340	A	0	1.7	3.1	0.8	42	29
32	70340	B	2	6.2	6.8	3.6	32	27
32	70340	C	3	8.2	7.5	5.2	32	27
32	70340	D	3	8.0	8.7	4.0	28	26
32	70340	E MAGN	0	0.0	3.8	0.0	0	26
32	70340	F	4	6.8	3.7	9.9	46	27
32	70350	A	5	7.0	2.7	16.2	47	29
32	70350	B	2	1.6	1.7	2.0	67	30
32	70350	C	1	4.4	7.5	1.6	26	27
32	70350	D	2	7.9	9.1	3.7	28	25
32	70350	E	2	8.0	12.0	2.5	18	27
32	70350	F	0	0.6	0.8	0.7	89	33
32	70350	G	0	-1.0	1.3	0.0	0	30
33	70351	A	0	0.6	1.9	0.1	36	37
33	70351	B	0	1.1	5.1	0.1	18	27
33	70351	C	0	2.6	8.3	0.4	19	24
33	70351	D	0	1.5	4.0	0.4	27	31
33	70351	E	2	5.4	5.7	3.5	33	31
33	70360	A	3	5.9	4.0	6.9	45	28
33	70360	B	0	0.2	3.5	0.0	0	33
33	70360	C	1	3.4	6.8	1.1	26	27
33	70360	D	1	3.6	7.9	1.0	20	29
33	70360	E	0	0.9	3.7	0.1	25	28

Estimated depth may be unreliable because the stronger part of the conductor may be deeper or to one side of the flight line, or because of a shallow dip or overburden effects.

J9101 - FALCONBRIDGE LIMITED ANOMALY LIST - GENOA TOWNSHIP CLAIMS

FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM)		CONDUCTOR		BIRD
				INPHASE	QUAD.	CTP DEPTH	HEIGHT	
						MHOS	MTRS	MTRS
34	80010	A	0	1.2	2.3	0.6	42	35
34	80010	B	1	1.1	1.4	1.2	71	30
34	80020	A	0	-0.2	1.5	0.0	0	25
34	80020	B	2	5.0	5.4	3.3	33	31
34	80030	A	2	3.6	3.6	3.2	45	30
34	80040	A	0	0.5	0.7	0.6	94	33
34	80040	B MAGN	0	-0.2	1.6	0.0	0	30
34	80050	A	0	-1.5	0.5	0.0	0	34
34	80060	A MAGN	0	-0.6	1.5	0.0	0	30
34	80070	A	2	5.6	6.0	3.5	31	31
34	80080	A MAGN	0	-1.4	3.4	0.0	0	30
34	80080	B	2	7.0	10.2	2.5	22	27
34	80080	C	3	11.8	10.2	6.4	22	30
34	80080	D	0	0.9	3.6	0.1	23	31
34	80090	A	0	2.3	6.0	0.6	18	33
34	80090	B	1	3.4	7.4	1.0	18	32
34	80090	C	2	5.3	7.9	2.1	22	31
34	80090	D MAGN	0	-1.8	5.2	0.0	0	34
34	80090	E MAGN	0	-0.3	1.9	0.0	0	30
34	80100	A MAGN	0	-2.9	2.5	0.0	0	30
34	80100	B MAGN	0	-2.2	3.8	0.0	0	29
34	80100	C MAGN	0	-3.7	4.6	0.0	0	25
34	80100	D MAGN	0	-4.2	6.7	0.0	0	26
34	80100	E	2	5.7	8.1	2.4	25	28
34	80110	A	2	3.3	3.1	3.4	52	27
34	80110	B	2	3.1	2.7	3.7	52	31
34	80110	C	0	0.0	2.6	0.0	0	31
34	80120	A	0	-0.2	2.3	0.0	0	27
34	80120	B	0	-0.2	1.4	0.0	0	28
34	80120	C	3	2.9	1.6	7.0	66	32
34	80120	D	2	5.7	6.2	3.5	40	21
34	80120	E	0	-0.1	3.2	0.0	0	25
34	80130	A	0	0.9	2.1	0.3	47	29

Estimated depth may be unreliable because the stronger part of the conductor may be deeper or to one side of the flight line, or because of a shallow dip or overburden effects.

J9101 - FALCONBRIDGE LIMITED ANOMALY LIST - GENOA TOWNSHIP CLAIMS

FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM)		CONDUCTOR		BIRD
				INPHASE	QUAD.	CTP DEPTH	HEIGHT	
						MHOS	MTRS	MTRS
34	80130	B	3	11.2	8.3	7.8	26	31
34	80140	A	2	9.5	11.1	3.9	26	24
34	80140	B	2	4.8	5.5	3.0	37	27
34	80150	A	0	1.5	3.2	0.6	35	32
34	80150	B	1	3.2	6.4	1.1	26	28
34	80160	A	0	0.0	0.8	0.0	0	27
34	80160	B	3	8.4	5.8	7.7	37	27
34	80160	C	0	1.6	3.5	0.6	34	31
34	80170	A	1	1.7	2.0	1.7	59	31
34	80170	B	3	7.4	5.1	7.4	41	26
34	80170	C	3	0.7	0.3	5.6	133	34
34	80180	A	5	12.2	5.4	16.2	36	26
34	80180	B	3	5.1	3.2	7.3	46	32
34	80190	A	3	4.9	3.5	6.0	48	28
34	80190	B	3	3.9	3.3	4.2	43	34
34	80190	C	0	-0.6	0.4	0.0	0	30
34	80200	A	0	1.1	1.7	0.9	60	31
34	80200	B	1	2.5	3.7	1.5	44	26
34	80210	A MAGN	0	0.9	3.2	0.1	27	31
34	80210	B	0	0.0	0.2	0.0	0	32
34	80220	A	4	5.5	3.3	8.0	55	22
34	80220	B	2	3.1	3.4	2.6	46	29
34	80220	C	2	2.2	1.8	3.5	62	34
34	80230	A MAGN	0	0.8	3.3	0.1	27	28
34	80240	A MAGN	0	-0.2	3.4	0.0	0	25
34	80250	A MAGN	1	3.2	4.9	1.6	39	24
34	80250	B	0	-0.1	2.3	0.0	0	28
34	80260	A MAGN	0	-0.5	1.7	0.0	0	31
34	80270	A MAGN	0	-4.7	0.9	0.0	0	29
34	80270	B	0	0.2	4.2	0.0	1	28
34	80280	A	0	0.2	2.5	0.0	15	27

Estimated depth may be unreliable because the stronger part of the conductor may be deeper or to one side of the flight line, or because of a shallow dip or overburden effects.

J9101 - FALCONBRIDGE LIMITED ANOMALY LIST - GENOA TOWNSHIP CLAIMS

FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM)		CONDUCTOR		BIRD
				INPHASE	QUAD.	CTP DEPTH	DEPTH	HEIGHT
						MHOS	MTRS	MTRS
34	80280	B	0	-0.1	3.2	0.0	0	31
34	80280	C	0	-0.5	0.9	0.0	0	28
34	80280	D	2	0.4	0.2	3.3	162	37
34	80280	E MAGN	0	-10.3	2.5	0.0	0	24
34	80280	F MAGN	1	2.8	4.9	1.2	33	28
34	80290	A MAGN	0	0.1	3.2	0.0	0	31
34	80290	B MAGN	0	-4.0	3.4	0.0	0	29
34	80290	C MAGN	0	0.0	2.4	0.0	0	30
34	80290	D	0	-0.4	2.0	0.0	0	32
34	80300	A MAGN	0	-4.4	0.0	0.0	0	29
34	80300	B MAGN	0	-1.4	2.9	0.0	0	33
34	80300	C MAGN	0	-2.1	1.9	0.0	0	29
34	80310	A MAGN	0	-0.4	0.8	0.0	0	36
34	80310	B MAGN	0	-0.6	1.3	0.0	0	28
34	80310	C	0	0.8	1.5	0.5	59	32
34	80310	D	0	0.5	3.0	0.0	21	29
34	80320	A	0	0.4	2.5	0.0	23	30
34	80320	B MAGN	0	0.6	1.2	0.3	65	31
34	80320	C	0	0.8	1.4	0.6	65	30
34	80330	A	1	3.0	4.2	1.8	39	29
34	80330	B	0	0.3	2.6	0.0	18	29
34	80340	A	0	1.1	2.1	0.6	47	33
34	80340	B MAGN	0	-0.6	4.3	0.0	0	26
34	80350	A MAGN	1	3.4	5.0	1.7	30	33
34	80350	B MAGN	0	1.5	4.4	0.3	28	27
34	80350	C	0	0.1	2.7	0.0	0	32
34	80360	A	0	-1.2	2.9	0.0	0	30
34	80360	B	0	2.2	4.9	0.7	31	26
34	80360	C	0	2.1	3.9	0.9	36	30
34	80370	A MAGN	0	-1.9	3.2	0.0	0	30
34	80370	B MAGN	0	-2.5	4.8	0.0	0	31
34	80370	C	0	1.3	3.5	0.4	33	28
34	80380	A	0	0.7	3.3	0.0	26	27
34	80380	B MAGN	0	0.0	10.9	0.0	0	24
34	80380	C MAGN	0	-1.1	5.7	0.0	0	28

Estimated depth may be unreliable because the stronger part of the conductor may be deeper or to one side of the flight line, or because of a shallow dip or overburden effects.

J9101 - FALCONBRIDGE LIMITED ANOMALY LIST - GENOA TOWNSHIP CLAIMS

FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM)		CONDUCTOR		BIRD	
				INPHASE	QUAD.	CTP DEPTH MHOS	DEPTH MTRS	HEIGHT MTRS	
34	80390	A	MAGN	0	-4.3	4.9	0.0	0	27
34	80390	B	MAGN	0	-10.3	3.4	0.0	0	25
34	80390	C	MAGN	0	-3.2	1.5	0.0	0	31
34	80390	D		0	-0.1	4.9	0.0	0	29
34	80400	A		0	-0.3	4.0	0.0	0	23
34	80400	B	MAGN	0	-7.3	0.2	0.0	0	27
34	80400	C	MAGN	0	-7.9	1.3	0.0	0	33
34	80410	A	MAGN	0	-3.6	1.0	0.0	0	31
34	80410	B	MAGN	0	-15.3	1.8	0.0	0	27
34	80410	C	MAGN	0	-6.0	1.1	0.0	0	28
34	80410	D		0	0.1	3.6	0.0	0	28

Estimated depth may be unreliable because the stronger part of the conductor may be deeper or to one side of the flight line, or because of a shallow dip or overburden effects.

APPENDIX III


CERTIFICATE OF QUALIFICATIONS

I, IAN JOHNSON, certify that:

1. I am registered as a Professional Engineer in the Province of Ontario.
2. I reside at 38 Tinti Place in the town of Thornhill, Ontario.
3. I hold a Ph.D. in Geophysics from the University of British Columbia, having graduated in 1972.
4. I have been continuously engaged in both professional and managerial roles in the minerals industry in Canada and abroad for the past fourteen years.
5. The accompanying report was prepared from published or publicly available information and material supplied by Falconbridge Limited - Exploration and Aerodat Limited in the form of government reports and proprietary airborne exploration data. I have not personally visited the specific property.
7. I have no interest, direct or indirect, in the property described nor in Falconbridge Limited - Exploration.
8. I hereby consent to the use of this report in a Statement of Material Facts of the Company and for the preparation of a prospectus for submission to the appropriate securities commission and/or other regulatory authorities.

J9101G
Thornhill, Ontario
August 7, 1991

Signed,


Ian Johnson, Ph.D., P. Eng.



APPENDIX IV

PERSONNEL

FIELD

Flown March 3, 1991

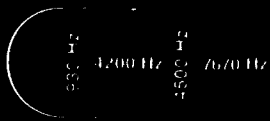
Pilots Luke Kukovica

Operators Peter Moore

OFFICE

Processing Mary Chong-Foo
George McDonald
Ed Hamilton

Report Ian Johnson



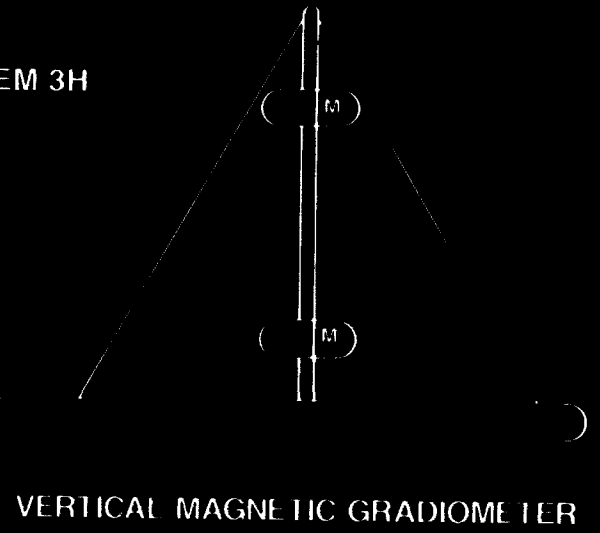
HEM 4



HEM 3L

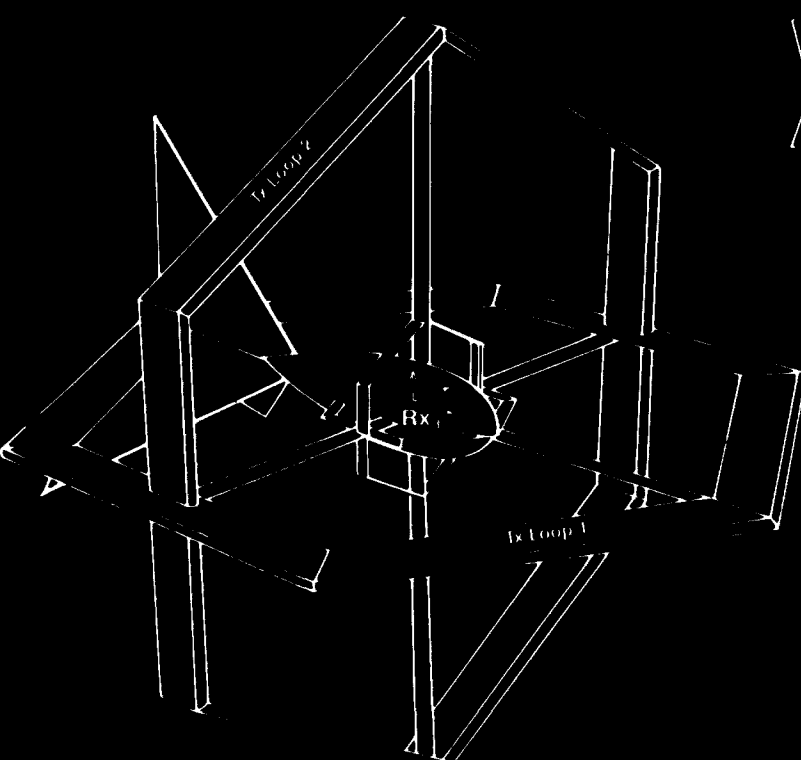
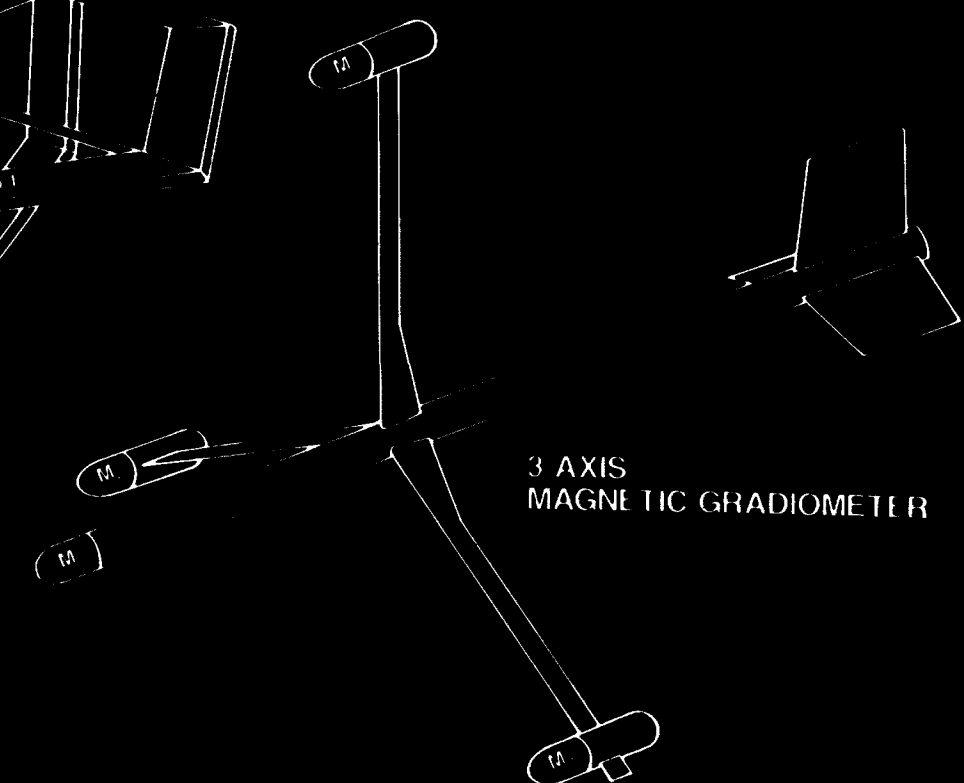


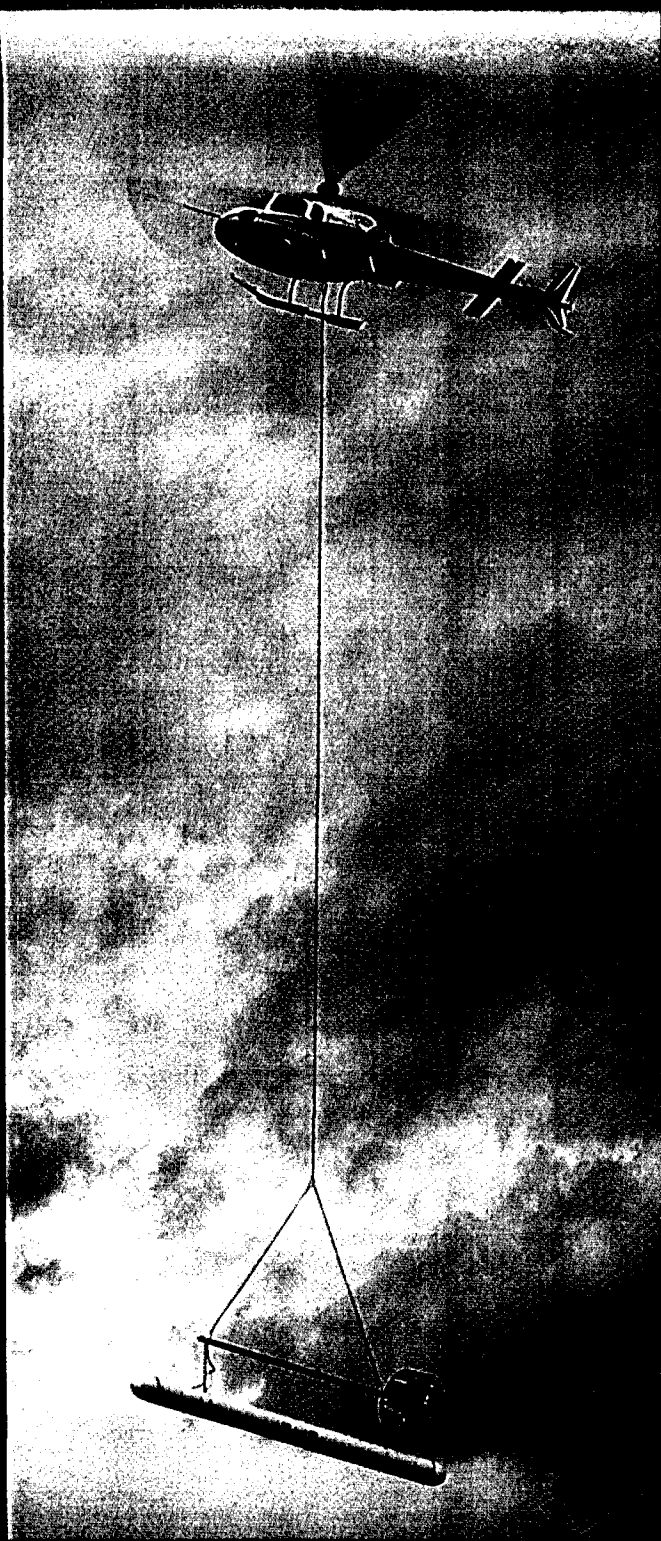
HEM 3H



EXPERIMENTAL TRANSIENT EM
2 AXIS RIGID GEOMETRY

3 AXIS
MAGNETIC GRADIOMETER





AERODAT began operating in 1968 to provide a specialized service in the field of helicopter-borne geophysical surveys. Since that time several hundred thousand kilometers of electromagnetic, magnetic and radiometric flights have been flown. AERODAT offers its clients the most advanced multi-frequency, multi-orientation electromagnetic systems, magnetometers, gamma spectrometers and radar positioning systems, backed by Aerodat's proven operational skill and experience.

SERVICES

ELECTROMAGNETIC HEM and VLF:

Specially designed and configured systems for mineral exploration programs—base metals, gold and kimberlites.

Analysis software may be applied to the results to interpret strata resistivity and thickness for geologic mapping, including geotechnical, ground water and placer applications.

MAGNETIC TOTAL FIELD and GRADIENT:

A primary method for geologic and structural mapping. The magnetic gradient method provides maximum resolution of subtle magnetic anomalies and complex geological structures.

GAMMA RAY SPECTROMETRY:

A geophysical method that can aid geological mapping as well as direct uranium exploration programs.

ELECTRONIC NAVIGATION:

Facilitates the navigation and positioning of detailed surveys. Positional control is accurate to better than 10 meters providing a data resolution and accuracy comparable to ground surveys.

COMPUTER COMPILATION and INTERPRETATION:

Advanced in-house compilation hardware and software permit custom tailoring of presentations and analysis products to meet the survey objectives.



Report of Work Conducted After Recording Claim

Mining Act

Transaction Number
W9360.00022

Personal information collected on this form is obtained under the authority of the Mining Act. Its collection should be directed to the Provincial Manager, Mining Lands, Min-
ing Division, Toronto, P3E 8A5, telephone (705) 870-7264.



41016SE9058 2.14949 GENOA

900

- Instructions:**
- Please type or print and submit in duplicate.
 - Refer to the Mining Act and Regulations for requirements of filing assessment work or consult the Mining Recorder.
 - A separate copy of this form must be completed for each Work Group.
 - Technical reports and maps must accompany this form in duplicate.
 - A sketch, showing the claims the work is assigned to, must accompany this form.

Recorded Holder(s) Falconbridge Limited		Client No. 130679
Address P.O. Box 1140, 571 Moneta Avenue, Timmins, ON, P4N 7H9		Telephone No. (705)267-1188
Mining Division Porcupine	Township/Area Marion	M or G Plan No. G-1174
Date Work Performed	From: March 3, 1991	To: August 7, 1991

Work Performed (Check One Work Group Only)

Work Group	Type
<input checked="" type="checkbox"/> Geotechnical Survey	Helicopter Borne Magnetic, Electromagnetic and VLF-EM
<input type="checkbox"/> Physical Work, Including Drilling	
<input type="checkbox"/> Rehabilitation	
<input type="checkbox"/> Other Authorized Work	
<input type="checkbox"/> Assays	
<input type="checkbox"/> Assignment from Reserve	

RECEIVED

MAR 19 1993

MINING LANDS BRANCH

Total Assessment Work Claimed on the Attached Statement of Costs \$ 4,629.00

Note: The Minister may reject for assessment work credit all or part of the assessment work submitted if the recorded holder cannot verify expenditures claimed in the statement of costs within 30 days of a request for verification.

Persons and Survey Company Who Performed the Work (Give Name and Address of Author of Report)

Name	Address
Ian Johnston Aerodat Limited	3883 Nashua Drive Mississauga, ON, L4V 1R3

RECORDED

FEB 19 1993

Attach a schedule if necessary)

Certification of Beneficial Interest * See Note No. 1 on reverse side

I certify that at the time the work was performed, the claims covered in this work report were recorded in the current holder's name or held under a beneficial interest by the current recorded holder.	Date	Recorded Holder or Agent (Signature)
--	------	--------------------------------------

Certification of Work Report

I certify that I have a personal knowledge of the facts set forth in this Work report, having performed the work or witnessed same during and/or after its completion and annexed report is true.

Name and Address of Person Certifying Roman Gedzala Jim Aultman, c/o Falconbridge Limited, P.O. Box 1140, 571 Moneta Avenue, Timmins, ON, P4N 7H9		
Telephone No. (705)267-1188	Date Feb 19/93	Certified By (Signature) <i>R. Gedzala</i>

For Office Use Only

Total Value Cr. Recorded \$4,629.	Date Recorded FEB. 19/93	Mining Recorder <i>[Signature]</i>	Received Stamp RECEIVED FEB 19 1993 HTB (c) 135
	Deemed Approval Date MAY 20/93	Date Approved	
	Date Notice for Amendments Sent		

Work Report Number for Applying Reserve	Claim Number (see Note 2)	Number of Claim Units
	P-568516	1
	P-568517	1
	P-568518	1
	P-619128	1
	P-619129	1
	P-619130	1
	P-622999	1
	P-623000	1
	P-624001	1
	P-624002	1
	P-624003	1
	P-628434	1
	P-628435	1
	P-628436	1
	P-628437	1
	P-628438	1
	P-628439	1
	—	

Total Number of Claims

Value of Assessment Work Done on this Claim	Value Applied to this Claim
\$46.00	∅
\$137.00	∅
\$136.00	∅
\$56.00	∅
\$55.00	∅
\$161.00	∅
\$205.00	∅
\$213.00	∅
\$185.00	∅
\$207.00	∅
\$71.00	∅
\$107.00	∅
\$104.00	∅
\$105.00	∅
\$81.00	∅
\$112.00	∅
\$51.00	∅
—	—

Total Value Work Done

Total Value Work Applied

Value Assigned from this Claim	Reserve: Work to be Claimed at a Future Date
∅	\$46.00
∅	\$137.00
∅	\$136.00
∅	\$56.00
∅	\$55.00
∅	\$161.00
∅	\$205.00
∅	\$213.00
∅	\$185.00
∅	\$207.00
∅	\$71.00
∅	\$107.00
∅	\$104.00
∅	\$105.00
∅	\$81.00
∅	\$112.00
∅	\$51.00
—	—

Total Assigned From

Total Reserve

Credits you are claiming in this report may be cut back. In order to minimize the adverse effects of such deletions, please indicate from which claims you wish to prioritize the deletion of credits. Please mark (✓) one of the following:

1. Credits are to be cut back starting with the claim listed last, working backwards.
2. Credits are to be cut back equally over all claims contained in this report of work.
3. Credits are to be cut back as prioritized on the attached appendix.

In the event that you have not specified your choice of priority, option one will be implemented.

Note 1: Examples of beneficial interest are unrecorded transfers, option agreements, memorandum of agreements, etc., with respect to the mining claims.

Note 2: If work has been performed on patented or leased land, please complete the following:

I certify that the recorded holder had a beneficial interest in the patented or leased land at the time the work was performed.

Signature

Date

Work Report Number for Applying Reserve	Claim Number (see Note 2)	Number of Claim Units
	P-628440	1
	P-634522	1
	P-634523	1
	P-750622	1
	P-750623	1
	P-1176234	1
	P-1176235	1
	P-1176236	1
	P-1176237	1
	P-1176238	1
	P-1176239	1
	P-1176240	1
	P-1176241	1
	P-1176242	1
	P-1176243	1
	P-1176244	1
	P-1176245	1
	—	

Total Number of Claims

Value of Assessment Work Done on this Claim	Value Applied to this Claim
\$29.00	Ø
\$108.00	Ø
\$34.00	Ø
\$147.00	Ø
\$133.00	Ø
\$116.00	Ø
\$130.00	Ø
\$129.00	Ø
\$131.00	Ø
\$132.00	Ø
\$164.00	Ø
\$145.00	Ø
\$110.00	Ø
\$91.00	Ø
\$128.00	Ø
\$137.00	Ø
\$170.00	Ø
—	—

Total Value Work Done

Total Value Work Applied

Value Assigned from this Claim	Reserve: Work to be Claimed at a Future Date
Ø	\$29.00
Ø	\$108.00
Ø	\$34.00
Ø	\$147.00
Ø	\$133.00
Ø	\$116.00
Ø	\$130.00
Ø	\$129.00
Ø	\$131.00
Ø	\$132.00
Ø	\$164.00
Ø	\$145.00
Ø	\$110.00
Ø	\$91.00
Ø	\$128.00
Ø	\$137.00
Ø	\$170.00
—	—

Total Assigned From

Total Reserve

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MAR 19 1996

MINING LANDS BR.

Credits you are claiming in this report may be cut back. In order to minimize the adverse effects of such provisions, please indicate from which claims you wish to prioritize the deletion of credits. Please mark (✓) one of the following:

- Credits are to be cut back starting with the claim listed last, working backwards.
- Credits are to be cut back equally over all claims contained in this report of work.
- Credits are to be cut back as prioritized on the attached appendix.

In the event that you have not specified your choice of priority, option one will be implemented.

Note 1: Examples of beneficial interest are unrecorded transfers, option agreements, memorandum of agreements, etc., with respect to the mining claims.

Note 2: If work has been performed on patented or leased land, please complete the following:

I certify that the recorded holder had a beneficial interest in the patented or leased land at the time the work was performed

Signature _____ Date _____

Statement of Costs for Assessment Credit

État des coûts aux fins du crédit d'évaluation

Transaction No./N° de transaction
W 9360.00022

Mining Act/Loi sur les mines

Personal information collected on this form is obtained under the authority of the Mining Act. This information will be used to maintain a record and ongoing status of the mining claim(s). Questions about this collection should be directed to the Provincial Manager, Minings Lands, Ministry of Northern Development and Mines, 4th Floor, 159 Cedar Street, Sudbury, Ontario P3E 6A5, telephone (705) 670-7264.

Les renseignements personnels contenus dans la présente formule sont recueillis en vertu de la Loi sur les mines et serviront à tenir à jour un registre des concessions minières. Adresser toute question sur la collecte de ces renseignements au chef provincial des terrains miniers, ministère du Développement du Nord et des Mines, 159, rue Cedar, 4^e étage, Sudbury (Ontario) P3E 6A5, téléphone (705) 670-7264.

1. Direct Costs/Coûts directs

Type	Description	Amount Montant	Totals Total global
Wages Salaires	Labour Main-d'oeuvre		
	Field Supervision Supervision sur le terrain	\$305.00	\$305.00
Contractor's and Consultant's Fees Droits de l'entrepreneur et de l'expert-conseil	Type Airborne	\$4,324.00	
	Geophysics		\$4,324.00
Supplies Used Fournitures utilisées	Type		
Equipment Rental Location de matériel	Type		
Total Direct Costs Total des coûts directs			\$4,629.00

2. Indirect Costs/Coûts indirects

** Note: When claiming Rehabilitation work Indirect costs are not allowable as assessment work. Pour le remboursement des travaux de réhabilitation, les coûts indirects ne sont pas admissibles en tant que travaux d'évaluation.

Type	Description	Amount Montant	Totals Total global
Transportation Transport	Type		
Food and Lodging Nourriture et hébergement			
Mobilization and Demobilization Mobilisation et démoblisation			
Sub Total of Indirect Costs Total partiel des coûts indirects			
Amount Allowable (not greater than 20% of Direct Costs) Montant admissible (n'excédant pas 20 % des coûts directs)			
Total Value of Assessment Credit (Total of Direct and Allowable indirect costs) Valeur totale du crédit d'évaluation (Total des coûts directs et indirects admissibles)			

Note: The recorded holder will be required to verify expenditures claimed in this statement of costs within 30 days of a request for verification. If verification is not made, the Minister may reject for assessment work all or part of the assessment work submitted.

Note: Le titulaire enregistré sera tenu de vérifier les dépenses demandées dans le présent état des coûts dans les 30 jours suivant une demande à cet effet. Si la vérification n'est pas effectuée, le ministre peut rejeter tout ou une partie des travaux d'évaluation présentés.

Filing Discounts

1. Work filed within two years of completion is claimed at 100% of the above Total Value of Assessment Credit.
2. Work filed three, four or five years after completion is claimed at 50% of the above Total Value of Assessment Credit. See calculations below:

Remises pour dépôt

1. Les travaux déposés dans les deux ans suivant leur achèvement sont remboursés à 100 % de la valeur totale susmentionnée du crédit d'évaluation.
2. Les travaux déposés trois, quatre ou cinq ans après leur achèvement sont remboursés à 50 % de la valeur totale du crédit d'évaluation susmentionné. Voir les calculs ci-dessous.

Total Value of Assessment Credit $\times 0.50 =$

Valeur totale du crédit d'évaluation $\times 0,50 =$

MAR 19 1993

Certification Verifying Statement of Costs

I hereby certify: that the amounts shown are as accurate as possible and these costs were incurred while conducting assessment work on the lands shown on the accompanying Report of Work form.

that as _____ I am authorized (Recorded Holder, Agent, Position in Company)

to make this certification

Attestation de l'état des coûts

J'atteste par la présente: que les montants indiqués sont le plus exact possible et que ces dépenses ont été engagées pour effectuer les travaux d'évaluation sur les terrains indiqués dans la formule de rapport de travail ci-joint.

Et qu'à titre de _____ je suis autorisé (titulaire enregistré, représentant, poste occupé dans la compagnie)

à faire cette attestation.

Signature _____ Date 16/2/93



**Report of Work Conducted
After Recording Claim**

Mining Act

Transaction Number
W9360.00023

Personal information collected on this form is obtained under the authority of the Mining Act. This information will be used for correspondence. Questions about this collection should be directed to the Provincial Manager, Mining Lands, Ministry of Northern Development and Mines, Fourth Floor, 159 Cedar Street, Sudbury, Ontario, P3E 6A5, telephone (705) 670-7264.

- Instructions:**
- Please type or print and submit in duplicate.
 - Refer to the Mining Act and Regulations for requirements of filing assessment work or consult the Mining Recorder.
 - A separate copy of this form must be completed for each Work Group.
 - Technical reports and maps must accompany this form in duplicate.
 - A sketch, showing the claims the work is assigned to, must accompany this form.

Recorded Holder(s) Falconbridge Limited		Client No. 130679
Address P.O. Box 1140, 571 Moneta Avenue, Timmins, ON, P4N 7H9		Telephone No. (705)267-1188
Mining Division Porcupine	Township/Area Marion and Genoa	M or G Plan No. G-1131, G-1174
Dates Work Performed From: March 3, 1991		To: August 7, 1991

Work Performed (Check One Work Group Only)

Work Group	Type
<input checked="" type="checkbox"/> Geotechnical Survey	Helicopter Borne Magnetic, Electromagnetic and VLF-EM
<input type="checkbox"/> Physical Work, Including Drilling	
<input type="checkbox"/> Rehabilitation	
<input type="checkbox"/> Other Authorized Work	
<input type="checkbox"/> Assays	
<input type="checkbox"/> Assignment from Reserve	

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MINING LANDS BRANCH

Total Assessment Work Claimed on the Attached Statement of Costs \$ **3,424.00**

Note: The Minister may reject for assessment work credit all or part of the assessment work submitted if the recorded holder cannot verify expenditures claimed in the statement of costs within 30 days of a request for verification.

Persons and Survey Company Who Performed the Work (Give Name and Address of Author of Report)

Name	Address
Ian Johnston Aerodat Limited	3883 Nashua Drive Mississauga, ON, L4V 1R3

RECEIVED
MAR 19 1993
MINING LANDS BRANCH

RECORDED
FEB 19 1993
Receipt

(attach a schedule if necessary)

Certification of Beneficial Interest * See Note No. 1 on reverse side

I certify that at the time the work was performed, the claims covered in this work report were recorded in the current holder's name or held under a beneficial interest by the current recorded holder.	Date	Recorded Holder or Agent (Signature)
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Certification of Work Report

I certify that I have a personal knowledge of the facts set forth in this Work report, having performed the work or witnessed same during and/or after its completion and annexed report is true.

Name and Address of Person Certifying Roman Godzala Jim Aultman, c/o Falconbridge Limited, P.O. Box 1140, 571 Moneta Avenue, Timmins, ON, P4N 7H9		
Telephone No. (705)267-1188	Date Feb 19/93	Certified By (Signature) <i>R. Godzala</i>

For Office Use Only

Total Value Cr. Recorded \$3,424.	Date Recorded FEB. 19/93	Mining Recorder <i>[Signature]</i>	Received Stamp RECEIVED FEB 19 1993 HTB (c) 135
	Deemed Approval Date MAY 20/93	Date Approved	
	Date Notice for Amendments Sent		

Statement of Costs for Assessment Credit

État des coûts aux fins du crédit d'évaluation

Transaction No./N° de transaction
W 9360.00023

Mining Act/Loi sur les mines

Personal information collected on this form is obtained under the authority of the Mining Act. This information will be used to maintain a record and ongoing status of the mining claim(s). Questions about this collection should be directed to the Provincial Manager, Minings Lands, Ministry of Northern Development and Mines, 4th Floor, 159 Cedar Street, Sudbury, Ontario P3E 6A5, telephone (705) 670-7264.

Les renseignements personnels contenus dans la présente formule sont recueillis en vertu de la Loi sur les mines et serviront à tenir à jour un registre des concessions minières. Adresser toute question sur la collecte de ces renseignements au chef provincial des terrains miniers, ministère du Développement du Nord et des Mines, 159, rue Cedar, 4^e étage, Sudbury (Ontario) P3E 6A5, téléphone (705) 670-7264.

1. Direct Costs/Coûts directs

Type	Description	Amount Montant	Totals Total global
Wages Salaires	Labour Main-d'oeuvre		
	Field Supervision Supervision sur le terrain	\$225.00	\$225.00
Contractor's and Consultant's Fees Droits de l'entrepreneur et de l'expert-conseil	Type Airborne		
	Geophysics	\$3,199.00	\$3,199.00
Supplies Used Fournitures utilisées	Type		
Equipment Rental Location de matériel	Type		
Total Direct Costs Total des coûts directs			\$3,424.00

2. Indirect Costs/Coûts indirects

** Note: When claiming Rehabilitation work Indirect costs are not allowed as assessment work. Pour le remboursement des travaux de réhabilitation, les coûts indirects ne sont pas admissibles en tant que travaux d'évaluation.

Type	Description	Amount Montant	Totals Total global
Transportation Transport	Type		
Food and Lodging Nourriture et hébergement			
Mobilization and Demobilization Mobilisation et démobilité			
Sub Total of Indirect Costs Total partiel des coûts indirects			
Amount Allowable (not greater than 20% of Direct Costs) Montant admissible (n'excédant pas 20 % des coûts directs)			
Total Value of Assessment Credit (Total of Direct and Allowable Indirect costs)		Valeur totale du crédit d'évaluation (Total des coûts directs et indirects admissibles)	

Note: The recorded holder will be required to verify expenditures claimed in this statement of costs within 30 days of a request for verification. If verification is not made, the Minister may reject for assessment work all or part of the assessment work submitted.

Note: Le titulaire enregistré sera tenu de vérifier les dépenses demandées dans le présent état des coûts dans les 30 jours suivant une demande à cet effet. Si la vérification n'est pas effectuée, le ministre peut rejeter tout ou une partie des travaux d'évaluation présentés.

Filing Discounts

1. Work filed within two years of completion is claimed at 100% of the above Total Value of Assessment Credit.
2. Work filed three, four or five years after completion is claimed at 50% of the above Total Value of Assessment Credit. See calculations below:

Total Value of Assessment Credit	Total Assessment Claimed
x 0.50 =	MAR 19 1992

Remises pour dépôt

1. Les travaux déposés dans les deux ans suivant leur achèvement sont remboursés à 100 % de la valeur totale susmentionnée du crédit d'évaluation.
2. Les travaux déposés trois, quatre ou cinq ans après leur achèvement sont remboursés à 50 % de la valeur totale du crédit d'évaluation susmentionné. Voir les calculs ci-dessous.

Valeur totale du crédit d'évaluation	Evaluation totale demandée
x 0.50 =	

Certification Verifying Statement of Costs / Attestation de l'état des coûts

I hereby certify: that the amounts shown are as accurate as possible and these costs were incurred while conducting assessment work on the lands shown on the accompanying Report of Work form.

J'atteste par la présente: que les montants indiqués sont le plus exact possible et que ces dépenses ont été engagées pour effectuer les travaux d'évaluation sur les terrains indiqués dans la formule de rapport de travail ci-joint.

that as _____ I am authorized (Recorded Holder (Agent, Position in Company))

Et qu'à titre de _____ je suis autorisé (titulaire enregistré, représentant, poste occupé dans la compagnie)

to make this certification

à faire cette attestation.

Signature _____ Date _____

Report of Work Conducted Before Recording Claim

Mining Act

Transaction Number
W9360.00024

Information collected on this form is obtained under the authority of the Mining Act. This information will be used for correspondence. Questions about collection should be directed to the Provincial Manager, Mining Lands, Ministry of Northern Development and Mines, Fourth Floor, 159 Cedar Street, Toronto, Ontario, P3E 6A5, telephone (705) 670-7264.

- Instructions:**
- Please type or print and submit in duplicate.
 - Refer to the Mining Act and Regulations for requirements of filing assessment work or consult the Mining Recorder.
 - A separate copy of this form must be completed for each Work Group.
 - Technical reports and maps must accompany this form in duplicate.
 - A sketch, showing the claims the work is assigned to, must accompany this form.

Recorded Holder(s) Falconbridge Limited		Client No. 130679
Address P.O. Box 1140, 571 Moneta Avenue, Timmins, ON, P4N 7H9		Telephone No. (705)267-1188
Mining Division Porcupine	Township/Area Marion	M or G Plan No. G-1174
Assessment Work Performed From: March 3, 1991 To: August 7, 1991		

Work Performed (Check One Work Group Only)

Work Group	Type
<input checked="" type="checkbox"/> Regional Surveys	Helicopter Borne Magnetic, Electromagnetic and VLF-EM
<input type="checkbox"/> Prospecting	

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MAR 19 1993

Total Assessment Work Claimed on the Attached Statement of Costs \$ **2,601.00**

MINING LANDS BRANCH

Note: The Minister may reject for assessment work credit all or part of the assessment work submitted if the recorded holder cannot verify expenditures claimed in the statement of costs within 30 days of a request for verification.

Persons and Survey Company Who Performed the Work (Give Name and Address of Author of Report)

Name	Address
Alan Johnston Prodat Limited	3883 Nashua Drive Mississauga, ON, L4V 1R3

RECORDED
FEB 19 1993
Receipt _____

Attach a schedule if necessary)

RECEIVED

Verification of Beneficial Interest * See Note No. 1 on reverse side

I certify that at the time the work was performed, the claims covered in this work report were recorded in the current holder's name or held under a beneficial interest by the current recorded holder.

Date: **MAR 19 1993** Recorded Holder or Agent (Signature): _____

MINING LANDS BRANCH

Verification of Work Report

I certify that I have a personal knowledge of the facts set forth in this work report, having performed the work or witnessed it during and/or after its completion, and the annexed report is true.

Name and Address of Person Certifying:
**Edman Gudzala
Edman Gudzala, c/o Falconbridge Limited, P.O. Box 1140, 571 Moneta Avenue, Timmins, ON, P4N 7H9**

Phone No.: **(705) 267-1188** Date: **Feb 19/93** Certified By (Signature): **R. Gajda**

Recorder Office Use Only

Total Value Cr. Recorded 2,601.	Date Recorded FEB. 19/93	Mining Recorder <i>[Signature]</i>	Received Stamp RECEIVED
	Deemed Approval Date MAY 20/93	Date Approved	FEB 19 1993
	Date Notice for Amendments Sent		HB (c) 135



Statement of Costs
for Assessment Credit

État des coûts aux fins
du crédit d'évaluation

Mining Act/Loi sur les mines

Transaction No./N° de transaction
W9360.00024

Personal information collected on this form is obtained under the authority of the Mining Act. This information will be used to maintain a record and ongoing status of the mining claim(s). Questions about this collection should be directed to the Provincial Manager, Minings Lands, Ministry of Northern Development and Mines, 4th Floor, 159 Cedar Street, Sudbury, Ontario P3E 8A5, telephone (705) 670-7264.

Les renseignements personnels contenus dans la présente formule sont recueillis en vertu de la Loi sur les mines et serviront à tenir à jour un registre des concessions minières. Adresser toute question sur la collecte de ces renseignements au chef provincial des terrains miniers, ministère du Développement du Nord et des Mines, 159, rue Cedar, 4^e étage, Sudbury (Ontario) P3E 8A5, téléphone (705) 670-7264.

1. Direct Costs/Coûts directs

Type	Description	Amount Montant	Totals Total global
Wages Salaires	Labour Main-d'oeuvre		
	Field Supervision Supervision sur le terrain	\$172.00	\$172.00
Contractor's and Consultant's Fees Droits de l'entrepreneur et de l'expert- conseil	Type Airborne		
	Geophysics	\$2,429.00	\$2,429.00
Supplies Used Fournitures utilisées	Type		
Equipment Rental Location de matériel	Type		
Total Direct Costs Total des coûts directs			\$2,601.00

2. Indirect Costs/Coûts indirects

** Note: When claiming Rehabilitation work indirect costs are not allowable as assessment work.
Pour le remboursement des travaux de réhabilitation, les coûts indirects ne sont pas admissibles en tant que travaux d'évaluation.

Type	Description	Amount Montant	Totals Total global
Transportation Transport	Type		
Food and Lodging Nourriture et hébergement			
Mobilization and Démobilisation			
Sub Total of Indirect Costs Total partiel des coûts indirects			
Amount Allowable (not greater than 20% of Direct Costs) Montant admissible (n'excédant pas 20 % des coûts directs)			
Total Value of Assessment Credit (Total of Direct and Allowable indirect costs)			
Valeur totale du crédit d'évaluation (Total des coûts directs et indirects admissibles)			

Note: The recorded holder will be required to verify expenditures claimed in this statement of costs within 30 days of a request for verification. If verification is not made, the Minister may reject for assessment work all or part of the assessment work submitted.

Note: Le titulaire enregistré sera tenu de vérifier les dépenses demandées dans le présent état des coûts dans les 30 jours suivant une demande à cet effet. Si la vérification n'est pas effectuée, le ministre peut rejeter tout ou une partie des travaux d'évaluation présentés.

Filing Discounts

1. Work filed within two years of completion is claimed at 100% of the above Total Value of Assessment Credit.
2. Work filed three, four or five years after completion is claimed at 50% of the above Total Value of Assessment Credit. See calculations below:

Total Value of Assessment Credit	Total Assessment Claimed
× 0.50 =	MAR 19 1993

Remises pour dépôt

1. Les travaux déposés dans les deux ans suivant leur achèvement sont remboursés à 100 % de la valeur totale susmentionnée du crédit d'évaluation.
2. Les travaux déposés trois, quatre ou cinq ans après leur achèvement sont remboursés à 50 % de la valeur totale du crédit d'évaluation susmentionné. Voir les calculs ci-dessous.

Valeur totale du crédit d'évaluation	Evaluation totale demandée
× 0,50 =	

Certification Verifying Statement of Costs / MINING LANDS BRANCH / Certification de l'état des coûts

I hereby certify:
that the amounts shown are as accurate as possible and these costs were incurred while conducting assessment work on the lands shown on the accompanying Report of Work form.

J'atteste par la présente :
que les montants indiqués sont le plus exact possible et que ces dépenses ont été engagées pour effectuer les travaux d'évaluation sur les terrains indiqués dans la rapport de travail ci-joint.

that as _____ I am authorized
(Recorded Holder, Agent, Position in Company)

Et qu'à titre de _____ je suis autorisé
(titulaire enregistré, représentant, poste occupé dans la compagnie)

to make this certification

à faire cette attestation.

Signature _____ Date **Feb 26/93**

Report of Work Conducted Before Recording Claim

Mining Act

M.L.C.
Transaction Number
6/9360.00025

Personal information collected on this form is obtained under the authority of the Mining Act. This information will be used for correspondence. Questions about its collection should be directed to the Provincial Manager, Mining Lands, Ministry of Northern Development and Mines, Fourth Floor, 159 Cedar Street, Sudbury, Ontario, P3E 8A5, telephone (705) 670-7264.

- Instructions:**
- Please type or print and submit in duplicate.
 - Refer to the Mining Act and Regulations for requirements of filing assessment work or consult the Mining Recorder.
 - A separate copy of this form must be completed for each Work Group.
 - Technical reports and maps must accompany this form in duplicate.
 - A sketch, showing the claims the work is assigned to, must accompany this form.

Recorded Holder(s) Falconbridge Limited		Client No. 130679
Address P.O. Box 1140, 571 Moneta Avenue, Timmins, ON, P4N 7H9		Telephone No. (705)267-1188
Mining Division Porcupine	Township/Area Marion and Genoa	M or G Plan No. G-1174, G-1131
Dates Work Performed From: March 3, 1991 To: August 7, 1991		

Work Performed (Check One Work Group Only)

Work Group	Type
<input checked="" type="checkbox"/> Regional Surveys	Helicopter-Borne Magnetic, Electromagnetic and VLF-EM
<input type="checkbox"/> Prospecting	

RECEIVED
MAR 19 1993

Total Assessment Work Claimed on the Attached Statement of Costs \$ **2,436.00**

Note: The Minister may reject for assessment work credit all or part of the assessment work if the recorded holder cannot verify expenditures claimed in the statement of costs within 30 days of a request for verification.

Persons and Survey Company Who Performed the Work (Give Name and Address of Author of Report)

Name	Address
Ian Johnston Aerodat Limited	3883 Nashua Drive Mississauga, ON, L4V 1R3

RECORDED
FEB 19 1993
Receipt _____

attach a schedule if necessary)

Certification of Beneficial Interest * See Note No. 1 on reverse side

I certify that at the time the work was performed, the claims covered in this work report were recorded in the current holder's name or held under a beneficial interest by the current recorded holder.	Date MAR 19 1993	Recorded Holder or Agent (Signature) <i>[Signature]</i>
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MINING LANDS BRANCH

Certification of Work Report

I certify that I have a personal knowledge of the facts set forth in this work report, having performed the work or witnessed it during and/or after its completion, and the annexed report is true.

Name and Address of Person Certifying Jim Aultman c/o P.O. Box 1140, 571 Moneta Avenue, Timmins, ON, P4N 7H9		
Telephone No. (705)267-1188	Date Feb 19/93	Certified By (Signature) <i>[Signature]</i>

For Office Use Only

\$2,436.	Total Value Cr. Recorded	Date Recorded FEB. 19/93	Mining Recorder <i>[Signature]</i>	Received Stamp RECEIVED FEB 19 1993 <i>[Signature]</i>
	Deemed Approval Date MAY 20/93	Date Approved		
	Date Notice for Amendments Sent			



Statement of Costs
for Assessment Credit

État des coûts aux fins
du crédit d'évaluation

Transaction No./N° de transaction

W 9360.00025

Mining Act/Loi sur les mines

Personal information collected on this form is obtained under the authority of the Mining Act. This information will be used to maintain a record and ongoing status of the mining claim(s). Questions about this collection should be directed to the Provincial Manager, Minings Lands, Ministry of Northern Development and Mines, 4th Floor, 159 Cedar Street, Sudbury, Ontario P3E 6A5, telephone (705) 670-7264.

Les renseignements personnels contenus dans la présente formule sont recueillis en vertu de la Loi sur les mines et serviront à tenir à jour un registre des concessions minières. Adresser toute question sur la collecte de ces renseignements au chef provincial des terrains miniers, ministère du Développement du Nord et des Mines, 159, rue Cedar, 4^e étage, Sudbury (Ontario) P3E 6A5, téléphone (705) 670-7264.

1. Direct Costs/Coûts directs

Type	Description	Amount Montant	Totals Total global
Wages Salaires	Labour Main-d'oeuvre		
	Field Supervision Supervision sur le terrain	\$161.00	\$161.00
Contractor's and Consultant's Fees Droits de l'entrepreneur et de l'expert- conseil	Type Airborne		
	Geophysics	\$2,275.00	\$2,275.00
Supplies Used Fournitures utilisées	Type		
Equipment Rental Location de matériel	Type		
Total Direct Costs Total des coûts directs			\$2,436.00

2. Indirect Costs/Coûts indirects

** Note: When claiming Rehabilitation work indirect costs are not allowable as assessment work.
Pour le remboursement des travaux de réhabilitation, les coûts indirects ne sont pas admissibles en tant que travaux d'évaluation.

Type	Description	Amount Montant	Totals Total global
Transportation Transport	Type		
Food and Lodging Nourriture et hébergement			
Mobilization and Demobilization Mobilisation et démobilisation			
Sub Total of Indirect Costs Total partiel des coûts indirects			
Amount Allowable (not greater than 20% of Direct Costs) Montant admissible (n'excédant pas 20 % des coûts directs)			
Total Value of Assessment Credit (Total of Direct and Allowable Indirect costs)		Valeur totale du crédit d'évaluation (Total des coûts directs et indirects admissibles)	

Note: The recorded holder will be required to verify expenditures claimed in this statement of costs within 30 days of a request for verification. If verification is not made, the Minister may reject for assessment work all or part of the assessment work submitted.

Note : Le titulaire enregistré sera tenu de vérifier les dépenses demandées dans le présent état des coûts dans les 30 jours suivant une demande à cet effet. Si la vérification n'est pas effectuée, le ministre peut rejeter tout ou une partie des travaux d'évaluation présentés.

Filing Discounts

1. Work filed within two years of completion is claimed at 100% of the above Total Value of Assessment Credit.
2. Work filed three, four or five years after completion is claimed at 50% of the above Total Value of Assessment Credit. See calculations below:

Remises pour dépôt

1. Les travaux déposés dans les deux ans suivant leur achèvement sont remboursés à 100 % de la valeur totale susmentionnée du crédit d'évaluation.
2. Les travaux déposés trois, quatre ou cinq ans après leur achèvement sont remboursés à 50 % de la valeur totale du crédit d'évaluation susmentionné. Voir les calculs ci-dessous.

Total Value of Assessment Credit \times 0.50 = Total Assessment Claimed

Valeur totale du crédit d'évaluation \times 0,50 = Evaluation totale demandée

RECEIVED
MAR 19 1993

Certification Verifying Statement of Costs

I hereby certify:
that the amounts shown are as accurate as possible and these costs were incurred while conducting assessment work on the lands shown on the accompanying Report of Work form.

that as R. Gudzala (Recorded Holder, Agent, Position in Company) authorized

to make this certification

J'atteste par la présente :
que les montants indiqués sont le plus exact possible et que ces dépenses ont été engagées pour effectuer les travaux d'évaluation sur les terrains indiqués dans la formule de rapport de travail ci-joint.

Et qu'à titre de _____ je suis autorisé
(titulaire enregistré, représentant, poste occupé dans la compagnie)

à faire cette attestation.

Signature R. Gudzala Date Feb 21/93



Ontario

Ministry of
Northern Development
and Mines

Ministère du
Développement du Nord
et des Mines

Geoscience Approvals Section
Mining Lands Branch
Willet Green Miller Centre
933 Ramsey Lake Road
6th Floor
Sudbury, Ontario
P3E 6B5

Telephone: (705) 670-5853
Fax: (705) 670-5863

May 14, 1993

Our File: 2.14949
Transaction #: W9360.00022
W9360.00023
W9360.00024

Mining Recorder
Ministry of Northern Development
and Mines
60 Wilson Avenue
1st Floor
Timmins, Ontario
P4N 2S7

Dear Sir:

**RE: Approval of Assessment Work on mining claims P 568516 et al. in
Marion and Genoa Townships.**

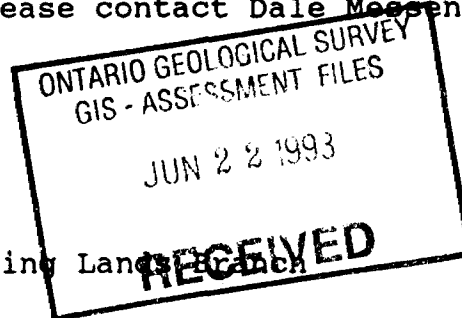
The assessment credits for airborne geophysics, section 15 of the Mining Act Regulations, as listed on the original Report of Work, have been approved as of May 5, 1993.

Please indicate this approval on the claim record sheets.

If you have any questions please contact Dale Messenger at (705) 670-5858.

Yours sincerely,

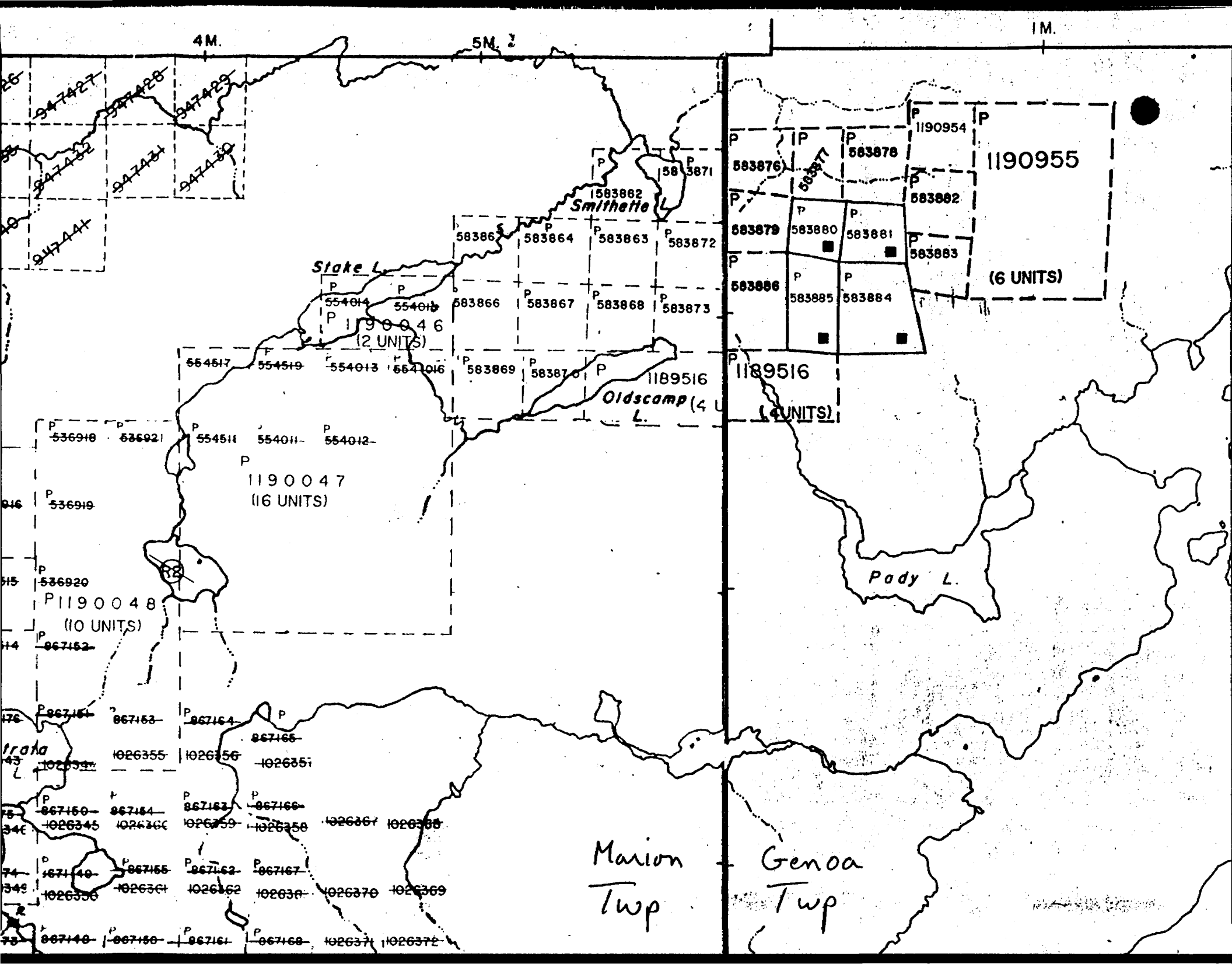
Blair Kite
(Acting) Senior Manager, Mining Lands Branch
Mines and Minerals Division



DEM/jl
Enclosures:

cc: Assessment Files Office
Toronto, Ontario

Resident Geologist
Timmins, Ontario



4M.

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Smithelle L.

Stake L.

1190046
(2 UNITS)

1189516
Oldscamp L.
(4 UNITS)

Pody L.

1190955

(6 UNITS)

1189516
(4 UNITS)

1190047
(16 UNITS)

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554817 554519 554013 554016 583869 583870

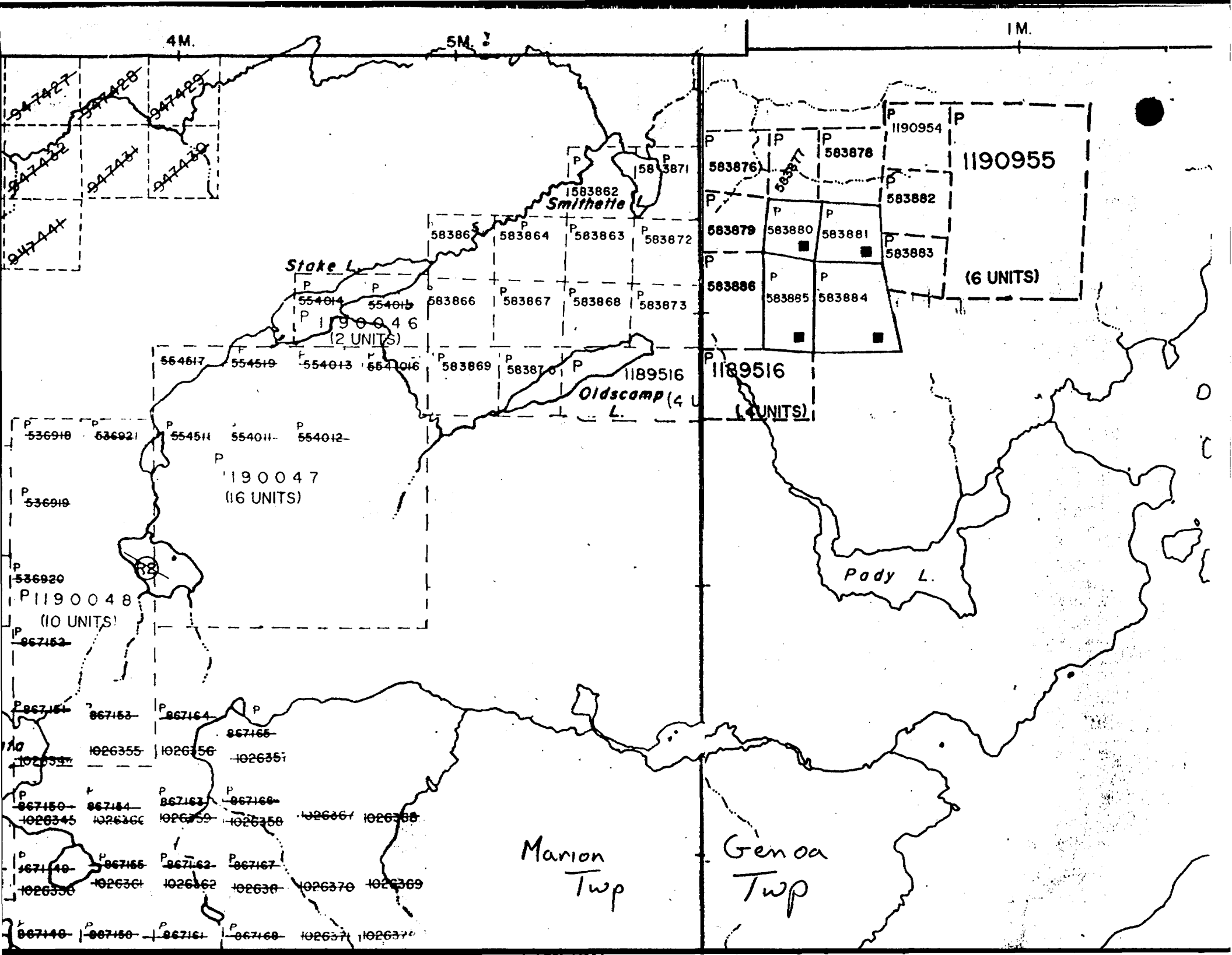
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Marion
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Genoa
Twp



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Stake L.

Smithette L.

Oldscamp L.

Pady L.

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(6 UNITS)

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Marion
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Falconbridge Limited
P.O. Box 1140
571 Moneta Avenue
Timmins, Ontario
P4N 7H9

Attention: Mr. Stan G. Clemmer

In Account With:

Aerodat Limited
3883 Nashua Drive
Mississauga, Ontario
L4V 1R3

RECEIVED

MAR 19 1993

MINING LANDS BRANCH

Re: Helicopterborne Geophysical Survey - Timmins area of Ontario

Pursuant to Schedule B - Payment Schedule
(on completion of flying) of Agreement
between Falconbridge Limited and Aerodat
Limited dated January 14, 1991.

Amount Due	\$90,000.00
GST (R100067024)	<u>6,300.00</u>
Total Amount Due	<u>\$96,300.00</u>

RD

	602-600-008-191 - 45% ⁸ 257,236.47 ^{SC} 47.00 ¹ '91	22,100.00
	602-600-008-186 - 45% ⁸ 657,437.50 ^{SC} 40,950.00	40,950.00
Fripp	602-600-008-703 - 5% ⁸ 16,432.50	9,750.00
Genoa	602-600-008-668 - 5% ⁸ 46,511.00	✓ 17,300.00
		<u>90,000.00</u> ✓

MARION/GENOA AEM SURVEY - LINE KILOMETRES PER CLAIM

- Genoa grid = 118km
- Marion grid = 127km
245km (100m lines)

Genoa claims

claim #	line kilometres	claim #	line kilometres
583876	1.40	583883	1.58
583877	1.25	583884	2.89
583878	1.66	583885	2.02
583879	1.28	583886	2.27
583880	1.04	1189516	2.54 (+ 4.25)
583881	1.17	1190954	1.64
583882	1.48	1190955	2.27

Marion claims

claim #	line kilometres	claim #	line kilometres
583862	1.69	583863	1.50
583864	1.58	583865	1.44
583866	1.58	583867	1.58
583868	1.51	583869	2.08
583870	1.96	583871	1.62

Marion claims - Block A - "Genoa"

claim #	line kilometres	claim #	line kilometres
583872	1.58	583873	1.58
1189516	4.25	1190046	1.30
1190047	1.04		

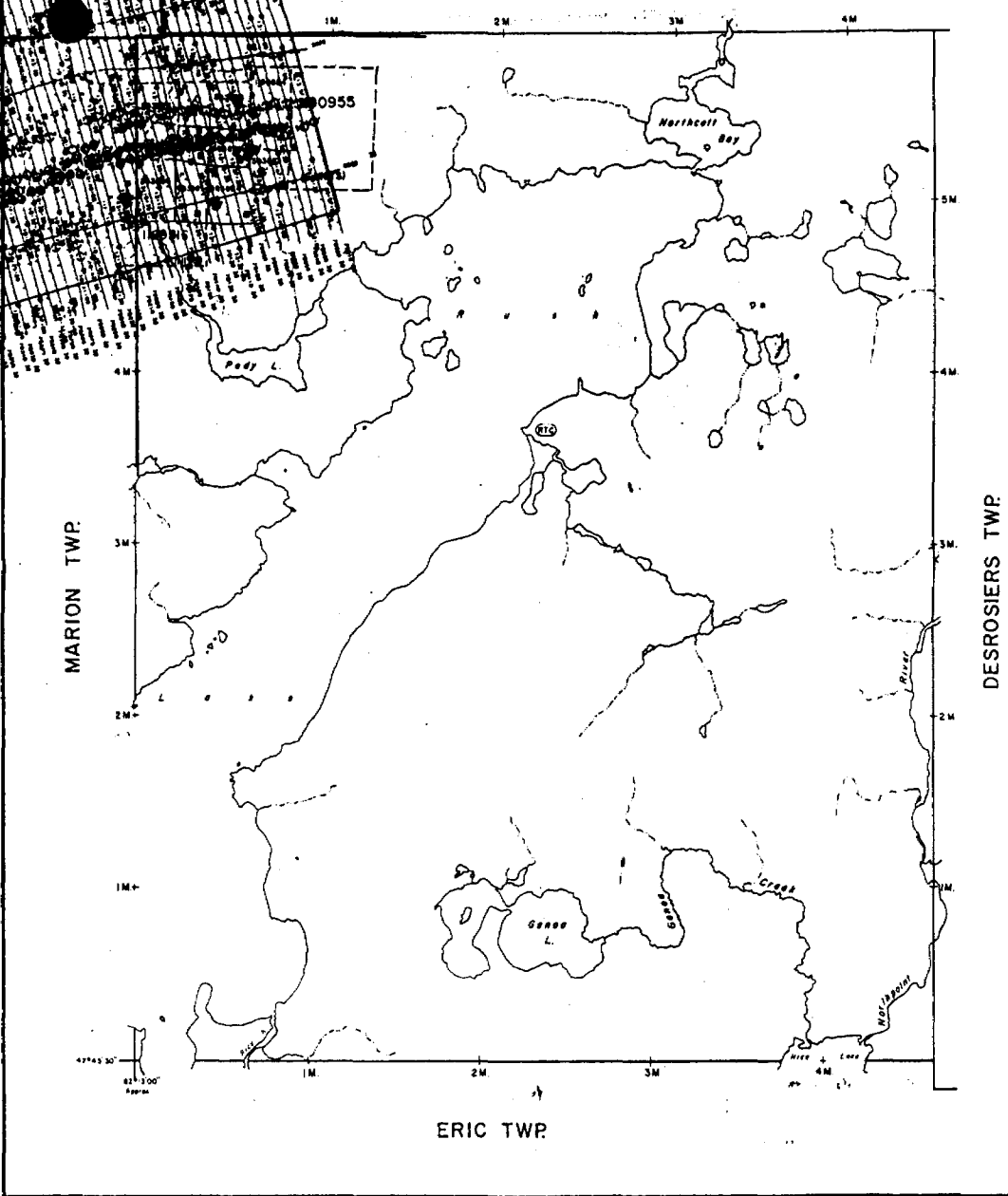
Marion claims - Block B

claim #	line kilometres	claim #	line kilometres
568516	0.54	568517	1.62
568518	1.61	619128	0.66
619129	0.65	619130	1.91
622999	2.43	623000	2.53
624001	2.20	624002	2.46
624003	0.84	628434	1.27
628435	1.23	628436	1.25
628437	0.96	628438	1.33
628439	0.60	628440	0.34
634522	1.28	634523	0.40
750622	1.75	750623	1.58

Marion Block B (cont'd)

claim #	line kilometres	claim #	line kilometres
1176234	1.38	1176235	1.54
1176236	1.53	1176237	1.56
1176238	1.57	1176239	1.95
1176240	1.72	1176241	1.30
1176242	1.08	1176243	1.52
1176244	1.63	1176245	2.02
1176423	0.88	1176424	1.76
1176425	1.12	1176426	0.86
1176427	2.06	1189511	4.11
1189512	3.08	1189513	4.74
1189514	0.90	1190051	7.98
1190561	3.78	1190562	1.00
1190563	3.34		

McOWEN TWP

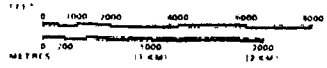


MARION TWP.

DESROSIERS TWP.

ERIC TWP

SCALE: 1 INCH = 40 CHAINS



LEGEND

- PATENTED LAND
 - CROWN LAND SALE
 - LEASES
 - LOCATED LAND
 - LICENSE OF OCCUPATION
 - MINING RIGHTS ONLY
 - SURFACE RIGHTS ONLY
 - ROADS
 - IMPROVED ROADS
 - KING'S HIGHWAYS
 - RAILWAYS
 - POWER LINES
 - MARSH OR MUSKEG
 - MINES
 - CANCELLED
 - L.U.P. LAND USE PERMIT
- C.S.
 - L.O.
 - M.R.O.
 - S.R.O.

REMOTE TOURIST CAMPS NOTES

400' surface rights reservation along the shores of all lakes and rivers.
LEASE, SURFACE & MINING RIGHTS

TOWNSHIP
GENOA
M.N.R. ADMINISTRATIVE DISTRICT
CHAPLEAU
MINING DIVISION
PORCUPINE
LAND TITLES / REGISTRY DIVISION
SUDBURY

Ministry of Natural Resources
Ontario
Ministry of Northern Development and Mines

Date: REVISED FEB 1990
ACTIVATED JANUARY 10, 1992 BY D.C.
Number: G-1131
DRAWN BY R.B.



Falconbridge Limited
P.O. Box 1140
571 Moneta Avenue
Timmins, Ontario
P4N 7H9

Attention: Mr. Stan G. Clemmer

In Account With:

Aerodat Limited
3883 Nashua Drive
Mississauga, Ontario
L4V 1R3

RECEIVED

MAR 19 1993

MINING LANDS BRANCH

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R.D.

	602-600-008-191 - 45% ⁸ 257,23,647.00 ¹⁹⁹¹ 1 '91	22,100.00
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Genoa	602-600-008-668 - 5% ⁸ 16,511.00	✓ 17,300.00
		<u>90,000.00</u>

[Handwritten signatures and initials: SGC, JG, and a large signature]

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245km (100m lines)

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583868	1.51	583869	2.08
583870	1.96	583871	1.62

Marion claims - Block A - "Genoa"

claim #	line kilometres	claim #	line kilometres
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1190047	1.04		

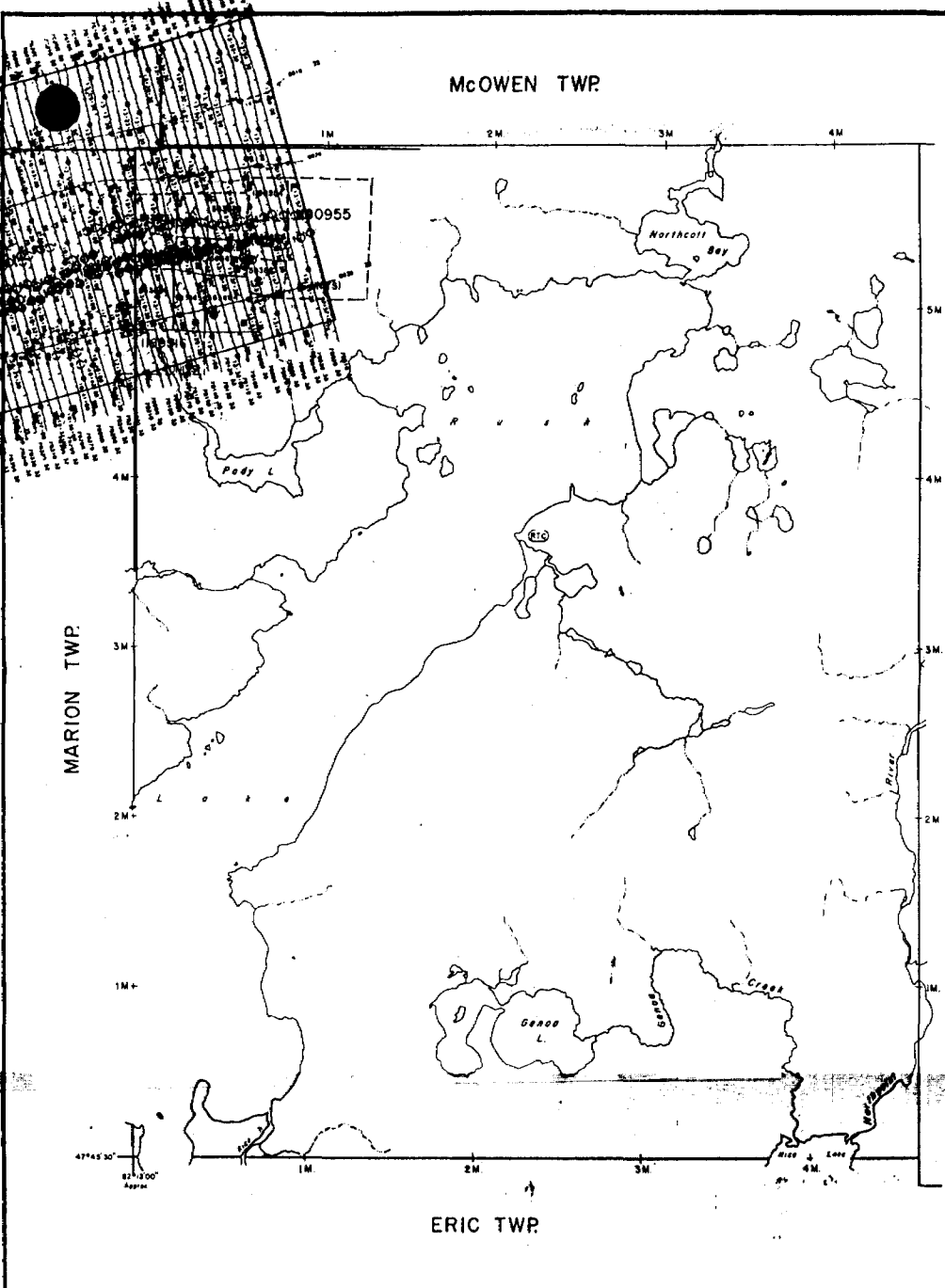
Marion claims - Block B

claim #	line kilometres	claim #	line kilometres
568516	0.54	568517	1.62
568518	1.61	619128	0.66
619129	0.65	619130	1.91
622999	2.43	623000	2.53
624001	2.20	624002	2.46
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750622	1.75	750623	1.58

Marion Block B (cont'd)

claim #	line kilometres	claim #	line kilometres
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1176236	1.53	1176237	1.56
1176238	1.57	1176239	1.95
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1190561	3.78	1190562	1.00
1190563	3.34		

McOWEN TWP

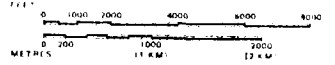


MARION TWP.

DESROSIERS TWP.

ERIC TWP.

SCALE: 1 INCH = 40 CHAINS



LEGEND

- PATENTED LAND P
- CROWN LAND SALE C.S
- LEASES L
- LOCATED LAND Loc
- LICENSE OF OCCUPATION L.O
- MINING RIGHTS ONLY M.R.O
- SURFACE RIGHTS ONLY S.R.O
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- IMPROVED ROADS
- KING'S HIGHWAYS
- RAILWAYS
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- CLP. LAND USE PERMIT C

REMOTE TOURIST CAMPS NOTES

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LEASE, SURFACE & MINING RIGHTS ■

TOWNSHIP

GENOA

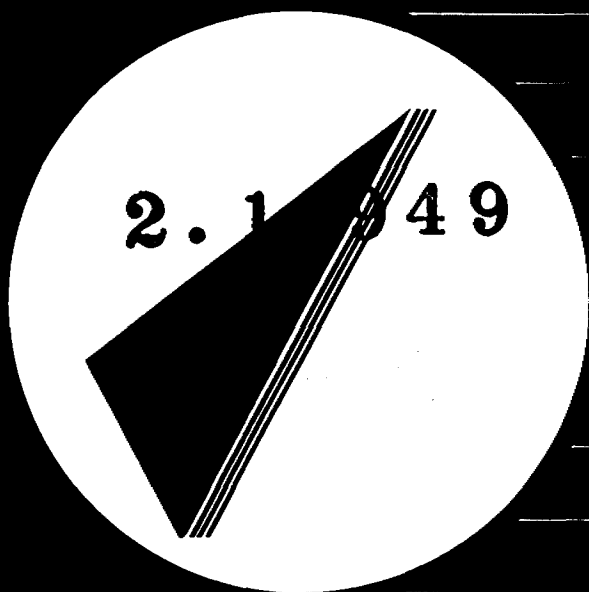
M.N.R. ADMINISTRATIVE DISTRICT
CHAPLEAU
MINING DIVISION
PORCUPINE
LAND USE REGISTRY DIVISION
SUDBURY

Ministry of Natural Resources
Ontario
Ministry of Northern Development and Mines

Date: REVISED FEB 1990
ACTIVATED AUGUST 19, 1992
BY D.C.
DRAWN BY B.R.

Number
G-1131

AERODAT



VLF EM

MAGNETICS

RADIOMETRICS

INTERPRETATION

ELECTROMAGNETICS

RESEARCH & DEVELOPMENT

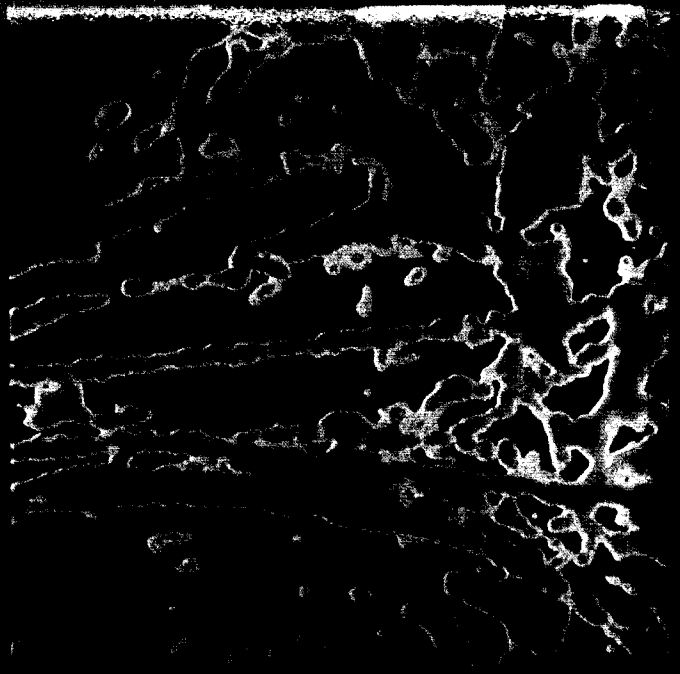
ELECTRONIC POSITIONING

GRADIENT MAGNETICS

DATA PROCESSING



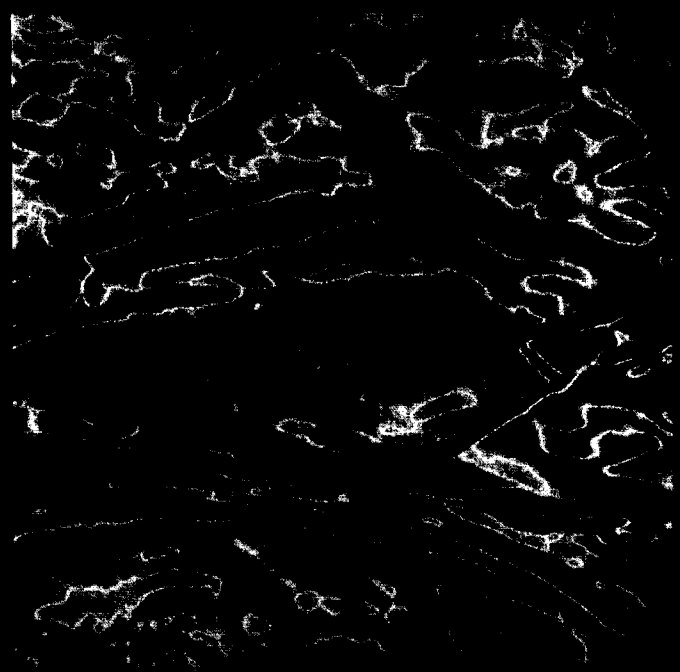
MAGNETIC VERTICAL GRADIENT



APPARENT RESISTIVITY



MAGNETIC TOTAL FIELD



VLF-EM TOTAL FIELD

The above map examples represent just some of the information collected by an Aerodat 3-frequency HEM / 2-frequency VLF-EM / magnetometer survey. The flight line spacing was 100 meters (1/16 mile) accurately controlled by a radar navigation system to a relative accuracy of about 5 meters. Such multisensor, low level, electronic navigation surveys map a variety of geophysical parameters with a resolution and sensitivity comparable to ground surveys at less cost and in shorter time. The above miniature maps each cover 100 square kilometers and contain 1000 line kilometers of geophysical information.

**REPORT ON
COMBINED HELICOPTER-BORNE
MAGNETIC, ELECTROMAGNETIC AND VLF-EM SURVEYS
GENOA TOWNSHIP CLAIMS
RUSH LAKE AREA, ONTARIO**

FOR

**FALCONBRIDGE LTD. - EXPLORATION
571 MONETA AVENUE, BOX 1140
TIMMINS, ONTARIO
P4N 7H9**

BY

**AERODAT LIMITED
3883 NASHUA DRIVE
MISSISSAUGA, ONTARIO
L4V 1R3
PHONE: 416 - 671-2446**

August 7, 1991

2. 14949

**copy
3/10/91**

J9101G

**Ian Johnson, Ph.D., P.Eng.
Consulting Geophysicist**

TABLE OF CONTENTS

1.	INTRODUCTION	1
2.	SURVEY AREAS	1
3.	SURVEY PROCEDURES	2
4.	DELIVERABLES	2
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LIST OF MAPS

Maps are labelled according to scale, map type and sheet number. Map scales are 1:5,000 and 1:20,000. All map types are not necessarily presented at both scales. Details on map types, scales and map sheet layout are given in Section 4.

BLACK LINE MAPS:

<u>Map Type</u>	<u>Description</u>
1.	BASE MAP; screened topographic base map with township boundaries and UTM reference corners or grid.
2.	FLIGHT PATH MAP; photocombination of the base map with flight lines, and EM anomaly symbols.
3.	COMPILATION/INTERPRETATION MAP; with base map.
4.	TOTAL FIELD MAGNETIC CONTOURS; with base map.
5.	VERTICAL MAGNETIC GRADIENT CONTOURS; with base map.
6.	APPARENT RESISTIVITY CONTOURS; apparent resistivity calculated for the 935 Hz data, with base map.
7.	VLF-EM TOTAL FIELD CONTOURS; with base map.
8.	HEM OFFSET PROFILES (935 Hz); with base map and flight lines.

COLOUR MAPS:

1. **TOTAL FIELD MAGNETICS;** with superimposed contours and EM anomaly symbols.
2. **VERTICAL GRADIENT MAGNETICS;** with superimposed contours and EM anomaly symbols.
3. **APPARENT RESISTIVITY;** calculated for the 935 Hz data with superimposed contours and EM anomaly symbols.
4. **VLF-EM TOTAL FIELD;** with superimposed contours, fiducials and EM anomaly symbols.

5A. HEM OFFSET PROFILES; 935 Hz and 850 Hz data with flight lines and EM anomaly symbols.

5B. HEM OFFSET PROFILES; 4175 Hz and 4600 Hz data with flight lines and EM anomaly symbols.

DERIVATIVE COLOUR MAPS:

1-A. TOTAL FIELD MAGNETICS SHADOW MAPS; at illumination directions given by angle A.

**REPORT ON
COMBINED HELICOPTER-BORNE
MAGNETIC, ELECTROMAGNETIC AND VLF-EM
SURVEYS, GENOA TOWNSHIP CLAIMS,
RUSH LAKE AREA, ONTARIO**

1. INTRODUCTION

This report describes an airborne geophysical survey carried out on behalf of Falconbridge Limited - Exploration (Falconbridge) by Aerodat Limited under a contract dated January 4, 1991. Principal geophysical sensors included a four frequency electromagnetic system, a high sensitivity cesium vapour magnetometer and a two frequency VLF-EM system. Ancillary equipment included a radar ranging navigation system, a colour video tracking camera, a radar altimeter, a power line monitor and a base station magnetometer.

The survey was carried out over two areas centered in Marion Township and about 110 km southwest of Timmins. Part of one area is in Genoa Township, immediately east of Marion Township. The two areas are designated areas Marion East and Marion West. Marion East is immediately north west of Rush Lake and covers 10.5 square kilometres. Marion West is centered some 8 km southwest of area A and covers approximately 12 square kilometres. Total survey coverage was approximately 245 line kilometres (area A - 108 km traverse lines plus 10 km magnetic tie lines, area B - 123 km traverse lines plus 4 km magnetic tie lines). The flight line spacing was 100 m. The Aerodat job number is J9101G.

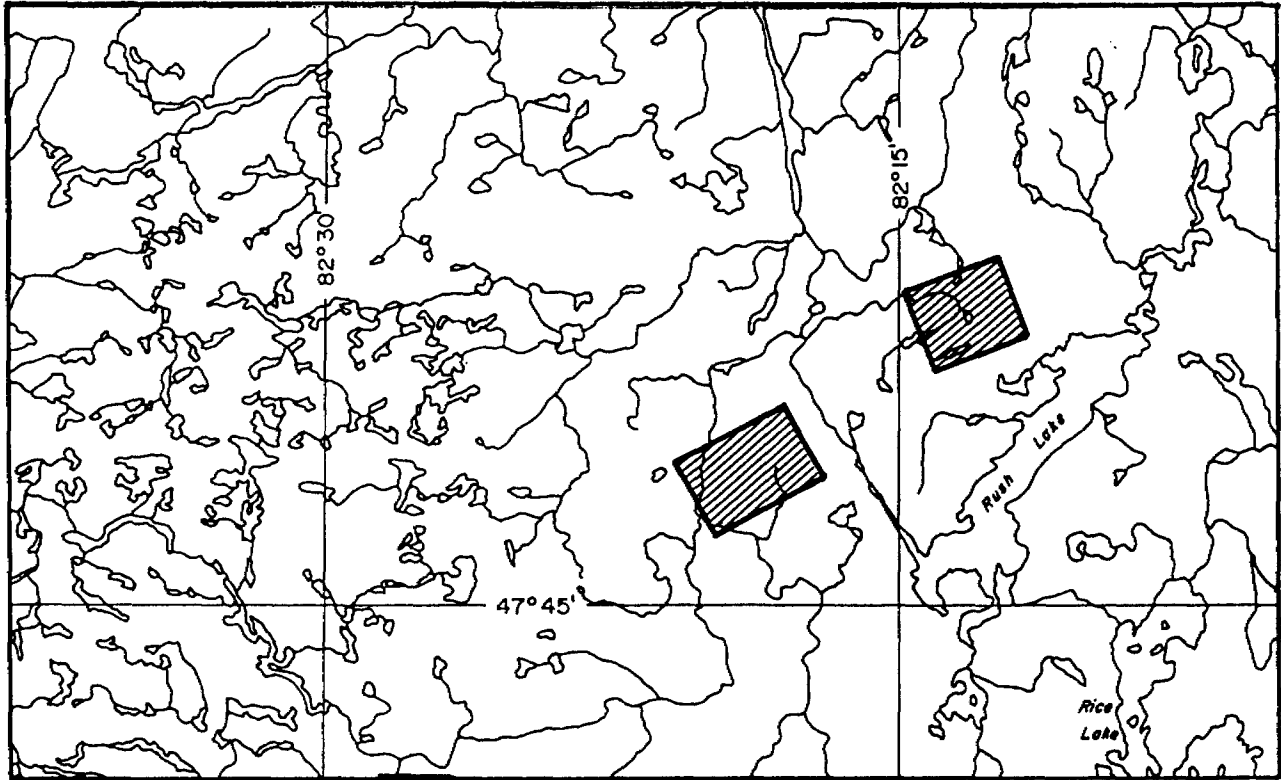
This report describes the survey, the data processing and the data presentation. Electromagnetic anomalies which are thought to be the response to bedrock conductors have been identified and appear on selected map products as EM anomaly symbols with interpreted source characteristics. Where EM and Magnetic results supported it, anomaly centers are joined to form conductor axes. Recommendations concerning areas with favourable geophysical characteristics are made with reference to a compilation/interpretation map.

2. SURVEY AREAS

The survey areas are centred some 110 km southwest of Timmins, Ontario. Area topography is shown on the 1:50,000 scale NTS map sheet - 41O/16 (Rush Lake).

Local relief is minimal - elevations are 1250 ±50 feet. The areas are free of major roads, powerlines, railroads, etc.

The survey areas are shown in the attached index map which includes local topography and latitude - longitude coordinates.



LOCATION MAP

**HELICOPTERBORNE GEOPHYSICAL SURVEY
GENOA TOWNSHIP CLAIMS
RUSH LAKE AREA, ONTARIO**

**on behalf of
FALCONBRIDGE LIMITED - EXPLORATION**

BY

**AERODAT LIMITED
J9101G**

The local magnetic field has an inclination of 76° and a declination of 8° west of north.

3. SURVEY PROCEDURES

The survey was flown on March 3, 1991. Principal personnel are listed in Appendix IV. Three (3) survey flights were required to complete the project.

The flight line spacing was 100 m. The flight line direction was approximately nnw/ssw for both areas. The aircraft ground speed was maintained at approximately 60 knots (30 metres per second). The nominal EM sensor height was 30 metres, consistent with the safety of the aircraft and crew.

Following equipment installation and testing, the ground based transponders of the radar ranging navigation system were installed at two or more sites or more near the survey area. The UTM coordinates of each site were taken from published 1:50,000 NTS maps. The base line (or line between transponders) was flown to determine their separation. The result is used to check the UTM coordinates assigned to each transponder.

The UTM coordinates of survey area corners were taken from maps provided by Falconbridge. These coordinates are used to program the navigation system. A test flight was used to confirm that area coverage would be as required.

Thereafter the traverse lines are flown under the guidance of the navigation system. The operator entered manual fiducials over prominent topographic features as seen on a 1:10,000 scale topographic map - a 5 times photographic enlargement of the 1:50,000 scale NTS sheet. Survey lines which showed excessive deviation were re-flown.

The magnetic tie lines were flown using visual navigation in areas of low topographic and magnetic relief. Aircraft position was taken from the navigation system. Three magnetic tie lines were flown in Marion East. One magnetic tie line was flown in Marion West.

Calibration lines are flown at the start, middle (if required) and end of every survey flight. These lines are flown outside of ground effects to record electromagnetic zero levels.

4. DELIVERABLES

The results of the survey are presented in a report plus maps. The report is presented in four copies. Folded white print copies of the 1:20,000 scale black line maps are bound with the report.

The black line maps are delivered as cronaflex (or clear acetate) originals. The colour maps are delivered in four copies. The shadow maps are delivered in two copies. All maps are rolled and

delivered in map tube(s).

A full list of all map types is given at the beginning of this report. A summary is given here.

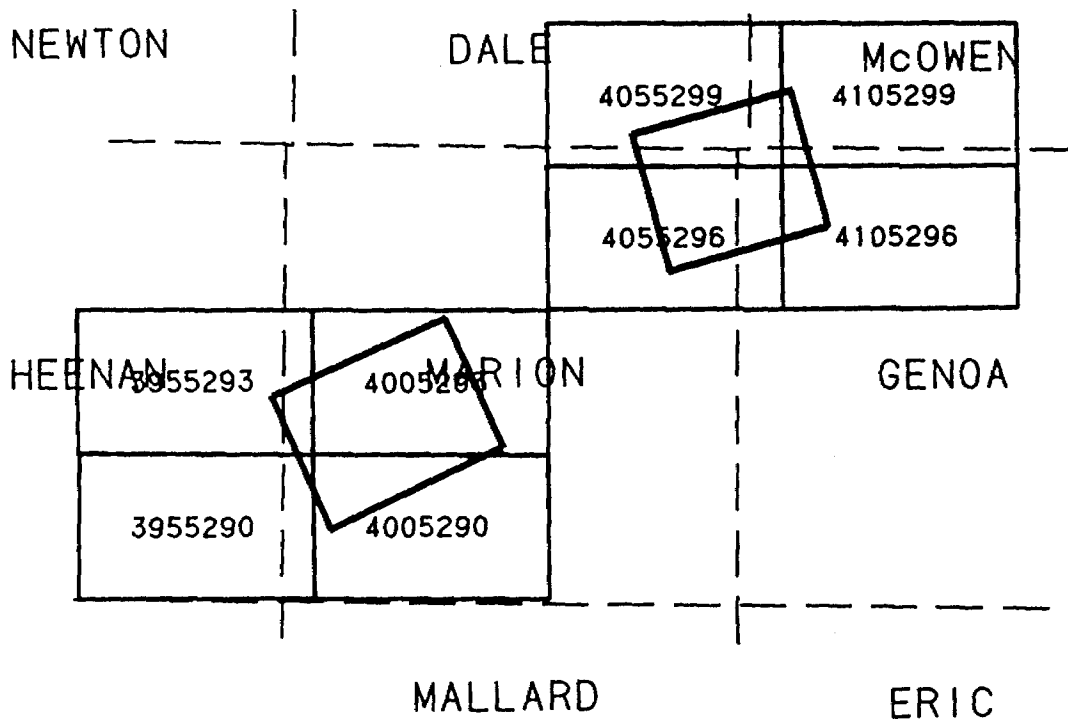
<u>MAP TYPE</u>	<u>DESCRIPTION</u>
1	Base Map (Black line)
2	Flight Path Map (Black line)
3	Compilation/Interpretation Map (Black line)
4	Total Magnetic Field Contours (Black line)
5	Vertical Magnetic Gradient Contours (Black line)
6	Apparent Resistivity - 935 Hz (Black line)
7	VLF-EM Total Field Contours (Black line)
8	HEM Offset Profiles - 935 Hz (Black line)
1	Total Magnetic Field Contours (Colour)
2	Vertical Magnetic Gradient Contours (Colour)
3	Apparent Resistivity Contours - 935 Hz - (Colour)
4	VLF-EM Total Field Contours (Colour)
5A	HEM Offset Profiles - (935 & 850 Hz) (Colour)
5B	HEM Offset Profiles - (4175 & 4600 Hz) (Colour)
1A	Total Field Magnetic Shadow Maps (Colour)

Black line map scales are as follows:

<u>MAP TYPE</u>	<u>1:5,000</u>	<u>1:20,000</u>
1	X	X
2	X	X
3	X	X
4	X	X
5	X	X
6		X
7		X
8		X

All maps, except type 2 (flight path map with anomaly centers), are presented on cronaflex. All type 2 maps are presented on clear acetate.

The colour and shadow maps are presented at the following scales:



MAP SHEET LAYOUT
1:50,000 SCALE
HELICOPTERBORNE GEOPHYSICAL SURVEY
GENOA TOWNSHIP CLAIMS

 on behalf of
FALCONBRIDGE LIMITED - EXPLORATION

 BY

AERODAT LIMITED
J9101G

<u>MAP TYPE</u>	<u>1:5,000</u>	<u>1:20,000</u>
1	X	X
2	X	X
3		X
4		X
5(A&B)	X	
1-A		X

The 1:20,000 scale maps are presented on one map sheet - both areas. These maps show township boundaries and major topographic features. The 1:5,000 scale maps are presented on eight map sheets. The map sheet layout for the 1:5,000 scale maps is shown in the attached figure.

Each 1:5,000 scale map sheet covers an area of 5000 m (east-west) by 3000 m (north-south). Map sheet boundaries are lines of equal UTM grid eastings and northings. Map sheets are labelled using a 7 number code. The first three numbers indicate the UTM easting (in kilometres) of the western boundary of the sheet. The last four numbers indicate the UTM northing (in kilometres) of the southern boundary of the sheet. The 1:5,000 scale map sheet number 4055296 for example covers the area given by

UTM Eastings from 405000 to 410000
UTM Northings from 5296000 to 5199000

The 5,000 scale maps show local topography and a 1 km square UTM grid. A total of eight 1:5,000 scale maps were needed to cover the survey area.

The processed digital data is organized on 9 track archive tape. Both the profile and the gridded data are saved on tape. A full description of the archive tape(s) is delivered with the tape(s).

All gridded data are also provided on diskettes suitable for displaying on IBM compatible 286 or 386 microcomputers using the Aerodat RTI software package.

The Aerodat RTI (Real Time Imaging) program for displaying the gridded data sets from the survey is delivered to Falconbridge.

5. AIRCRAFT AND EQUIPMENT

5.1 Aircraft

An Astar 350B helicopter, (C-GJIX), owned and operated by Questral Helicopters, was

used for the survey. Installation of the geophysical and ancillary equipment was carried out by Aerodat. The survey aircraft was flown at a mean terrain clearance of 60 metres.

5.2 Electromagnetic System

The electromagnetic system was an Aerodat 4-frequency system. Two vertical coaxial coil pairs were operated at 935 Hz and 4,600 Hz and two horizontal coplanar coil pairs at 850 Hz and 4,175 Hz. The transmitter-receiver separation was 7 metres. Inphase and quadrature signals were measured simultaneously for the 4 frequencies with a time constant of 0.1 seconds. The HEM bird was towed 30 metres below the helicopter.

5.3 VLF-EM System

The VLF-EM System was a Herz Totem 2A. This instrument measures the total field and vertical quadrature components of two selected frequencies. The sensor was towed in a bird 15 metres below the helicopter.

VLF transmitters are designated "Line" and "Ortho". The line station is that which is in a direction from the survey area which is ideally normal to the flight line direction. This is the VLF station most often used because of optimal coupling with near vertical conductors running perpendicular to the flight line direction. The ortho station is ideally 90 degrees in azimuth away from the line station.

The transmitters used were NAA, Cutler, Maine broadcasting at 24.0 kHz and NSS, Annapolis, Maryland broadcasting at 21.4 kHz. NAA (24.0 kHz) was used as the line station and NSS (21.4 kHz) was used as the ortho station. Cutler is some 20° south of east from the survey areas.

5.4 Magnetometer

The magnetometer employed was a Scintrex H8 cesium, optically pumped magnetometer sensor. The sensitivity of this instrument is 0.001 nanoTeslas at a 0.2 second sampling rate. The sensor was towed in a bird 15 metres below the helicopter.

5.5 Ancillary Systems

Base Station Magnetometer

An IFG-2 proton precession magnetometer was operated at the base of operations to record diurnal variations of the earth's magnetic field. The clock of the base station was synchronized with that of the airborne system to facilitate later correlation. Recording resolution was 1 nT. The update rate was 4 seconds.

External magnetic field variations were recorded on a 3" wide paper chart and on diskette.

The analog record shows the magnetic field trace plotted on a grid. Each division of the grid (0.25") is equivalent to 1 minute (chart speed) or 5 nT (vertical sensitivity). The date, time and current total field magnetic value are printed every 10 minutes.

Radar Altimeter

A King KRA-10 radar altimeter was used to record terrain clearance. The output from the instrument is a linear function of altitude.

Tracking Camera

A Panasonic colour video camera was used to record flight path on VHS video tape. The camera was operated in continuous mode. The flight number, 24 hour clock time (to .01 second), and manual fiducial number are encoded on the video tape.

Radar Ranging Navigation System

A Motorola Miniranger III positioning system was used to guide the pilot over a programmed grid. The ranges to at least two ground stations were digitally recorded. The output sampling rate is 1 second. Ranges are recorded with a resolution of 0.1 m.

Analog Recorder

A RMS dot matrix recorder was used to display the data during the survey. Record contents are as follows:

<u>Label</u>	<u>Contents</u>	<u>Scale</u>
GEOPHYSICAL SENSOR DATA		
MAGF	Total Field Magnetics, Fine	2.5 nT/mm
MAGC	Total Field Magnetics, Course	25 nT/mm
VLT	VLF-EM, Total Field, Line Station	2.5 %/mm
VLQ	VLF-EM, Vertical Quadrature, Line Station	2.5 %/mm
VOT	VLF-EM, Total Field, Ortho Station	2.5 %/mm
VOQ	VLF-EM, Vertical Quadrature, Ortho Station	2.5 %/mm
X09I	935 Hz, Coaxial, Inphase	2.5 ppm/mm
X09Q	935 Hz, Coaxial, Quadrature	2.5 ppm/mm
X4KI	4600 Hz, Coaxial, Inphase	2.5 ppm/mm
X4KQ	4600 Hz, Coaxial, Quadrature	2.5 ppm/mm
P09I	850 Hz, Coplanar, Inphase	5 ppm/mm
P09Q	850 Hz, Coplanar, Quadrature	5 ppm/mm
P4KI	4175 Hz, Coplanar, Inphase	10 ppm/mm
P4KQ	4175 Hz, Coplanar, Quadrature	10 ppm/mm

ANCILLARY DATA

RALT	Radar Altimeter	10 ft/mm
PWRL	60 Hz Power Line Monitor	-

The zero of the radar altimeter is 5 cm (5 large divisions) from the top of the analog chart. The full analog range for the radar altimeter is therefore 500 feet. A flying height of 60 m (197 feet) gives an analog trace which is three large divisions (3 cm) below the top of the analog record.

All but the VLF data are shown on the analog records as positive up. The VLF channels are reversed - positive anomalies are seen as downward excursion and negative anomalies are seen as upward excursions.

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

Vertical lines crossing the record are operator activated manual fiducial markers. The start of any survey line is identified by two closely spaced manual fiducials. The end of any survey line is identified by three closely spaced manual fiducials. Manual fiducials are numbered in order. Every tenth manual fiducial is indicated by its number, printed at the bottom of the record.

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

Digital Recorder

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

<u>DATA TYPE</u>	<u>SAMPLING</u>	<u>RESOLUTION</u>
Magnetometer	0.2 s	0.001 nT
VLF-EM (4 Channels)	0.2 s	0.03 %
HEM (8 Channels)	0.1 s	0.03 ppm (coaxial), 0.06 ppm (coplanar)
Position (2 Channels)	0.2 s	0.1 m
Altimeter	0.2 s	0.05 m
Power Line Monitor	0.2 s	-
Manual Fiducial		
Clock Time		

6. DATA PROCESSING AND PRESENTATION

6.1 Base Map

The 1:20,000 scale base maps were prepared from 1:20,000 scale maps of township boundaries provided by Falconbridge. Local topography - a 2.5 times enlargement of the 1:50,000 scale NTS sheet - was added. The 1:5,000 scale base maps were made as a ten times photographic enlargement of the 1:50,000 scale NTS map sheet.

6.2 Flight Path Map

The flight path is drawn using linear interpolation between x,y positions from the navigation system. These positions are updated every second (or about 6mm at a scale of 1:5,000). These positions are expressed as UTM eastings (x) and UTM northings (y).

The manual fiducials are shown as a small circle and labelled by fiducial number. The 24 hour clock time is shown as a small square, plotted every 30 seconds. Small tick marks are plotted every 2 seconds. Larger tick marks are plotted every 10 seconds.

The block, line and flight numbers are given at the start and end of each survey line. The number 70340 32 indicates area A (block 7), line 34, flight 32. For area B, the block number is 8. The high block and flight numbers are due to the fact that this survey followed a larger project for Falconbridge which was done under the same Aerodat job number.

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

6.3 Electromagnetic Survey Data

The electromagnetic data were recorded digitally at a sample rate of 10 per second with a time constant of 0.1 seconds. A two stage digital filtering process was carried out to reject major sferic events and the reduce system noise.

Local sferic activity can produce sharp, large amplitude events that cannot be removed by conventional filtering procedures. Smoothing or stacking will reduce their amplitude but leave a broader residual response that can be confused with geological phenomena. To avoid this possibility, a computer algorithm searches out and rejects the major sferic events.

The signal to noise ratio was further enhanced by the application of a low pass 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 0.25 seconds. This low effective time constant gives minimal profile distortion.

Following the filtering process, a base level correction was made using EM zero levels determined during high altitude calibration sequences. The correction applied is a linear function of time that ensures the corrected amplitude of the various inphase and quadrature components is zero when no conductive or permeable source is present. The filtered and levelled data were used in the determination of apparent resistivity (see below).

The HEM offset profiles are plotted at vertical scales of 2 ppm/mm (935 and 4600 Hz) and 8 ppm/mm (850 and 4175 Hz).

6.4 Total Field Magnetics

The aeromagnetic data were corrected for diurnal variations by adjustment with the recorded base station magnetic values. Where needed, the magnetic tie line results were used to further level the magnetic data. No corrections for regional variations were applied. The corrected profile data were interpolated on to a regular grid using an Akima spline technique. The grid provided the basis for threading the presented contours. The minimum contour interval is 2 nT. Grid cell sizes of 25 m (1:20,000 scale maps) and 10 m (1:5,000 scale maps) were used.

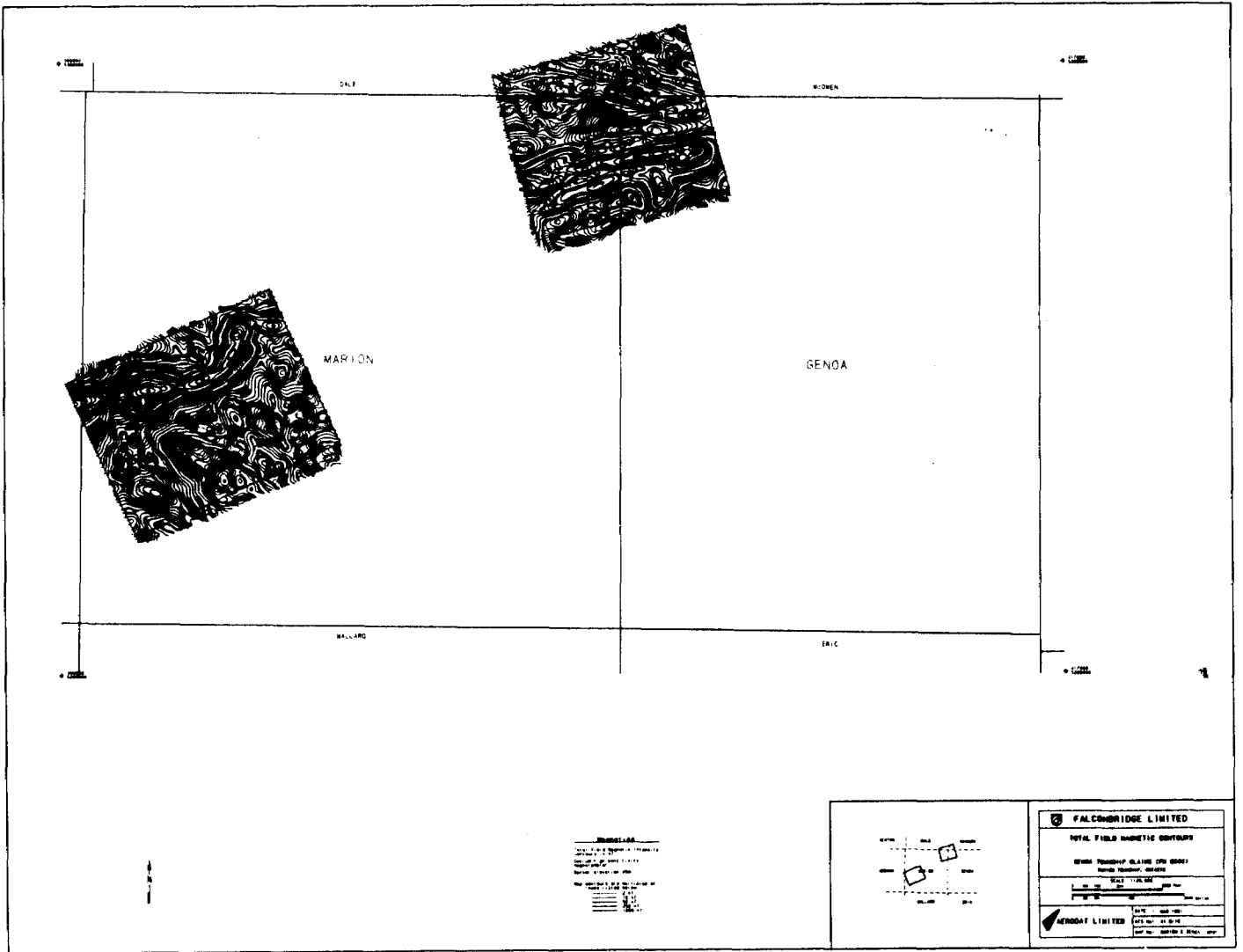
A page size copy of the 1:20,000 scale black line contoured total magnetic field map is attached.

6.5 Vertical Magnetic Gradient

The vertical magnetic gradient was calculated from the gridded total field magnetic data. The calculation is based on a 17 x 17 point convolution in the space domain. The results are contoured using a minimum contour interval of 0.2 nT/m. Grid cell sizes are the same as those used in processing the total field data.

6.6 Apparent Resistivity

The apparent resistivity is calculated by assuming a 200 metre thick conductive layer over resistive bedrock. The computer determines the resistivity that would be consistent with the sensor elevation and recorded inphase and quadrature response amplitudes at the selected frequency. The apparent resistivity profile data were interpolated onto a regular grid at a 25 metres (or 10 metres) true scale interval using an Akima spline technique and contoured using logarithmically arranged contour intervals. The contour interval is 0.1 log(ohm.m). This translates to contour lines at 100, 126, 158, 200, 251, 316, 398, 501, 631 and 794 ohm.m and multiples of 10. Thicker contour lines are used for 100 and 316 ohm.m and multiples of 10.



MARION
 GENOA
 DALE
 KIDDER
 BULLING
 ERIC

		FALCONBRIDGE LIMITED TOTAL FIELD MAGNETIC CONTOUR Scale: 1:100,000 REPRODUCED BY THE NATIONAL ARCHIVES
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The highest measurable resistivity is approximately equal to the transmitter frequency. The lower limit on resistivity is rarely encountered.

6.7 VLF-EM

The VLF Total Field data from the Line Station is levelled such that a response of 0% is seen in non-anomalous regions. The corrected profile data are interpolated onto a regular grid using an Akima spline technique. The grid provided the basis for threading the presented contours. The minimum contour interval is 0.5 %. Grid cell size is 25 m (or 10 m).

7. INTERPRETATION

7.1 Area Geology

The following notes have been taken from Ontario Division of Mines, Geoscience Report 157, "Geology of the Chapleau Area, Districts of Algoma, Sudbury and Cochrane", 1977 by P.C. Thurston, G.M. Siragusa and R.P. Sage. Additional information has been taken from ODM Map number 2067 which shows the geology of Heenan, Marion and Genoa Townships at a scale of 1" = 1/2 mile.

- * In Marion and Heenan Townships, felsic to intermediate metavolcanics form a wedge-shaped unit some 16 km long and up to 5 km wide. It has an estimated maximum stratigraphic thickness of 3 km.
- * This felsic to intermediate metavolcanic unit is bordered on the southeast by younger granitic and dioritic rocks and on the northwest by the Woman River Iron Formation and overlying metavolcanics of intermediate to mafic composition.
- * The iron formation and adjoining metavolcanics (felsic to the southeast and mafic to the northwest) lie along the northwest limb of the Woman River anticline.
- * The occurrence of iron formation in a zone of transition from felsic to mafic volcanics, the presence of massive base metal sulphides in the iron formation and the association of these features with a major fold present a picture which is unique within the map area.
- * The Woman River iron formation consists of thin bands intercalated with metavolcanics. Typically, oxide-facies iron formation consists of interbedded magnetite layers, chert and pyritic graphitic slate. Occurrences of sulphide minerals (pyrite, pyrrhotite and rare sphalerite), along with disseminated magnetite are sporadic and not extensive.

The Woman River Iron Formation is seen on the GSC Aeromagnetic map (7077G) as a long arcuate magnetic anomaly with peak amplitudes more than 2000 nT. This anomaly crosses through the northern part of Genoa Township, curves to the southwest through Marion Township, ending in the southeast corner of Heenan Township for a total strike length of over 20 km. The survey areas are centered over 3.5 and 4 km segments of this iron formation.

Area geology maps show nnw/sse trending regional faults and diabase dykes.

7.2 Exploration Target

The following notes have been taken from ODM Geoscience Report 157 cited above.

- * The iron formation of Genoa, Heenan and Marion Townships has been intermittently examined for iron and base metals since shortly after 1900. This formation consists of two or more parallel bands composed of magnetite, siderite, chert, pyrite and pyrrhotite and contains local concentrations of base metal sulphides.
- * there is a change in the iron formation facies from west to east. Oxide facies dominate in the west and sulphide facies dominate in the east. A vertical transition is also present - the iron formation gradually changes from siliceous magnetite - siderite at the base to light grey banded chert having negligible iron content at the top of the formation.
- * initial mineral exploration for iron in Heenan, Marion and Genoa Townships over the Woman River Iron Range was conducted prior to 1910. This activity failed to indicate an iron deposit of economic importance but some base metal mineralization was uncovered. Exploration for iron along this belt remained dormant until the early 1960's. Indicated reserves are about 5 million tons of ore grading nearly 40% iron.

A Lead-Zinc occurrence in the northwest corner of Genoa Township is shown on the 1" = 1/2 mile geology map - 2067. The ODM Geoscience Report Number 157 shows this to be an active base metals exploration are beginning in 1929. Reported mineral occurrences have been pyrite, pyrrhotite, chalcopyrite, galena, sphalerite, bornite, magnetite and graphite.

Most of the Woman River Iron Formation is shown as being covered by surveyed mining properties.

The purpose of the helicopter-borne geophysical survey was to define the airborne geophysical character of the iron formation in as much detail as is currently possible and

to suggest possible base metals targets.

7.3 EM Anomaly Selection and Analysis

A. Anomaly Selection

The purpose of EM anomaly selection is to identify possible bedrock conductors. The principal characteristic for most anomalies picked is a positive anomaly in the 935 Hz inphase channel with a coincident low in the 850 Hz inphase channel. The same behaviour in the 935/850 Hz quadrature channels, the 4600/4175 Hz inphase and/or quadrature channels will support picking a weak 935 Hz inphase anomaly or may be used in some cases as selection criteria on their own.

These criteria reject EM anomalies due to gradual changes in overburden thickness or resistivity. For such anomalies, the coaxial and coplanar channels (either inphase or quadrature) for the same operating frequency move together and no separation is seen. This information is best seen in the contour plan maps of apparent resistivity.

The width of an anomaly from a thin sheet conductor will depend principally on depth of burial, dip and orientation with respect to flight line direction. A near vertical conductor running normal to the flight lines will yield a coaxial EM anomaly whose width is about 2.5 times the source-sensor separation (measured from 20% of the anomaly peak). The anomaly from such conductors at surface is about 80 m (4 mm at 1:20,000 or 1.6 cm at 1:5,000). The comparable figures for a conductor under 50 m of overburden is 220 m (1.1 cm at 1:20,000 or 4.4 cm at 1:5,000).

Special care is taken in areas of negative inphase response (due to magnetite). The quadrature channels may be the only indicators of a coincident conductor.

EM anomalies due to cultural sources are so judged if there is a coincident response in the power line monitor as seen on the analog records. If present, they are shown on maps as open squares. Conductance range estimates and inphase response amplitudes are not plotted with the anomaly symbol.

B. Analysis

The EM anomaly response amplitudes at 935 Hz are used to determine the conductance and depth of burial of a vertical thin sheet conductor model. These data appear in Appendix II.

The inphase anomaly amplitude and the thin sheet conductance range as determined from the 935 Hz response amplitudes are shown with the plotted anomaly symbols. Each anomaly is identified by flight line number and letter label.

Where the 935 and/or 850 Hz inphase channels are clearly negative, an "M" is printed inside the anomaly symbol and MAGN is shown in the anomaly listings.

Conductance estimates are only valid when working with sufficient anomaly amplitudes. Where the anomaly has been picked from the 4600 and 4175 Hz responses and there is no clear 935 Hz inphase anomaly, the conductance estimates derived from the 935 Hz responses are unreliable. The true conductance is probably quite low however (i.e. less than 1 mho) and in a range where conductance differences are not distinguishable.

Conductive overburden will generally reduce thin sheet conductance estimates because of elevated background levels in the quadrature channels. Depth of burial estimates will in general be too small.

7.4 General Comments

EM

Both survey areas show generally high resistivities - greater than 5000 ohm-m. Relatively thin and/or non-conducting overburden is indicated. Away from the obvious bedrock conductors in the Woman River Iron Formation, the exception is the southwest corner of Marion West - apparent resistivities are less than 600 ohm-m over a broad region. An area of thicker overburden is expected.

Both survey areas show narrow bands of strong bedrock conductors. These bands are composed of up to four parallel conductors with a total width of 300 m or less. In Marion East, the EM anomalies are those of a near vertical thin sheet conductors - 935 Hz inphase high and coincident 850 Hz inphase low. Negative inphase anomalies are rare. Conductance estimates are uniformly high - more than 8 mhos.

The EM anomalies in Marion West are much different. The coaxial and coplanar channels track each other - a flatlying or tabular source is indicated. Discrete near vertical thin sheet conductors are not expected. The anomaly center representation is misleading - the apparent resistivity map is probably a more realistic representation. Negative inphase anomalies are common in Marion West. Conductance estimates of less than 1 mho in the conductor band are probably too low.

Both areas show scattered weak EM anomalies away from the central conductor bands. Responses are often seen in the 4600/4175 Hz quadrature channels and on the border of a resistivity low - edge effects are a concern.

Magnetics

Both areas show the total field magnetic high expected over the Woman River Iron

Formation. Peak amplitudes in Marion East are over 5000 nT. The contrast with low magnetic gradient and amplitude areas immediately north of the iron formation is striking. A magnetic source which is vertical or with a moderate southern dip is expected.

In Marion West peak amplitudes exceed 3000 nT with values over 6000 nT near the border of Marion and Heenan Townships. Total field anomalies appear broader than those seen in Marion East.

The vertical gradient data shows the high amplitude responses expected over the iron formation - 200 to 400 nT/m. The total field high in Marion East now appears as three parallel magnetic anomalies over a width of 600 to 800 m. In Marion West, the VG contour map shows only one source with an average width of some 200 m. The idea of a flat lying or wide tabular source, first proposed with the EM responses, persists.

Three nnw/sse trending faults have been inferred in Marion West from the contoured vertical gradient maps. The eastern most fault is the most definite. A nnw/ssw trending fault has been proposed in Marion East. The evidence is taken from a combination of breaks in the VG and VLF data. In both cases it is difficult to discern possible faults given the small survey areas.

In Marion East, the region of the Woman River Iron Formation is seen as three parallel bands with a total width less than 1000 m. The center band has high magnetic and conductance values. The northern band is less so. The southern band is magnetic only and negative inphase responses are common. Magnetic anomaly amplitudes are not as strong as those in the center band.

VLF

The contoured VLF data shows strong linear anomalies with the expected bias towards the transmitter - Cutler at about 20° south of east. Responses are particularly strong in Marion East with peak amplitudes over 20 to 30%. A weak nnw/sse trending VLF anomaly has been used as evidence of a possible fault.

Response amplitudes in Marion West are weaker over the iron formation - peak amplitudes are generally less than 10%. This may be due to a number of possible breaks in the conductor band and occasionally unfavourable strike directions. The absence of clear VLF conductors in the southwest corner of Marion West is probably due to thicker and/or more conductive overburden.

7.5 Compilation/Interpretation Map

The compilation/interpretation maps show the following features

- EM conductor axes
- the +5 and +25 nT/m VG contour lines

- possible faults
- VLF conductor axes
- favourable area labels

A page size copy of the 1:20,000 scale compilation map is attached.

EM conductor axes are drawn through EM anomalies of like character. Consistency with local magnetic strike is often a factor.

The +5 nT/m vertical gradient contour line is used to indicate the possible outline of moderately strong magnetic sources. The additional +25 nT/m contour line indicates a strong magnetic source.

Possible faults have been taken from the contoured vertical gradient maps. In Marion East, the VLF data has been used as well.

VLF conductor axes have been drawn through the peaks of prominent VLF anomalies.

Interesting geophysical responses have been selected for discussion (see below). These are identified on the compilation maps by letter/number labels.

7.6 Favourable Areas

Geophysical targets of special interest are based on promising bedrock conductors in a favourable setting. Weak conductors on the edge of resistivity lows and in an uninteresting geophysical setting are usually passed over. All high conductance EM anomalies, unless part of a long formational conductor, are considered worthy of comment.

Within the conductive bands in both survey areas, the airborne geophysical data alone does not provide enough information to select one part of the conductor over another. A detailed study of the airborne geophysical results by a geologist with more discriminating exploration models is needed.

Outside these conductive bands, a number of isolated bedrock conductors show reasonable conductance estimates and promising EM anomaly shapes. These are labelled A1 to A5. In the discussion below, each target is identified by the area, survey line and 24 hour clock time of the most promising EM anomaly in the conductor.

A1: Marion West: Line 80290 (17:03:08)

A three line conductor about 100 m south of the iron formation. The EM anomalies have been picked based on the behaviour of the inphase channels - the 850 Hz inphase channel is largely negative, the 935 Hz inphase anomaly is more

positive. There are no anomalies in the 4600/4175 Hz quadrature channels.

A coincident magnetic anomaly has amplitudes almost as high as those over the iron formation immediately to the north. This target appears to be a small segment broken off from the iron formation. The EM responses from the conductor are weaker than those from the coincident (or neighbouring) magnetite.

A2: Marion West: Line 80200 (16:35:55)

A two line conductor 800 m south of the iron formation. Conductance estimates are 2 to 4 mhos. There is a coincident 150 nT magnetic anomaly. EM peak amplitudes are 3 ppm in the 935 and 4600 Hz inphase channels. As the coaxial and coplanar anomalies are the same shape, a flat lying or wide tabular source is expected.

The coincident quadrature anomalies are less than 3 ppm and the conductance may be higher than shown.

A3: Marion East: Line 70360 (14:11:48)

A three line conductor in the northwest corner of the survey area. The conductor forms part of an east/west trending magnetic (200 nT) and VLF (10 to 20%) feature.

Although the conductance estimates are low - less than 1 mho - the 4600/4175 Hz anomalies clearly indicate a thin sheet near vertical bedrock conductor at or near surface.

A4: Marion East: Line 70120 (13:30:39)

A one line anomaly 500 m south of the iron formation. The conductance estimate - less than 1 mho - is unfair. The conductor is surrounded by negative inphase responses. A much higher conductance estimate should apply.

The conductor is located at the center of a relatively broad, n/s trending magnetic anomaly (1500 nT). The 4600/4175 Hz data suggest a dip to the south.

A5: Marion East: Line 70080 (13:40:48)

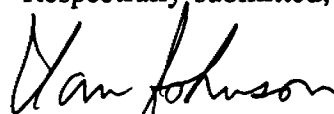
Like A1 in Marion West, this appears as a small segment broken off from the iron formation. Conductance estimates are moderate - 4 to 8 mhos. A higher value is possible given the nearby effects of magnetite.

8. CONCLUSIONS

High resolution helicopterborne geophysical surveys have been completed over two areas with a total area of about 22.5 square kilometres centered in Marion and Genoa Townships, just northwest of Rush Lake and some 110 km southwest of Timmins. Total coverage is approximately 235 line kilometres (231 km traverse plus 14 km magnetic tie lines). Results are presented on black line and colour maps at scales of 1:5,000 and 1:20,000. Map types include EM anomaly centres, apparent resistivity, contoured magnetic field, contoured vertical magnetic gradient and contoured VLF-EM Total Field data.

Preferred geophysical characteristics have been built up from a model geological target. These characteristics have been extracted from various map products and transferred to a compilation/interpretation map. Favourable areas are discussed with reference to this compilation map.

Respectfully submitted,



Ian Johnson, Ph.D., P.Eng.
Consulting Geophysicist

for

AERODAT LIMITED

August 7, 1991

J9101G



APPENDIX I

GENERAL INTERPRETIVE CONSIDERATIONS

Electromagnetic

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

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

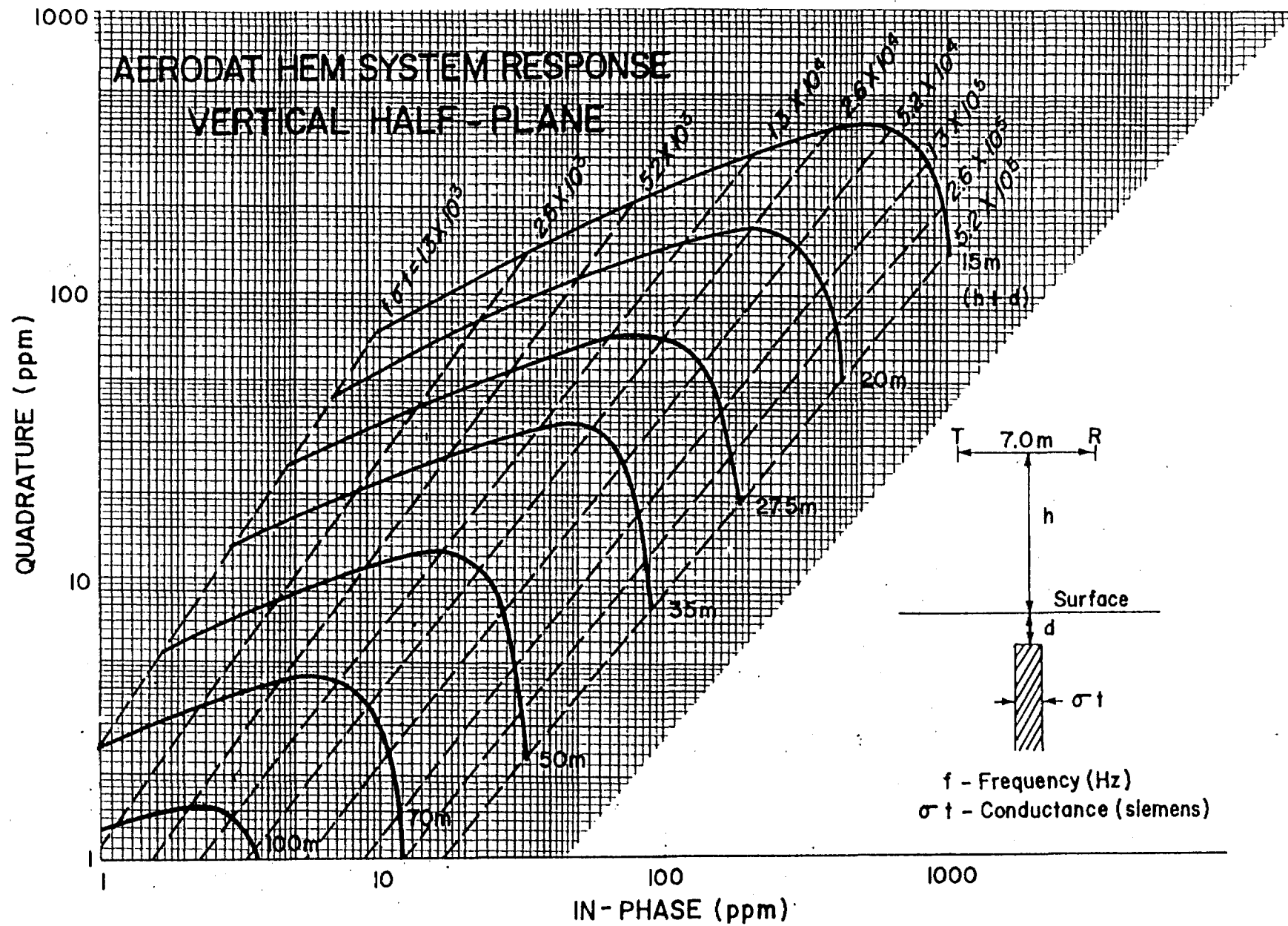
Electrical Considerations

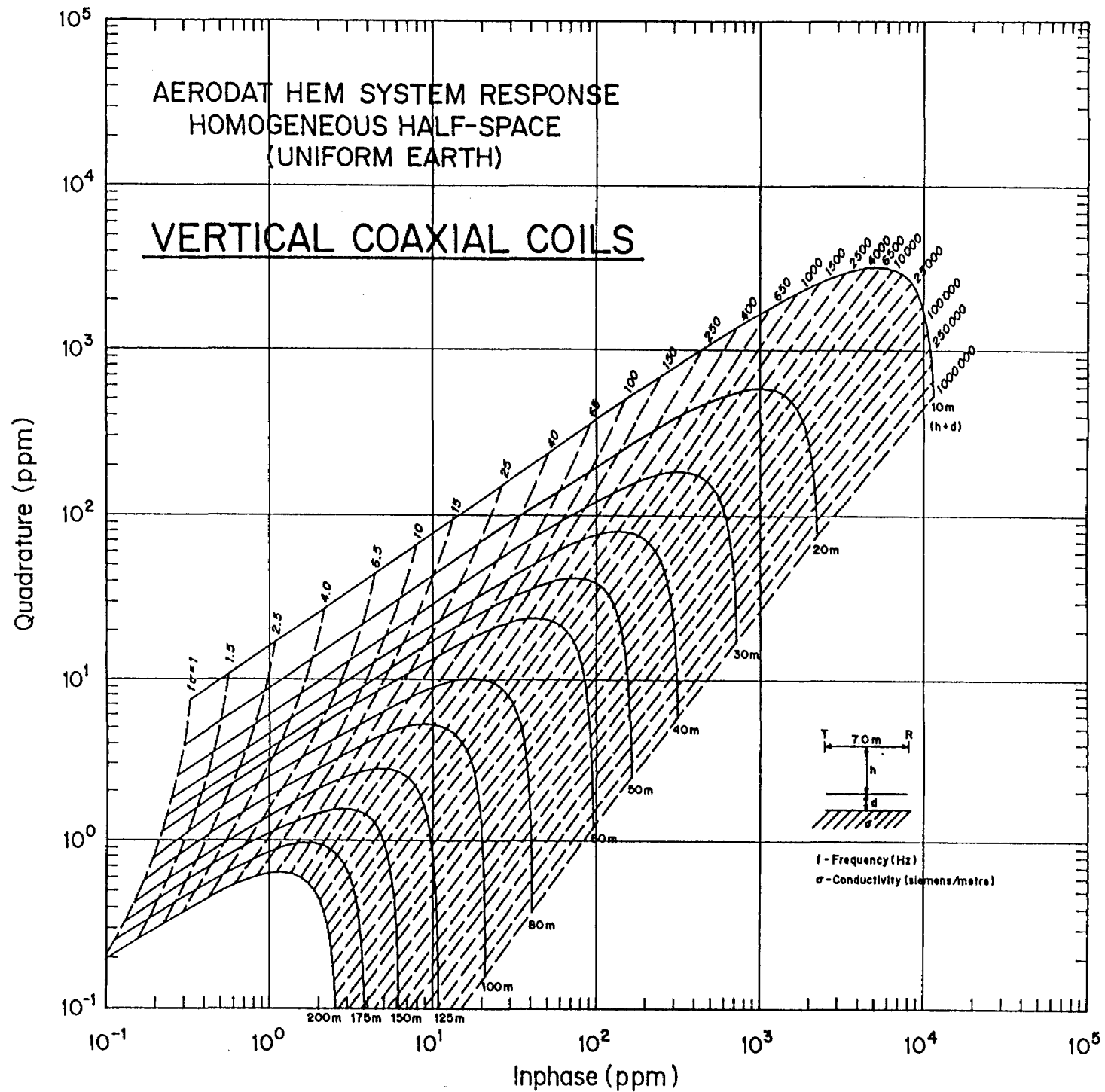
For a given conductive body the measure of its conductivity or conductance is closely related to the measured phase shift between the received and transmitted electromagnetic field. A small phase shift indicates a relatively high conductance, a large phase shift lower conductance. A small phase shift results in a large inphase to quadrature ratio and a large phase shift a low ratio. This relationship is shown quantitatively for non-magnetic vertical half-plane and half-space models on the accompanying phasor diagrams. Other physical models will show the same trend but different quantitative relationships.

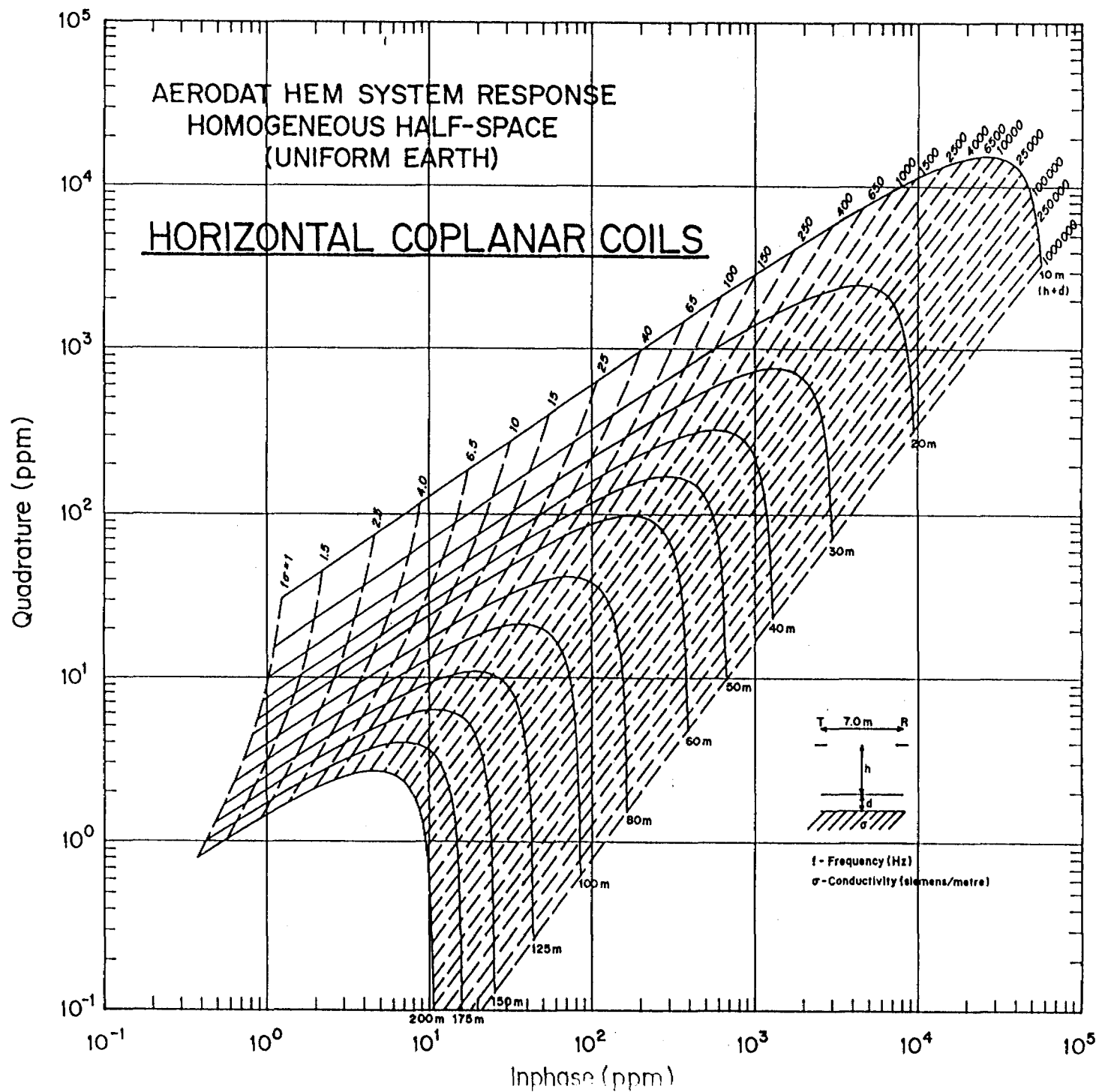
The phasor diagram for the vertical half-plane model, as presented, is for the coaxial coil configuration with the amplitudes in parts per million (ppm) of the primary field as measured at the response peak over the conductor. To assist the interpretation of the survey results the computer is used to identify the apparent conductance and depth of selected anomalies. The results of this calculation are presented in anomaly listings included in the survey report and the conductance and inphase amplitude are presented in symbolized form on the map presentation.

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

The conductance and depth values as presented are correct only as far as the model approximates the real geological situation. The actual geological source may be of limited length, have significant dip, or may be strongly magnetic. Its conductivity and thickness may vary with depth







and/or strike and adjacent bodies and overburden may have modified the response. In general the conductance estimate is less affected by these limitations than is the depth estimate, but both should be considered as relative rather than absolute guides to the anomaly's properties.

Conductance in mhos is the reciprocal of resistance in ohms and in the case of narrow slab-like bodies is the product of electrical conductivity and thickness.

The higher ranges of conductance, greater than 2-4 mhos, indicate that a significant fraction of the electrical conduction is electronic rather than electrolytic in nature. Materials that conduct electronically are limited to certain metallic sulphides and to graphite. High conductance anomalies, roughly 10 mhos or greater, are generally limited to massive sulphides or graphites.

Sulphide minerals, with the exception of such ore minerals as sphalerite, cinnabar and stibnite, are good conductors. Sulphides may occur in a disseminated manner that inhibits electrical conduction through the rock mass. In this case the apparent conductance can seriously underrate the quality of the conductor in geological terms. In a similar sense the relatively non-conducting sulphide minerals noted above may be present in significant concentrations in association with minor conductive sulphides, and the electromagnetic response will only relate to the minor associated mineralization. Indicated conductance is also of little direct significance for the identification of gold mineralization. Although gold is highly conductive, it would not be expected to exist in sufficient quantity to create a recognizable anomaly. Minor accessory sulphide mineralization may however provide a useful indirect indication.

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

Geometrical Considerations

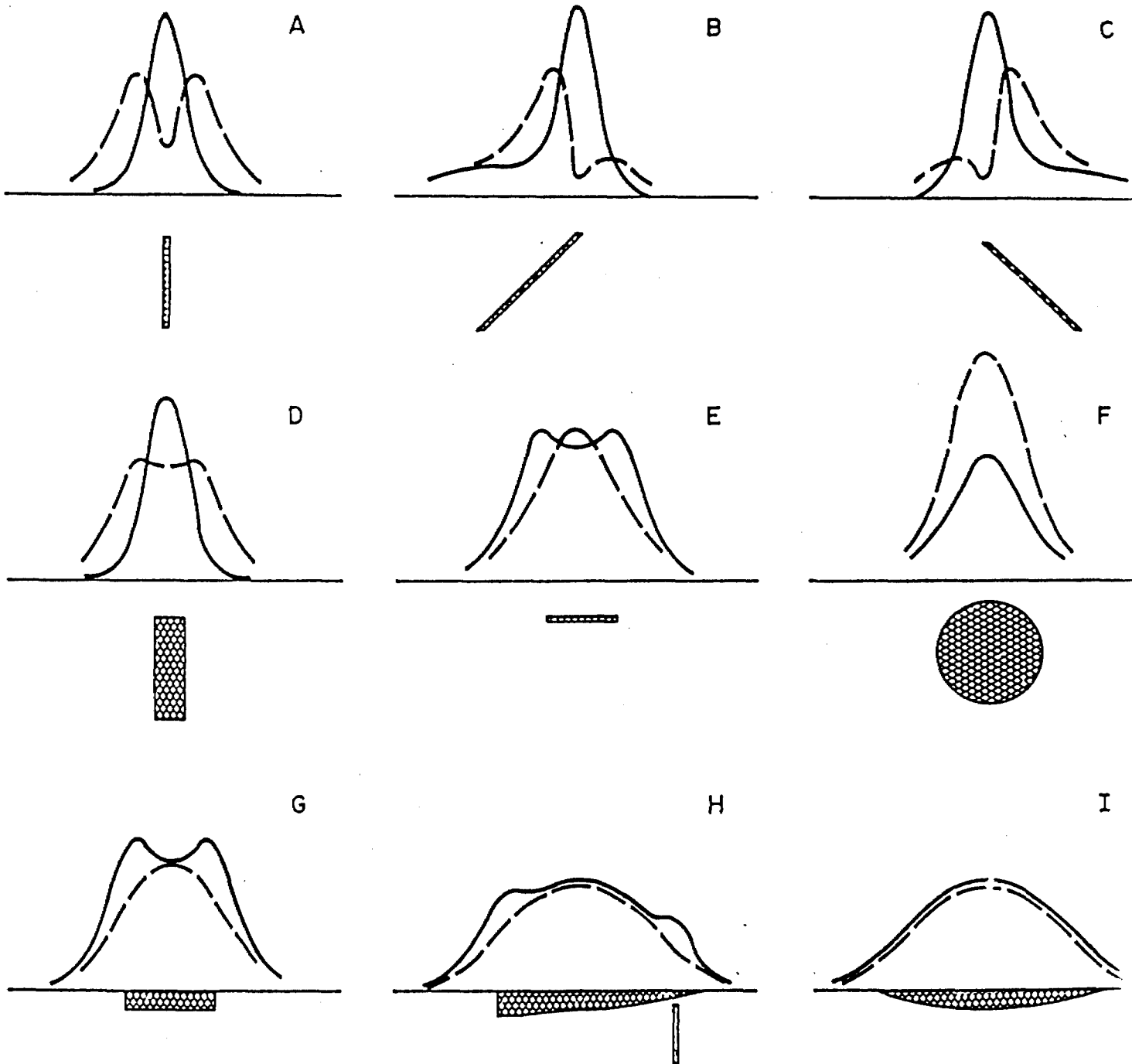
Geometrical information about the geologic conductor can often be interpreted from the profile shape of the anomaly. The change in shape is primarily related to the change in inductive coupling among the transmitter, the target, and the receiver. The accompanying figure shows a selection of HEM response profile shapes from nine idealized targets. Response profiles are labelled A through I. These labels are used in the discussion which follows.

In the case of a thin, steeply dipping, sheet-like conductor, the coaxial coil pair will yield a near symmetric peak over the conductor. On the other hand, the coplanar coil pair will pass through a null couple relationship and yield a minimum over the conductor, flanked by positive side lobes.(Profile A) As the dip of the conductor decrease from vertical, the coaxial anomaly shape changes only slightly, but in the case of the coplanar coil pair the side lobe on the down dip side strengthens relative to that on the up dip side.(Profiles B and C).

As the thickness of the conductor increases, induced current flow across the thickness of the

HEM RESPONSE PROFILE SHAPE AS AN INDICATOR OF CONDUCTOR GEOMETRY

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



conductor becomes relatively significant and complete null coupling with the coplanar coils is no longer possible.(Profile D) As a result, the apparent minimum of the coplanar response over the conductor diminishes with increasing thickness, and in the limiting case of a fully 3 dimensional body or a horizontal layer or half-space, the minimum disappears completely.

A horizontal conducting layer such as a horizontal thin sheet or overburden will produce a response in the coaxial and coplanar coils that is a function of altitude (and conductivity if not uniform). The profile shape will be similar in both coil configurations with an amplitude ratio (coplanar:coaxial) of about 4:1*(Profiles E and G).

In the case of a spherical conductor, the induced currents are confined to the volume of the sphere, but not relatively restricted to any arbitrary plane as in the case of a sheet-like form. The response of the coplanar coil pair directly over the sphere may be up to 8* times greater than that of the coaxial pair.(Profile F)

In summary, a steeply dipping, sheet-like conductor will display a decrease in the coplanar response coincident with the peak of the coaxial response. The relative strength of this coplanar null is related inversely to the thickness of the conductor. A pronounced null indicates a relatively thin conductor. The dip of such a conductor can be inferred from the relative amplitudes of the side-lobes.

Massive conductors that could be approximated by a conducting sphere will display a simple single peak profile form on both coaxial and coplanar coils, with a ratio between the coplanar to coaxial response amplitudes as high as 8*.

Overburden anomalies often produce broad poorly defined anomaly profiles.(Profile I) In most cases, the response of the coplanar coils closely follows that of the coaxial coils with a relative amplitude ratio of 4*.

Occasionally, if the edge of an overburden zone is sharply defined with some significant depth extent, an edge effect will occur in the coaxial coils. In the case of a horizontal conductive ring or ribbon, the coaxial response will consist of two peaks, one over each edge; whereas the coplanar coil will yield a single peak.(Profile H)

* It should be noted at this point that Aerodat's definition of the measured ppm unit is related to the primary field sensed in the receiving coil without normalization to the maximum coupled (coaxial configuration). If such normalization were applied to the Aerodat units, the amplitude of the coplanar coil pair would be halved.

Magnetics

The Total Field Magnetic Map shows contours of the total magnetic field, uncorrected for regional variation. Whether an EM anomaly with a magnetic correlation is more likely to be

caused by a sulphide deposit than one without depends on the type of mineralization. An apparent coincidence between an EM and a magnetic anomaly may be caused by a conductor which is also magnetic, or by a conductor which lies in close proximity to a magnetic body. The majority of conductors which are also magnetic are sulphides containing pyrrhotite and/or magnetite. Conductive and magnetic bodies in close association can be, and often are, graphite and magnetite. It is often very difficult to distinguish between these cases. If the conductor is also magnetic, it will usually produce an EM anomaly whose general pattern resembles that of the magnetics. Depending on the magnetic permeability of the conducting body, the amplitude of the inphase EM anomaly will be weakened, and if the conductivity is also weak, the inphase EM anomaly may even be reversed in sign.

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

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

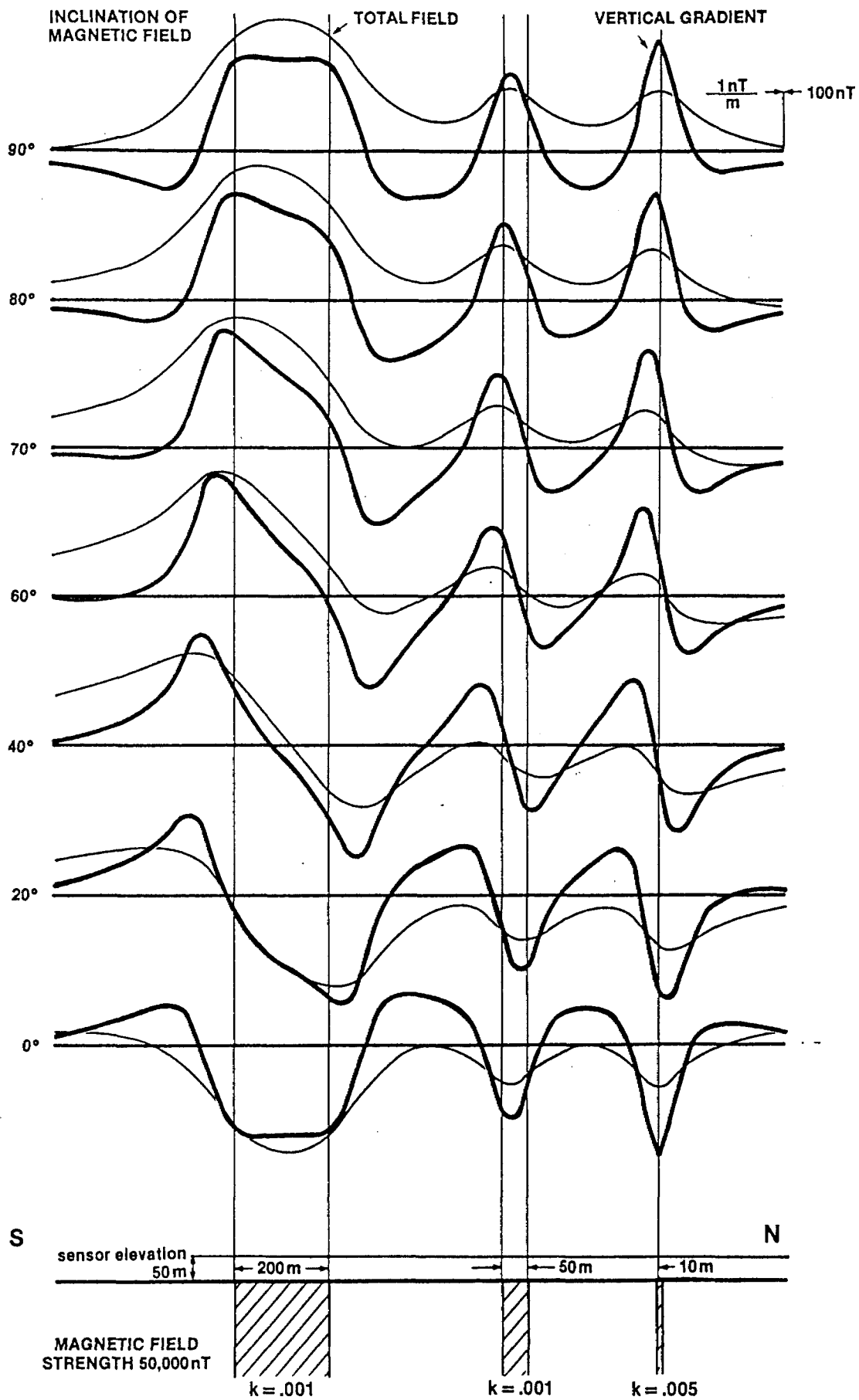
Theoretical profiles of total field and vertical gradient anomalies from tabular sources at a variety of magnetic inclinations are shown in the attached figure. Sources are 10, 50 and 200 m wide. The source-sensor separation is 50 m. The thin line is the total field profile. The thick line is the vertical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

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

Outline

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

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



Dip

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

Depth of Burial

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

VLF Electromagnetics

The VLF-EM method employs the radiation from powerful military radio transmitters as the primary signals. The magnetic field associated with the primary field is locally horizontal and normal to a line pointing at the transmitter.

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

The relatively high frequency of VLF (15-25) kHz provides high response factors for bodies of low conductance. Relatively "disconnected" sulphide ores have been found to produce measurable VLF signals. For the same reason, poor conductors such as sheared contacts, breccia zones, narrow faults, alteration zones and porous flow tops normally produce VLF anomalies. The method can therefore be used effectively for geological mapping. The only relative disadvantage of the method lies in its sensitivity to conductive overburden. In conductive ground the depth of exploration is severely limited.

The effect of strike direction is important in the sense of the relation of the conductor axis relative to the energizing electromagnetic field. A conductor aligned along a radius drawn from a transmitting station will be in a maximum coupled orientation and thereby produce a stronger response than a similar conductor at a different strike angle. Theoretically, it would be possible for a conductor, oriented tangentially to the transmitter to produce no signal. The most obvious effect of the strike angle consideration is that conductors favourably oriented with respect to the transmitter location and also near perpendicular to the flight direction are most clearly rendered and usually dominate the map presentation.

The total field anomaly is an indicator of the existence and position of a conductor. The response will be a maximum over the conductor, without any special filtering, and strongly favour the upper edge of the conductor even in the case of a relatively shallow dip.

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

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

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

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

The vertical quadrature component over steeply dipping sheet-like conductor will be a cross-over type response with the cross-over closely associated with the upper edge of the conductor.

The response is a cross-over type due to the fact that it is the vertical rather than total field quadrature component that is measured. The response shape is due largely to geometrical rather than conductivity considerations and the distance between the maximum and minimum on either side of the cross-over is related to target depth. For a given target geometry, the larger this distance the greater the depth.

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

AERODAT LIMITED
June, 1991.

APPENDIX II
ANOMALY LISTINGS

J9101 - FALCONBRIDGE LIMITED ANOMALY LIST - GENOA TOWNSHIP CLAIMS

FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM)		CONDUCTOR		BIRD
				INPHASE	QUAD.	CTP DEPTH	HEIGHT	
						MHOS	MTRS	MTRS
33	70010	A	1	0.6	0.7	1.0	100	31
33	70010	B	0	0.0	1.7	0.0	0	37
33	70020	A	0	0.4	2.7	0.0	20	30
33	70020	B	3	3.3	1.9	6.9	58	34
33	70030	A	0	-0.2	2.3	0.0	0	34
33	70040	A	1	0.8	0.8	1.5	99	27
33	70040	B	3	2.3	1.6	4.5	69	31
33	70040	C	3	3.1	2.4	4.4	54	34
33	70050	A	4	14.5	7.3	14.4	32	25
33	70050	B	0	0.6	2.7	0.0	30	27
33	70060	A	0	1.1	2.4	0.5	45	29
33	70060	B	4	7.0	4.4	8.2	40	30
33	70070	A	0	-0.5	0.4	0.0	0	28
33	70070	B	3	6.8	5.5	5.7	37	28
33	70070	C	5	18.8	7.1	23.1	28	27
33	70070	D	0	1.3	3.9	0.3	26	31
33	70080	A	0	1.6	3.3	0.7	33	34
33	70080	B	6	18.2	4.4	41.8	27	30
33	70080	C	4	3.9	1.9	9.4	57	33
33	70080	D	3	8.0	5.8	7.1	37	27
33	70090	A	5	13.4	5.5	18.5	33	27
33	70090	B	0	1.2	3.0	0.4	28	38
33	70100	A	1	1.9	2.9	1.2	39	37
33	70100	B	5	19.6	8.1	20.8	25	27
33	70110	A	5	22.5	7.8	27.5	20	31
33	70110	B	4	13.5	7.4	12.5	24	33
33	70110	C	0	1.6	4.2	0.4	27	31
33	70120	A	1	2.3	3.6	1.3	35	35
33	70120	B	4	8.2	5.3	8.4	35	30
33	70120	C	5	18.7	6.5	25.8	24	31
33	70120	D MAGN	1	2.2	3.9	1.0	38	28
33	70130	A	5	16.4	7.2	18.1	24	32

Estimated depth may be unreliable because the stronger part of the conductor may be deeper or to one side of the flight line, or because of a shallow dip or overburden effects.

J9101 - FALCONBRIDGE LIMITED ANOMALY LIST - GENOA TOWNSHIP CLAIMS

FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM)		CONDUCTOR		BIRD
				INPHASE	QUAD.	CTP DEPTH	HEIGHT	
						MHOS	MTRS	MTRS
33	70130	B	4	13.1	8.8	9.4	24	30
33	70130	C	1	2.8	4.9	1.2	24	37
33	70140	A	1	2.4	3.1	1.8	40	36
33	70140	B	4	15.6	7.5	15.7	31	25
33	70140	C	5	11.0	4.3	18.6	35	30
33	70150	A	5	12.3	4.7	19.9	33	29
33	70150	B	4	11.8	5.8	13.9	31	30
33	70150	C	0	1.2	3.4	0.3	28	33
33	70160	A	0	0.4	1.2	0.1	50	36
33	70160	B	3	8.8	6.3	7.5	33	29
33	70160	C	5	11.4	4.3	19.7	32	32
33	70170	A	4	10.5	5.4	12.5	34	30
33	70170	B	3	4.7	4.0	4.5	45	28
33	70170	C	3	4.7	3.6	5.3	45	30
33	70170	D MAGN	0	-0.4	2.0	0.0	0	30
33	70170	E	0	0.3	2.2	0.0	22	31
33	70180	A	0	0.6	2.0	0.1	35	35
33	70180	B MAGN	0	-1.2	0.8	0.0	0	29
33	70180	C	3	7.3	5.5	6.5	37	28
33	70180	D	4	10.6	5.7	11.8	31	32
33	70190	A	5	16.9	7.8	17.1	24	31
33	70190	B	2	4.3	5.2	2.6	39	25
33	70190	C MAGN	0	-0.7	1.8	0.0	0	33
33	70190	D	0	0.2	2.1	0.0	12	35
33	70200	A	0	0.5	3.6	0.0	17	28
33	70200	B	2	3.2	4.1	2.1	36	33
33	70200	C	2	3.0	3.4	2.4	41	34
33	70210	A	4	4.6	1.8	13.7	55	33
33	70210	B	4	8.2	3.4	15.5	40	32
33	70210	C	0	-0.3	3.1	0.0	0	29
33	70220	A	0	0.2	2.3	0.0	13	32
33	70220	B	2	2.4	2.7	2.2	53	29
33	70220	C	5	18.2	6.0	27.5	23	32
33	70220	D	4	7.1	3.1	13.7	40	35
32	70230	A	4	5.6	2.9	9.9	48	31

Estimated depth may be unreliable because the stronger part of the conductor may be deeper or to one side of the flight line, or because of a shallow dip or overburden effects.

J9101 - FALCONBRIDGE LIMITED ANOMALY LIST - GENOA TOWNSHIP CLAIMS

FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM)		CONDUCTOR		BIRD
				INPHASE	QUAD.	CTP DEPTH MHOS	DEPTH MTRS	HEIGHT MTRS
32	70230	B	4	6.7	3.8	9.3	44	28
32	70230	C	3	6.4	4.1	7.7	38	34
32	70230	D	1	0.9	1.0	1.3	83	33
32	70240	A	0	0.0	0.7	0.0	0	34
32	70240	B	0	1.7	3.2	0.8	38	31
32	70240	C	4	8.3	5.1	9.0	34	32
32	70240	D	5	8.8	3.3	18.2	39	32
32	70250	A	0	0.2	0.9	0.0	52	33
32	70250	B	6	17.0	3.9	43.9	30	29
32	70250	C	5	5.1	1.6	19.4	55	32
32	70260	A	0	0.3	1.9	0.0	29	29
32	70260	B	4	6.5	3.4	10.3	43	31
32	70260	C	5	12.9	3.6	30.9	32	32
32	70260	D	0	-0.5	0.8	0.0	0	26
32	70260	E	0	-0.3	1.1	0.0	0	27
32	70260	F	0	0.3	0.3	0.8	148	30
32	70270	A	0	-0.5	0.9	0.0	0	28
32	70270	B	4	9.4	4.8	12.2	36	30
32	70270	C	4	7.0	3.7	10.4	44	29
32	70270	D	0	0.2	2.0	0.0	22	27
32	70280	A	0	1.5	4.0	0.4	31	27
32	70280	B	4	4.9	2.2	11.5	52	32
32	70280	C	5	8.3	2.8	20.7	41	32
32	70280	D	0	0.0	1.7	0.0	0	27
32	70290	A	5	8.5	3.1	18.7	41	31
32	70290	B	3	2.6	1.7	5.2	65	32
32	70290	C	0	0.6	3.2	0.0	22	29
32	70290	D	1	3.0	5.1	1.3	32	28
32	70300	A	1	3.1	4.2	1.9	38	30
32	70300	B	3	4.6	3.4	5.5	41	36
32	70300	C	3	4.2	2.7	6.5	49	34
32	70300	D	5	13.6	3.9	30.3	30	32
32	70310	A	5	14.9	6.5	17.7	30	28
32	70310	B	3	3.4	2.2	5.9	57	32
32	70310	C	3	2.0	1.2	5.3	73	36
32	70310	D	3	4.2	3.4	4.7	45	32
32	70310	E	0	0.8	2.1	0.2	43	30

Estimated depth may be unreliable because the stronger part of the conductor may be deeper or to one side of the flight line, or because of a shallow dip or overburden effects.

J9101 - FALCONBRIDGE LIMITED ANOMALY LIST - GENOA TOWNSHIP CLAIMS

FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM)		CONDUCTOR		BIRD
				INPHASE	QUAD.	CTP DEPTH	HEIGHT	
						MHOS	MTRS	MTRS
32	70320	A	2	1.4	1.2	2.6	80	31
32	70320	B	3	7.6	5.5	6.9	35	30
32	70320	C	1	2.9	4.1	1.7	38	30
32	70320	D	0	0.7	1.4	0.4	59	33
32	70320	E	6	21.6	6.6	32.1	24	29
32	70330	A	5	17.5	7.3	19.8	28	27
32	70330	B	0	1.3	2.2	0.8	53	28
32	70330	C	3	7.7	5.4	7.3	36	29
32	70330	D	3	9.2	6.4	7.9	33	28
32	70330	E	2	3.6	4.9	2.0	37	27
32	70340	A	0	1.7	3.1	0.8	42	29
32	70340	B	2	6.2	6.8	3.6	32	27
32	70340	C	3	8.2	7.5	5.2	32	27
32	70340	D	3	8.0	8.7	4.0	28	26
32	70340	E MAGN	0	0.0	3.8	0.0	0	26
32	70340	F	4	6.8	3.7	9.9	46	27
32	70350	A	5	7.0	2.7	16.2	47	29
32	70350	B	2	1.6	1.7	2.0	67	30
32	70350	C	1	4.4	7.5	1.6	26	27
32	70350	D	2	7.9	9.1	3.7	28	25
32	70350	E	2	8.0	12.0	2.5	18	27
32	70350	F	0	0.6	0.8	0.7	89	33
32	70350	G	0	-1.0	1.3	0.0	0	30
33	70351	A	0	0.6	1.9	0.1	36	37
33	70351	B	0	1.1	5.1	0.1	18	27
33	70351	C	0	2.6	8.3	0.4	19	24
33	70351	D	0	1.5	4.0	0.4	27	31
33	70351	E	2	5.4	5.7	3.5	33	31
33	70360	A	3	5.9	4.0	6.9	45	28
33	70360	B	0	0.2	3.5	0.0	0	33
33	70360	C	1	3.4	6.8	1.1	26	27
33	70360	D	1	3.6	7.9	1.0	20	29
33	70360	E	0	0.9	3.7	0.1	25	28

Estimated depth may be unreliable because the stronger part of the conductor may be deeper or to one side of the flight line, or because of a shallow dip or overburden effects.

J9101 - FALCONBRIDGE LIMITED ANOMALY LIST - GENOA TOWNSHIP CLAIMS

FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM)		CONDUCTOR		BIRD
				INPHASE	QUAD.	CTP MHOS	DEPTH MTRS	HEIGHT MTRS
34	80010	A	0	1.2	2.3	0.6	42	35
34	80010	B	1	1.1	1.4	1.2	71	30
34	80020	A	0	-0.2	1.5	0.0	0	25
34	80020	B	2	5.0	5.4	3.3	33	31
34	80030	A	2	3.6	3.6	3.2	45	30
34	80040	A	0	0.5	0.7	0.6	94	33
34	80040	B MAGN	0	-0.2	1.6	0.0	0	30
34	80050	A	0	-1.5	0.5	0.0	0	34
34	80060	A MAGN	0	-0.6	1.5	0.0	0	30
34	80070	A	2	5.6	6.0	3.5	31	31
34	80080	A MAGN	0	-1.4	3.4	0.0	0	30
34	80080	B	2	7.0	10.2	2.5	22	27
34	80080	C	3	11.8	10.2	6.4	22	30
34	80080	D	0	0.9	3.6	0.1	23	31
34	80090	A	0	2.3	6.0	0.6	18	33
34	80090	B	1	3.4	7.4	1.0	18	32
34	80090	C	2	5.3	7.9	2.1	22	31
34	80090	D MAGN	0	-1.8	5.2	0.0	0	34
34	80090	E MAGN	0	-0.3	1.9	0.0	0	30
34	80100	A MAGN	0	-2.9	2.5	0.0	0	30
34	80100	B MAGN	0	-2.2	3.8	0.0	0	29
34	80100	C MAGN	0	-3.7	4.6	0.0	0	25
34	80100	D MAGN	0	-4.2	6.7	0.0	0	26
34	80100	E	2	5.7	8.1	2.4	25	28
34	80110	A	2	3.3	3.1	3.4	52	27
34	80110	B	2	3.1	2.7	3.7	52	31
34	80110	C	0	0.0	2.6	0.0	0	31
34	80120	A	0	-0.2	2.3	0.0	0	27
34	80120	B	0	-0.2	1.4	0.0	0	28
34	80120	C	3	2.9	1.6	7.0	66	32
34	80120	D	2	5.7	6.2	3.5	40	21
34	80120	E	0	-0.1	3.2	0.0	0	25
34	80130	A	0	0.9	2.1	0.3	47	29

Estimated depth may be unreliable because the stronger part of the conductor may be deeper or to one side of the flight line, or because of a shallow dip or overburden effects.

J9101 - FALCONBRIDGE LIMITED ANOMALY LIST - GENOA TOWNSHIP CLAIMS

FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM)		CONDUCTOR		BIRD
				INPHASE	QUAD.	CTP DEPTH MHOS	DEPTH MTRS	HEIGHT MTRS
34	80130	B	3	11.2	8.3	7.8	26	31
34	80140	A	2	9.5	11.1	3.9	26	24
34	80140	B	2	4.8	5.5	3.0	37	27
34	80150	A	0	1.5	3.2	0.6	35	32
34	80150	B	1	3.2	6.4	1.1	26	28
34	80160	A	0	0.0	0.8	0.0	0	27
34	80160	B	3	8.4	5.8	7.7	37	27
34	80160	C	0	1.6	3.5	0.6	34	31
34	80170	A	1	1.7	2.0	1.7	59	31
34	80170	B	3	7.4	5.1	7.4	41	26
34	80170	C	3	0.7	0.3	5.6	133	34
34	80180	A	5	12.2	5.4	16.2	36	26
34	80180	B	3	5.1	3.2	7.3	46	32
34	80190	A	3	4.9	3.5	6.0	48	28
34	80190	B	3	3.9	3.3	4.2	43	34
34	80190	C	0	-0.6	0.4	0.0	0	30
34	80200	A	0	1.1	1.7	0.9	60	31
34	80200	B	1	2.5	3.7	1.5	44	26
34	80210	A MAGN	0	0.9	3.2	0.1	27	31
34	80210	B	0	0.0	0.2	0.0	0	32
34	80220	A	4	5.5	3.3	8.0	55	22
34	80220	B	2	3.1	3.4	2.6	46	29
34	80220	C	2	2.2	1.8	3.5	62	34
34	80230	A MAGN	0	0.8	3.3	0.1	27	28
34	80240	A MAGN	0	-0.2	3.4	0.0	0	25
34	80250	A MAGN	1	3.2	4.9	1.6	39	24
34	80250	B	0	-0.1	2.3	0.0	0	28
34	80260	A MAGN	0	-0.5	1.7	0.0	0	31
34	80270	A MAGN	0	-4.7	0.9	0.0	0	29
34	80270	B	0	0.2	4.2	0.0	1	28
34	80280	A	0	0.2	2.5	0.0	15	27

Estimated depth may be unreliable because the stronger part of the conductor may be deeper or to one side of the flight line, or because of a shallow dip or overburden effects.

J9101 - FALCONBRIDGE LIMITED ANOMALY LIST - GENOA TOWNSHIP CLAIMS

FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM)		CONDUCTOR		BIRD
				INPHASE	QUAD.	CTP DEPTH	HEIGHT	
						MHOS	MTRS	MTRS
34	80280	B	0	-0.1	3.2	0.0	0	31
34	80280	C	0	-0.5	0.9	0.0	0	28
34	80280	D	2	0.4	0.2	3.3	162	37
34	80280	E MAGN	0	-10.3	2.5	0.0	0	24
34	80280	F MAGN	1	2.8	4.9	1.2	33	28
34	80290	A MAGN	0	0.1	3.2	0.0	0	31
34	80290	B MAGN	0	-4.0	3.4	0.0	0	29
34	80290	C MAGN	0	0.0	2.4	0.0	0	30
34	80290	D	0	-0.4	2.0	0.0	0	32
34	80300	A MAGN	0	-4.4	0.0	0.0	0	29
34	80300	B MAGN	0	-1.4	2.9	0.0	0	33
34	80300	C MAGN	0	-2.1	1.9	0.0	0	29
34	80310	A MAGN	0	-0.4	0.8	0.0	0	36
34	80310	B MAGN	0	-0.6	1.3	0.0	0	28
34	80310	C	0	0.8	1.5	0.5	59	32
34	80310	D	0	0.5	3.0	0.0	21	29
34	80320	A	0	0.4	2.5	0.0	23	30
34	80320	B MAGN	0	0.6	1.2	0.3	65	31
34	80320	C	0	0.8	1.4	0.6	65	30
34	80330	A	1	3.0	4.2	1.8	39	29
34	80330	B	0	0.3	2.6	0.0	18	29
34	80340	A	0	1.1	2.1	0.6	47	33
34	80340	B MAGN	0	-0.6	4.3	0.0	0	26
34	80350	A MAGN	1	3.4	5.0	1.7	30	33
34	80350	B MAGN	0	1.5	4.4	0.3	28	27
34	80350	C	0	0.1	2.7	0.0	0	32
34	80360	A	0	-1.2	2.9	0.0	0	30
34	80360	B	0	2.2	4.9	0.7	31	26
34	80360	C	0	2.1	3.9	0.9	36	30
34	80370	A MAGN	0	-1.9	3.2	0.0	0	30
34	80370	B MAGN	0	-2.5	4.8	0.0	0	31
34	80370	C	0	1.3	3.5	0.4	33	28
34	80380	A	0	0.7	3.3	0.0	26	27
34	80380	B MAGN	0	0.0	10.9	0.0	0	24
34	80380	C MAGN	0	-1.1	5.7	0.0	0	28

Estimated depth may be unreliable because the stronger part of the conductor may be deeper or to one side of the flight line, or because of a shallow dip or overburden effects.

J9101 - FALCONBRIDGE LIMITED ANOMALY LIST - GENOA TOWNSHIP CLAIMS

FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM)		CONDUCTOR		BIRD	
				INPHASE	QUAD.	CTP MHOS	DEPTH MTRS	HEIGHT MTRS	
34	80390	A	MAGN	0	-4.3	4.9	0.0	0	27
34	80390	B	MAGN	0	-10.3	3.4	0.0	0	25
34	80390	C	MAGN	0	-3.2	1.5	0.0	0	31
34	80390	D		0	-0.1	4.9	0.0	0	29
34	80400	A		0	-0.3	4.0	0.0	0	23
34	80400	B	MAGN	0	-7.3	0.2	0.0	0	27
34	80400	C	MAGN	0	-7.9	1.3	0.0	0	33
34	80410	A	MAGN	0	-3.6	1.0	0.0	0	31
34	80410	B	MAGN	0	-15.3	1.8	0.0	0	27
34	80410	C	MAGN	0	-6.0	1.1	0.0	0	28
34	80410	D		0	0.1	3.6	0.0	0	28

Estimated depth may be unreliable because the stronger part of the conductor may be deeper or to one side of the flight line, or because of a shallow dip or overburden effects.

APPENDIX III

CERTIFICATE OF QUALIFICATIONS

I, IAN JOHNSON, certify that:

1. I am registered as a Professional Engineer in the Province of Ontario.
2. I reside at 38 Tinti Place in the town of Thornhill, Ontario.
3. I hold a Ph.D. in Geophysics from the University of British Columbia, having graduated in 1972.
4. I have been continuously engaged in both professional and managerial roles in the minerals industry in Canada and abroad for the past fourteen years.
5. The accompanying report was prepared from published or publicly available information and material supplied by Falconbridge Limited - Exploration and Aerodat Limited in the form of government reports and proprietary airborne exploration data. I have not personally visited the specific property.
7. I have no interest, direct or indirect, in the property described nor in Falconbridge Limited - Exploration.
8. I hereby consent to the use of this report in a Statement of Material Facts of the Company and for the preparation of a prospectus for submission to the appropriate securities commission and/or other regulatory authorities.

J9101G
Thornhill, Ontario
August 7, 1991

Signed,



Ian Johnson, Ph.D., P. Eng.



APPENDIX IV

PERSONNEL

FIELD

Flown March 3, 1991

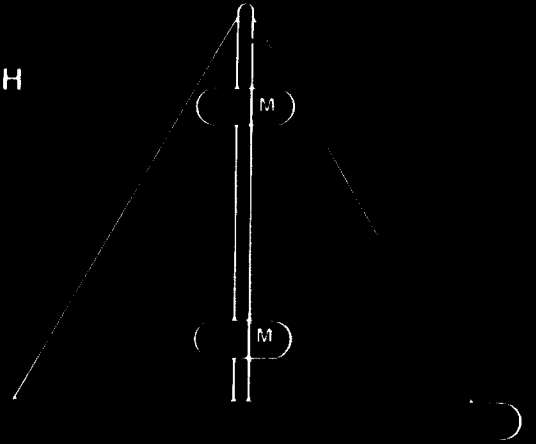
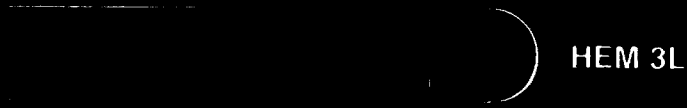
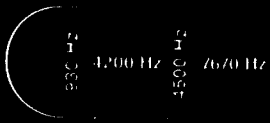
Pilots Luke Kukovica

Operators Peter Moore

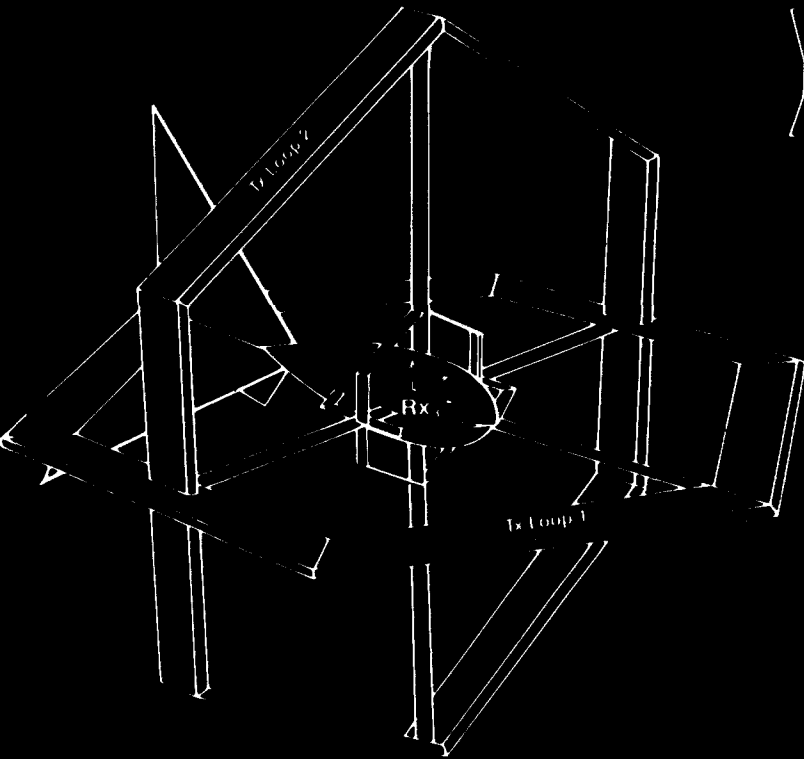
OFFICE

Processing Mary Chong-Foo
 George McDonald
 Ed Hamilton

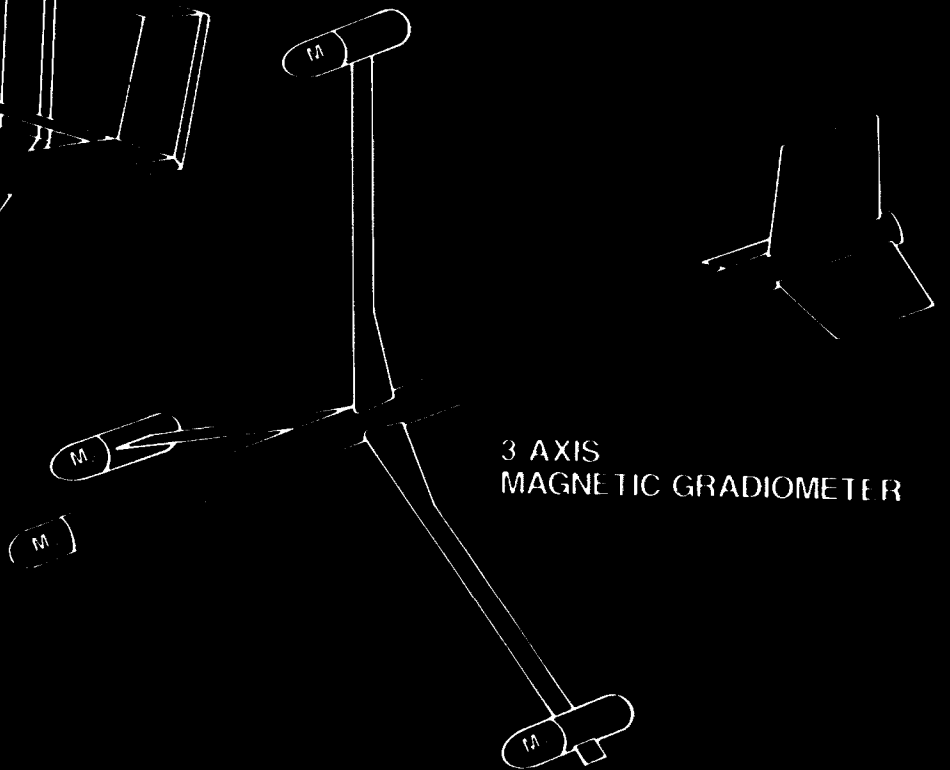
Report Ian Johnson



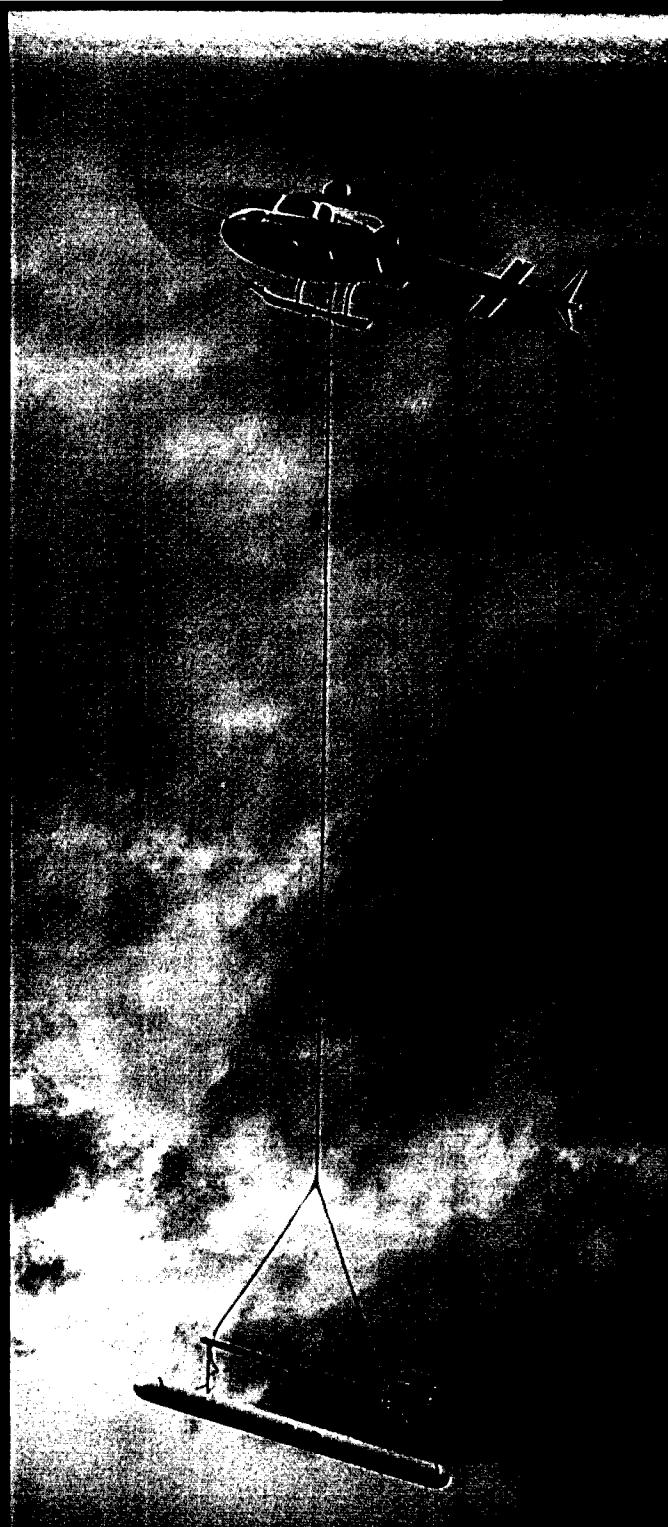
VERTICAL MAGNETIC GRADIOMETER



EXPERIMENTAL TRANSIENT EM
2 AXIS RIGID GEOMETRY



3 AXIS
MAGNETIC GRADIOMETER



AERODAT began operating in 1968 to provide a specialized service in the field of helicopter-borne geophysical surveys. Since that time several hundred thousand kilometers of electromagnetic, magnetic and radiometric data have been flown. **AERODAT** offers its clients the most advanced multi-frequency, multi-orientation electromagnetic systems, magnetometers, gamma spectrometers and radar positioning systems, backed by Aerodat's proven operational skill and experience.

SERVICES

ELECTROMAGNETIC HEM and VLF:

Specially designed and configured systems for mineral exploration programs - base metals, gold and kimberlites.

Analysis software may be applied to the results to interpret strata resistivity and thickness for geologic mapping, including geotechnical, ground water and placer applications.

MAGNETIC TOTAL FIELD and GRADIENT:

A primary method for geologic and structural mapping. The magnetic gradient method provides maximum resolution of subtle magnetic anomalies and complex geological structures.

GAMMA RAY SPECTROMETRY:

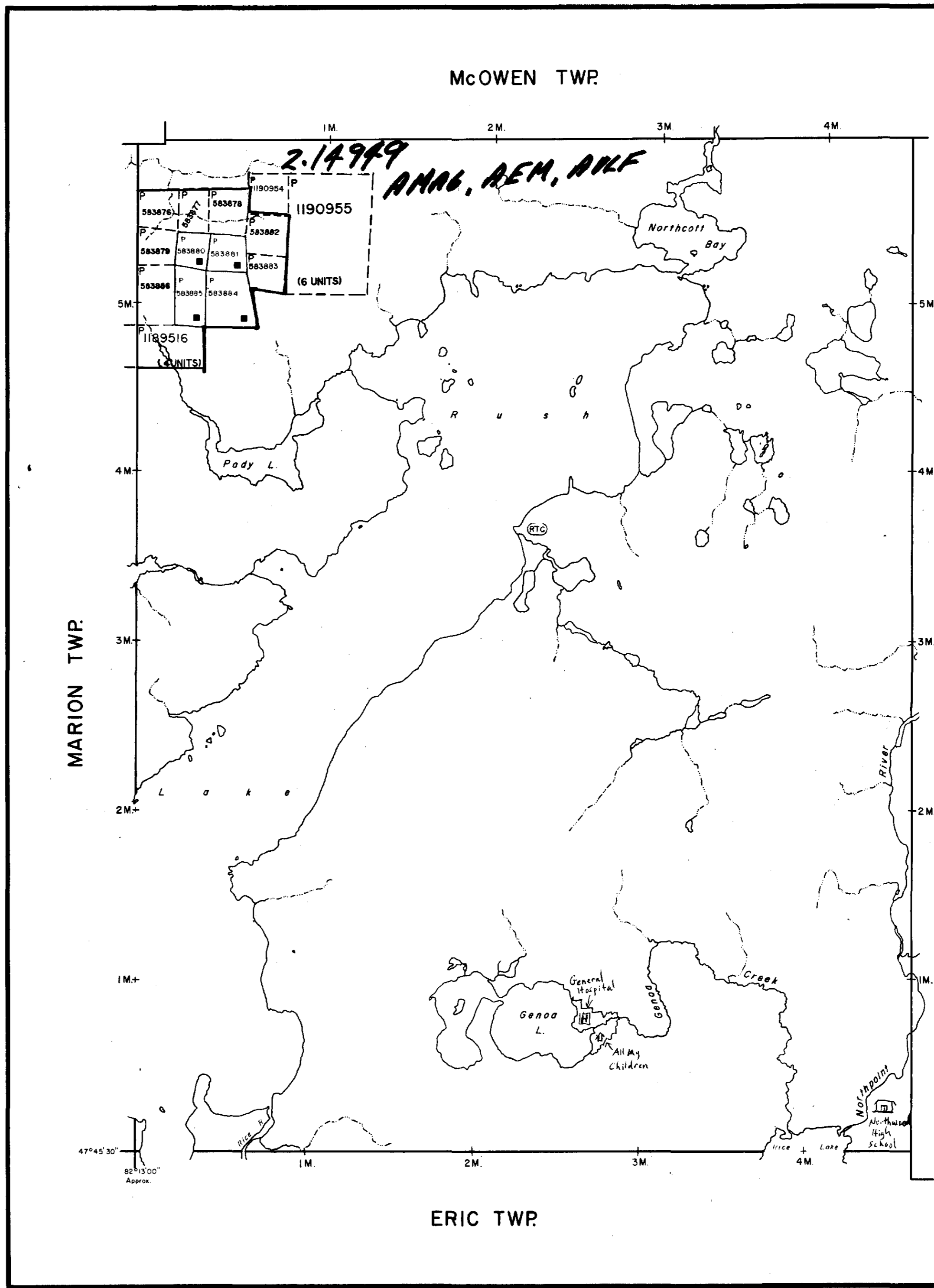
A geophysical method that can aid geological mapping as well as direct uranium exploration programs.

ELECTRONIC NAVIGATION:

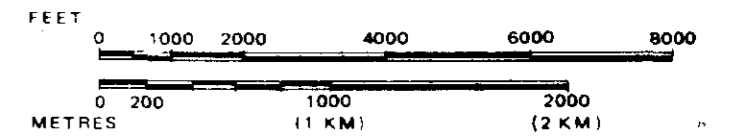
Facilitates the navigation and positioning of detailed surveys. Positional control is accurate to better than 10 meters providing a data resolution and accuracy comparable to ground surveys.

COMPUTER COMPILATION and INTERPRETATION:

Advanced in-house compilation hardware and software permit custom tailoring of presentations and analysis products to meet the survey objectives.



SCALE: 1 INCH = 40 CHAINS

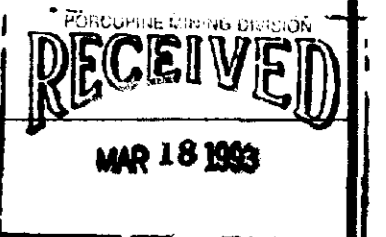


LEGEND

PATENTED LAND	Ⓟ
CROWN LAND SALE	C.S.
LEASES	Ⓛ
LOCATED LAND	Loc.
LICENSE OF OCCUPATION	L.O.
MINING RIGHTS ONLY	M.R.D.
SURFACE RIGHTS ONLY	S.R.O.
ROADS	—
IMPROVED ROADS	—
KING'S HIGHWAYS	—
RAILWAYS	—
POWER LINES	—
MARSH OR MUSKEG	—
MINES	Ⓜ
CANCELLED	C.
L.U.P. LAND USE PERMIT	

REMOTE TOURIST CAMPS NOTES

400' surface rights reservation along the shores of all lakes and rivers.
LEASE, SURFACE & MINING RIGHTS ■



TOWNSHIP

GENOA

M.N.R. ADMINISTRATIVE DISTRICT
CHAPLEAU
MINING DIVISION
PORCUPINE
LAND TITLES / REGISTRY DIVISION
SUDBURY



Ministry of Natural Resources

Ministry of Northern Development and Mines

Date
REVISED FEB 1990
ACTIVATED AUGUST 18, 1992
BY D.C.

Number
G-1131

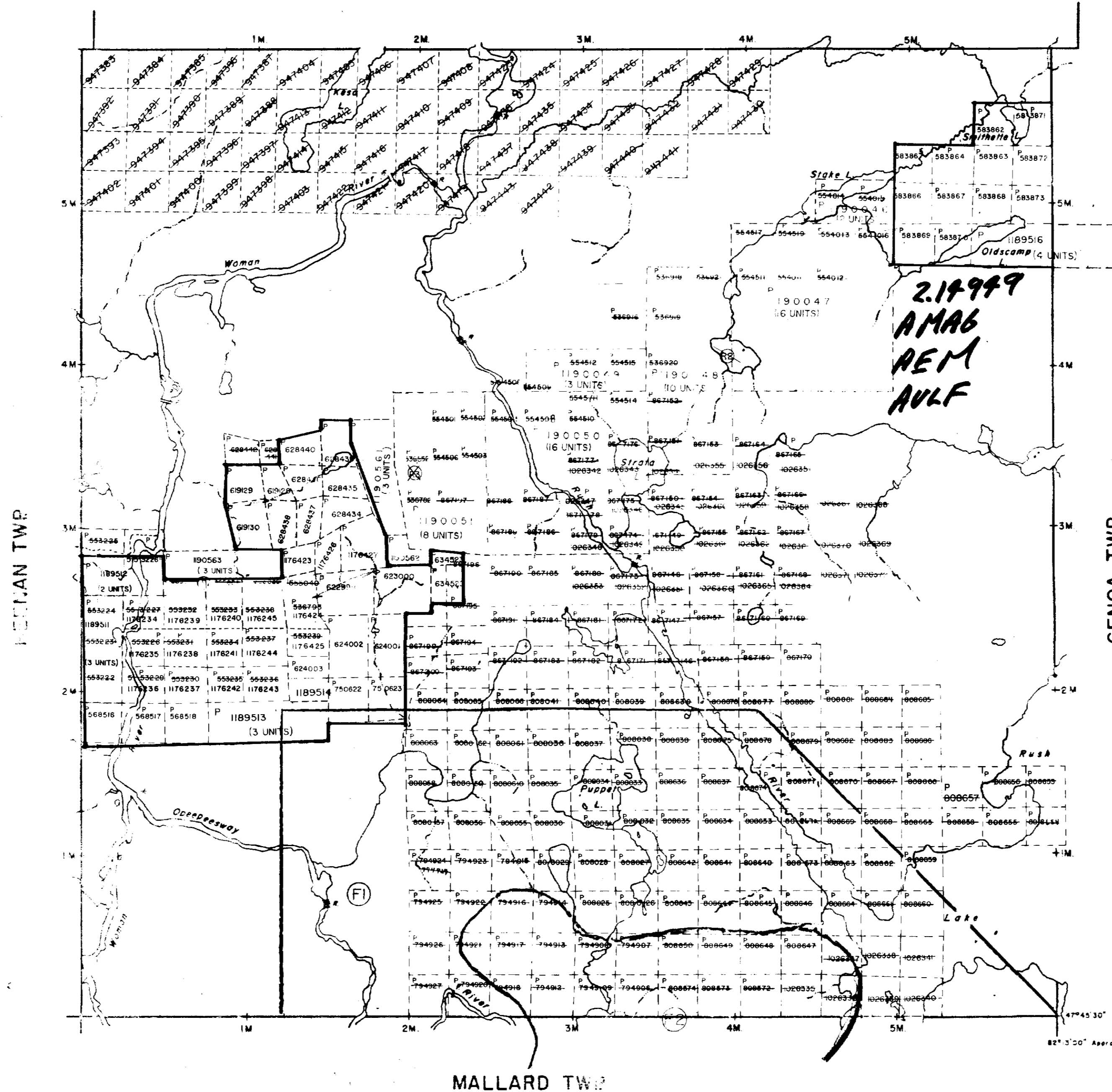
CHECKED BY B.B.

THE INFO APPEARS TO BE FROM V. AND AC GUARANTEEING CLAIMS WITH RECORD NORTHMENT ADDITIONAL ON THE LANDS E



410165E9056 2-14949 GENOA

DALE TWP.

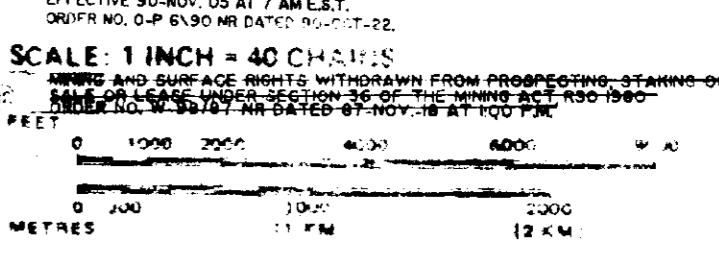


MALLARD TWP.

AREAS WITHDRAWN FROM DISPOSITION

M.R.O. - MINING RIGHTS ONLY
 S.R.O. - SURFACE RIGHTS ONLY
 M + S. - MINING AND SURFACE RIGHTS

Description	Order No.	Date	Disposition	File
MINING AND SURFACE RIGHTS WITHDRAWN FROM PROSPECTING, STAKING OUT, SALE OR LEASE UNDER SECTION 36 OF THE MINING ACT RSO 1990				
ORDER NO. W-60-86-86-05-21				
SURFACE AND MINING RIGHTS REOPENED TO PROSPECTING, STAKING OUT, SALE OR LEASE UNDER SECTION 36 OF THE MINING ACT RSO 1990				
EFFECTIVE 30-NOV-05 AT 7 AM E.S.T.				
ORDER NO. O-P-61-90 MR DATED 90-OCT-22				



LEGEND

PATENTED LAND	(P)
CROWN LAND SALE	C.S.
LEASES	(L)
LOCATED LAND	Loc.
LICENSE OF OCCUPATION	L.O.
MINING RIGHTS ONLY	M.R.O.
SURFACE RIGHTS ONLY	S.R.O.
ROADS	—
IMPROVED ROADS	—
KING'S HIGHWAYS	—
RAILWAYS	—
POWER LINES	—
MARSH OR MUSKEG	—
MINES	(M)
CANCELLED PATENTED S.R.O.	(C.S.)
LAND USE PERMIT	(L.U.P.)

(F1) THIS TWP. IS SUBJECT TO FOREST ACTIVITY IN 1993/94. FURTHER INFORMATION ON FILE.

NOTES

400' surface rights reservation along the shores of all lakes and rivers.

(M) MINING AND SURFACE RIGHTS WITHDRAWN FROM STAKING UNDER SECTION 36 OF THE MINING ACT RSO 1990. ORDER NO. W-71-87 DATED 87-FEB-3. (P-55037 TO 039 INCL.)

(F1) THIS TWP. IS SUBJECT TO FOREST ACTIVITIES IN 1992/93. FURTHER INFORMATION AVAILABLE ON FILE.

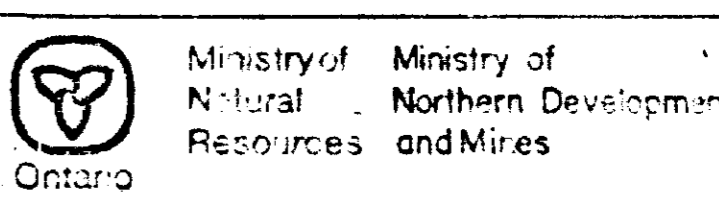
(R2) MINING AND SURFACE RIGHTS RE-OPENED TO PROSPECTING, STAKING OUT, SALE OR LEASE UNDER SECTION 36 OF THE MINING ACT, RSO 1990. EFFECTIVE 30-NOV-05 AT 7 AM E.S.T. ORDER NO. O-P-61-90 MR DATED 90-OCT-22

TOWNSHIP
MARION

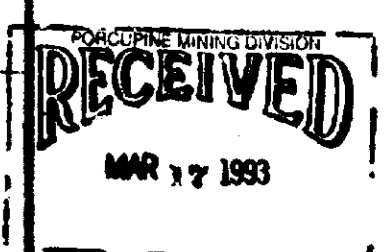
M.N.R. ADMINISTRATIVE DISTRICT
CHAPLEAU

MINING DIVISION
PORCUPINE

LAND TITLES / REGISTRY DIVISION
SUDBURY

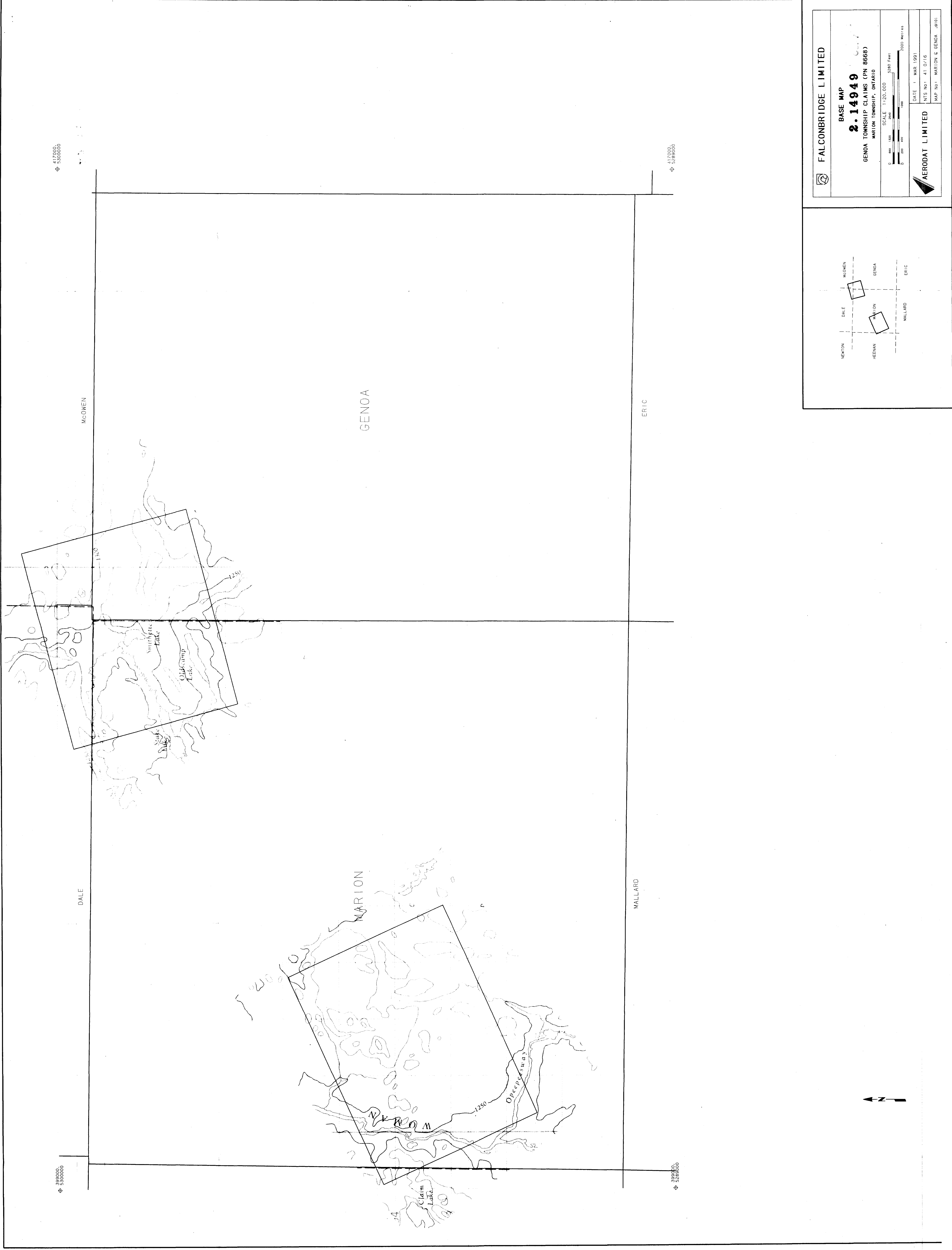


Date: JULY 1996
 Number: G-1174



THE INFORMATION THAT APPEARS ON THIS MAP HAS BEEN COMPILED FROM VARIOUS SOURCES, AND ACCURACY IS NOT GUARANTEED. THOSE WISHING TO STAKE MINING CLAIMS SHOULD CONSULT WITH THE MINING OF P. AD. ON THE N.





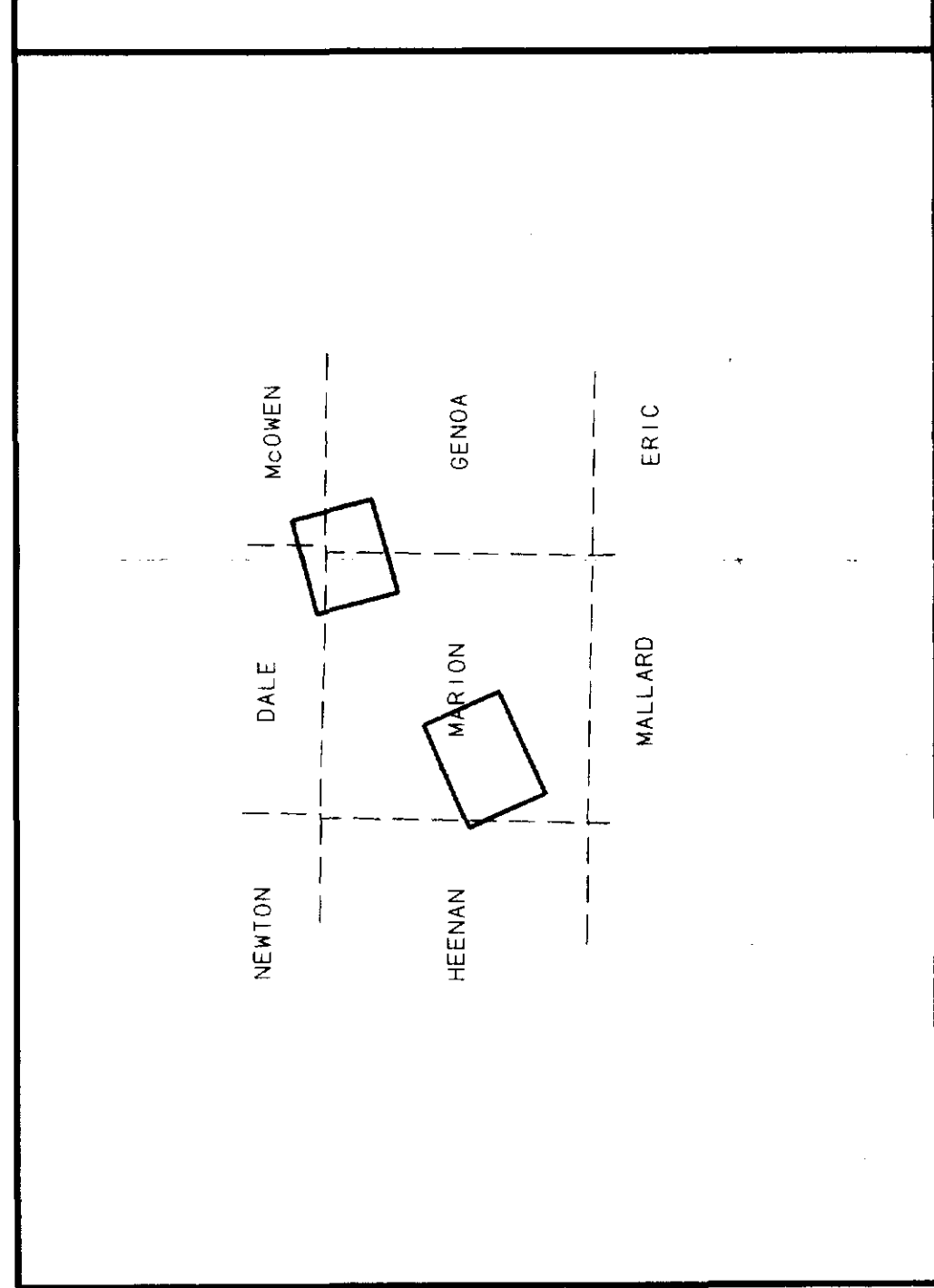
FALCONBRIDGE LIMITED

BASE MAP
2.14949
 GENOA TOWNSHIP CLAIMS (PN 8668)
 MARIION TOWNSHIP, ONTARIO

SCALE: 1:20,000
 0 500 1000 2000 3000 Feet
 0 200 400 800 1600 Metres

DATE: MAR 1991
 NTS No: 41 0716
 MAP No: MARIION & GENOA (910)

AERODAT LIMITED



417000
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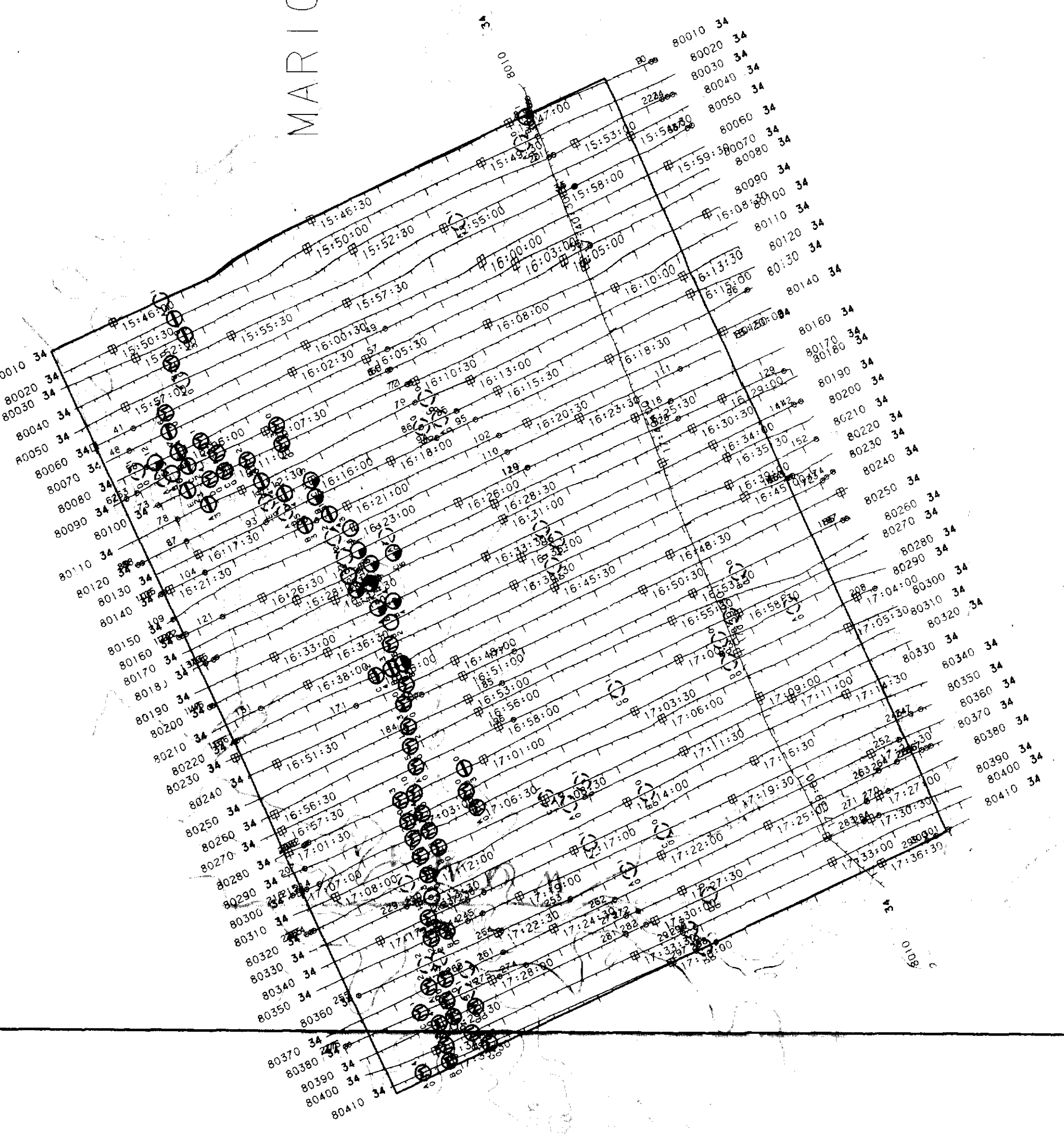
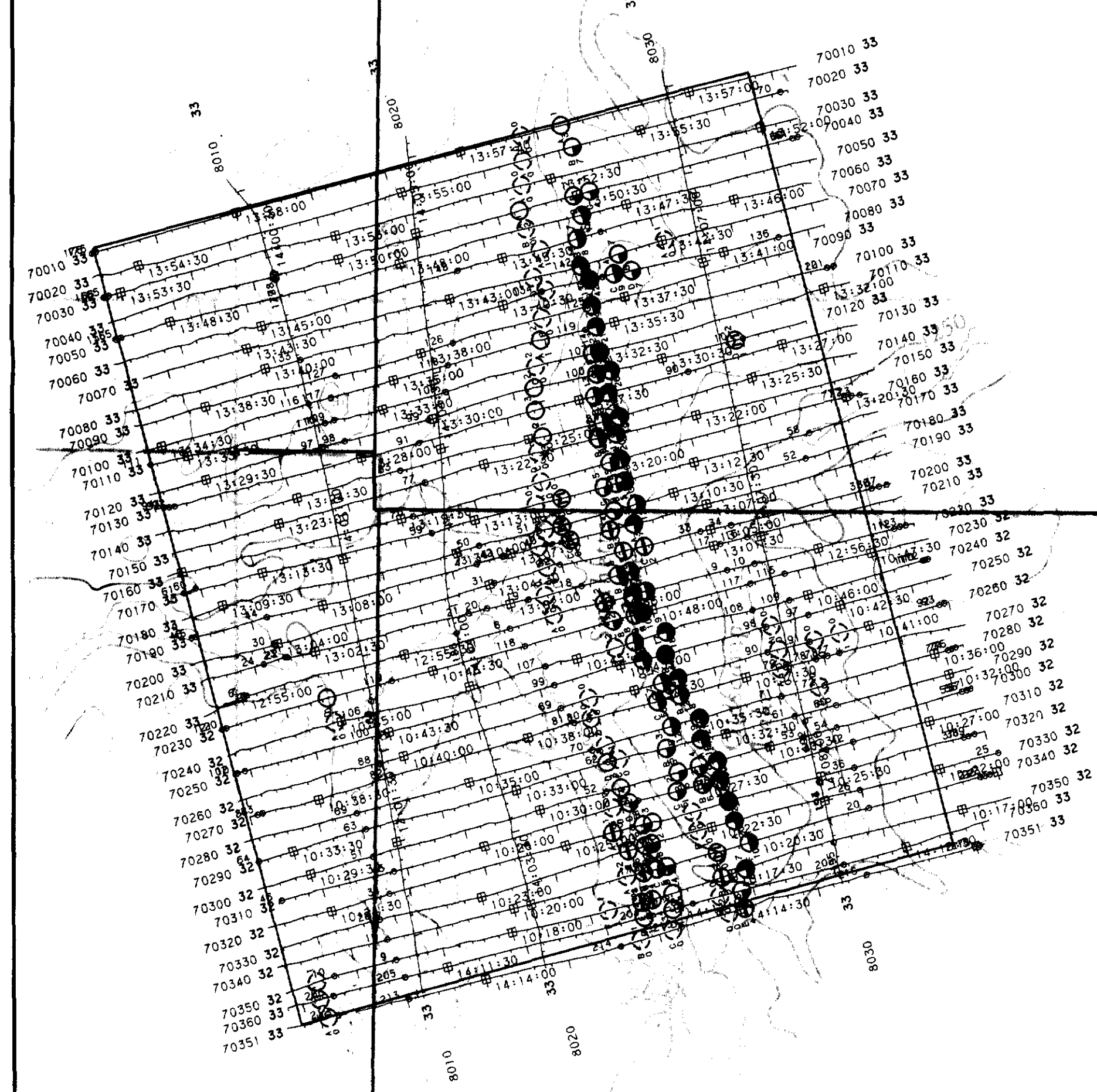
DALE

GENOA

MARION

ERIC

MALLARD



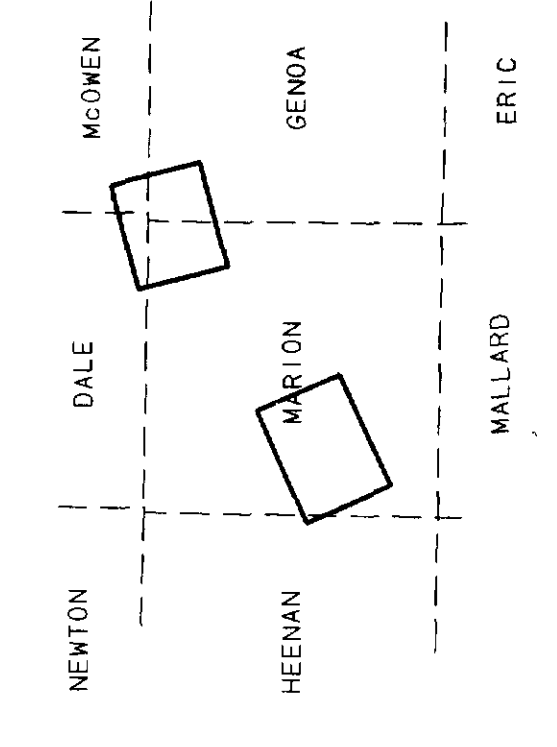
FALCONBRIDGE LIMITED

FLIGHT PATH
2.14949
 GENOA TOWNSHIP CLAIMS (PN 8668)
 MARION TOWNSHIP, ONTARIO

SCALE 1:20,000
 0 500 1000 2000 FEET

DATE: MAR 1991
 NTS No.: 41 D/TB
 MAP No.: MARION & GENOA (0101)

AERODAT LIMITED



EM Anomalies

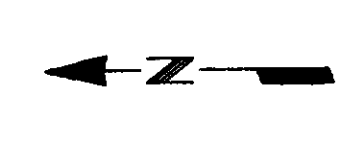
Conductivity Thickness (mas)

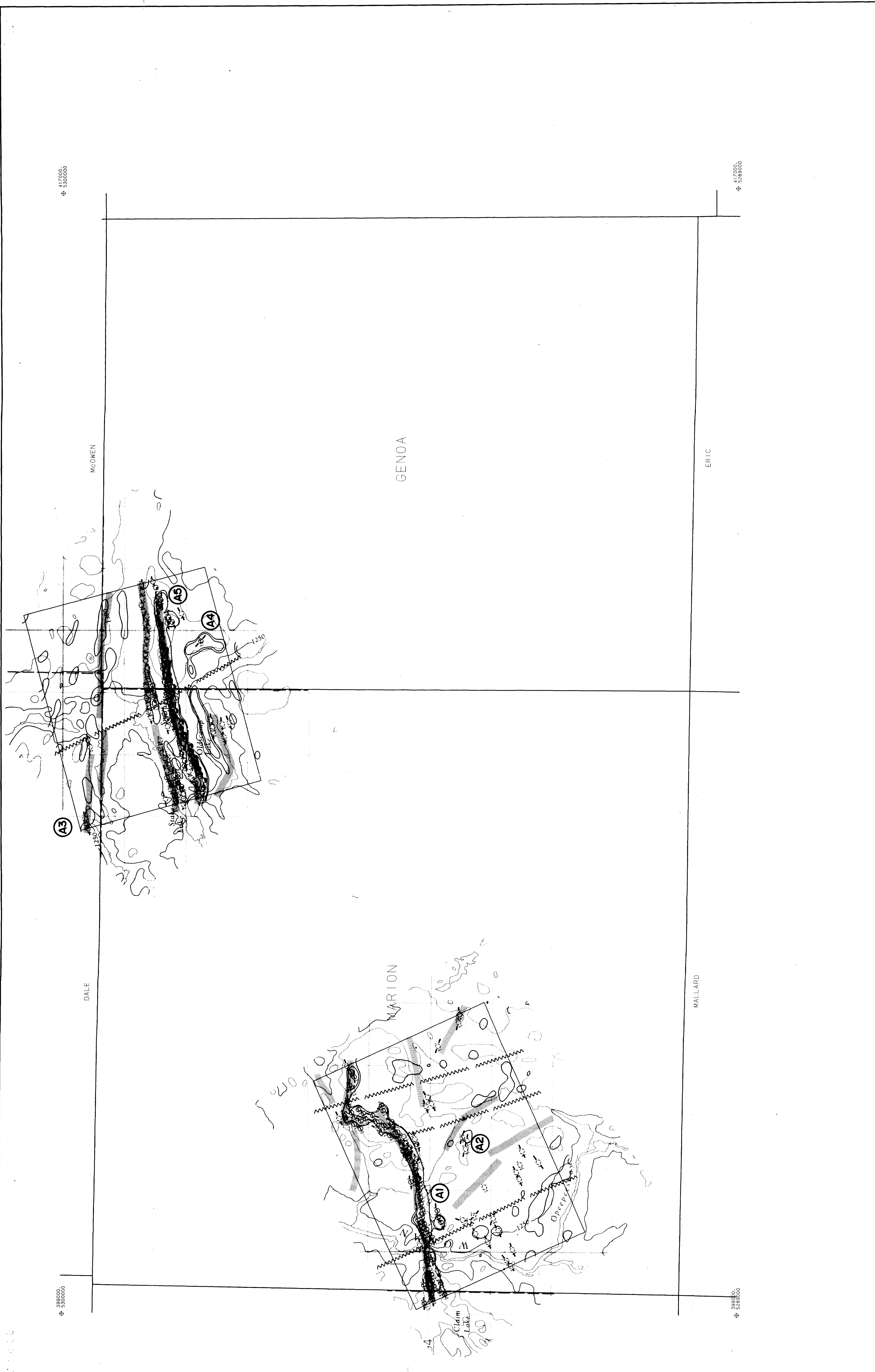
- 1 - 2
- 2 - 4
- 4 - 8
- 8 - 16
- 16 - 30

Resistivity anomaly

EM Anomaly A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z

Navigation and recovery using
 PAPER NAVIGATION SYSTEM
 Average terrain clearance 80m
 Average line spacing 100m



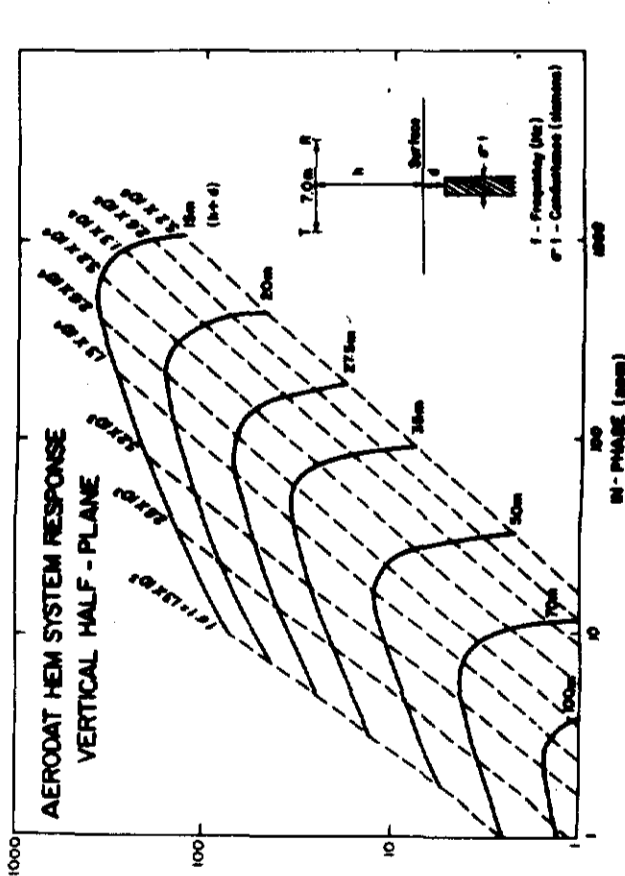


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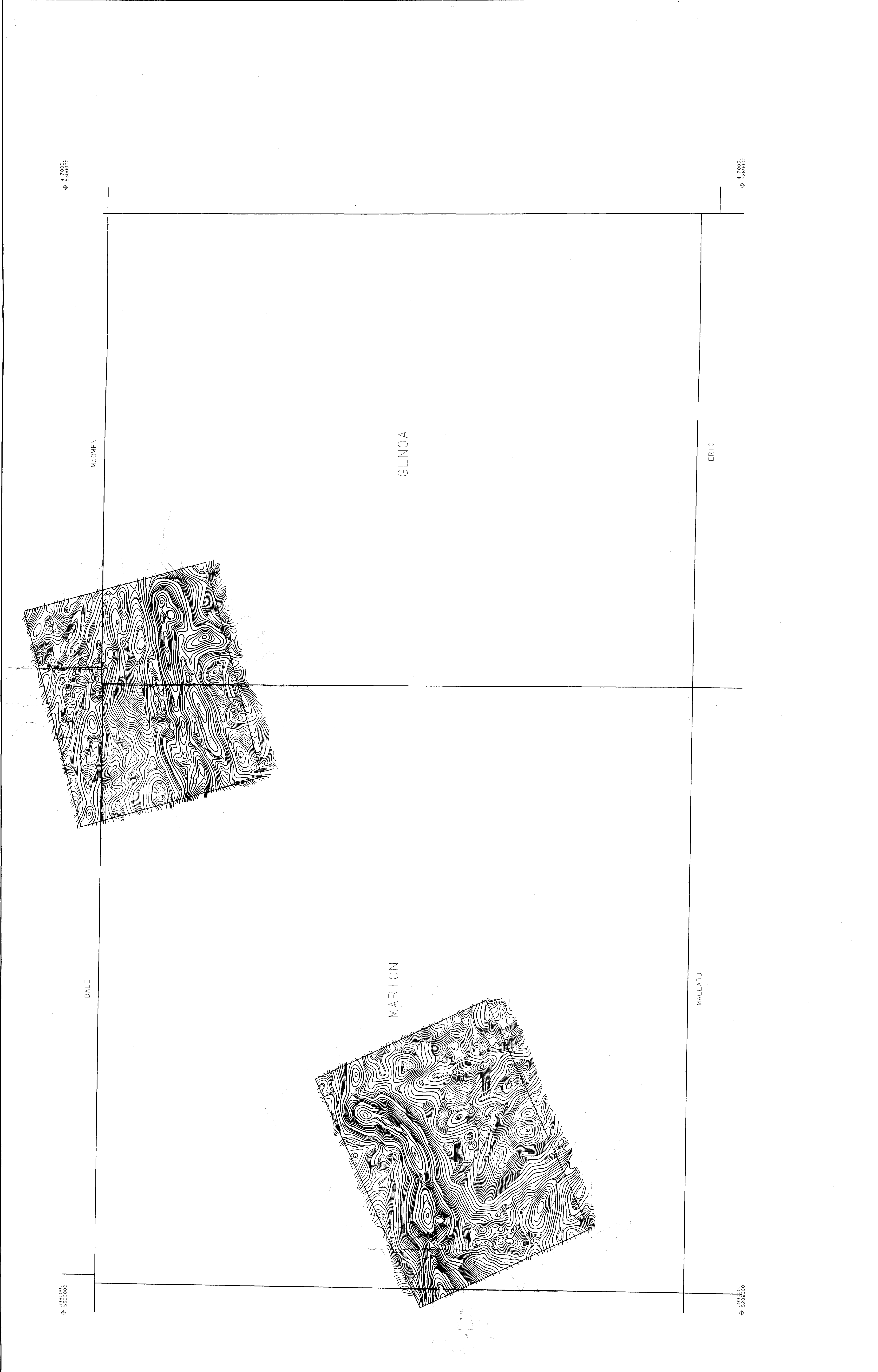
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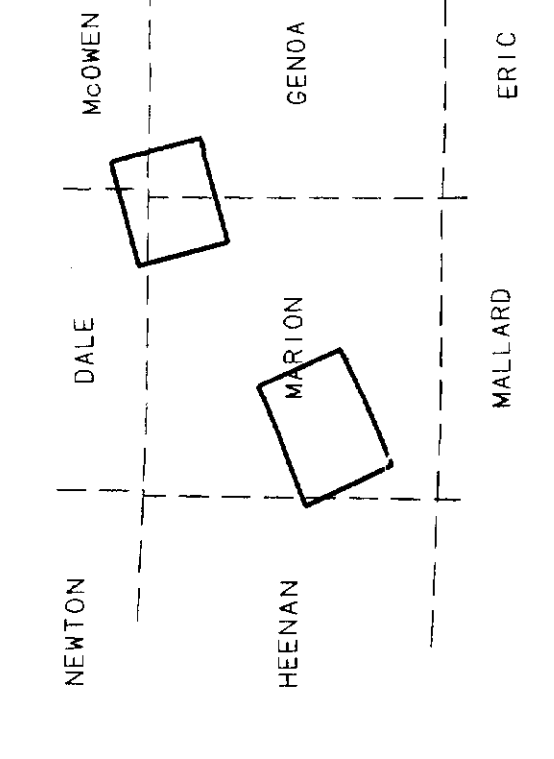


EM ANOMALIES
CONDUCTIVITY THICKNESS (mms)

○	0 - 1
○	1 - 2
○	2 - 3
○	3 - 4
○	4 - 8
○	8 - 15
○	15 - 30
○	30 - 60
○	60 - 120
○	120 - 240
○	240 - 480
○	480 - 960
○	960 - 1920
○	1920 - 3840
○	3840 - 7680
○	7680 - 15360
○	15360 - 30720
○	30720 - 61440
○	61440 - 122880
○	122880 - 245760
○	245760 - 491520
○	491520 - 983040
○	983040 - 1966080
○	1966080 - 3932160
○	3932160 - 7864320
○	7864320 - 15728640
○	15728640 - 31457280
○	31457280 - 62914560
○	62914560 - 125829120
○	125829120 - 251658240
○	251658240 - 503316480
○	503316480 - 1006632960
○	1006632960 - 2013265920
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MAGNETICS
 Total Field Magnetic Intensity
 Declination
 Declination Sensitivity
 Sensor Elevation: 45m
 Map Contours are Multiples of
 those listed below
 10 nT
 25 nT
 100 nT
 1000 nT



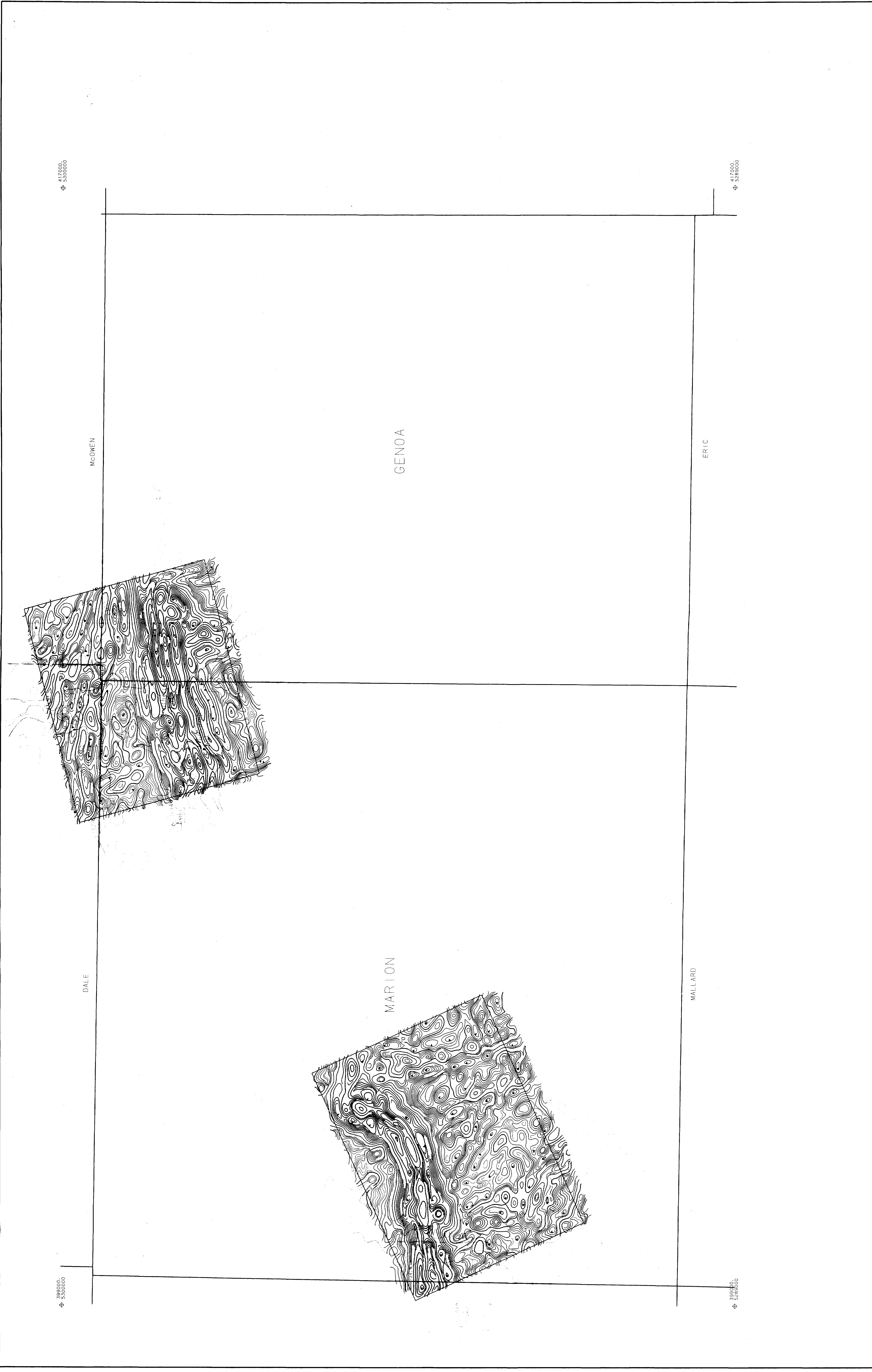
FALCONBRIDGE LIMITED

TOTAL FIELD MAGNETIC CONTOURS
2.14949
 GENOA TOWNSHIP CLAIMS (PN 8658)
 MARION TOWNSHIP, ONTARIO

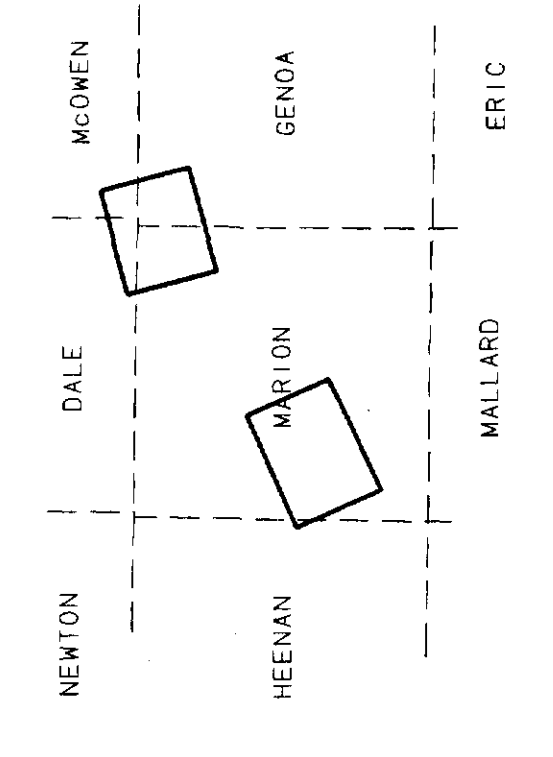
SCALE 1:200,000 240 Feet
 0 400 800 1600 3200 METERS

DATE : MAR 1993
 NIS No: 41 0716
 MAP No: MARION & GENOA (910)

AERODAT LIMITED



Vertical Gradient
 Vertical Magnetic Gradient contours are calculated from the total field magnetic intensity in nT/m. The sensor sensitivity is 25 nT/m. Sensor elevation 45m. Map contours are multiples of those listed: 0.25 nT/m, 1.00 nT/m, 2.50 nT/m, 5.00 nT/m, 10.00 nT/m.



FALCONBRIDGE LIMITED

CALCULATED VERTICAL MAGNETIC GRADIENT

2-14949

GENOA TOWNSHIP CLAIMS (PN 8668)
 MARION TOWNSHIP, ONTARIO

SCALE 1:250,000

DATE: MAR 1991
 NTS No: 41 0/16
 MAP No: MARION & GENOA (9/9)

AERODAT LIMITED

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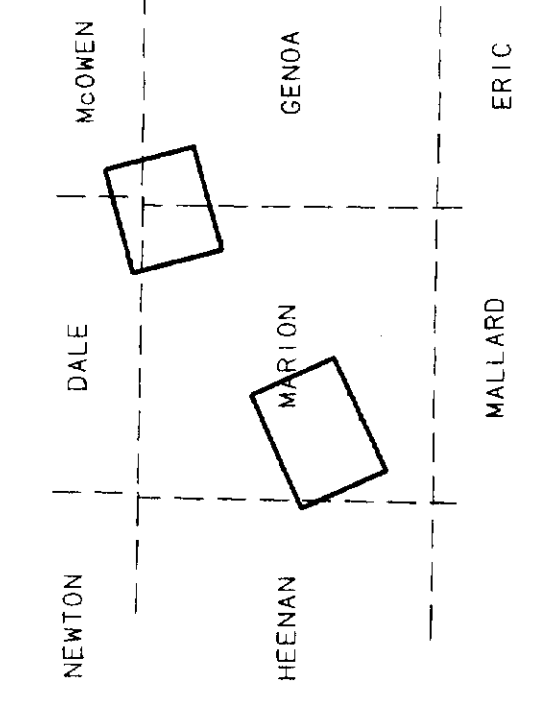
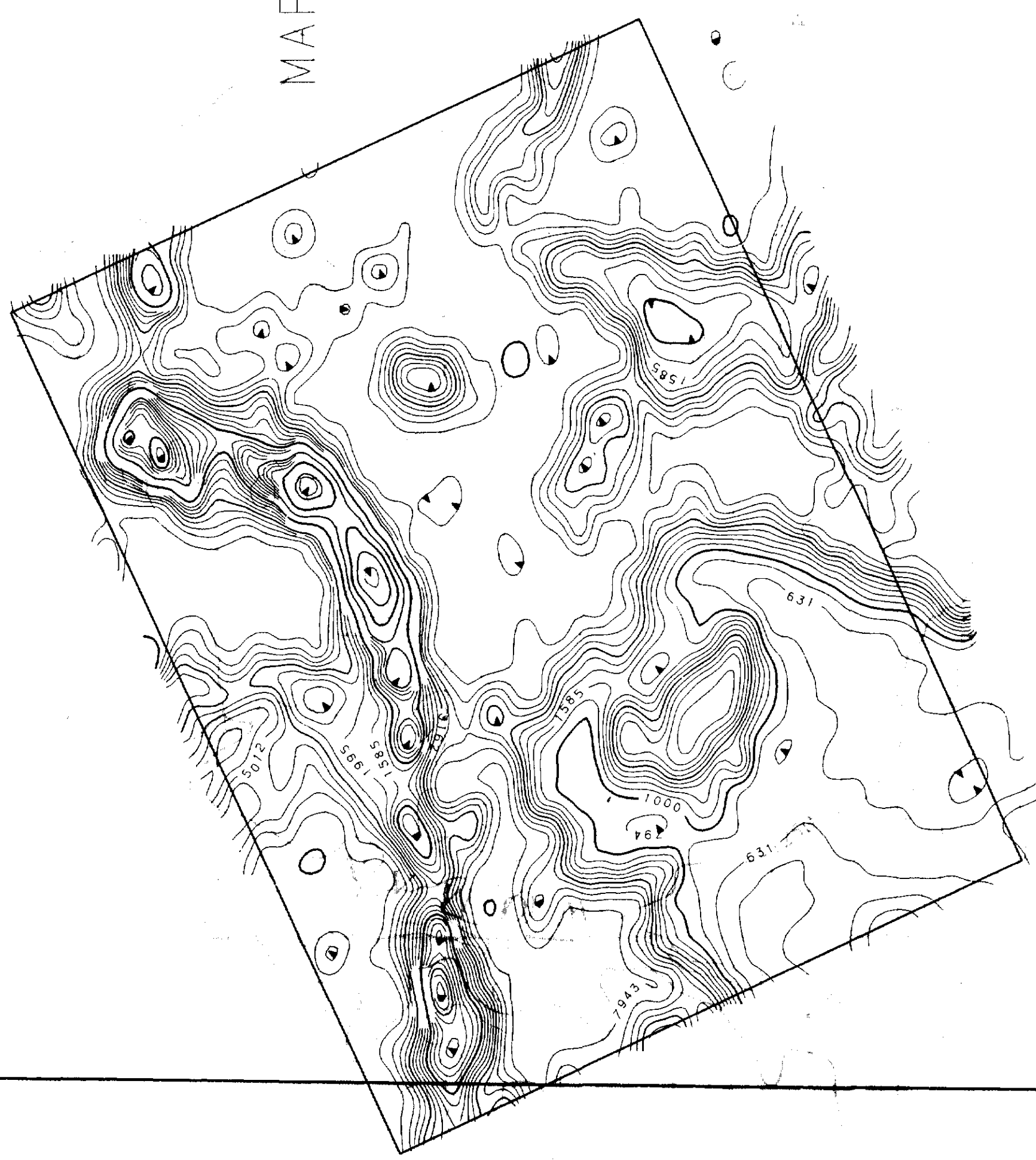
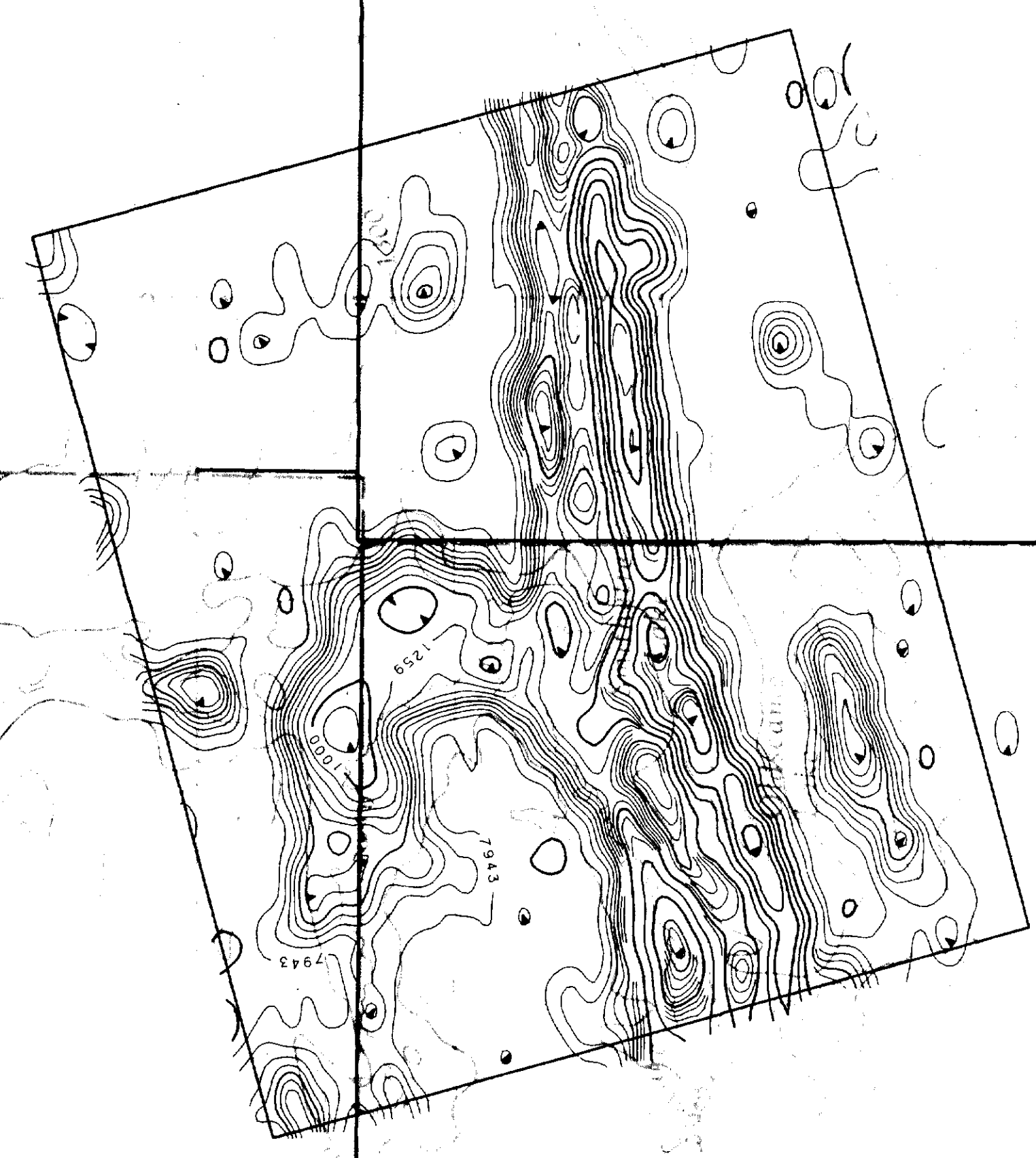
DALE

GENOA

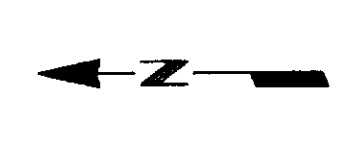
MARION

ERIC

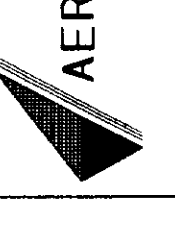
MALLARD

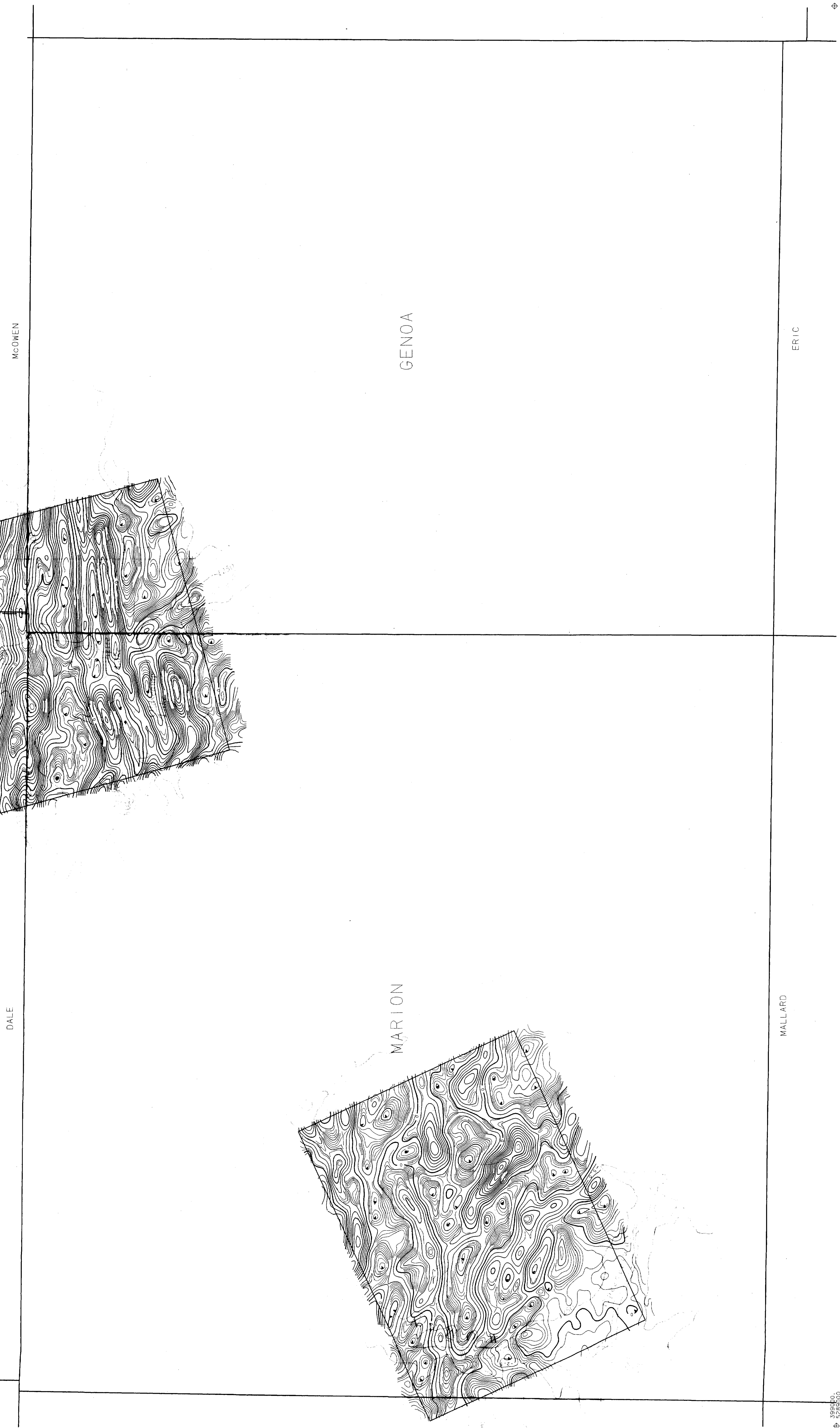
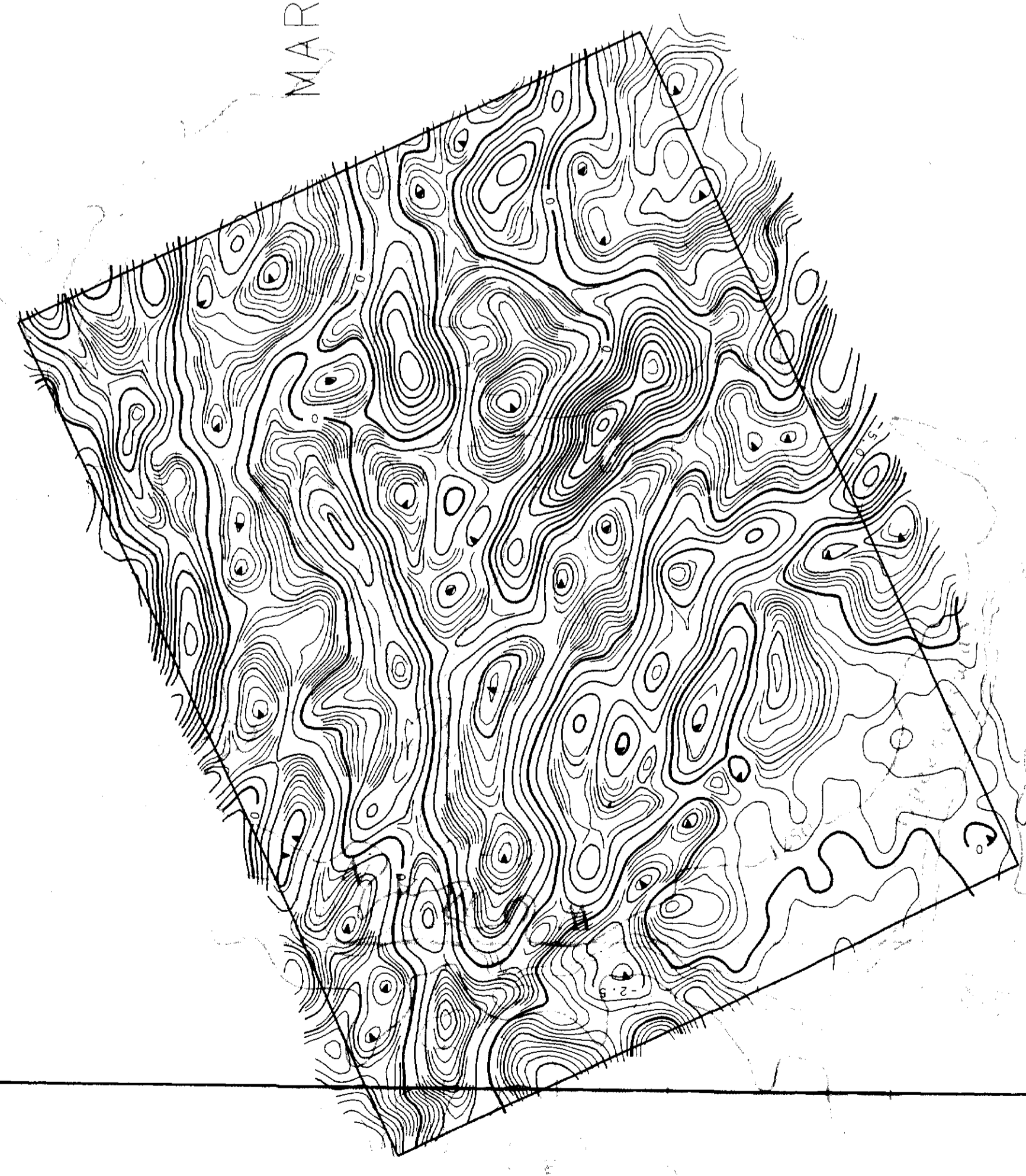
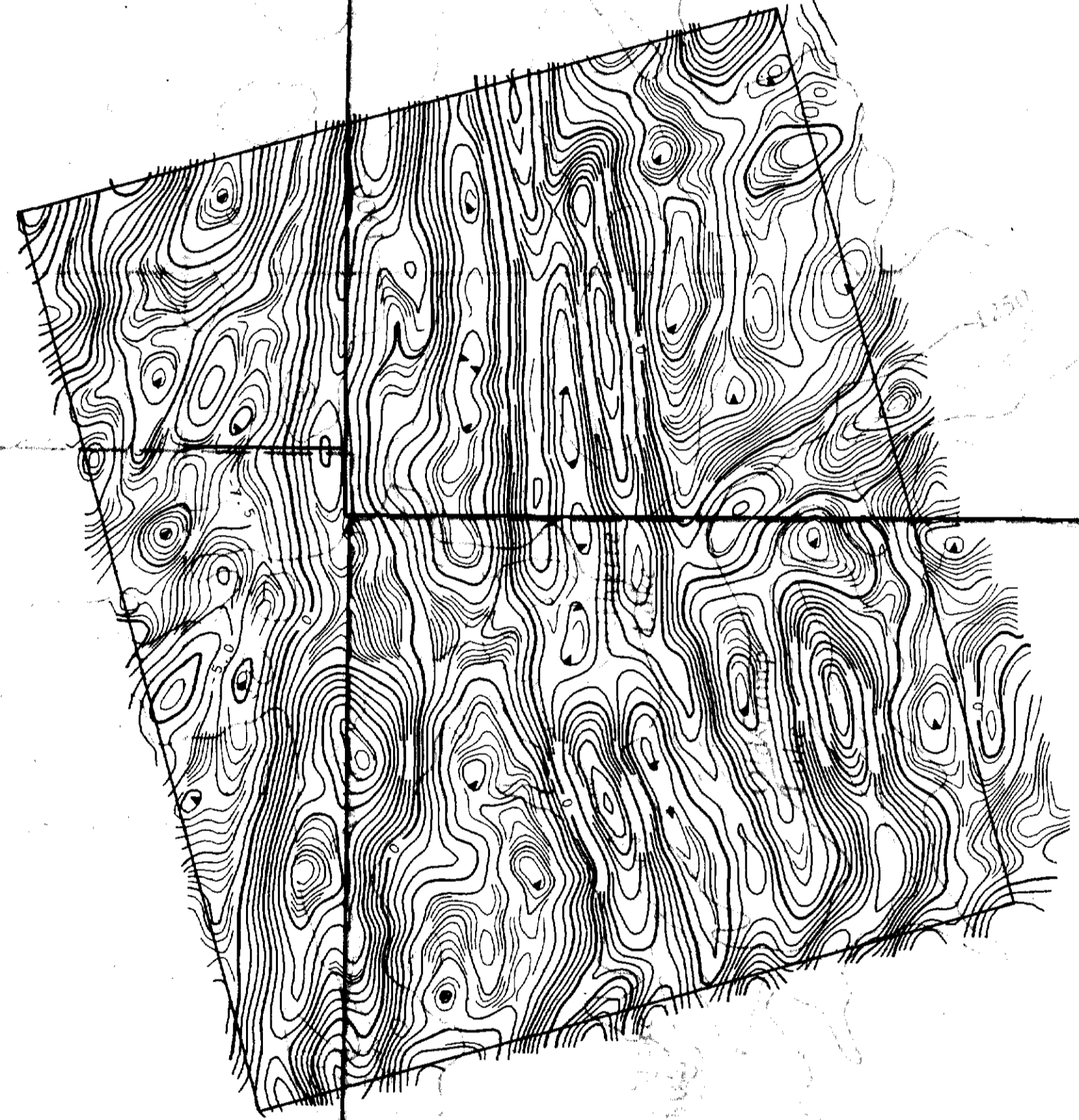


APPARENT RESISTIVITY
 Calculated from 935 Hz
 Wenner array
 200 m conductive layer
 Contouring in ohm-m at
 logarithmic intervals
 Sensor elevation 30m
 Map cross listed below
 0.1 ohm-m
 0.2 ohm-m
 0.5 ohm-m
 1.0 ohm-m
 2.0 ohm-m
 5.00 ohm-m



FALCONBRIDGE LIMITED
 APPARENT RESISTIVITY CONTOURS (935 Hz)
2.14949
 GENOA TOWNSHIP CLAIMS (PN 8668)
 MARION TOWNSHIP, ONTARIO
 SCALE 1:20,000
 DATE: MAR 1991
 NTS No: 41 0716
 MAP No: MARION & GENOA .0101





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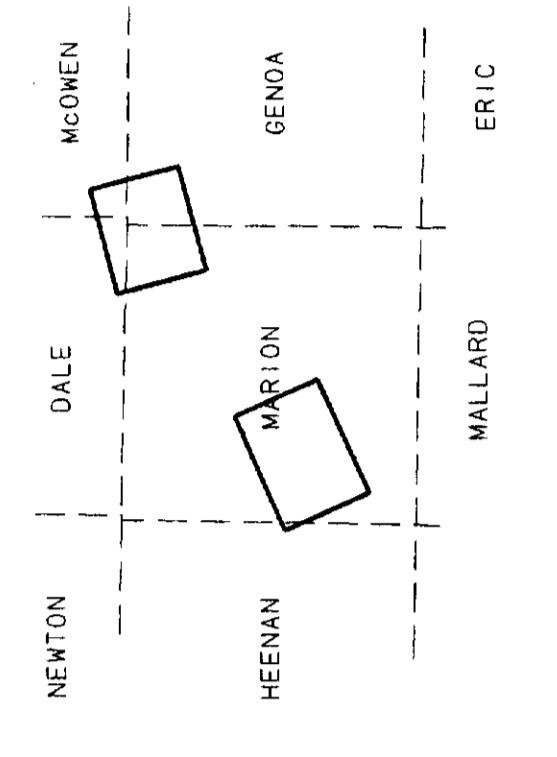
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VLF-EM
 VLF-EM Total Field Intensity
 in pT/cm
 Station: CMA
 Center: Maine
 Speed: 24.0 kHz
 Sense: elevation
 Map contour intervals of
 these listed below

2.5
5.0
10.0
20.0



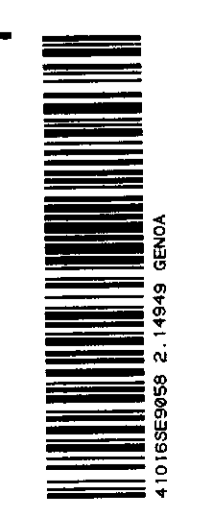
FALCONBRIDGE LIMITED

VLF-EM TOTAL FIELD CONTOURS
2.14949
 GENOA TOWNSHIP CLAIMS (PN 8668)
 MARION TOWNSHIP, ONTARIO

SCALE: 1:20,000

DATE: MAR 1991
 INTS No: 41 0716
 MAP No: MARION & GENOA -J000

AERODAT LIMITED



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MCOWEN

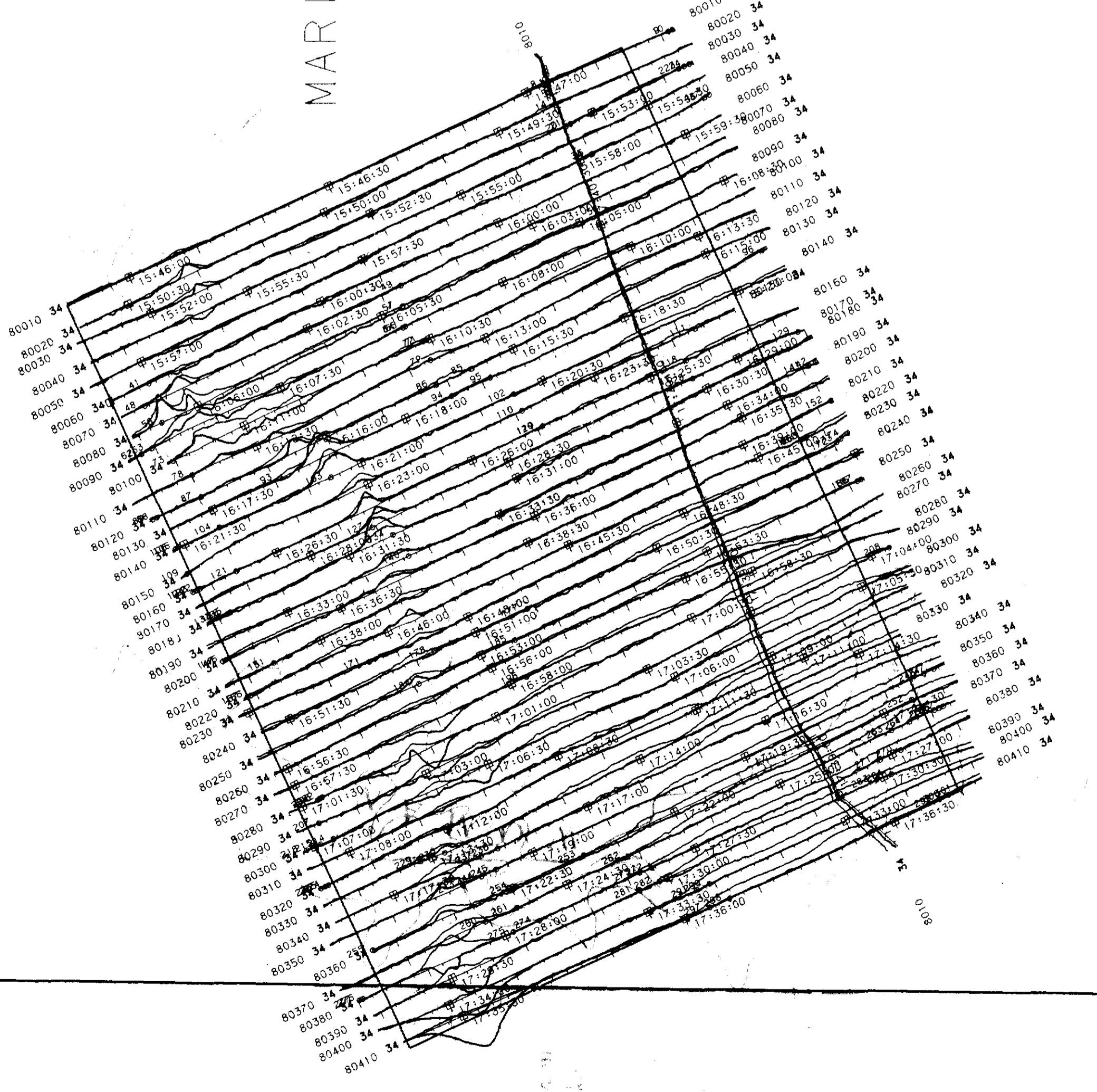
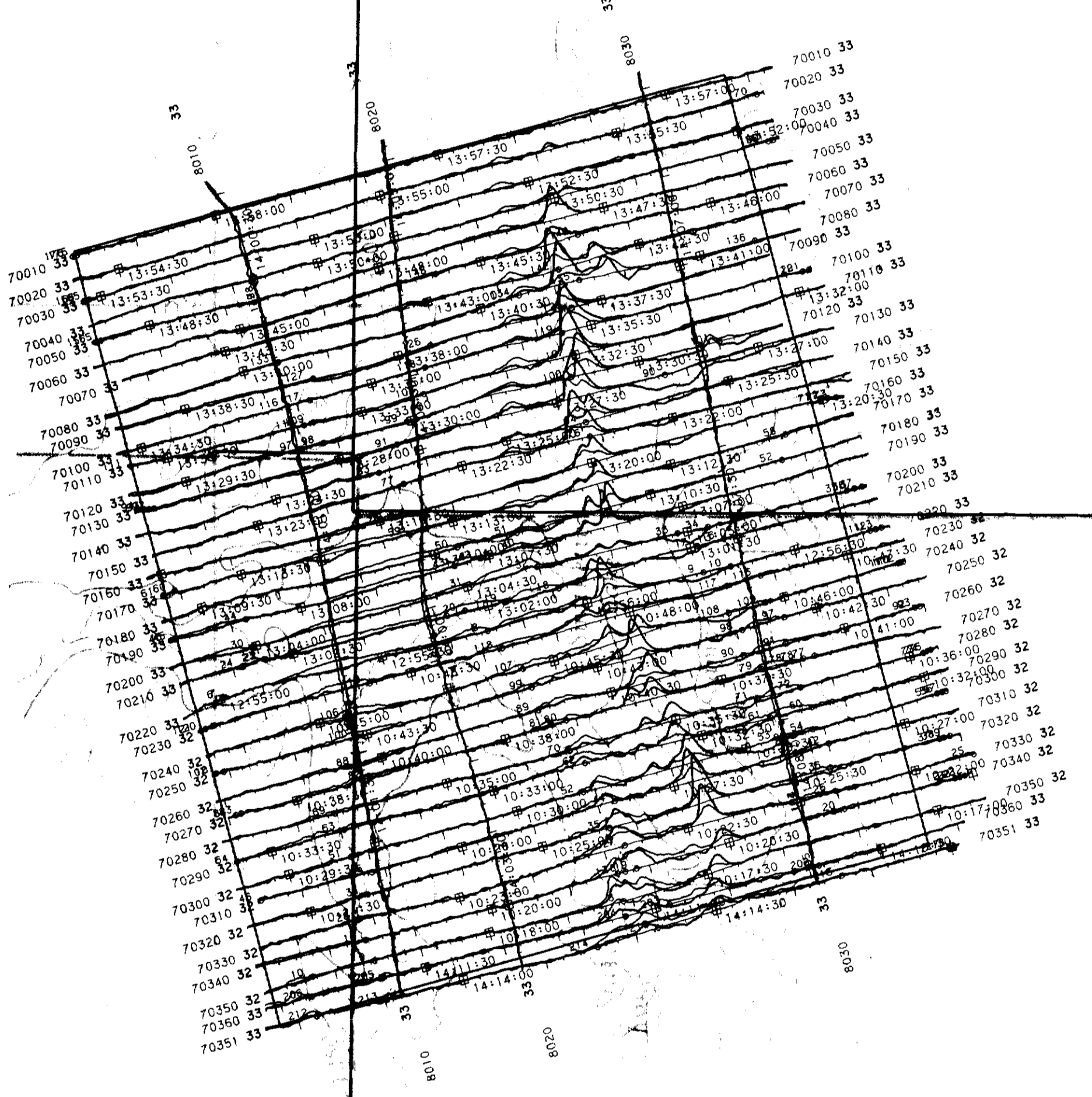
DALE

GENOA

MARION

ERIC

MALLARD



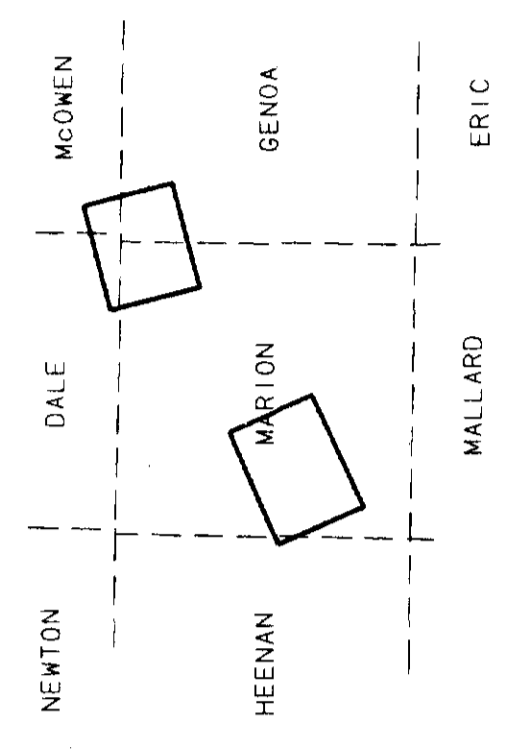
FALCONBRIDGE LIMITED

EM PROFILES (935 HZ)
2.14949
 GENOA TOWNSHIP CLAIMS (PN 8668)
 MARION TOWNSHIP, ONTARIO

SCALE: 1:20,000

DATE: MAR 1991
 INTS. NO.: 41, 0/16
 MAP NO.: MARION & GENOA .J01

AERODAT LIMITED

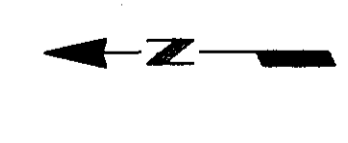


EM Profiles

935 HZ Coaxial 2 ppm/mm
 Real Time Data Acquisition System
 Sensor elevation: 7m
 Coll. separation:

Flight Path

Navigation and recovery using
 real time data acquisition system
 Average terrain clearance 60m
 Coll. separation: 100m



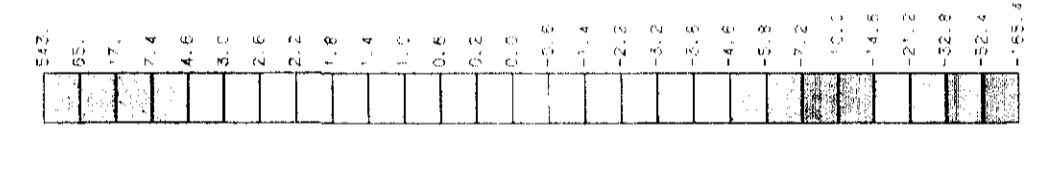
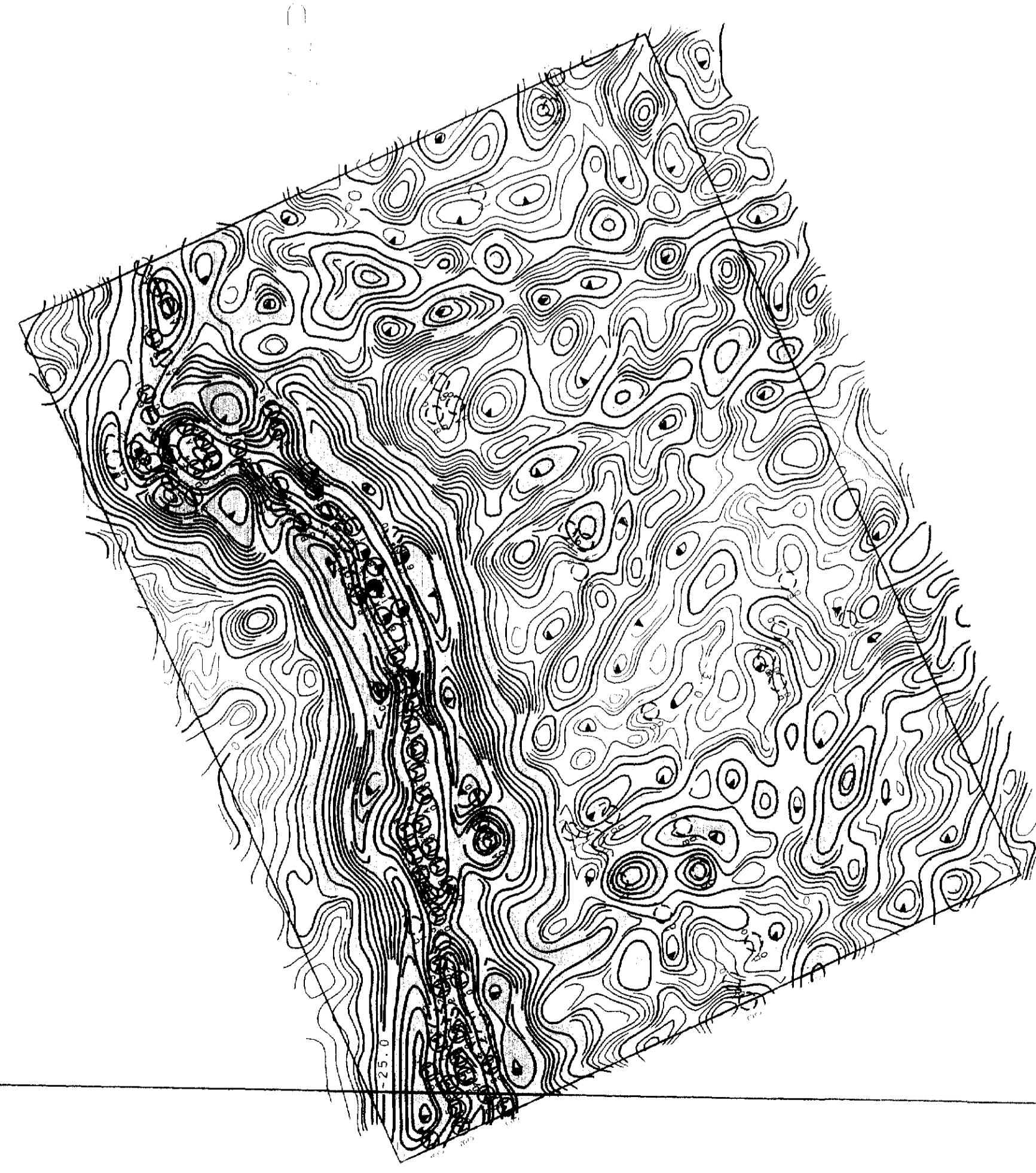
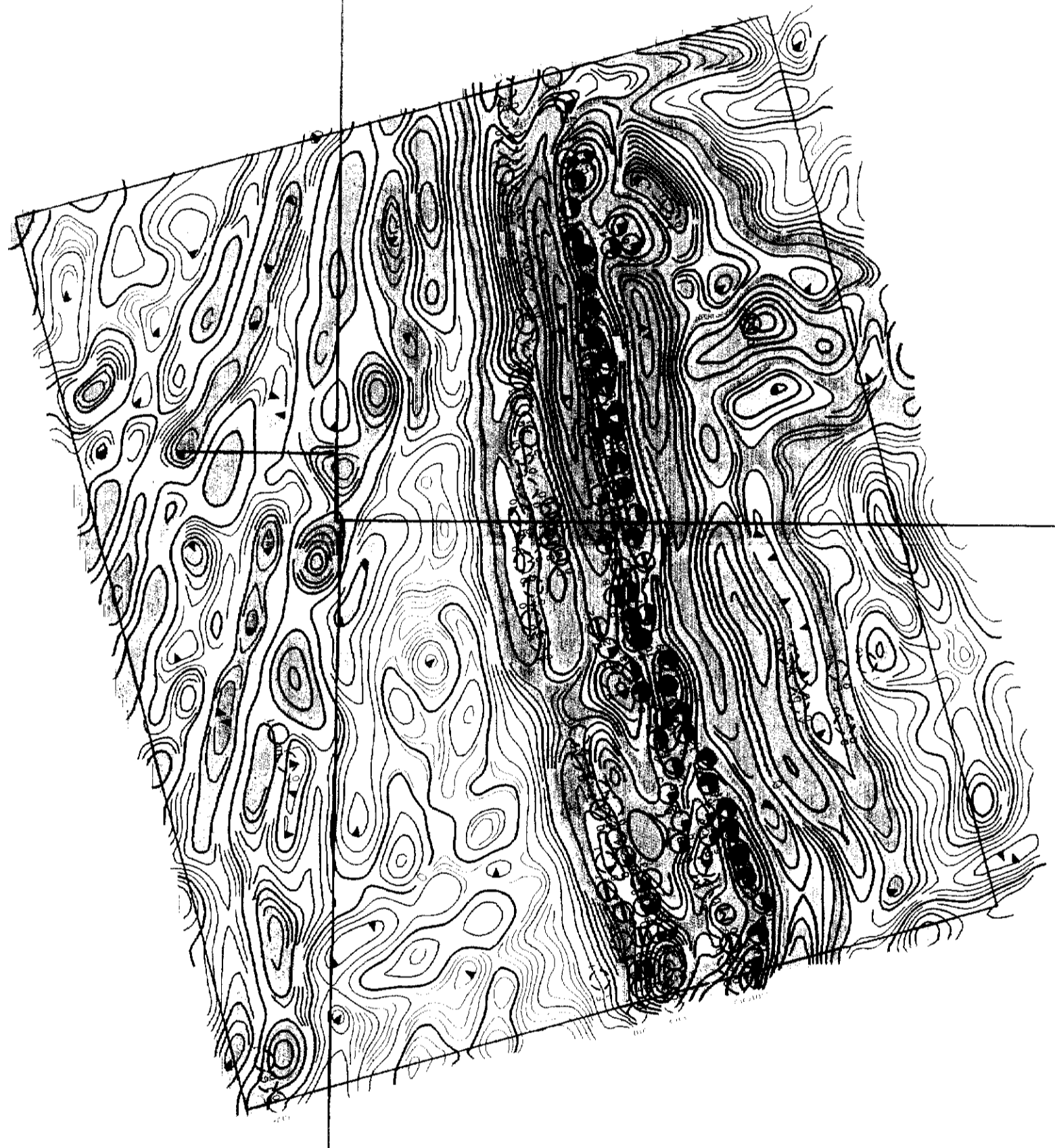
4-888888

3-888888

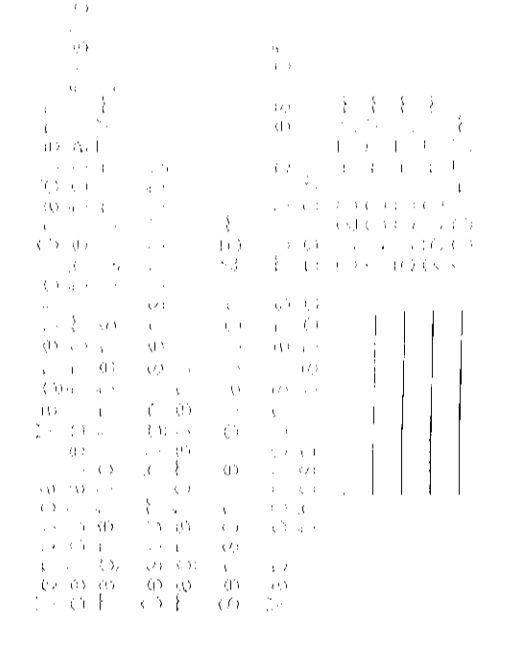
2-888888

1-888888

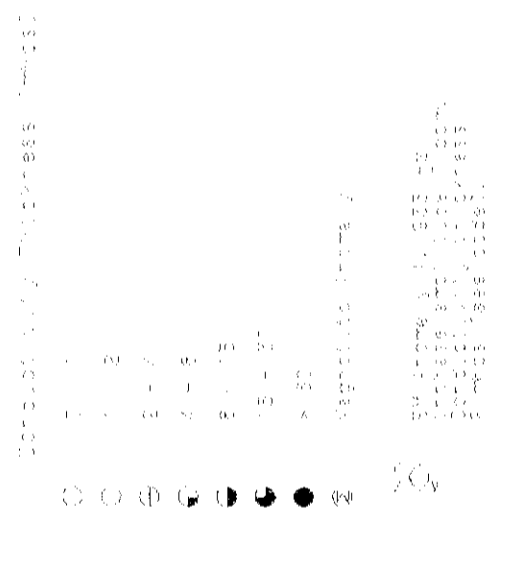
4-888888



Vertical Gradient



EM Anomalies

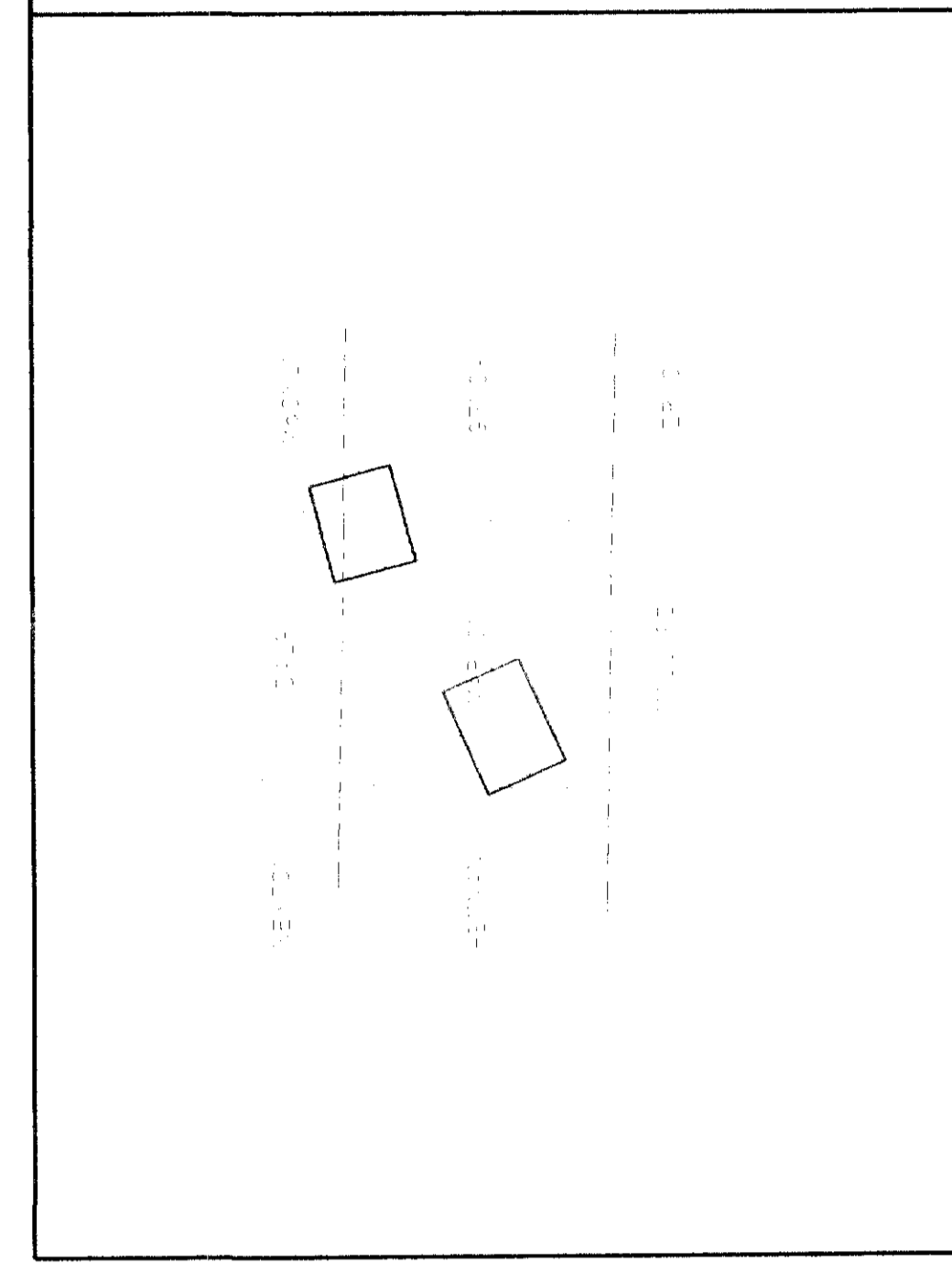


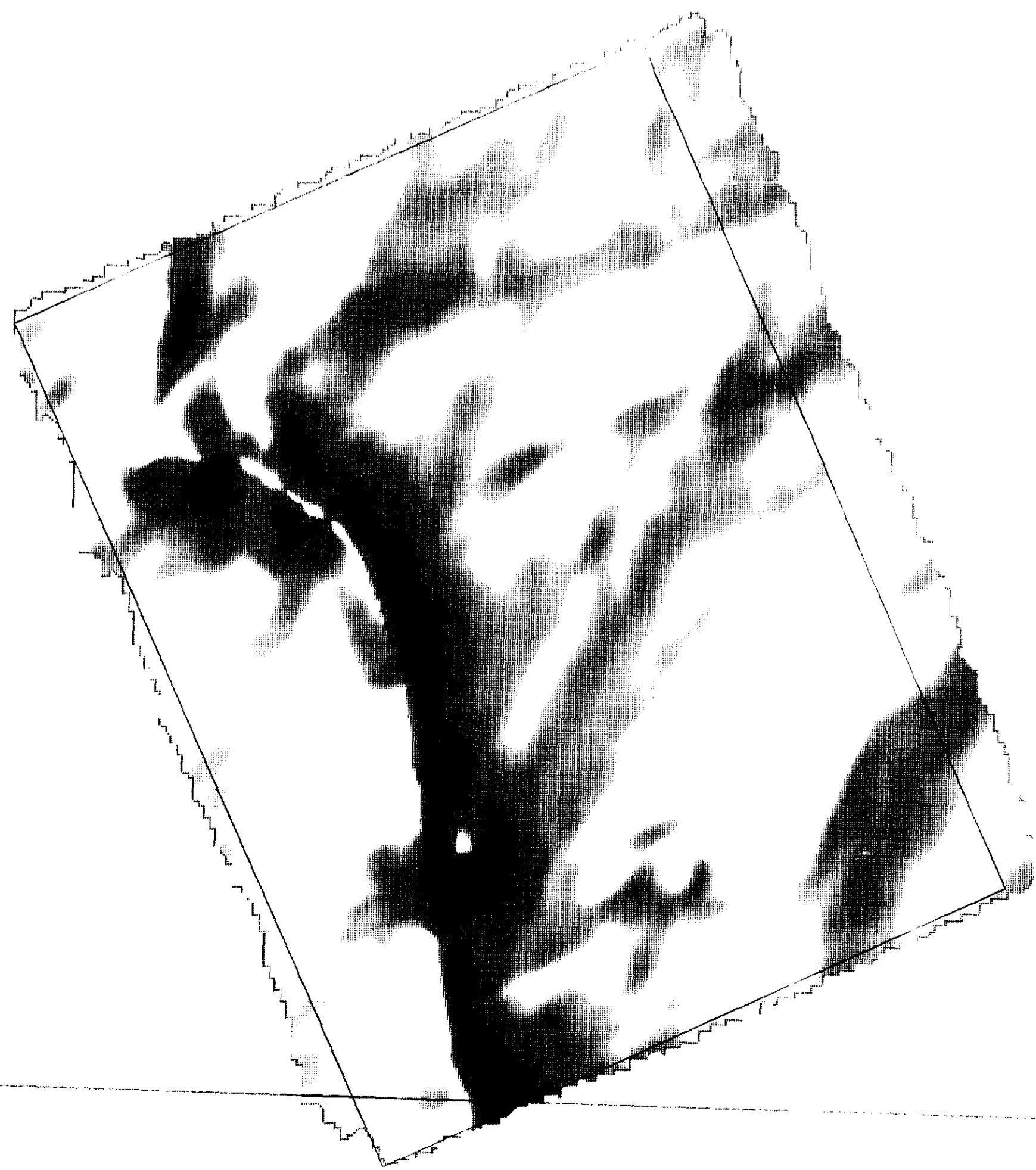
FALCONBRIDGE LIMITED
CALCULATED VERTICAL MAGNETIC GRADIENT
CONTOURS AND COLOURS

GENDA TOWNSHIP CLAIMS (FN 8668)
 MARION TOWNSHIP, ONTARIO

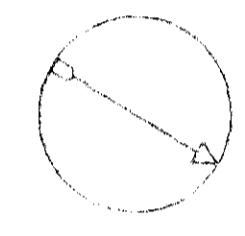
DATE: 1988
 BY: [Name]
 PROJECT: [Name]

AERODAT LIMITED





LEGEND



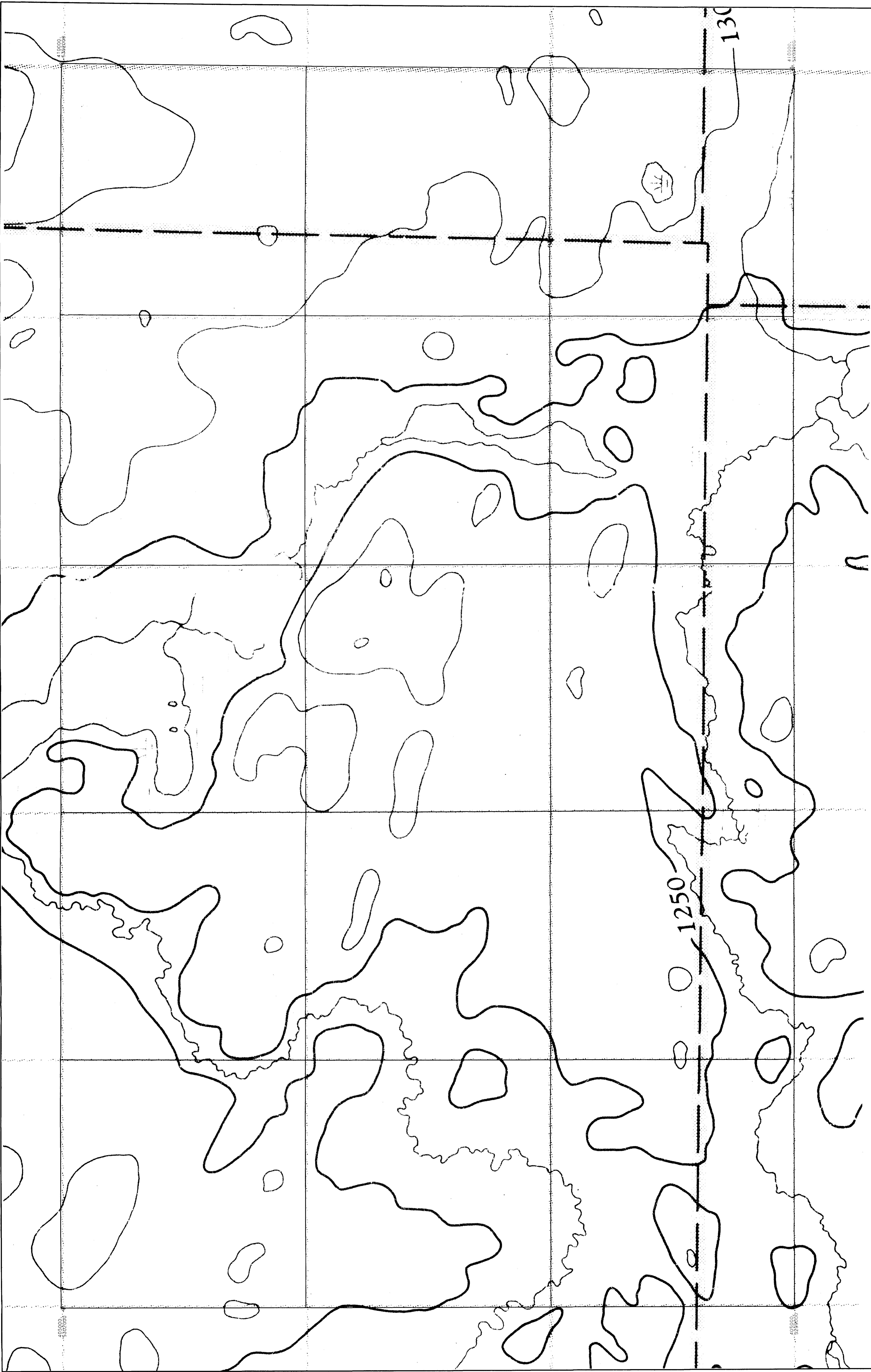
FALCONBRIDGE LIMITED

TOTAL FIELD MAGNETICS
SHADOW MAP

GEMDA PROJECT (PN 8668)
MARIJUANA CULTIVATION

AERODAT LIMITED





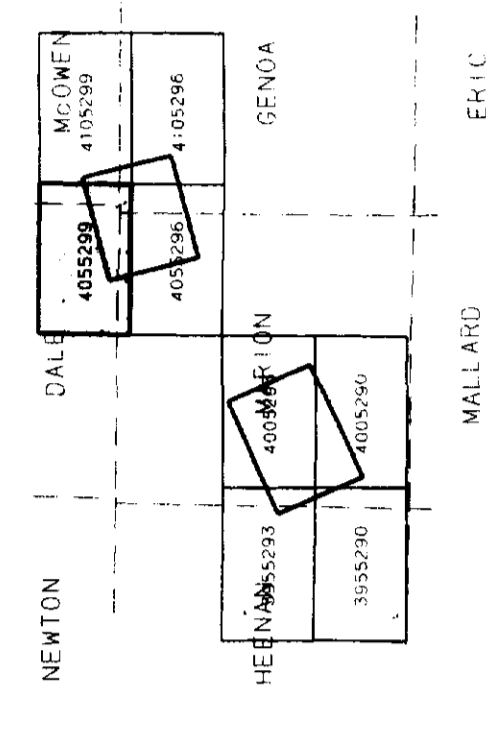
FALCONBRIDGE LIMITED

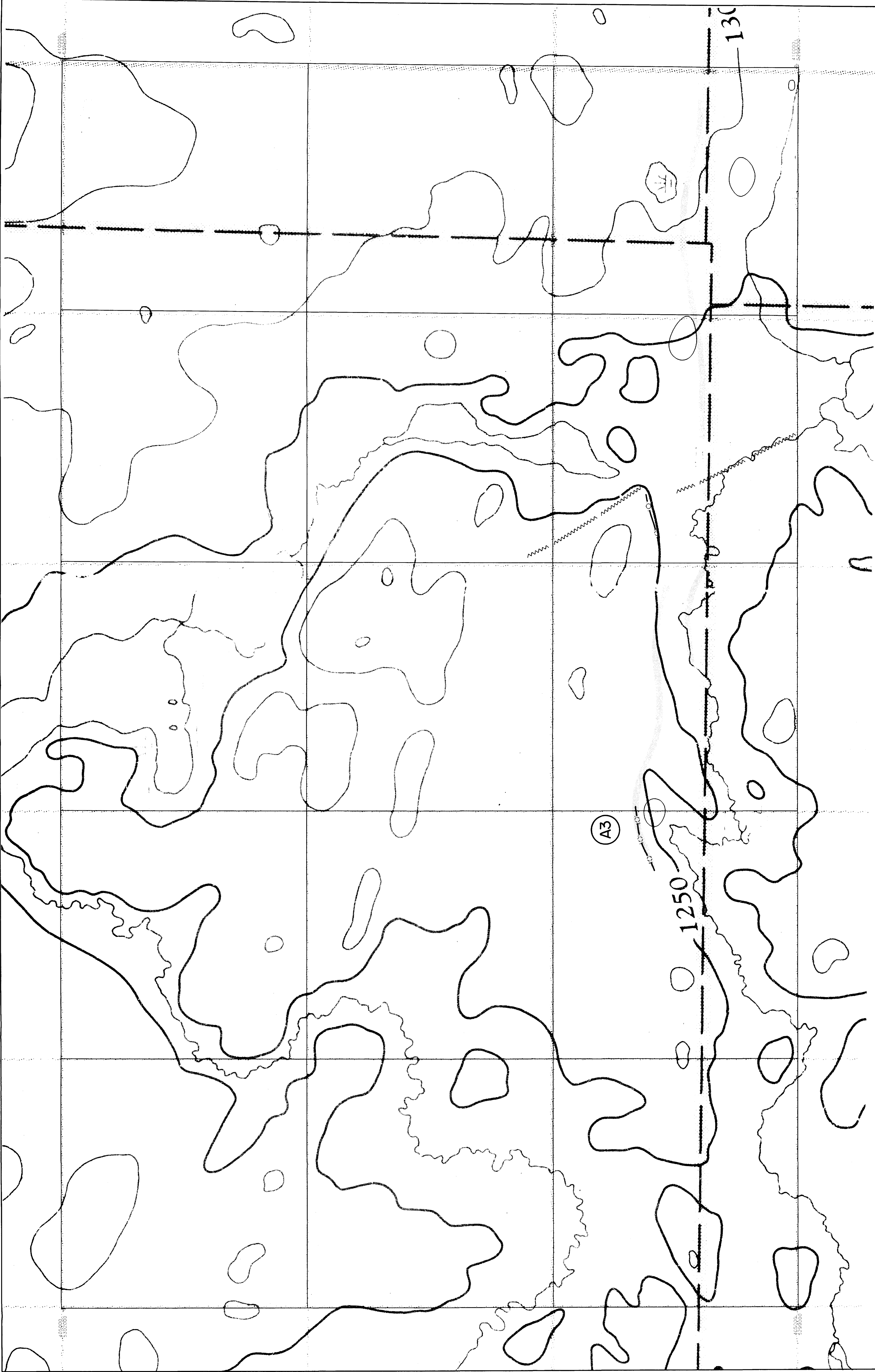
BASE MAP
2.14949
GENOA TOWNSHIP CLAIMS (FN 8668)
DALE TOWNSHIP, ONTARIO

SCALE: 1:50,000
0 100 200 300 400 500 METERS

DATE: MAR 1991
N.T.S. No: 41 0116
MAP No: 405229

AERODAT LIMITED





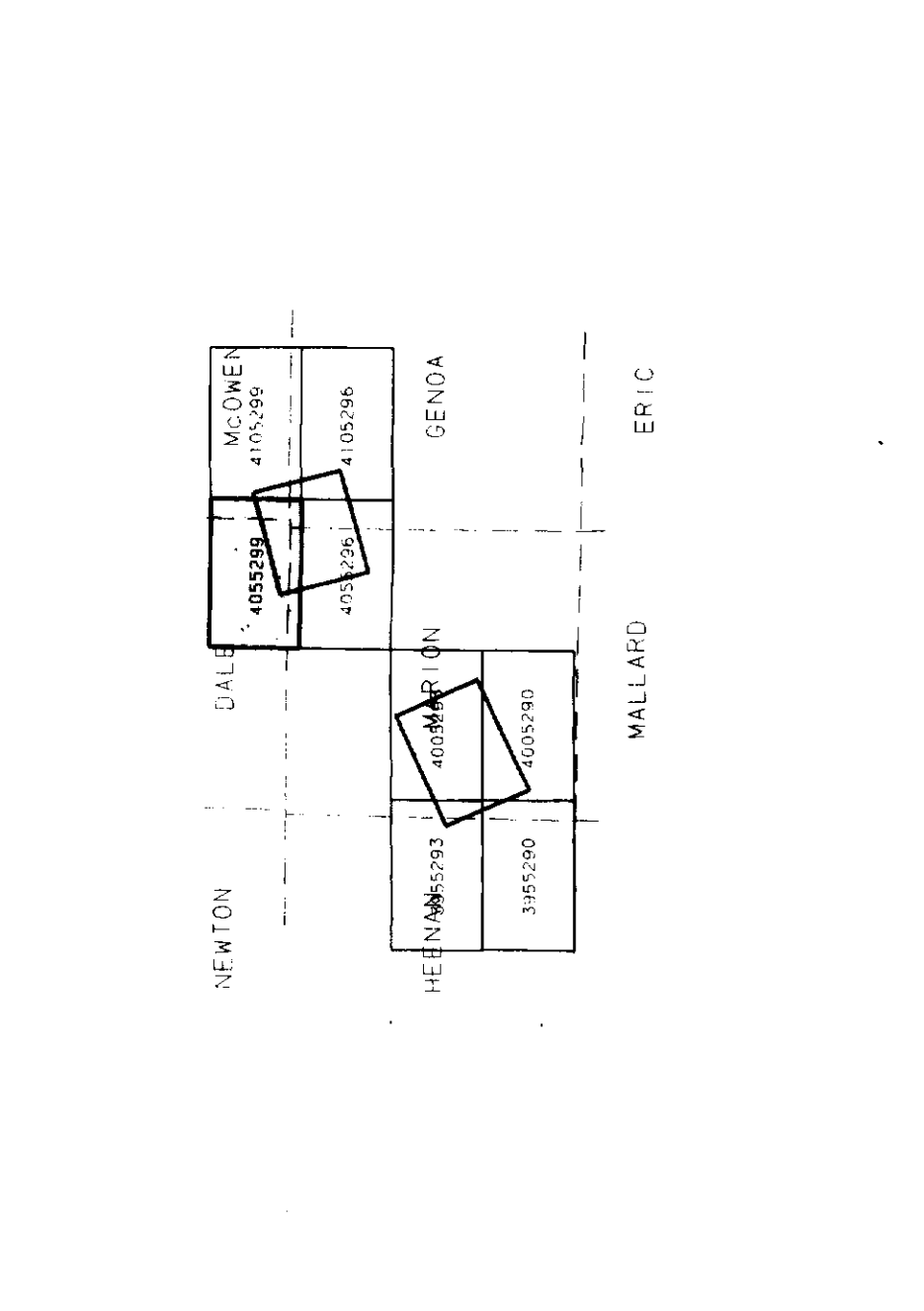
FALCONBRIDGE LIMITED

INTERPRETATION
2.14949
 GENOA TOWNSHIP CLAIMS (PN 8668)
 DALE TOWNSHIP, ONTARIO

SCALE: 1:25,000
 0 100 200 300 400 500 METERS

AERODAT LIMITED

DATE: 1 MAR 1997
 U.S. No: 41 0716
 MAP No: 4055299 (910)



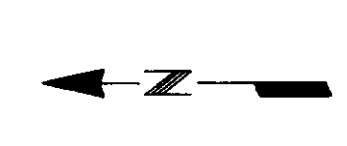
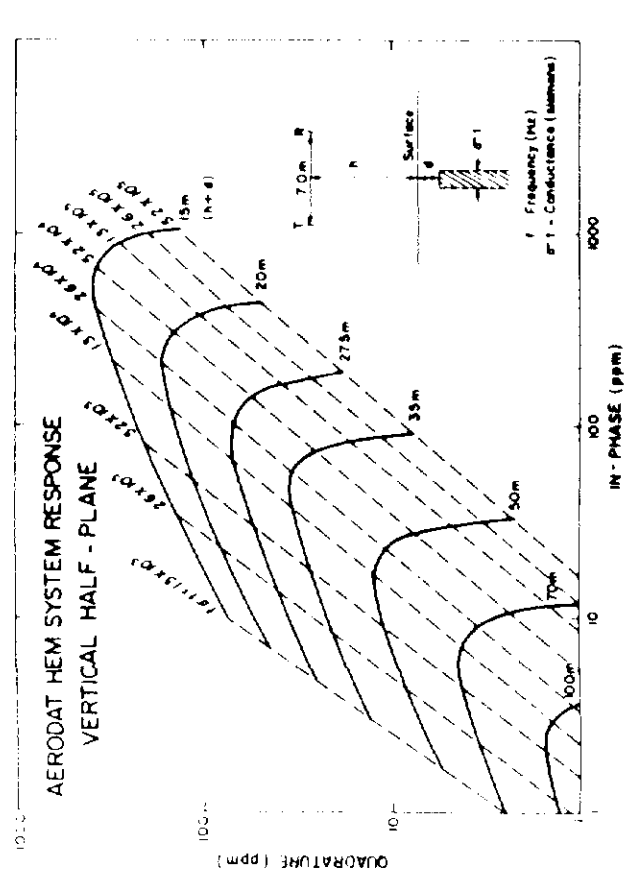
EM Anomalies
 Conductivity (mS/m)

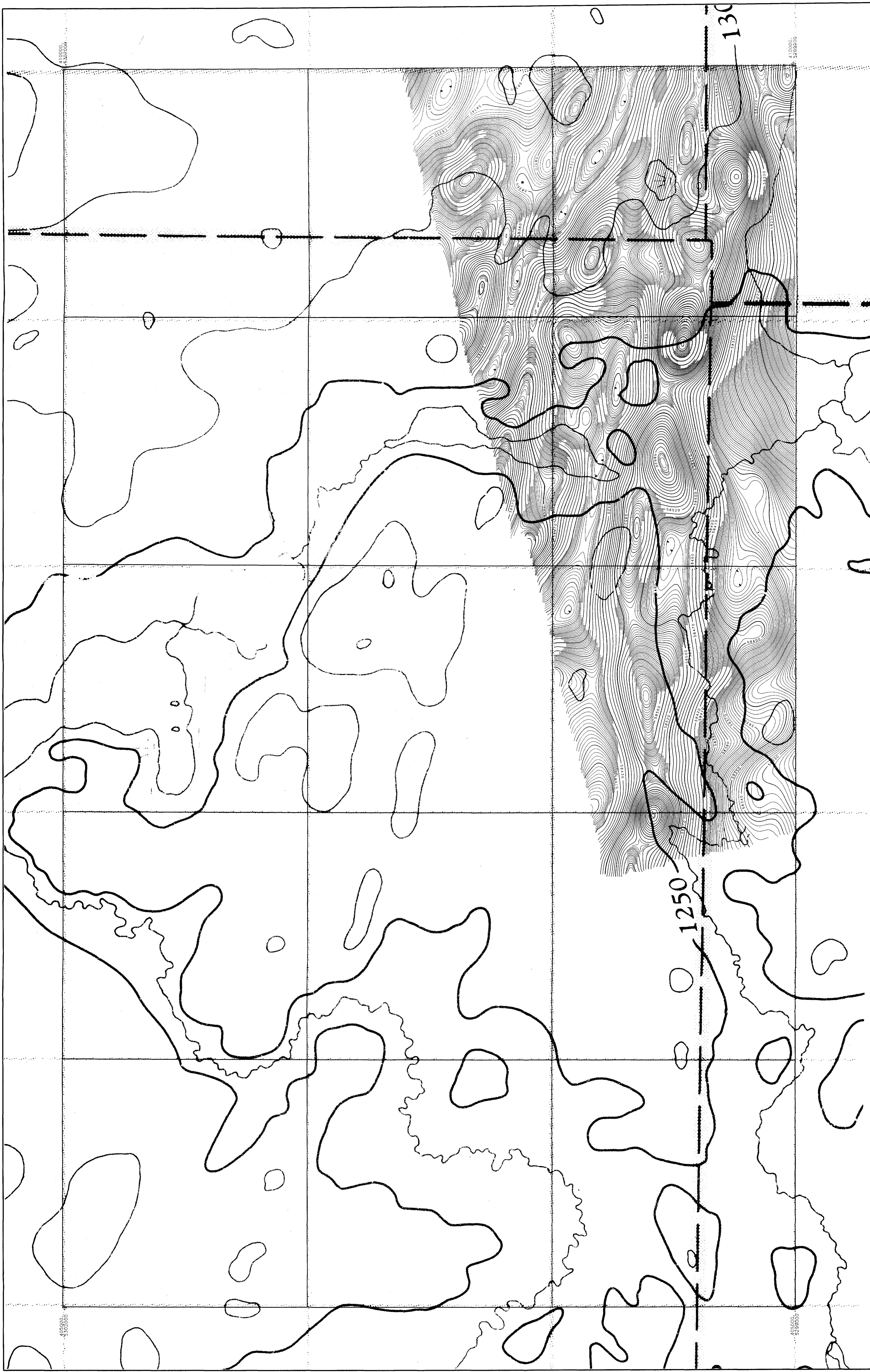
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0

Magnetic Anomaly
 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000 11000 12000 13000 14000 15000 16000 17000 18000 19000 20000 21000 22000 23000 24000 25000 26000 27000 28000 29000 30000 31000 32000 33000 34000 35000 36000 37000 38000 39000 40000 41000 42000 43000 44000 45000 46000 47000 48000 49000 50000 51000 52000 53000 54000 55000 56000 57000 58000 59000 60000 61000 62000 63000 64000 65000 66000 67000 68000 69000 70000 71000 72000 73000 74000 75000 76000 77000 78000 79000 80000 81000 82000 83000 84000 85000 86000 87000 88000 89000 90000 91000 92000 93000 94000 95000 96000 97000 98000 99000 100000

INTERPRETATION LEGEND

- Conductor Axis
- Vertical Conductive Contour Lines
- Vertical Non-Conductive Contour Lines
- Passive Point
- Target Layer
- VLF Conductor Axis





FALCONBRIDGE LIMITED

TOTAL FIELD MAGNETIC CONTOURS

2.14949

GENOA TOWNSHIP CLAIMS (PN 8668)

DALE TOWNSHIP, ONTARIO

SCALE 1:5,000

0 100 200 300 400 500 METERS

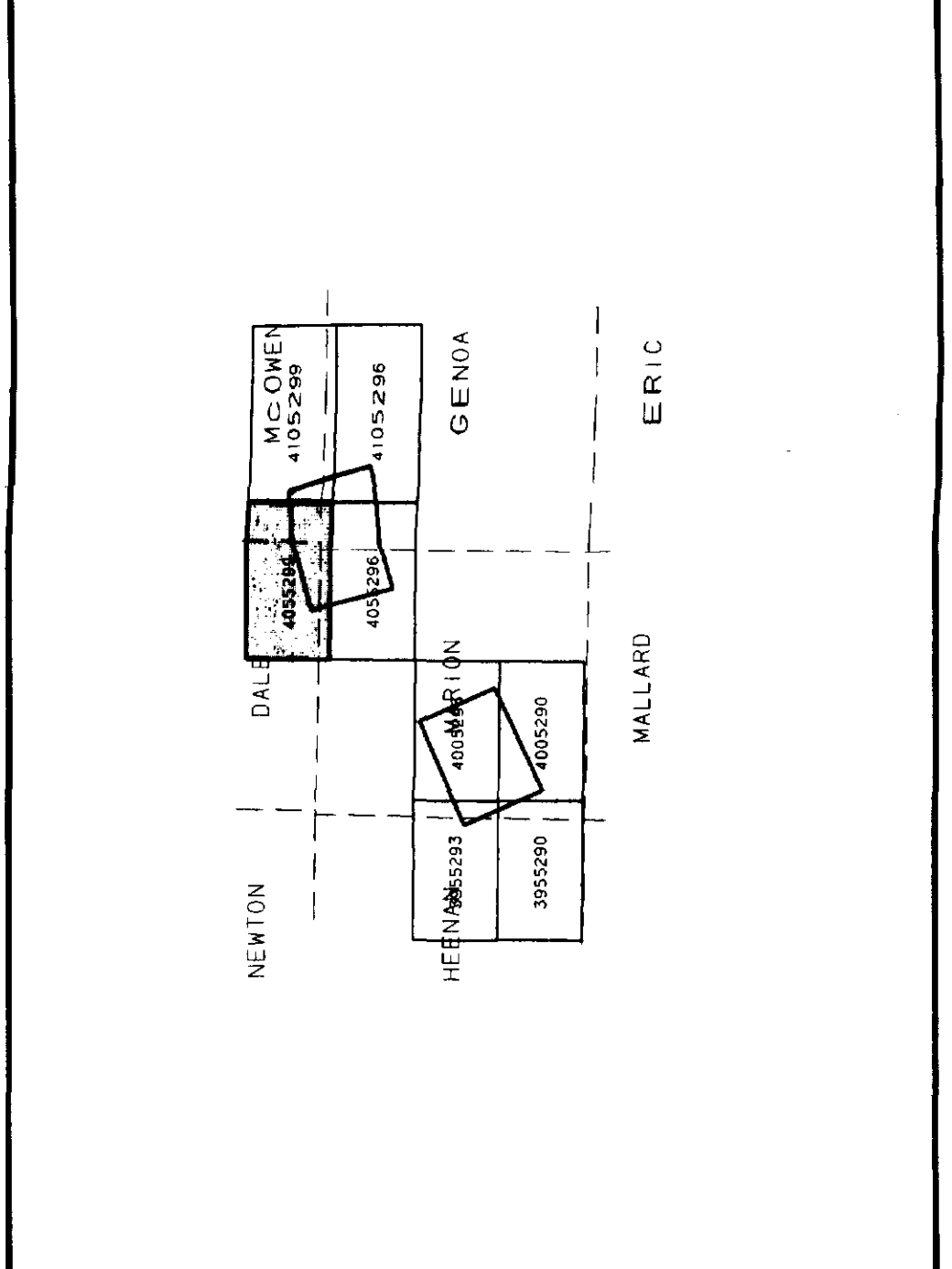
0 100 200 300 400 FEET

DATE: MAR 1991

NTS No.: 41 0/16

MAP No.: 4055299

AERODAT LIMITED



Magnetics

Total field magnetic intensity contours high sensitivity magnetometer...

Sensor elevation 40m

Map contours are multiples of those listed below

10 FT

250 FT

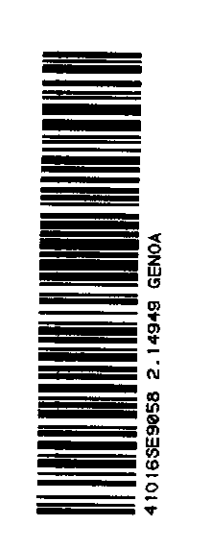
1000 FT

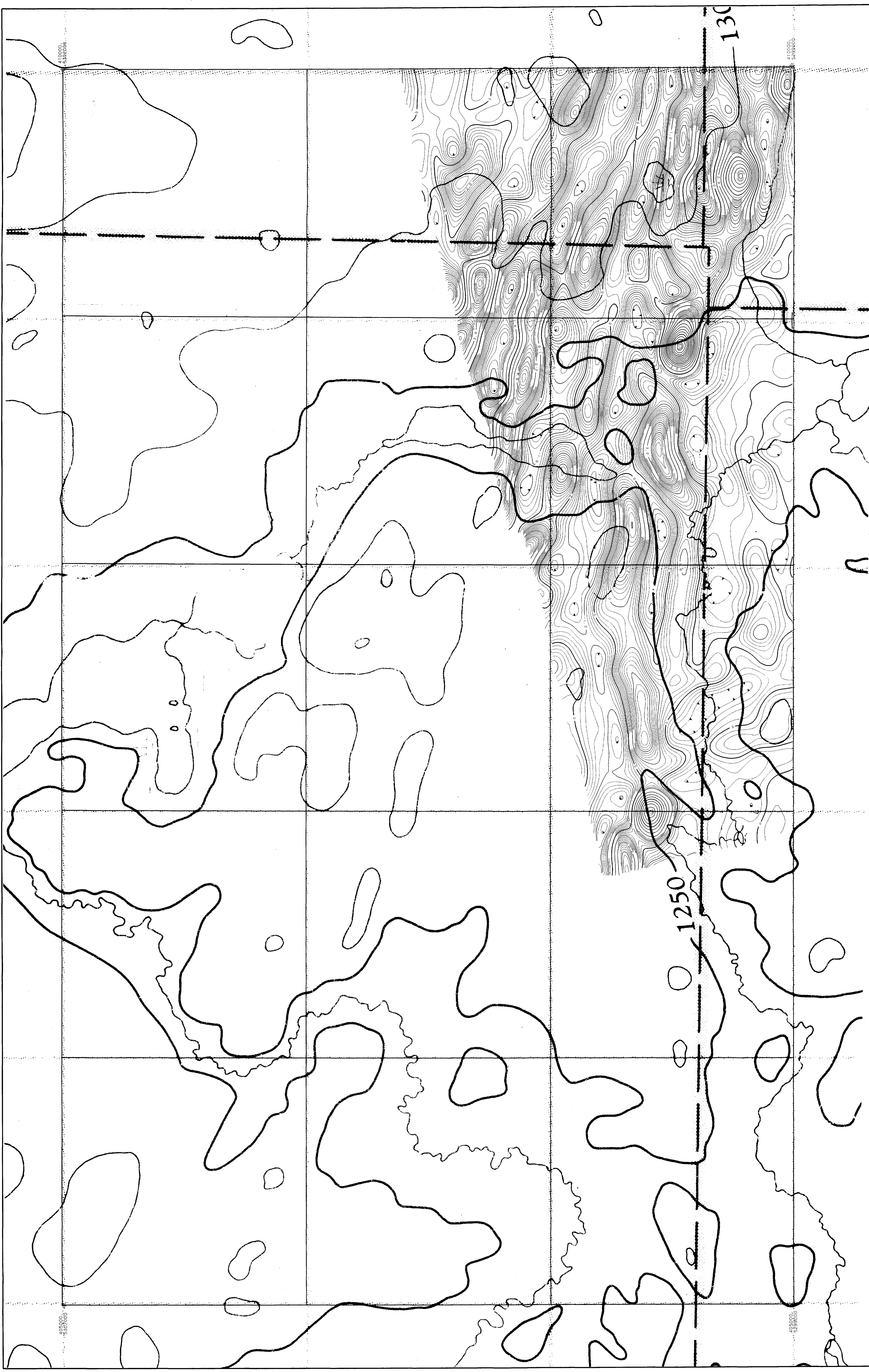
419000
5492000

419000
5492000

419000
5492000

419000
5492000





FALCONBRIDGE LIMITED

CALCULATED VERTICAL MAGNETIC GRADIENT

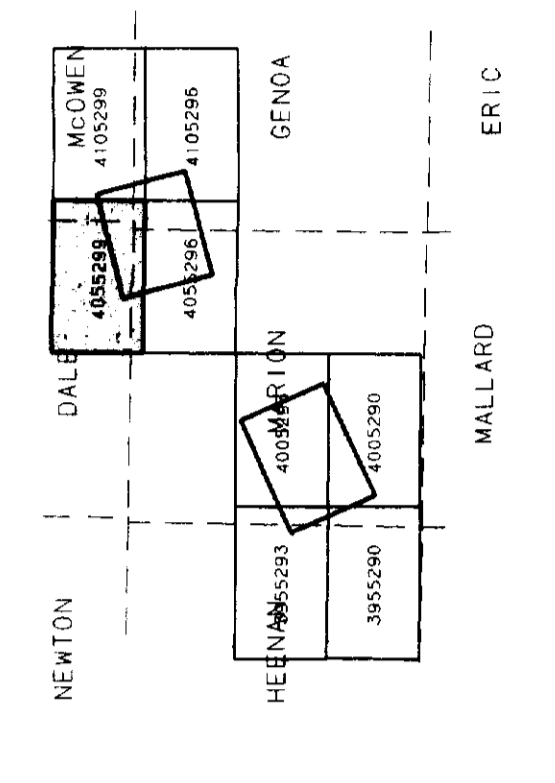
2.14949

GENOA TOWNSHIP CLAIMS (PN 8668)
DALE TOWNSHIP, ONTARIO

SCALE 1:5,000
0 100 200 300 400 500 METERS
0 100 200 300 400 500 FEET

DATE: MAR 1991
INSTRUMENT NO: 41 0716
MFP NO: 4055299

AERODAT LIMITED



Vertical Gradient

Vertical Magnetic Gradient calculated from the total field using a Geometrics Model 3000 Custom high sensitivity magnetometer.

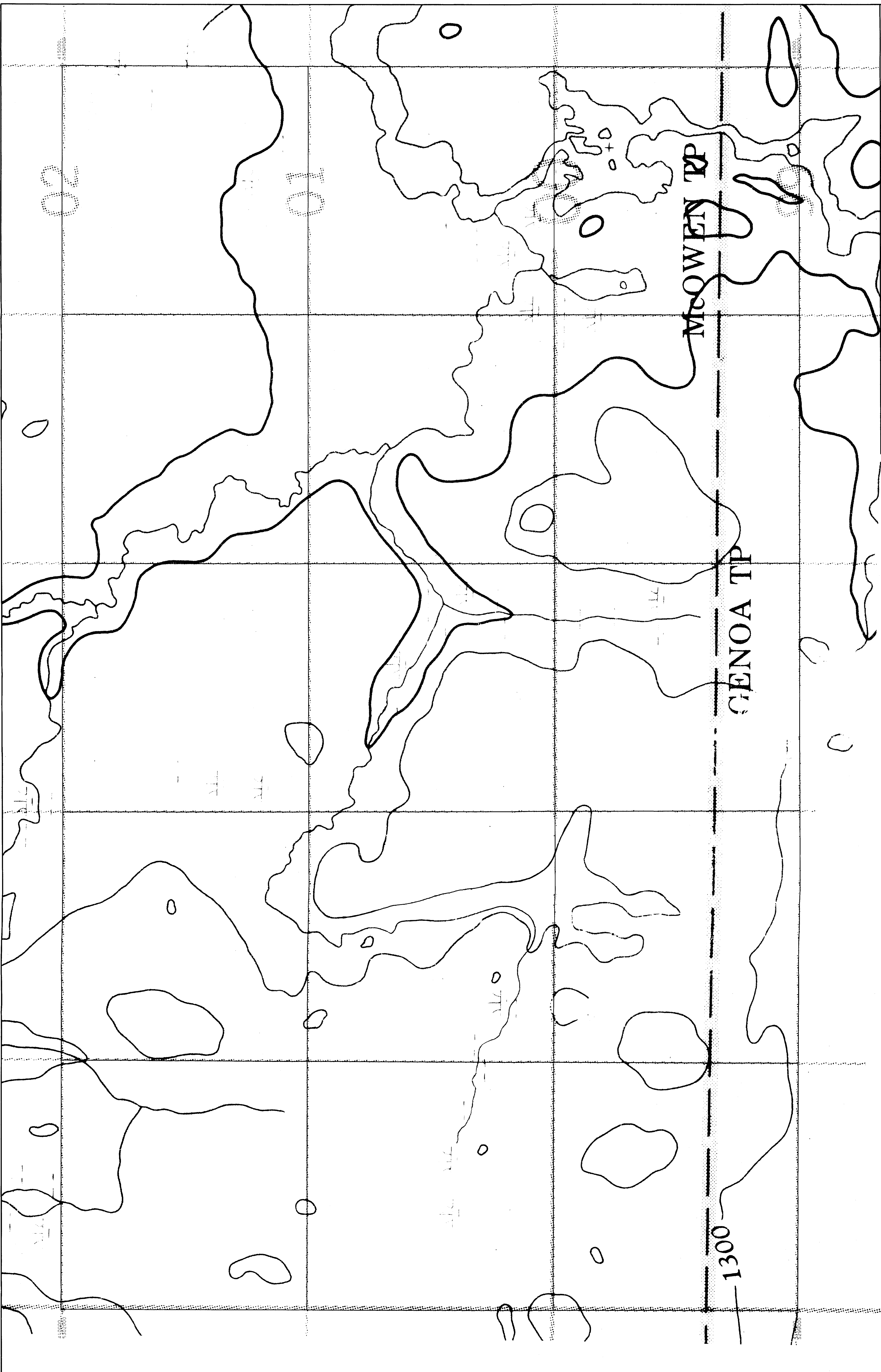
Sensor elevation 45m

Map contour interval 10m

Map contour interval values:

- 0.20 m/m
- 0.50 m/m
- 1.00 m/m
- 2.00 m/m
- 5.00 m/m
- 10.0 m/m

EPIC



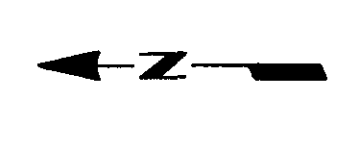
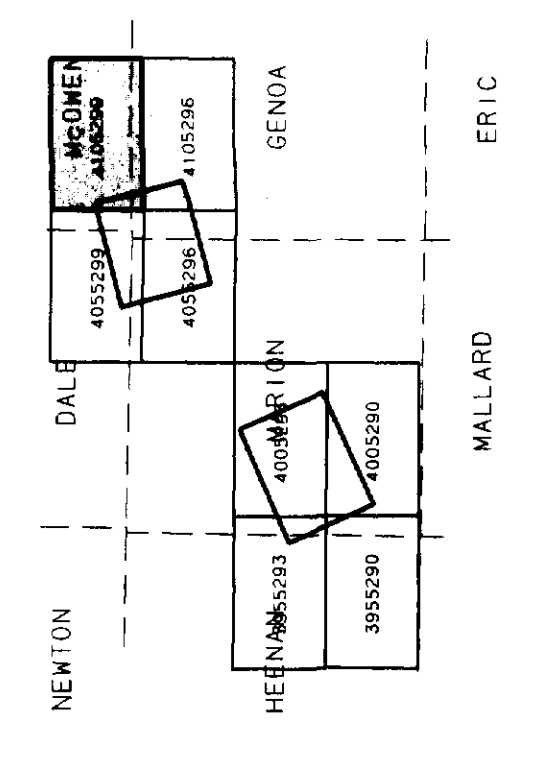
FALCONBRIDGE LIMITED

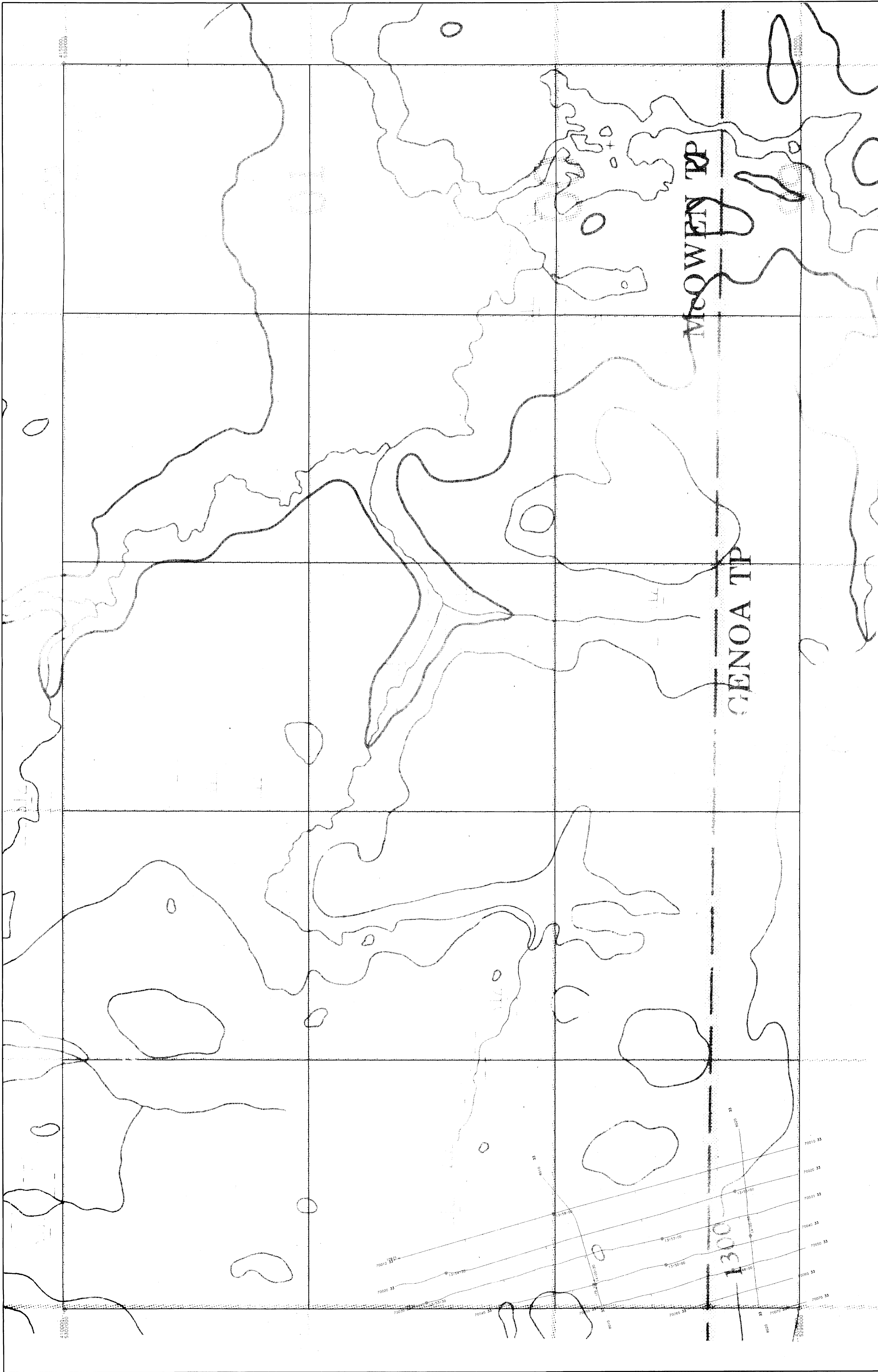
BASE MAP
2.14949
 GENOA TOWNSHIP CLAIMS (PN 8668)
 MCOWEN TOWNSHIP, ONTARIO

SCALE 1:5,000
 0 100 200 300 Feet
 0 50 100 150 Meters

DATE: APR 1997
 NTS No: 41 0/16
 MAP No: 4102299 (J01)

AERODAT LIMITED





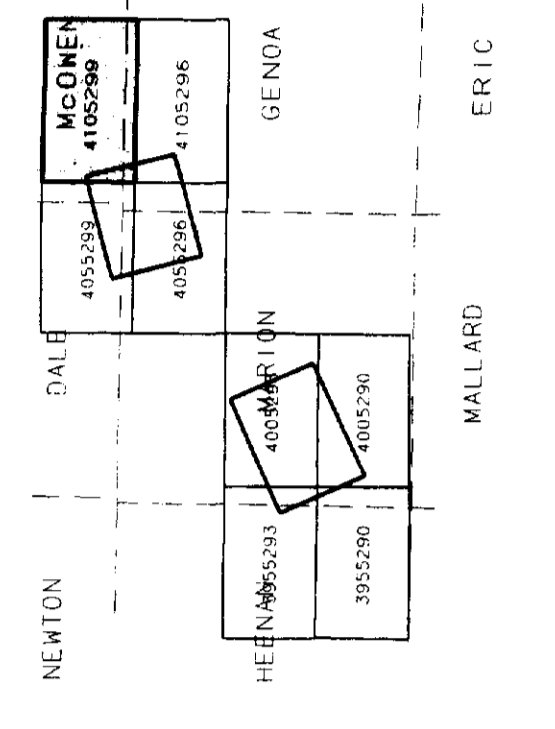
FALCONBRIDGE LIMITED

FLIGHT PATH
2.149.9
 GENOA TOWNSHIP CLAIMS (PN 8688)
 MCOWEN TOWNSHIP, ONTARIO

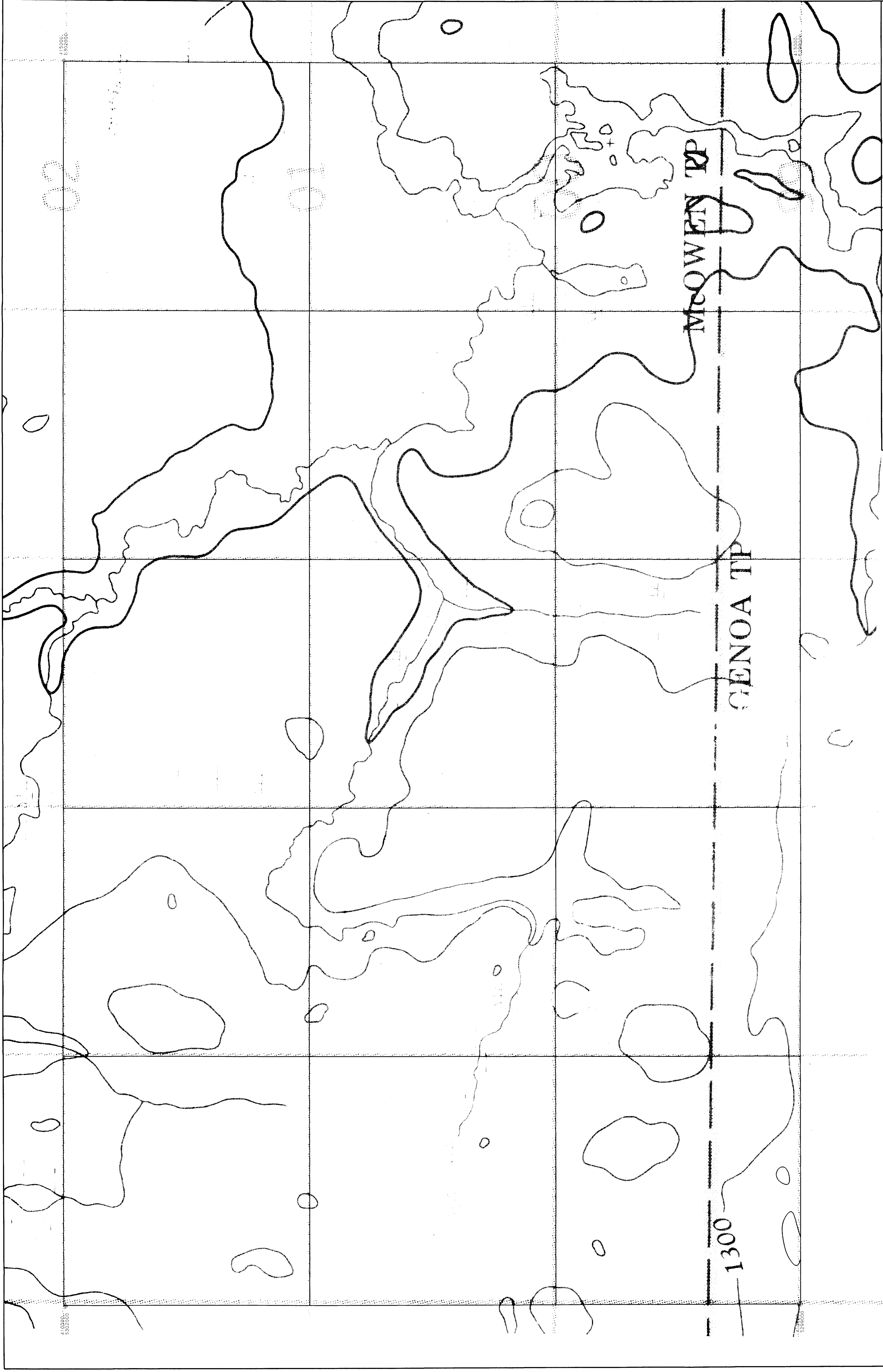
SCALE: 1:15,000

DATE: MAR 1991
 NTS No: 41 0715
 MAP No: 4105299

AERODAT LIMITED



- EM. ANOMALIES**
- Contour Interval: 100m
- 0 - 1
 - 1 - 2
 - 2 - 4
 - 4 - 8
 - 8 - 15
 - 15 - 30
 - 30 - 60
 - 60 - 120
 - 120 - 240
 - 240 - 480
 - 480 - 960
 - 960 - 1920
 - 1920 - 3840
 - 3840 - 7680
 - 7680 - 15360
 - 15360 - 30720
 - 30720 - 61440
 - 61440 - 122880
 - 122880 - 245760
 - 245760 - 491520
 - 491520 - 983040
 - 983040 - 1966080
 - 1966080 - 3932160
 - 3932160 - 7864320
 - 7864320 - 15728640
 - 15728640 - 31457280
 - 31457280 - 62914560
 - 62914560 - 125829120
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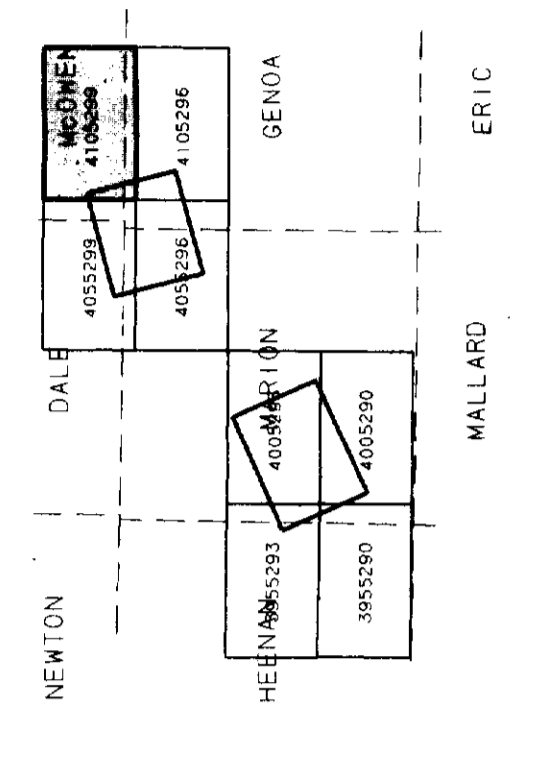
FALCONBRIDGE LIMITED

INTERPRETATION
2-14949
 GENOA TOWNSHIP CLAIMS (PN 8668)
 MCOWEN TOWNSHIP, ONTARIO

AERODAT LIMITED

DATE: 1 MAR 1981
 NIS NO: 41 0716
 MAP NO: 4102289

SCALE: 1:5,000
 0 100 200 300 METERS



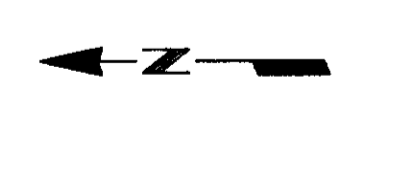
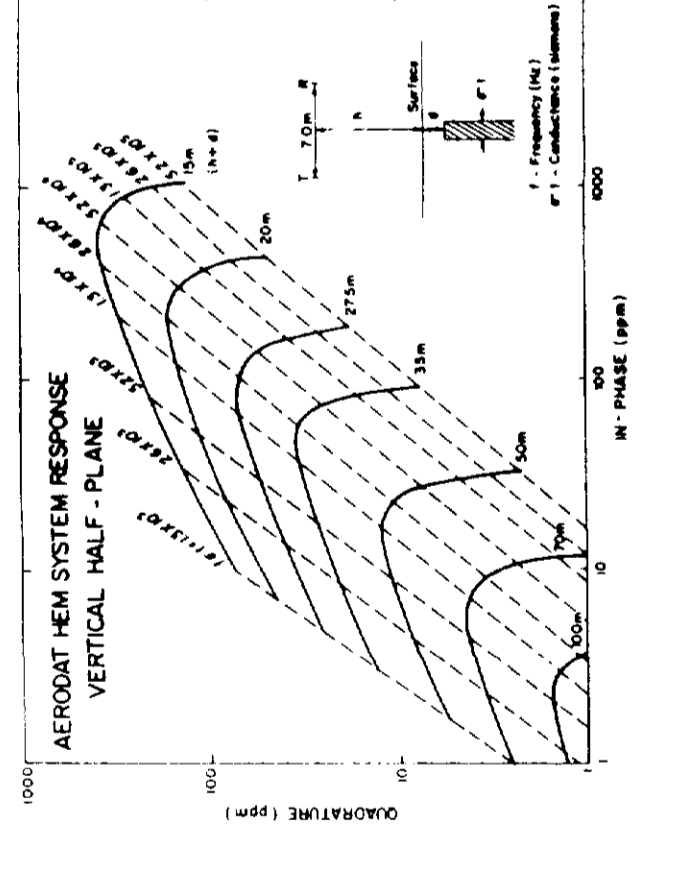
EM АЛОПЛАШ
 Conductivity (mhos/m)

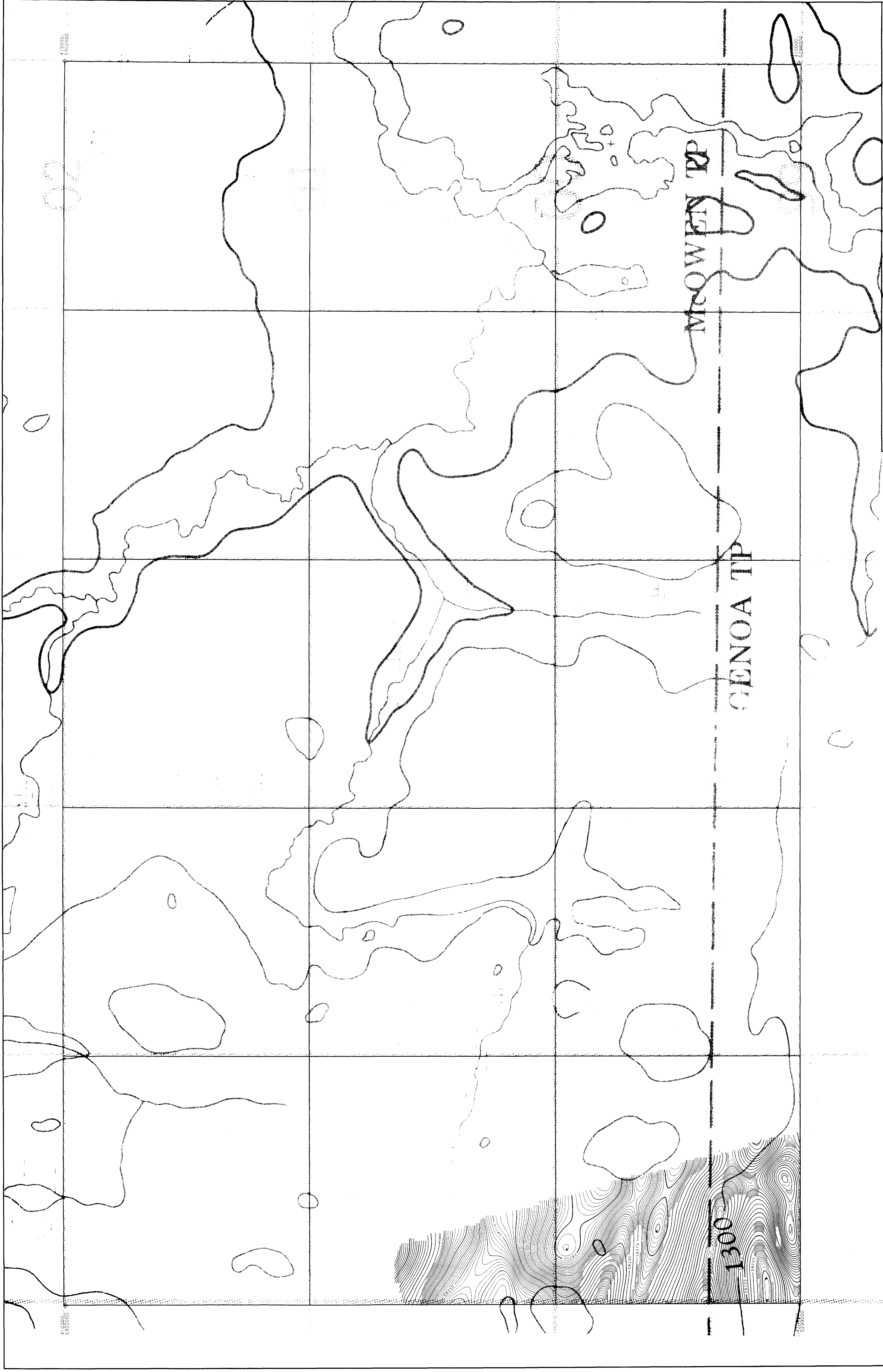
0 - 1
1 - 2
2 - 4
4 - 8
8 - 15
15 - 30

Registralive Anomaly
 Interpretation: 100%
 100% (100% of 100%)
 100% (100% of 100%)

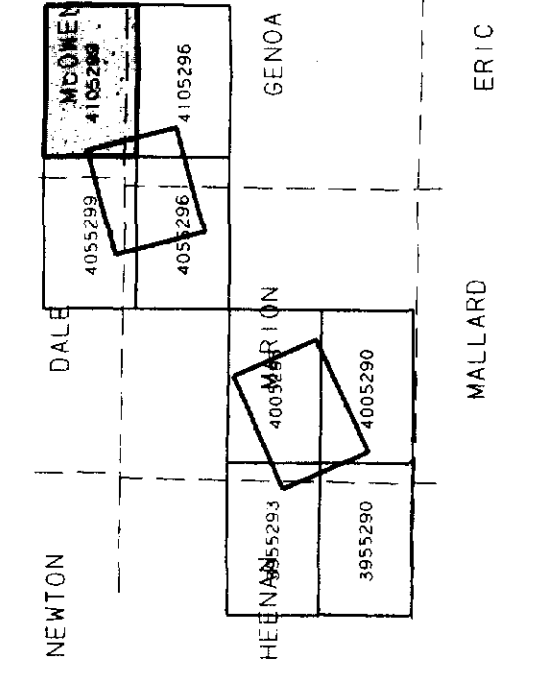
INTERPRETATION LEGEND

—	Collector Axis
—	Vertical Dip (Collector Axis)
—	Horizontal Dip (Collector Axis)
—	Residual Point
⊙	Target Label
⊙	VLF Collector Axis





Magnetics
 Total Field Magnetic Intensity
 Contours in nT
 Contour high sensitivity
 Residuals in nT
 Contour resolution 45m
 Map contours are multiples of
 those listed below
 50 nT
 100 nT
 250 nT
 500 nT



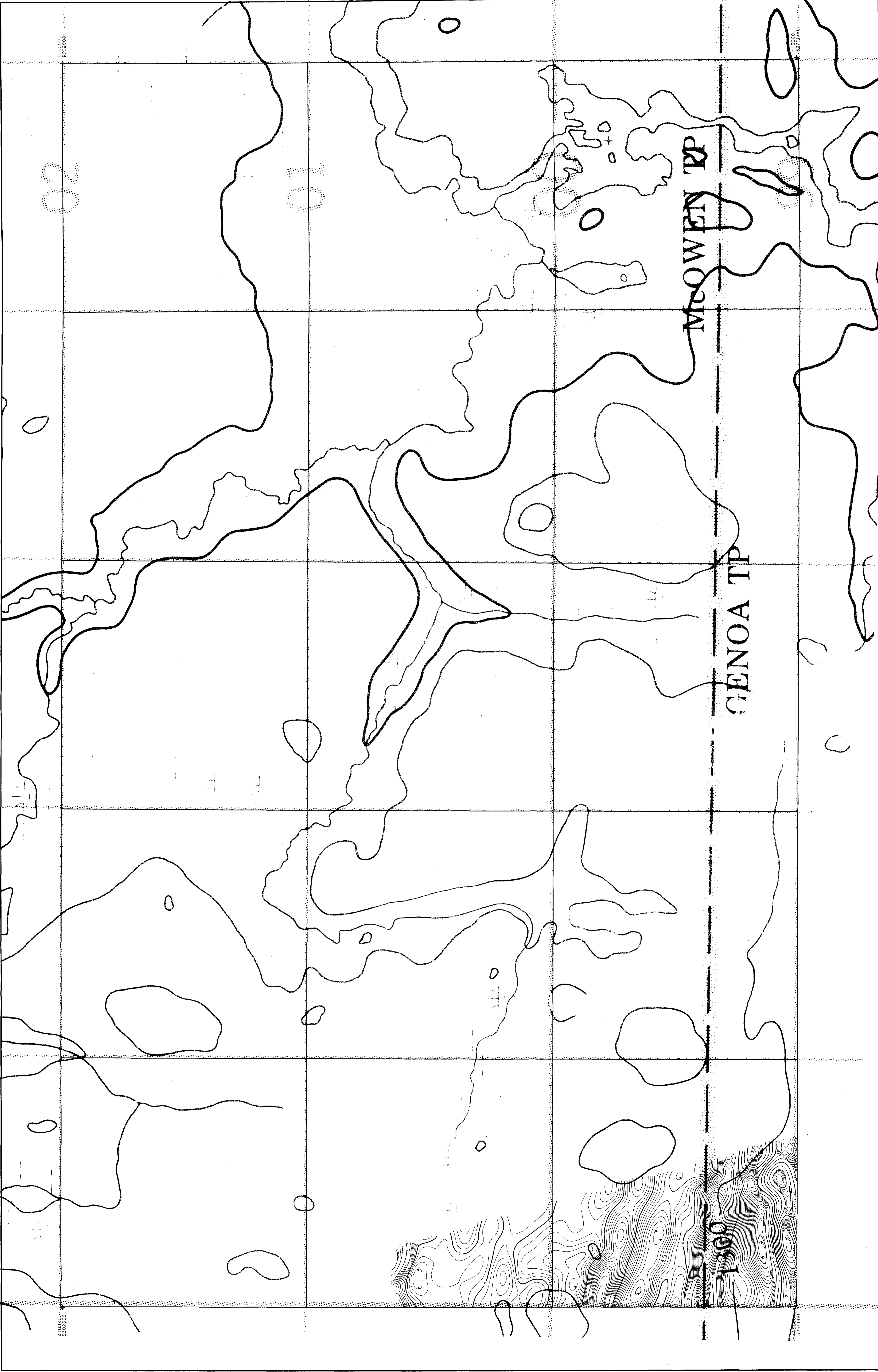
FALCONBRIDGE LIMITED

TOTAL FIELD MAGNETIC CONTOURS
2-14949
 GENOVA TOWNSHIP CLAIMS (PN 8668)
 MCOWEN TOWNSHIP, ONTARIO

SCALE 1:5,000 1:50 Feet 1:50 METERS

DATE: 1 MAR 1991
 NIS NO: 41 0716
 MAP NO: 4105299

AERODAT LIMITED



FALCONBRIDGE LIMITED

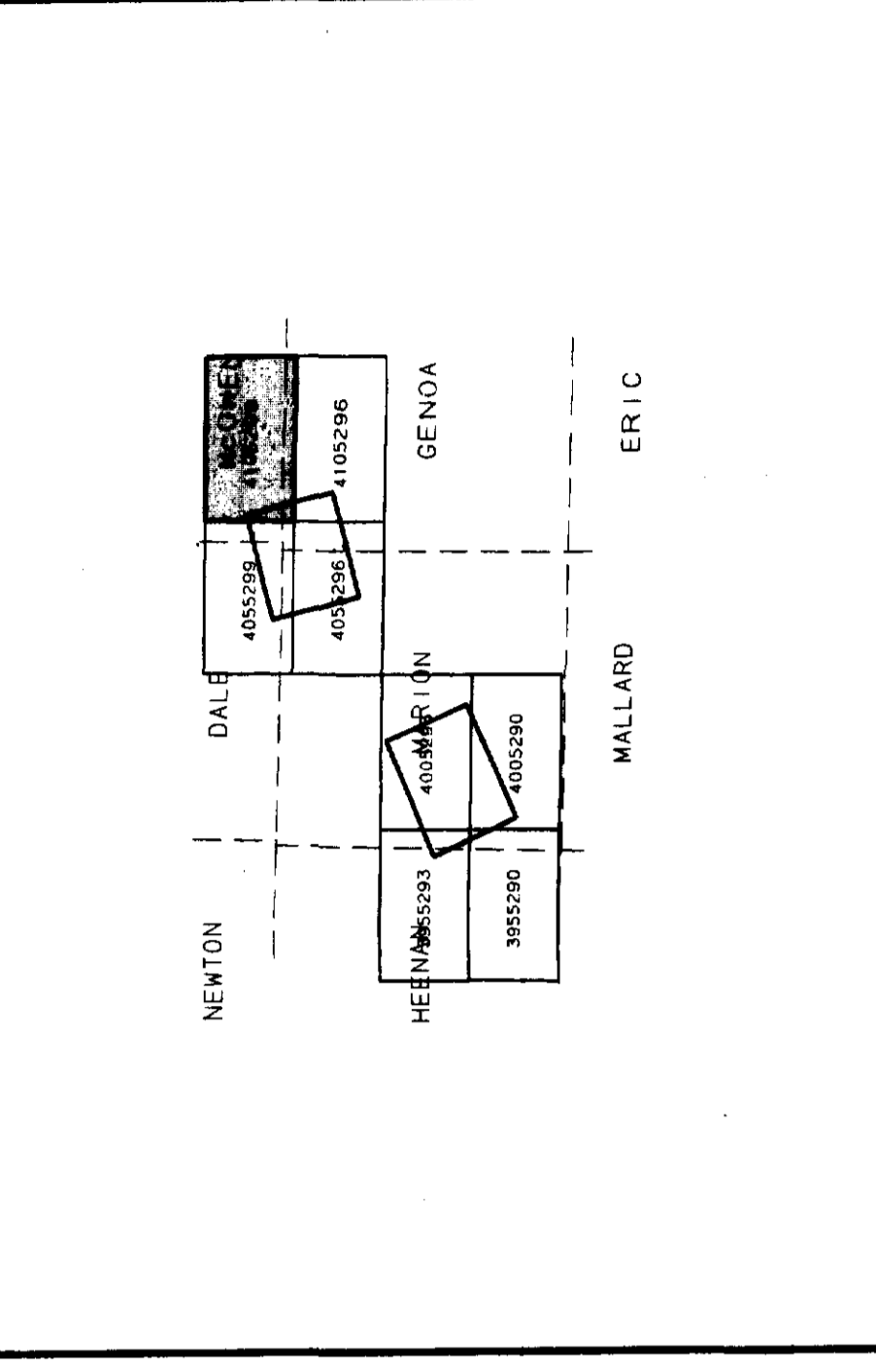
CALCULATED VERTICAL MAGNETIC GRADIENT
2.14949

GENOA TOWNSHIP CLAIMS (PN 8668)
 MCKENZIE TOWNSHIP, ONTARIO

SCALE 1:5,000

DATE: MAR 1991
 NTS No: 41 0/16
 MAP No: 4103299

AERODAT LIMITED

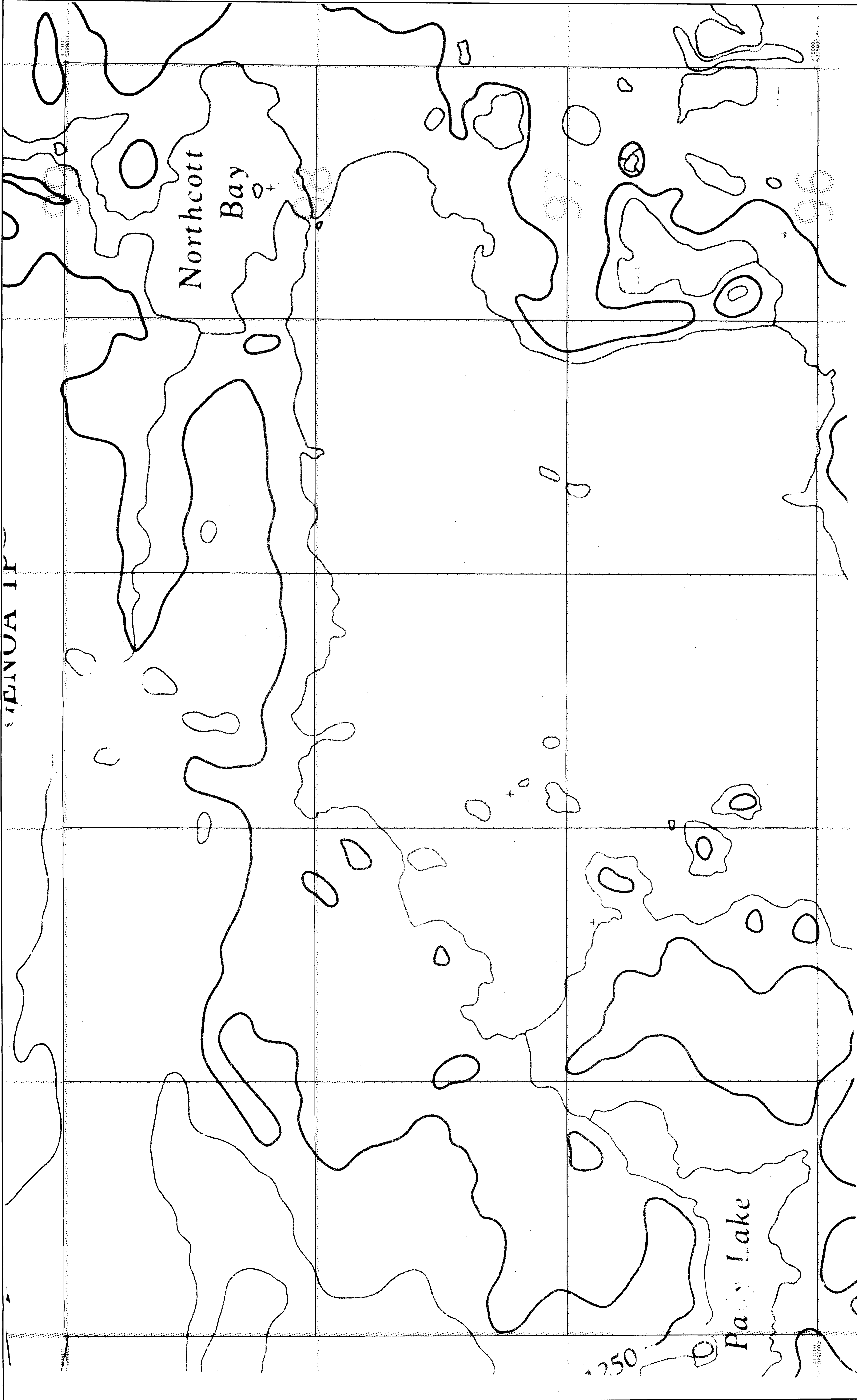


Vertical Gradient

Vertical Magnetic Gradient contours are calculated from the total field magnetic intensity in nT/m. Contour interval is 10 nT/m. Sensor elevation 45m. Map contours are multiples of those listed.

0.20 nT/m
0.50 nT/m
1.00 nT/m
2.50 nT/m
5.00 nT/m
10.0 nT/m

GENOA II



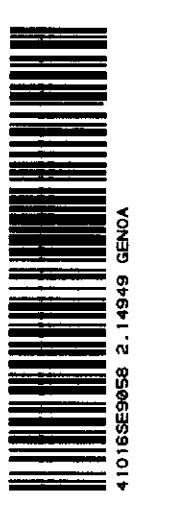
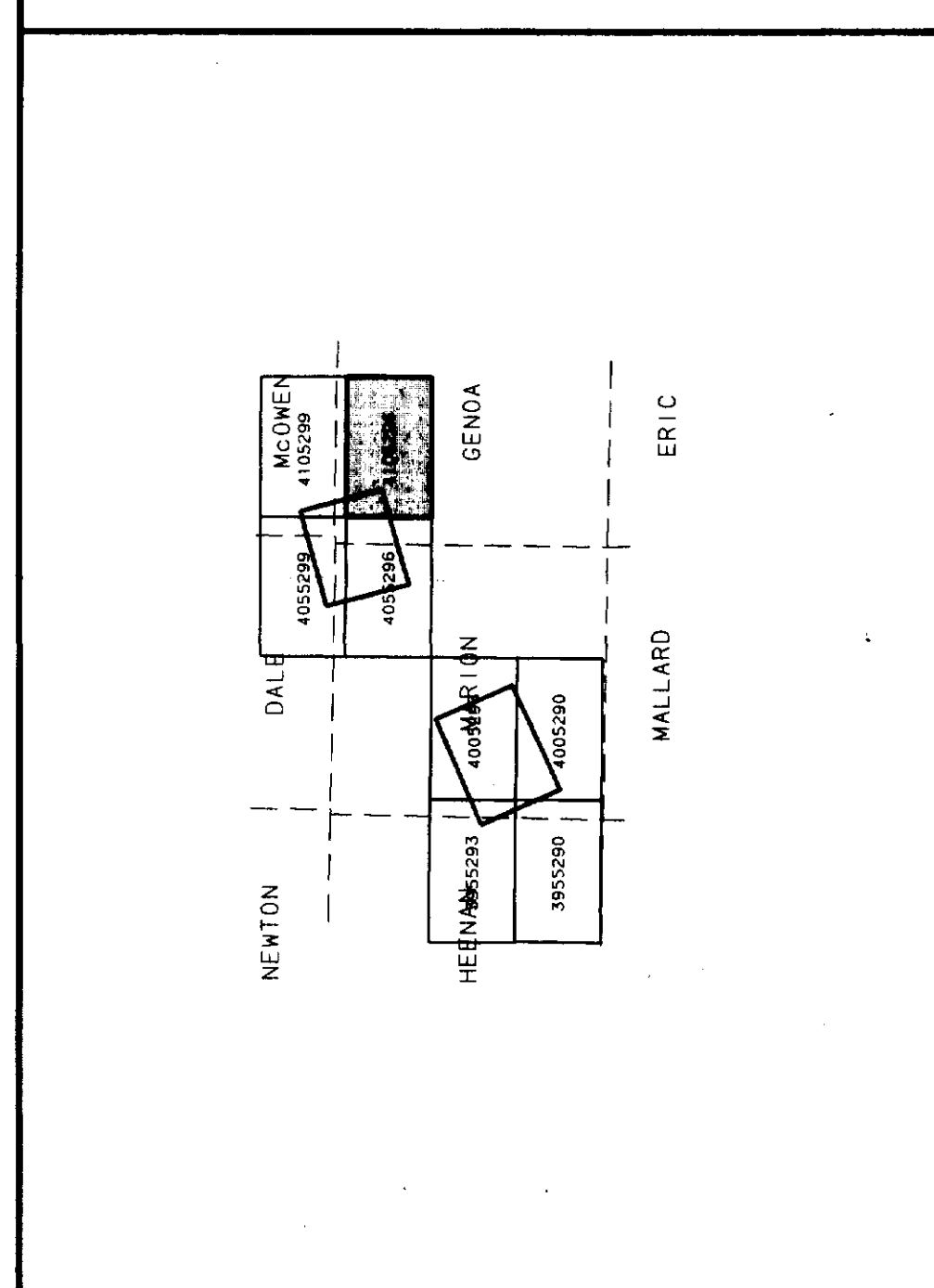
FALCONBRIDGE LIMITED

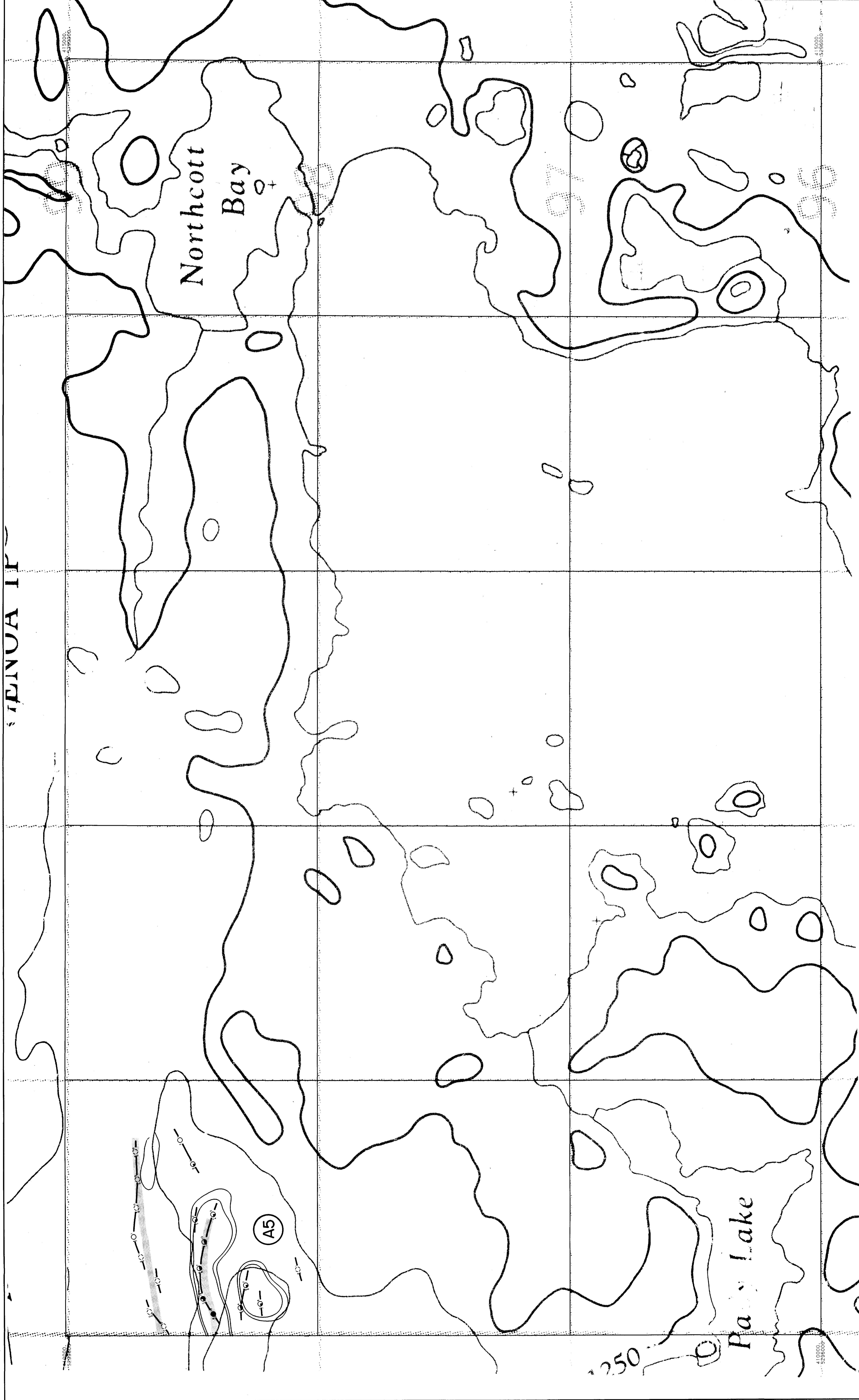
BASE MAP
2.14949
 GENOA TOWNSHIP CLAIMS (PN 8668)
 GENOA TOWNSHIP, ONTARIO

SCALE: 1:15,000
 0 100 200 300 Feet
 0 50 100 200 Meters

DATE: 1 MAR 1991
 NTS No: 41 0718
 MAP No: 4105296

AERODAT LIMITED





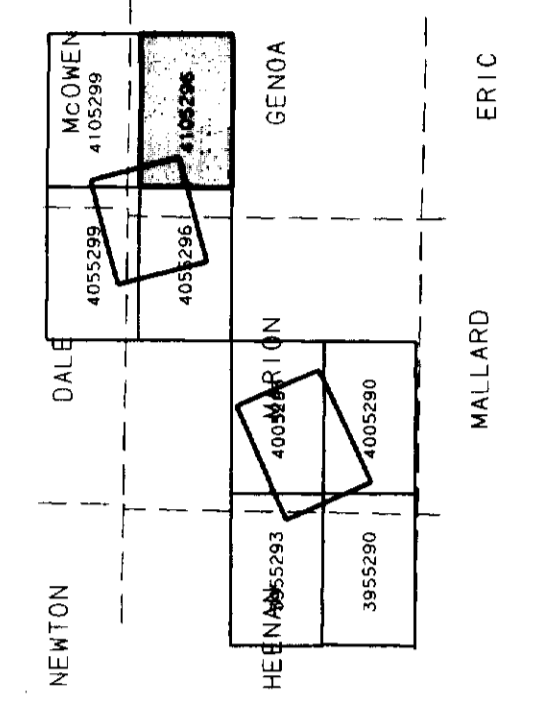
FALCONBRIDGE LIMITED

INTERPRETATION
2.14949
 GENOA TOWNSHIP CLAIMS (PN 8668)
 GENOA TOWNSHIP, ONTARIO

SCALE 1:15,000
 0 50 100 200 300 400 500 METERS
 0 100 200 300 400 500 FEET

DATE: MAR 1991
 NIS No: 41 0716
 MAP No: 4105296

AERODAT LIMITED



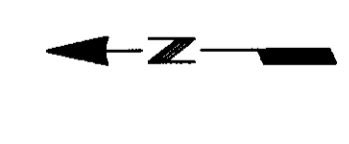
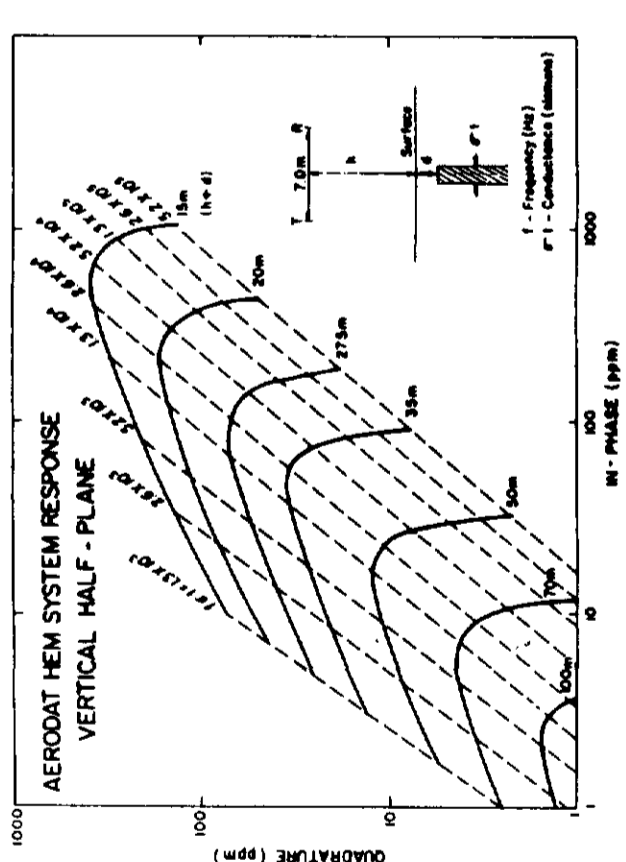
EM Anomalies
 Conductivity Thickness (mhos)

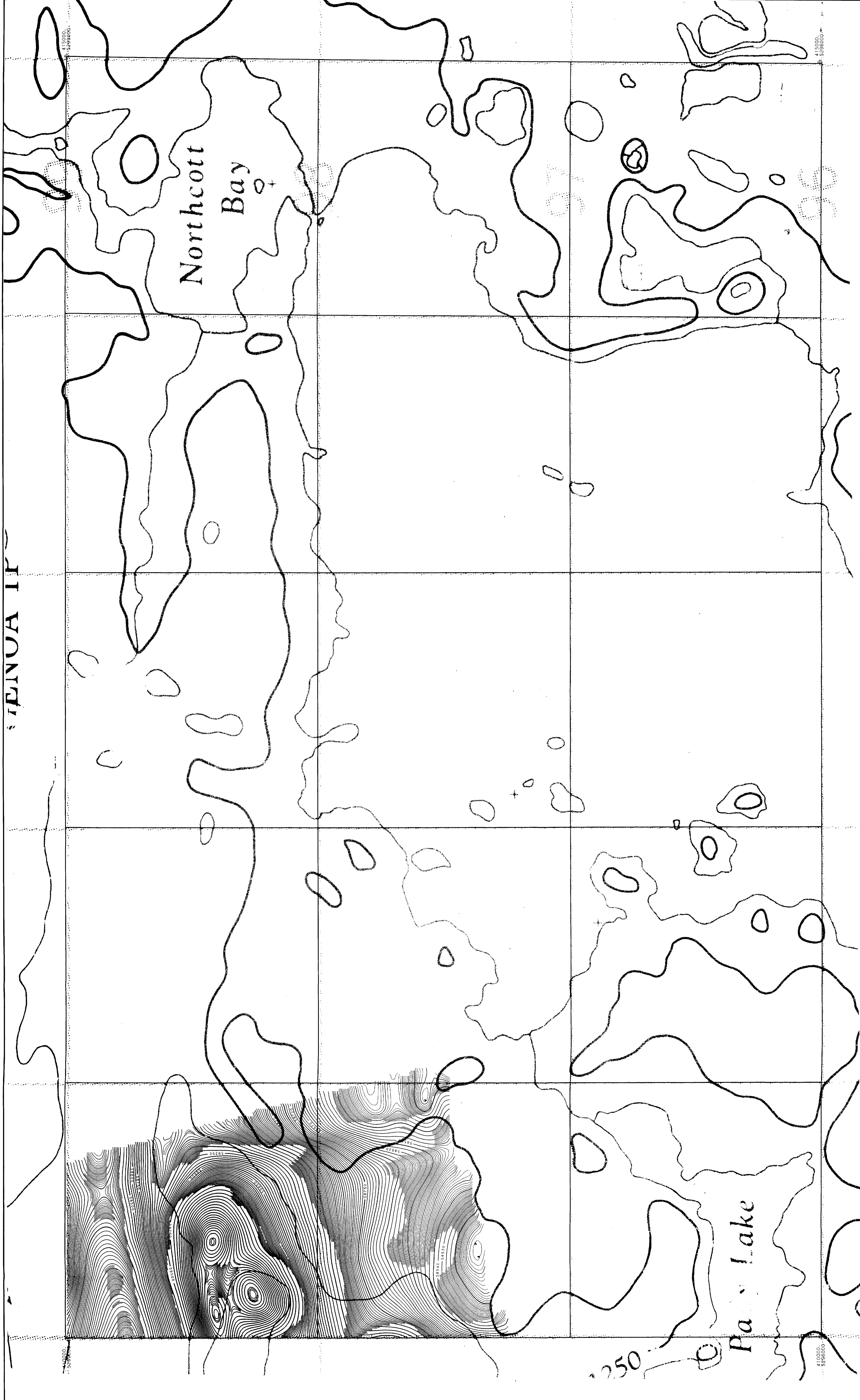
0 - 1
1 - 2
2 - 4
4 - 8
8 - 15
15 - 30
30 - 50
50 - 100

EM Anomaly A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z

INTERPRETATION LEGEND

Conductor Axis
Vertical Gradient Contour Lines
Vertical Gradient Contour Lines
Feature Fault
Target Light
VLF Conductivity Axis





GENOVA I.F.

FALCONBRIDGE LIMITED

TOTAL FIELD MAGNETIC CONTOURS

2-14949

GENOA TOWNSHIP CLAIMS (PN 8668)
GENOA TOWNSHIP, ONTARIO

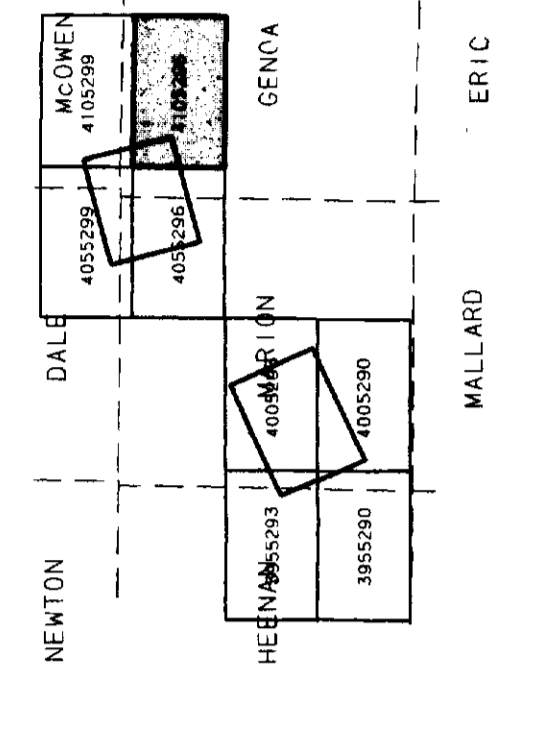
SCALE 1:15,000

DATE: MAR 1991

NIS No: 410716

MAP No: 4105296 (910)

AERODAT LIMITED



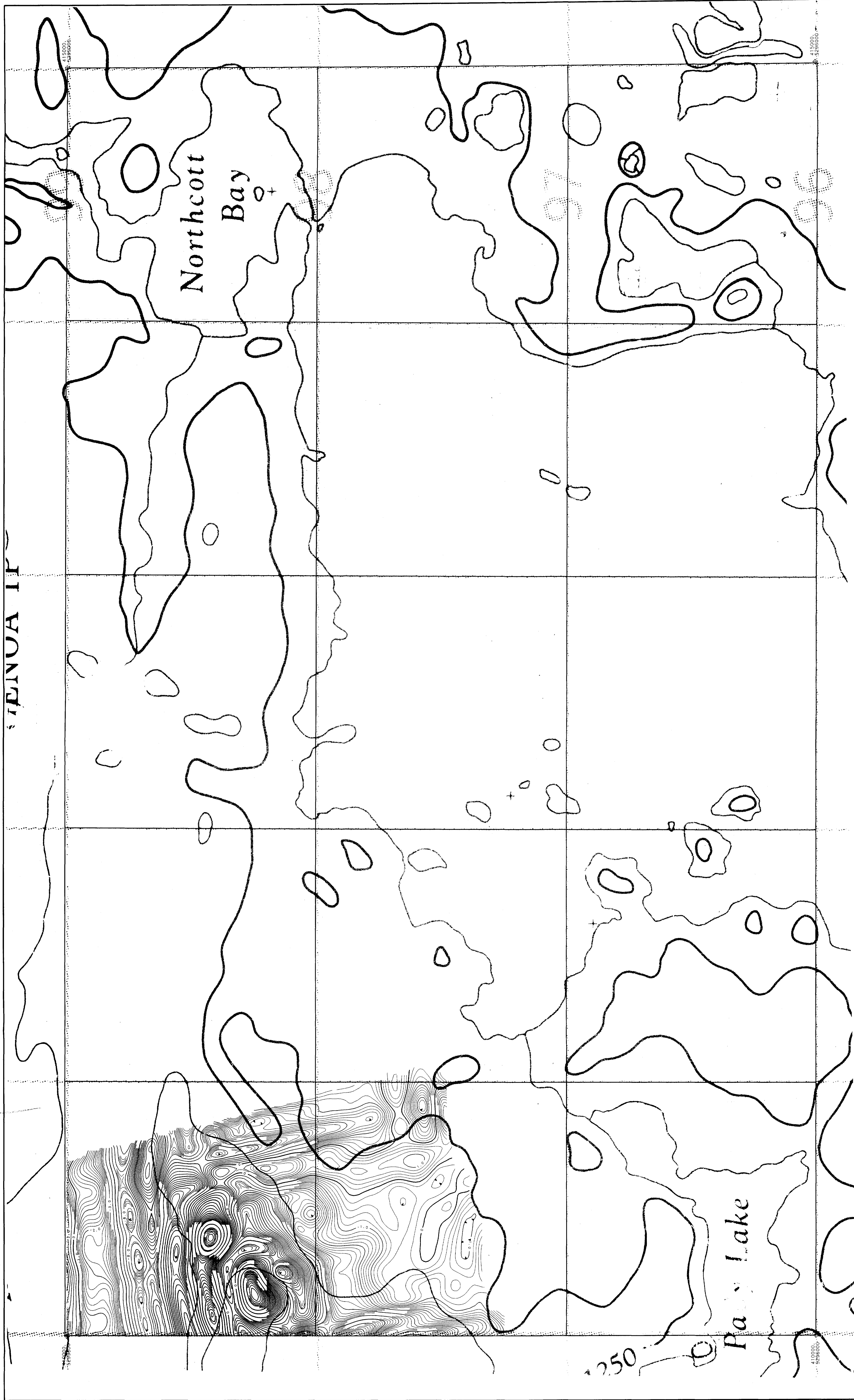
Magnetic

Total Field Magnetic Intensity
Contours in nT

Sensitivity
Sensor: GEOMATION 45m

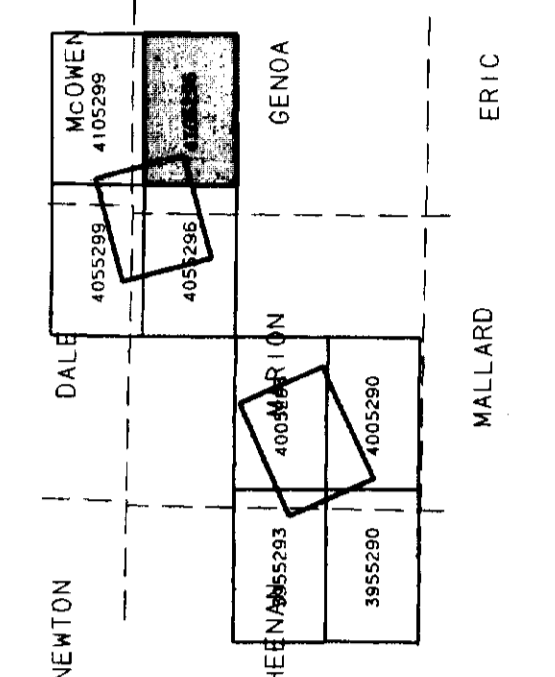
Map Contours are multiples of
2 nT
50 nT
100 nT
1000 nT





GENOVA IT

Vertical Gradient
 Vertical Magnetic Gradient
 calculated from the total field
 using a 100 Hz cesium
 magnetometer.
 Sensor elevation 45m
 Map projection UTM
 Contour interval 100 ft/m
 0.20 nT/m
 0.50 nT/m
 1.00 nT/m
 2.00 nT/m

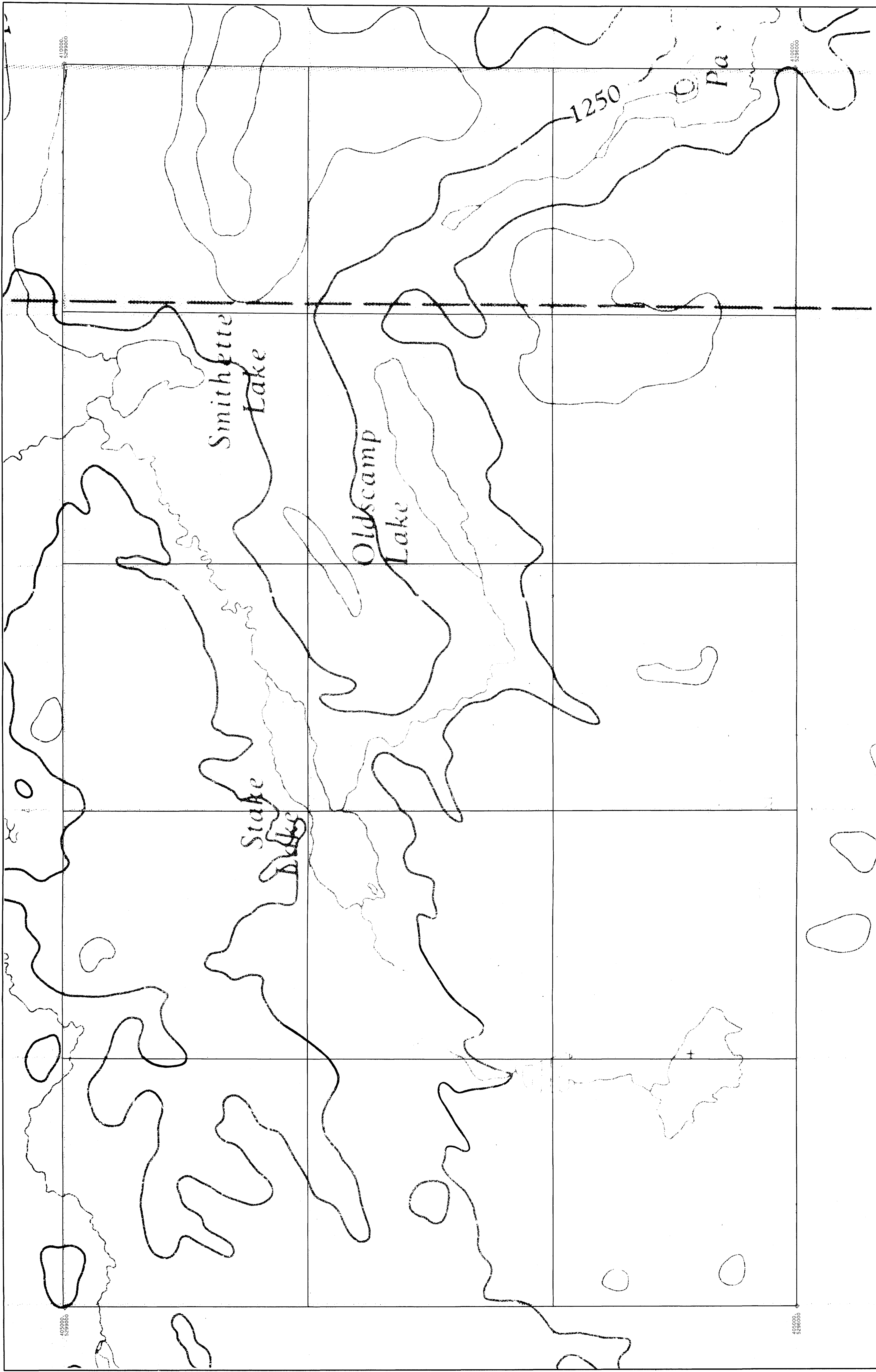


FALCONBRIDGE LIMITED
CALCULATED VERTICAL MAGNETIC GRADIENT
2-14949
 GENOA TOWNSHIP CLAIMS (PN 8668)
 GENOA TOWNSHIP, ONTARIO

SCALE 1:15,000
 0 100 200 300 400 500 METERS

DATE: MAR 1991
 INTS No: 41 0/16
 MAP No: 4105296
 J9101

AERODAT LIMITED



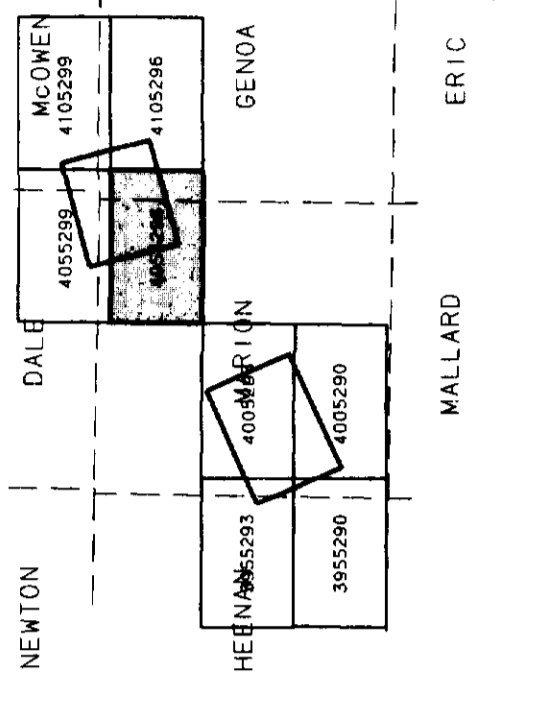
FALCONBRIDGE LIMITED

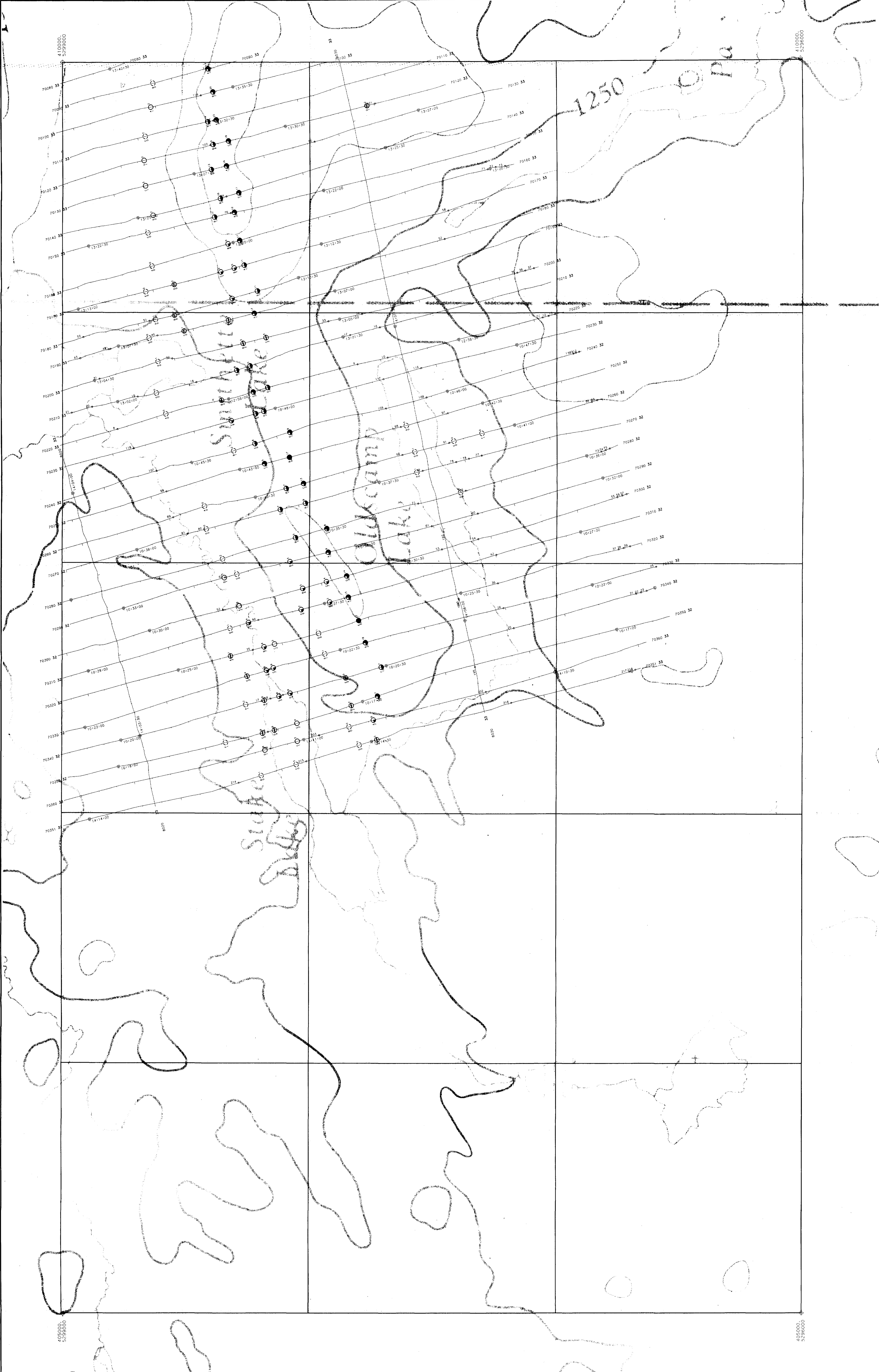
BASE MAP
2.14949
 GENDA TOWNSHIP CLAIMS (PN 8668)
 MARION TOWNSHIP, ONTARIO

SCALE: 1:15,000
 0 100 200 300 400 500 Feet
 0 50 100 150 200 Meters

DATE: MAR 1991
 NTS No: 41 0716
 MAP No: 4055206 (910)

AERODAT LIMITED





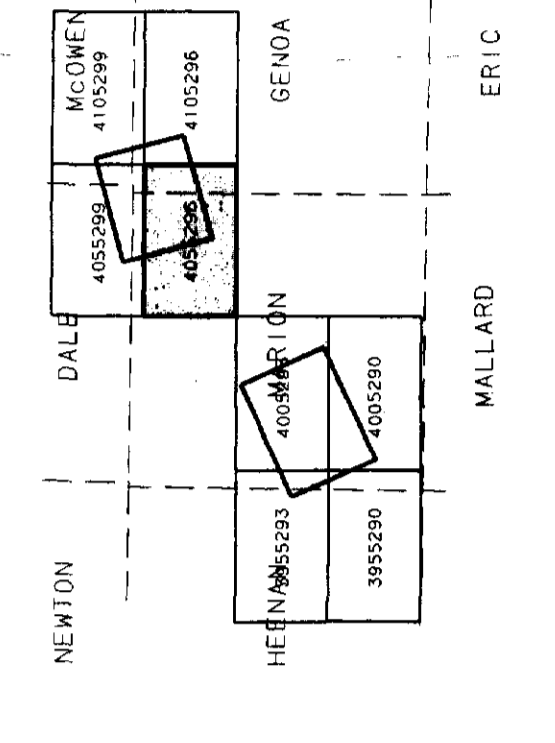
FALCONBRIDGE LIMITED

FLIGHT PATH
2.14949
 GENDA TOWNSHIP CLAIMS (PN 8668)
 MARION TOWNSHIP, ONTARIO

SCALE: 1:5,000
 0 100 200 300 400 500 METERS

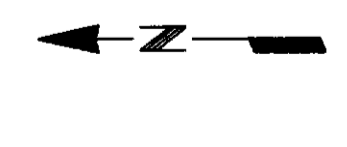
DATE: 1 MAR 1991
 NTS No: 41 0716
 MAP No: 4055296 (P10)

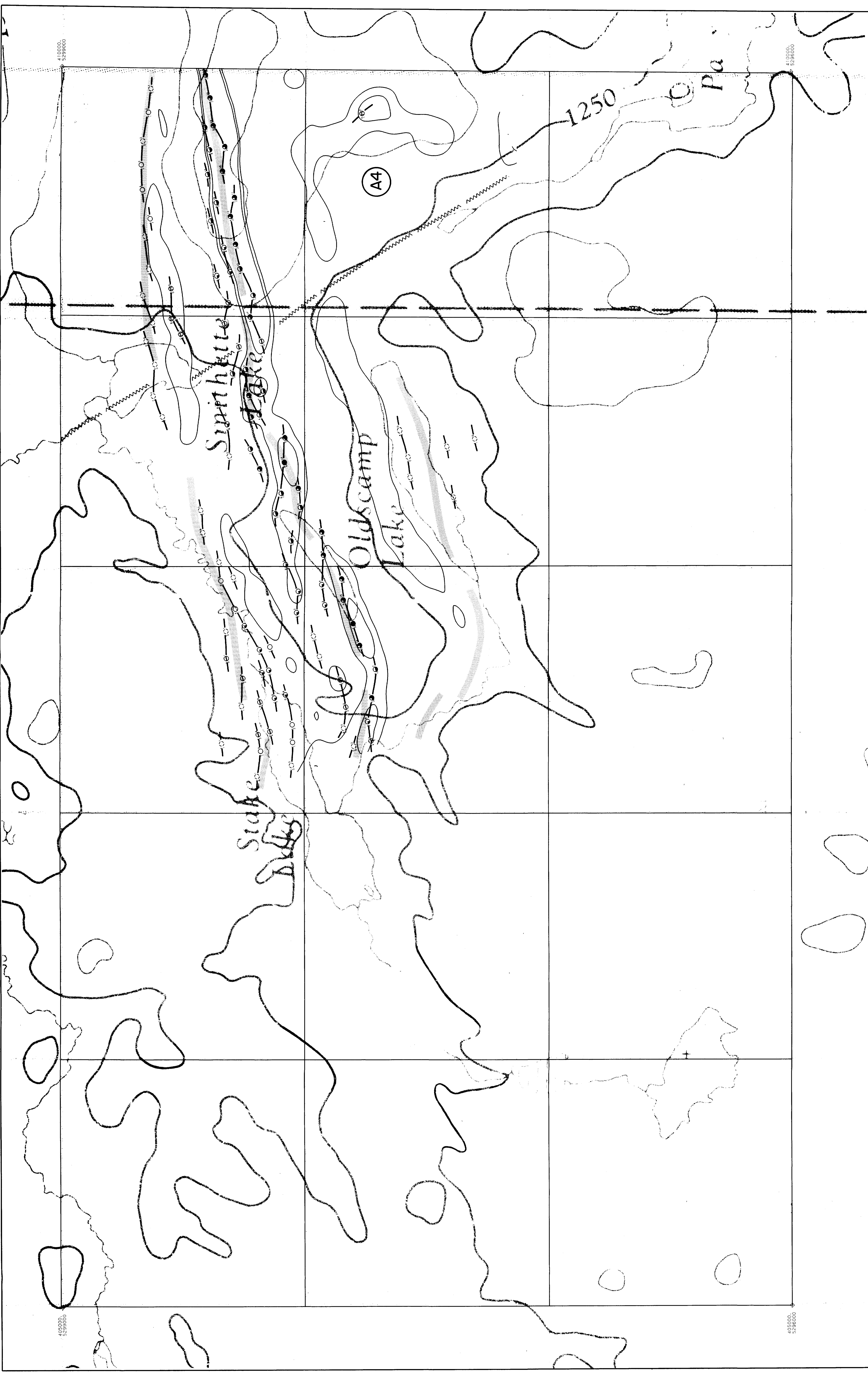
AERODAT LIMITED



- EM ANOMALIES**
 Conductivity (microhm/cm)
- 0 - 1
 - 2 - 3
 - 4 - 5
 - 6 - 7
 - 8 - 9
 - 10 - 15
 - 16 - 20
 - 21 - 30
 - 31 - 50
 - 51 - 100
 - 101 - 200
 - 201 - 500
 - 501 - 1000
 - 1000+
- Legend symbols:
 ○ Magnetic Anomaly
 ○ Genda
 ○ MALLARD
 ○ EPIC

Flight Path
 Navigation and recovery using
 Motorola MTR-1000 (DME 111)
 Average terrain clearance 60m
 Average line spacing 100m





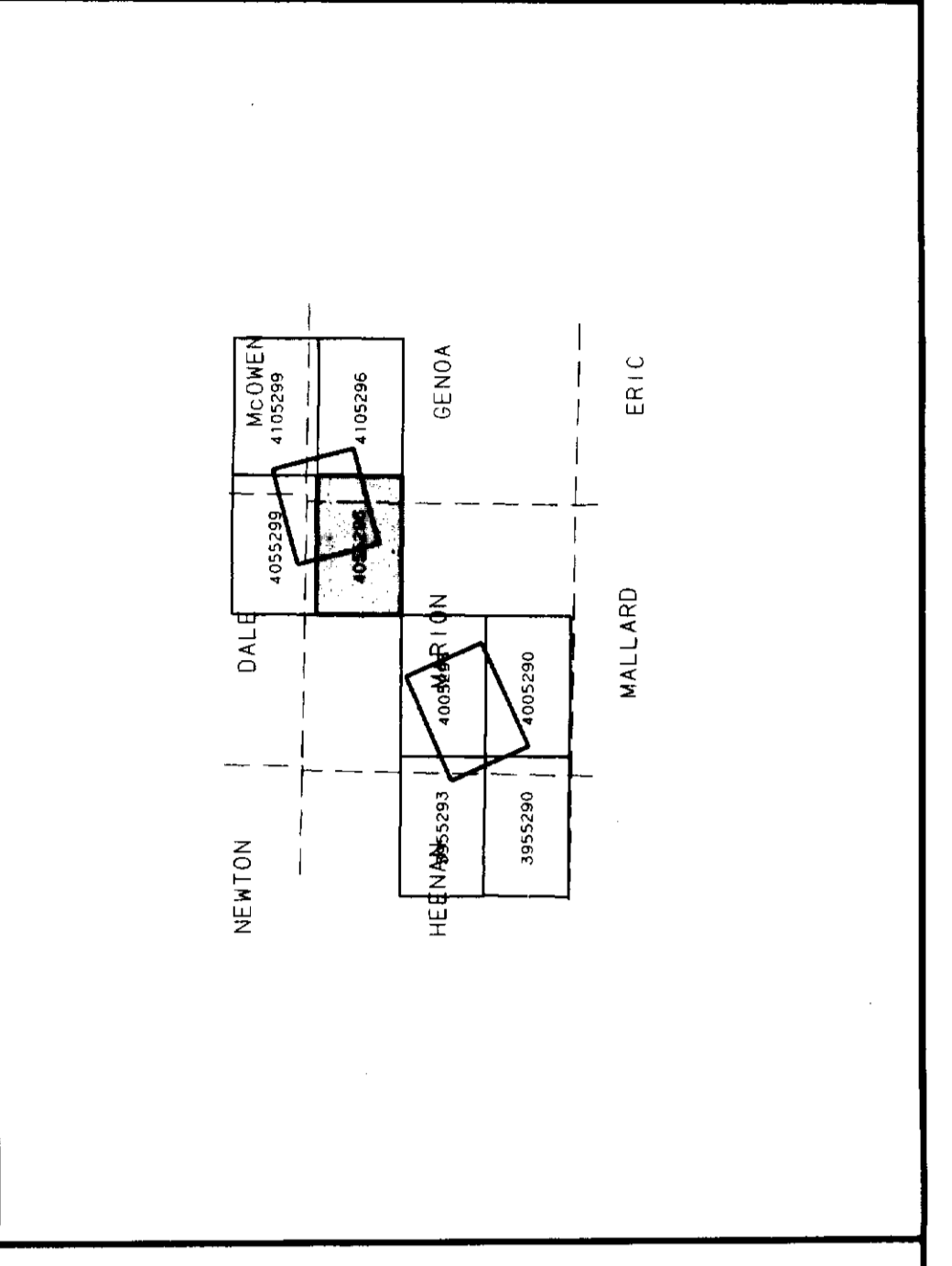
FALCONBRIDGE LIMITED

INTERPRETATION
2.14949
 GENOA TOWNSHIP CLAIMS (PN 8668)
 MARION TOWNSHIP, ONTARIO

SCALE: 1:15,000
 0 50 100 150 200 Feet
 0 50 100 150 200 Meters

DATE: MAR 1991
 NTS NO.: 41 0716
 MAP NO.: 4055296 (910)

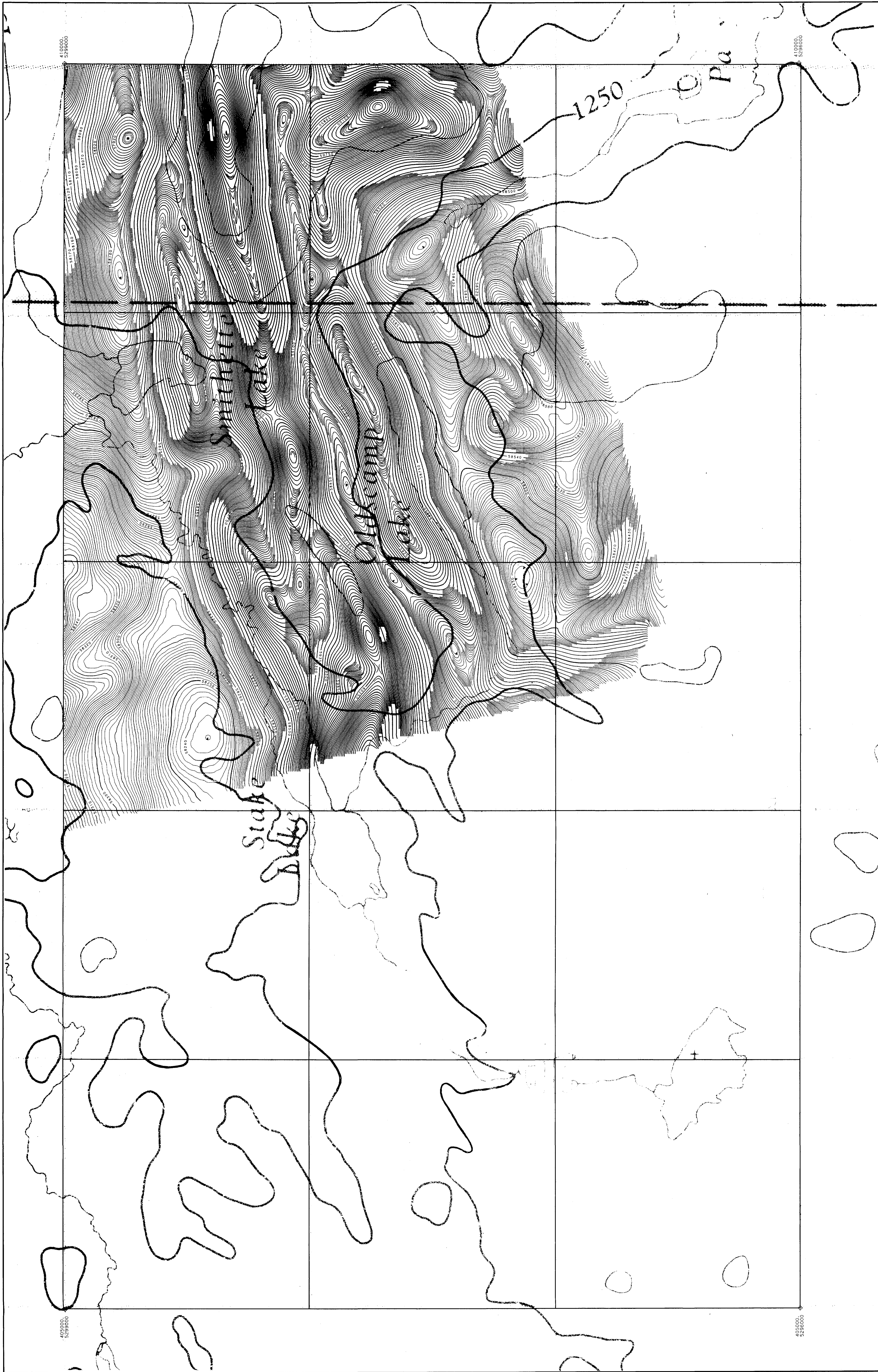
AERODAT LIMITED



EM ANOMALIES

Conductivity Thickness (EMU)

0 - 1
2 - 4
4 - 8
8 - 16
16 - 32
32 - 64
64 - 128
128 - 256
256 - 512
512 - 1024
1024 - 2048
2048 - 4096
4096 - 8192
8192 - 16384
16384 - 32768
32768 - 65536
65536 - 131072
131072 - 262144
262144 - 524288
524288 - 1048576
1048576 - 2097152
2097152 - 4194304
4194304 - 8388608
8388608 - 16777216
16777216 - 33554432
33554432 - 67108864
67108864 - 134217728
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FALCONBRIDGE LIMITED

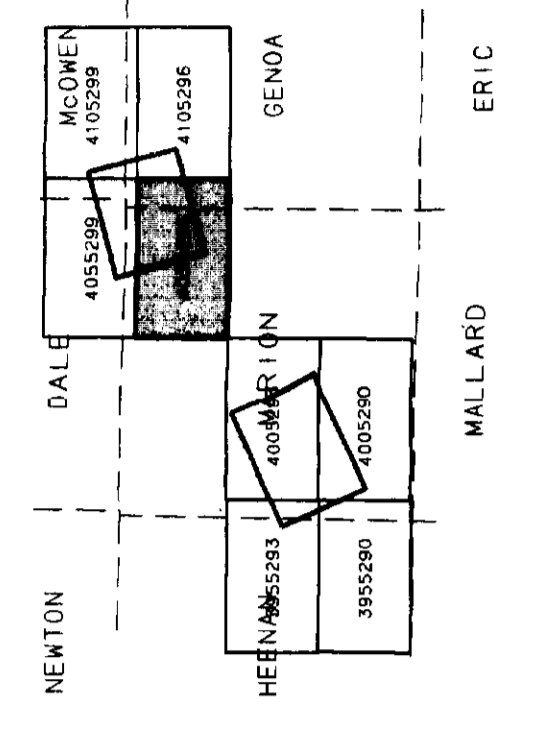
TOTAL FIELD MAGNETIC CONTOURS
2.14949

GENOA TOWNSHIP CLAIMS (PN 8668)
 MARION TOWNSHIP, ONTARIO

SCALE: 1:15,000
 0 100 200 300 400 500 METRES

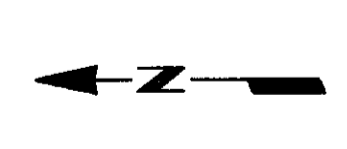
DATE: MAR 1991
 NTS No: 41 0716
 MAP No: 4055296 #101

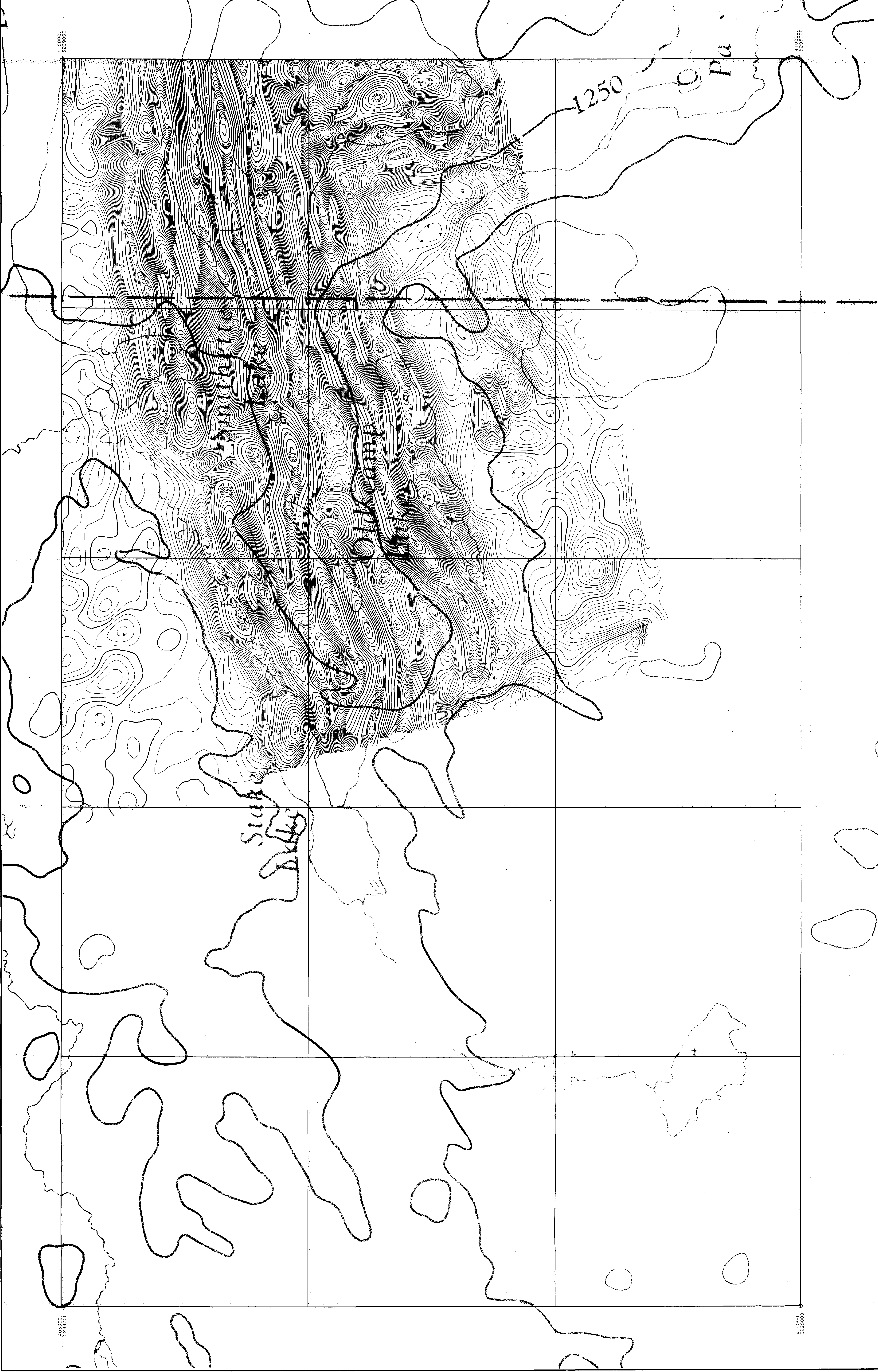
AERODAT LIMITED



Magnetics

Total Field Magnetic Intensity Contours in nT
 Contour Interval: 10 nT
 Sensor elevation: 45m
 Map contours are multiples of 100 nT
 200 nT
 300 nT
 400 nT
 500 nT
 600 nT
 700 nT
 800 nT
 900 nT
 1000 nT





FALCONBRIDGE LIMITED

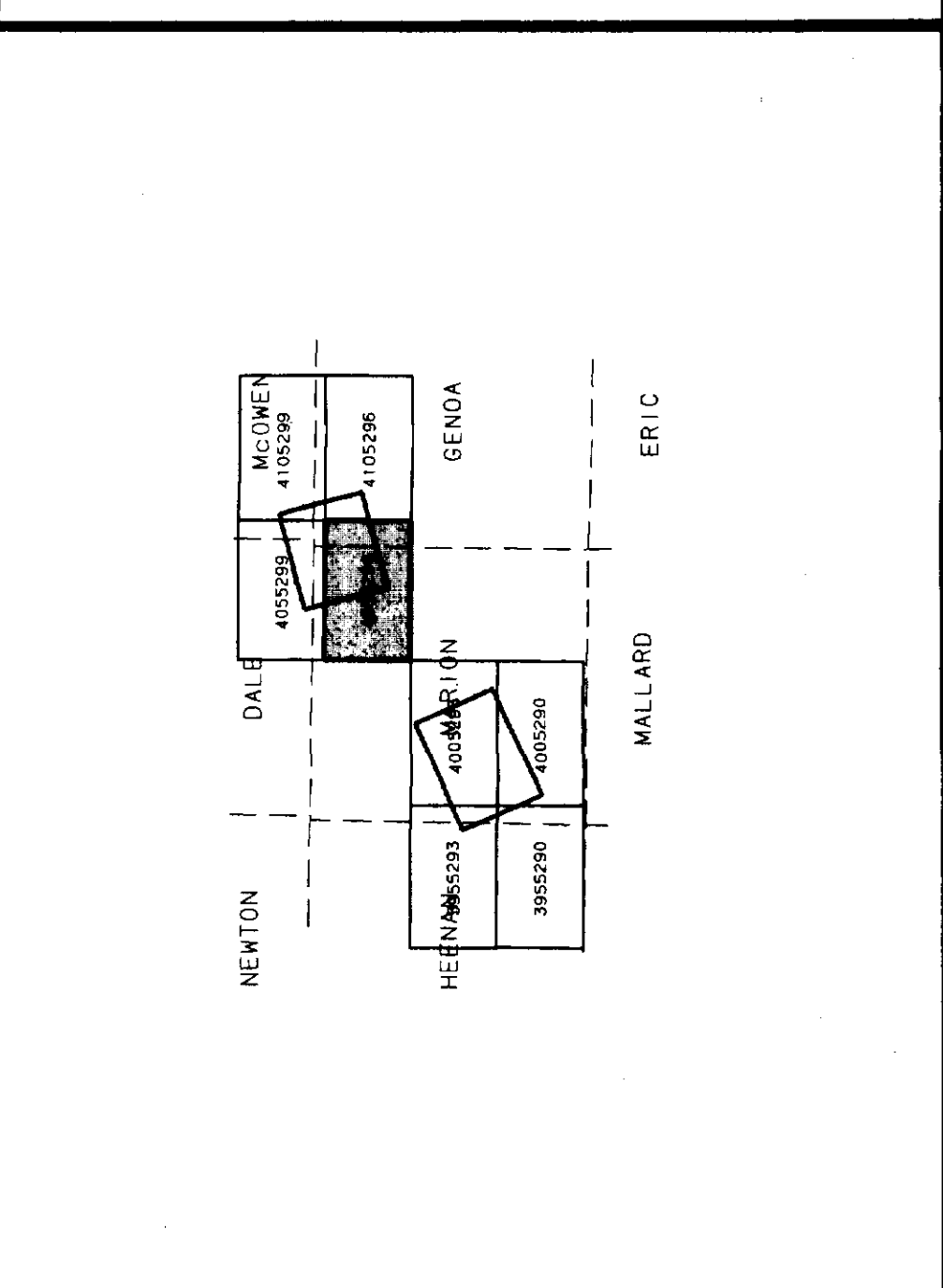
CALCULATED VERTICAL MAGNETIC GRADIENT
2.14949

GENDA TOWNSHIP CLAIMS (PN 8668)
 MARION TOWNSHIP, ONTARIO

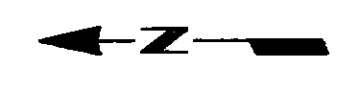
SCALE 1:5,000
 0 50 100 200 300 Feet
 0 50 100 200 300 Meters

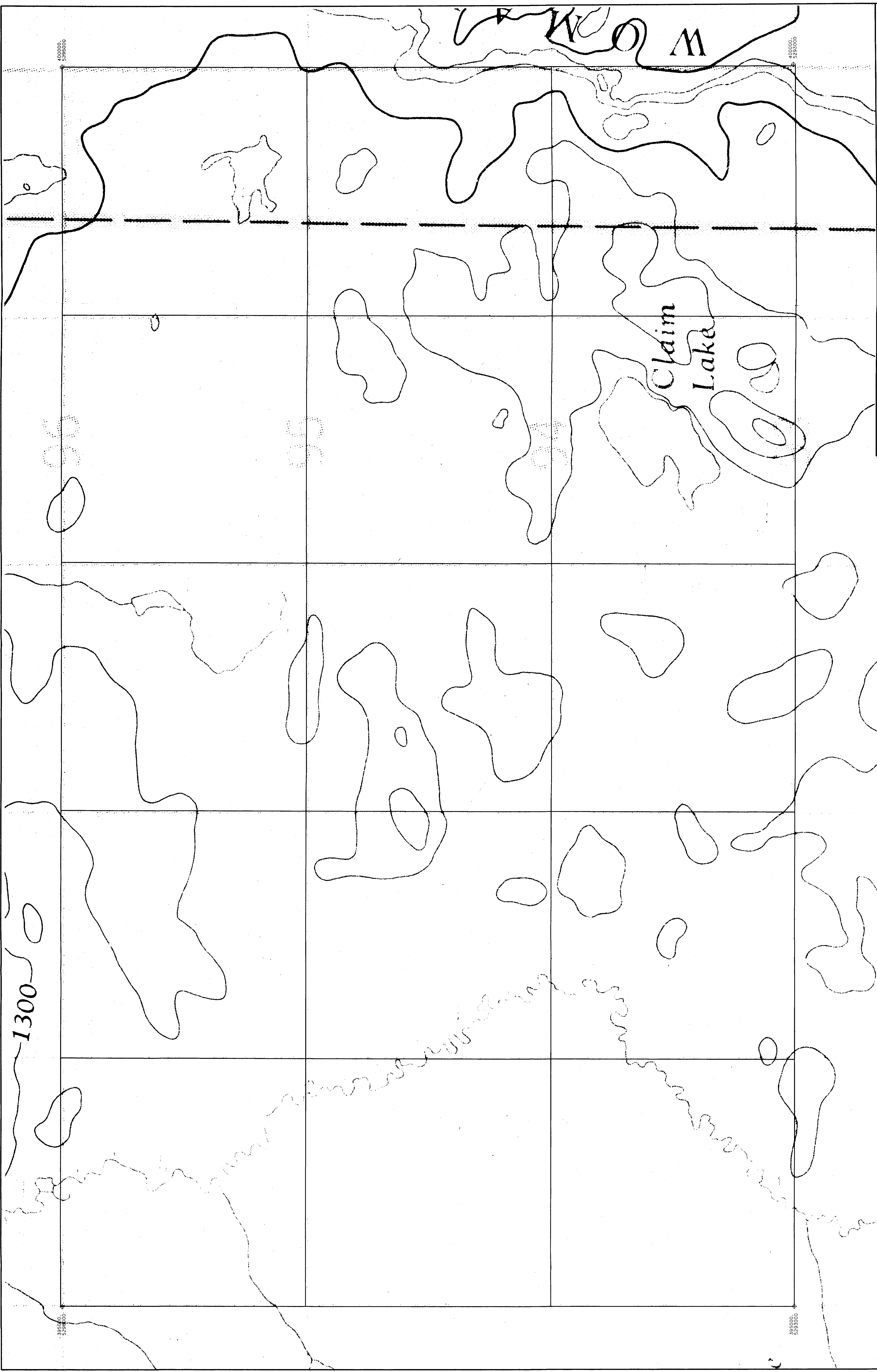
DATE: MAR 1991
 NTS No.: 41 07/16
 MAP No.: 4055296

AERODAT LIMITED



Vertical Gradient
 Vertical Magnetic Gradient
 calculated from the total field
 intensity using the following
 Geomagnetic parameters:
 Geomagnetic field intensity
 magnetometer.
 Sensor elevation 45m
 Map projection UTM
 Map datum NAD 83
 Map scale 1:5000
 Map projection UTM
 Map datum NAD 83
 Map scale 1:5000





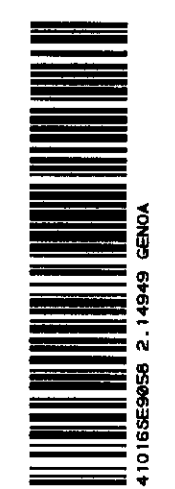
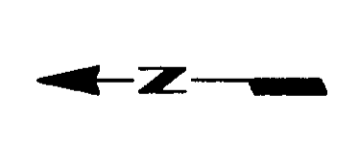
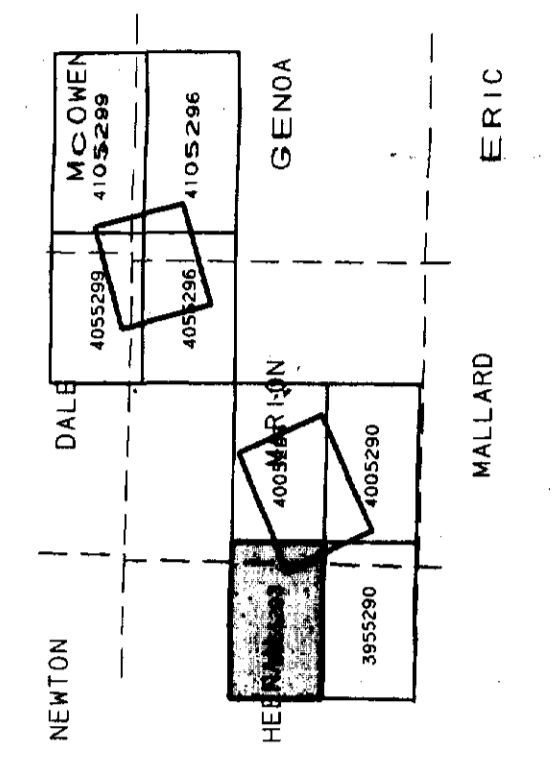
FALCONBRIDGE LIMITED

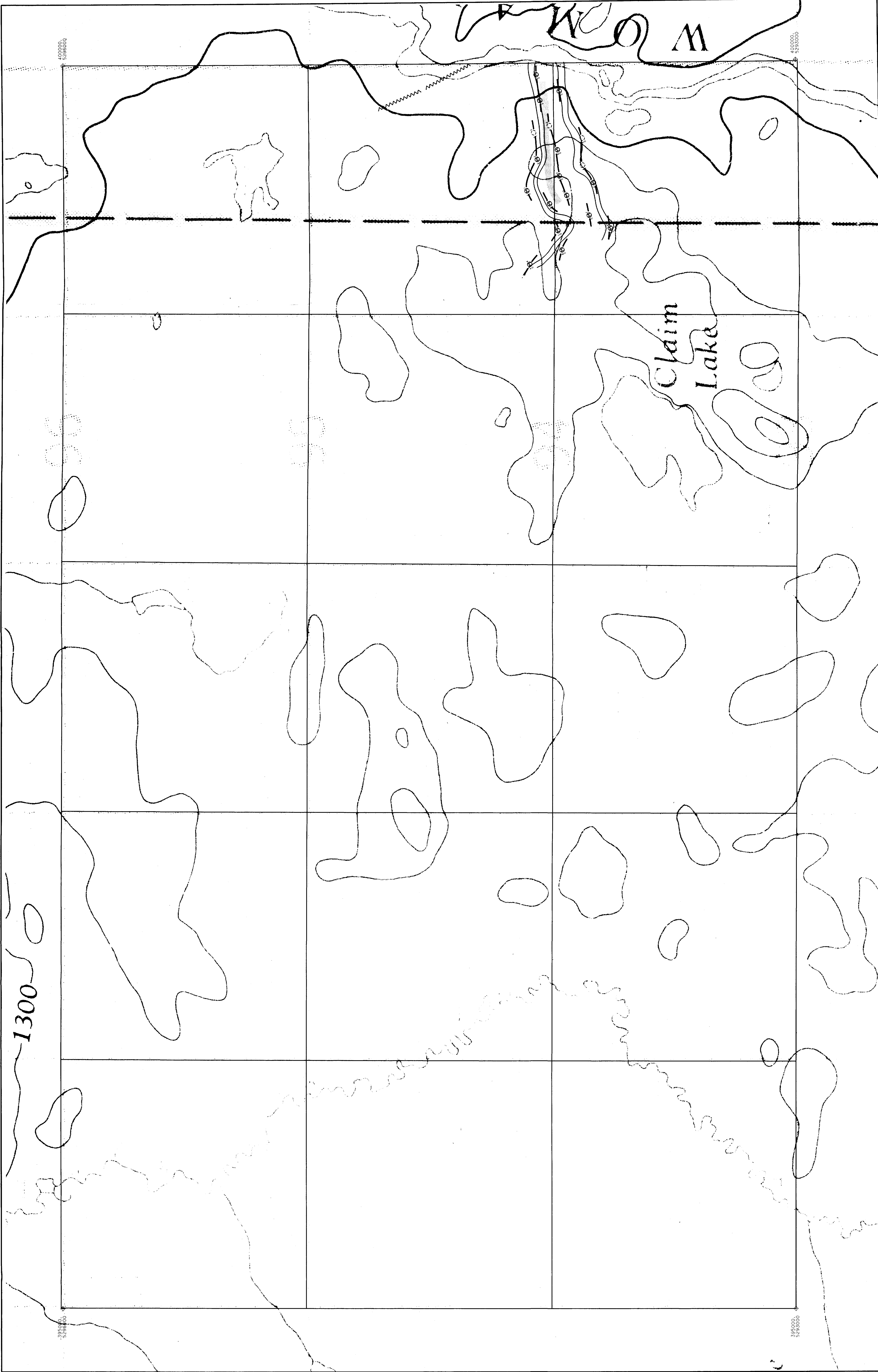
BASE MAP
2.149.49
 GENOA TOWNSHIP CLAIMS (PN 8668)
 HEESMAN TOWNSHIP, ONTARIO

SCALE: 1:5,000
 0 50 100 200 300 400 500 METERS

DATE: MAR 1991
 NTS NO: 41 0/16
 MAP NO: 3955293
 J9101

AERODAT LIMITED





FALCONBRIDGE LIMITED

INTERPRETATION

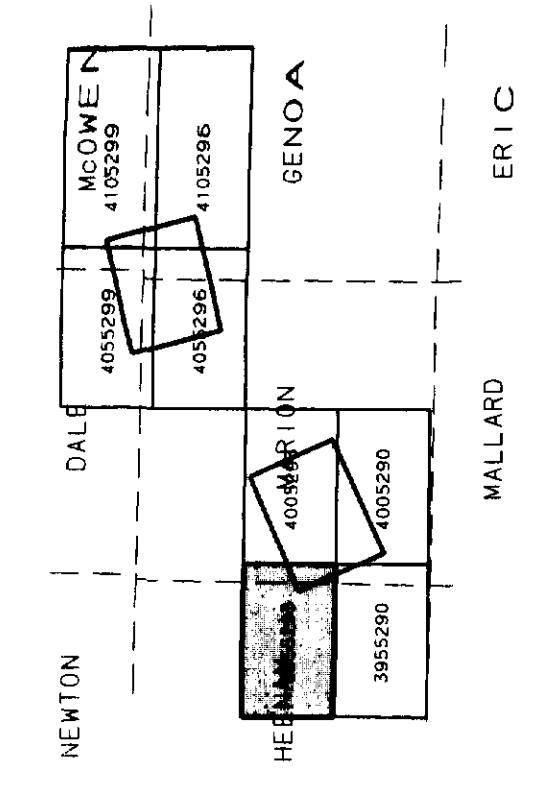
2.14949

GENOA TOWNSHIP CLAIMS (PN 8668)
HEBMAN TOWNSHIP, ONTARIO

SCALE 1:15,000 1:250 Feet 1:500 Meters

DATE: MAR 1991
NTS No: 41-0716
MFP No: 3955293

AERODAT LIMITED



EM ANOMALIES

Conductivity Thickness (mhos)

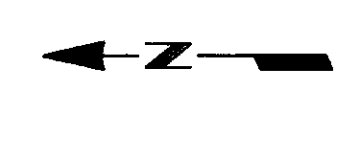
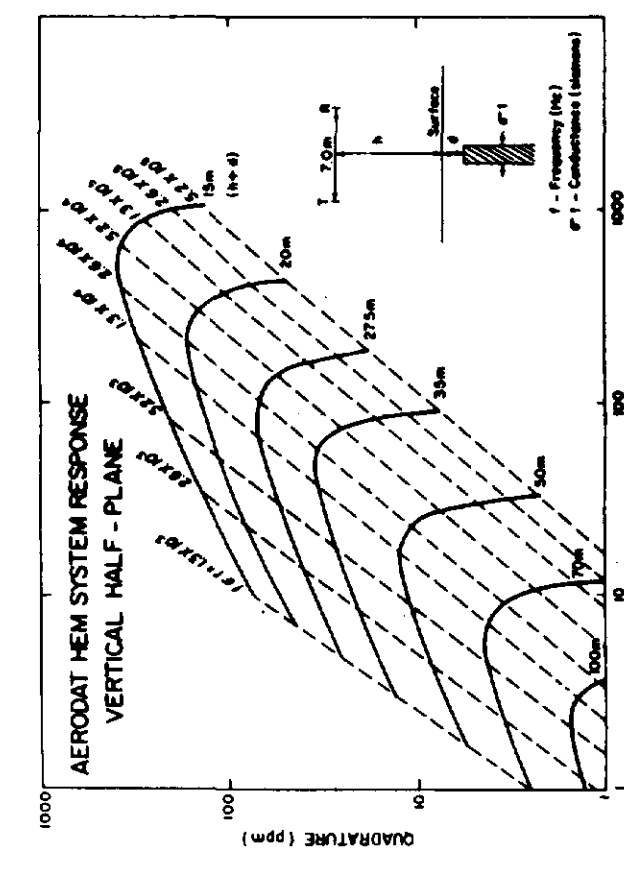
0 - 1
2 - 2
3 - 3
4 - 8
8 - 15
15 - 20

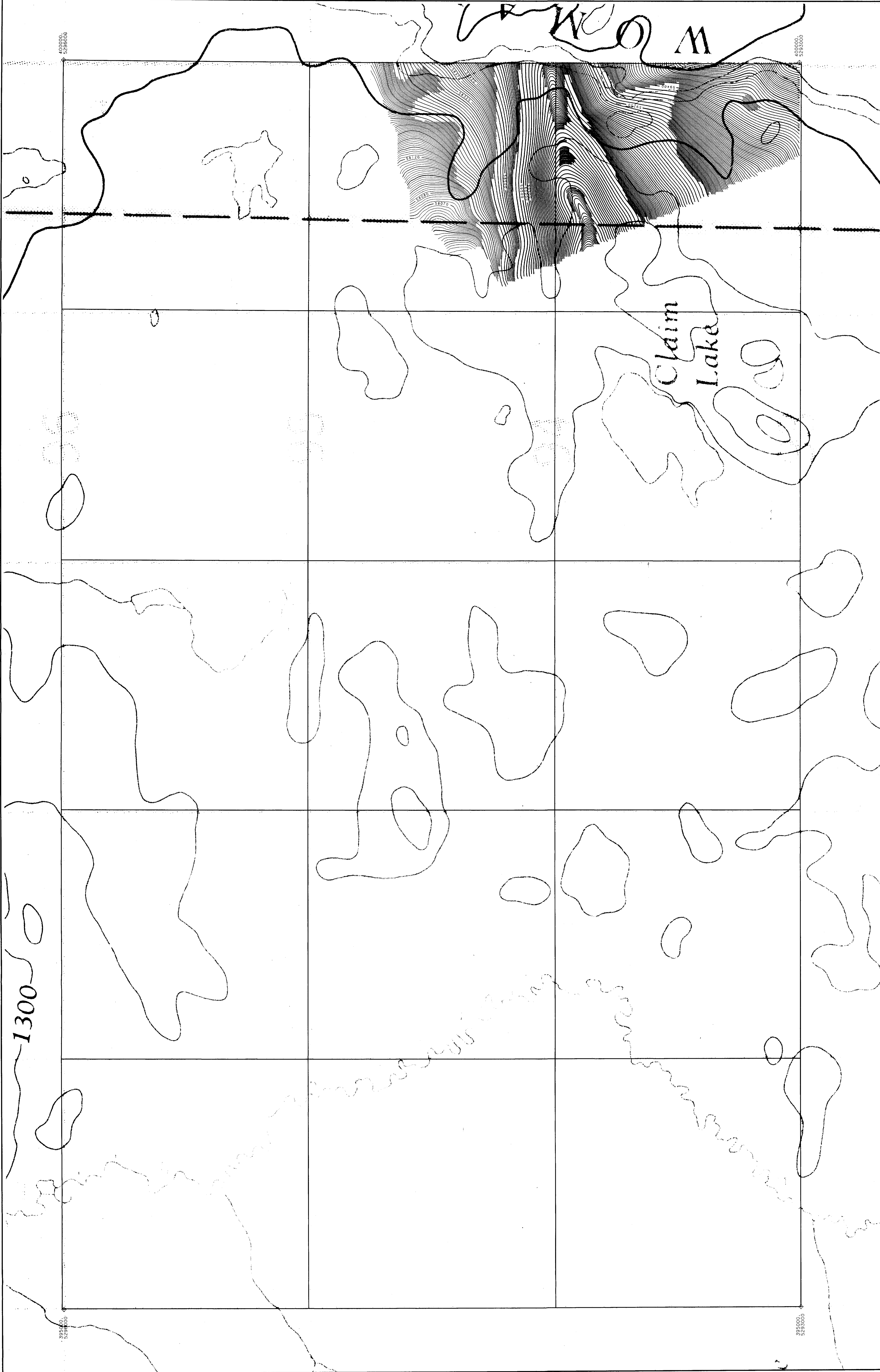
● Negative anomaly

○ High anomaly, > 100%
○ Low anomaly, < 100%
○ 2 mhos (10000)

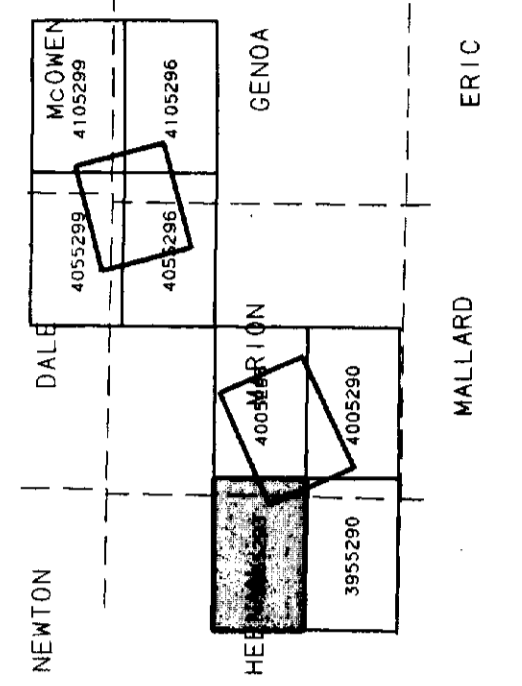
INTERPRETATION LEGEND

- Conductor Axis
- Vertical Gradient Control Line
- ±500m and ±1000m
- Possible Fault
- Target Load
- VLF Conductor Axis





Magnetics
 Total Field Magnetic Intensity
 Contours in mT
 Cesium high sensitivity
 magnetometer
 Sensor elevation 45m
 Map contours are multiples of
 10 mT
 250 mT
 500 mT
 1000 mT



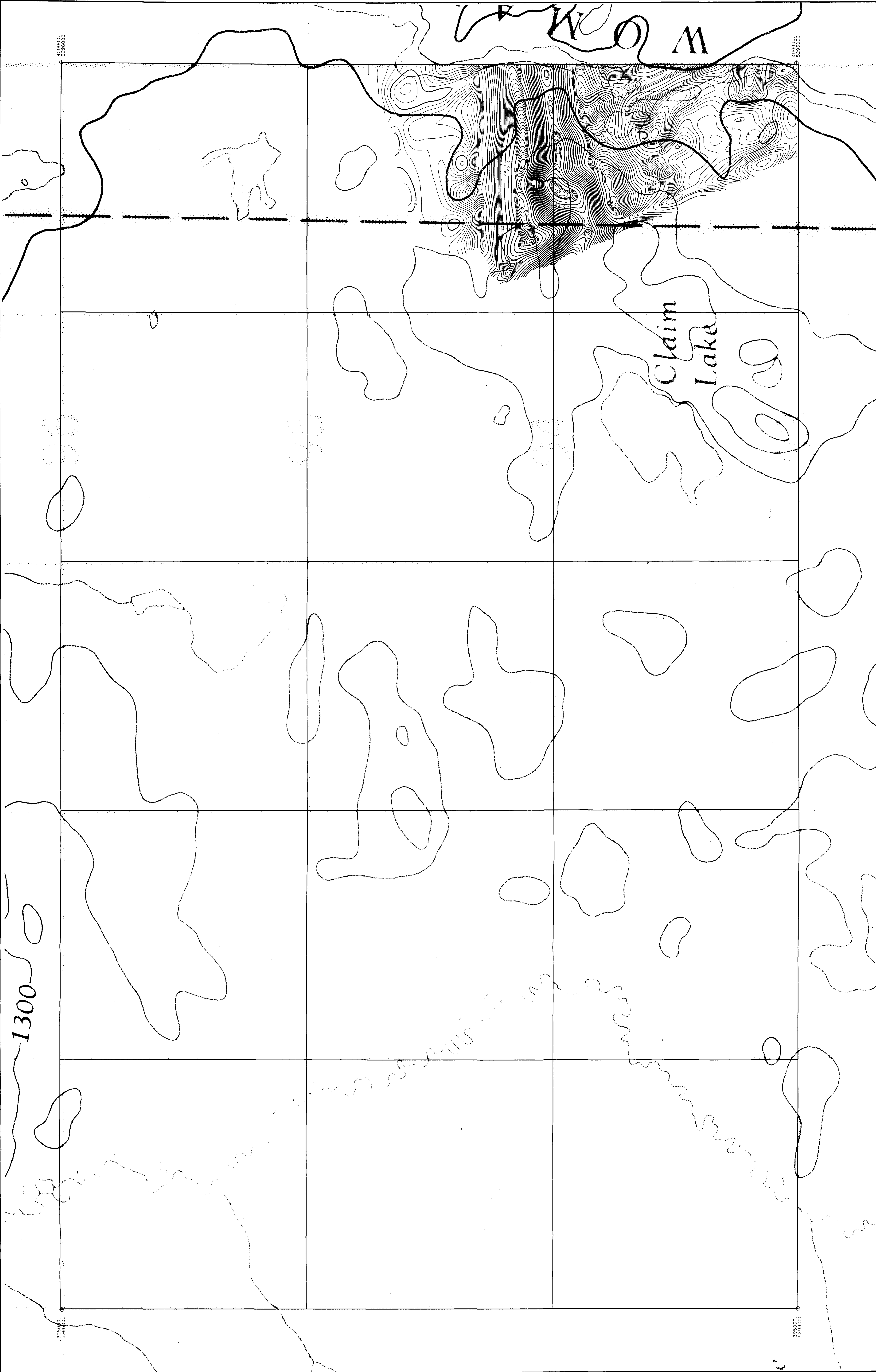
FALCONBRIDGE LIMITED

TOTAL FIELD MAGNETIC CONTOURS
2.14949
 GENOX TOWNSHIP CLAIMS (PN 8688)
 HERMAN TOWNSHIP, ONTARIO

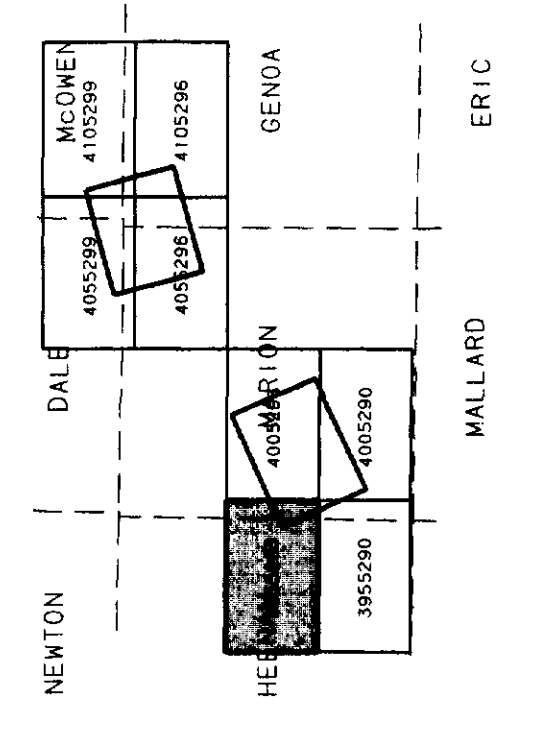
SCALE 1:5,000
 0 50 100 200 300 400 500 Feet
 0 50 100 200 300 400 Meters

AERODAT LIMITED

DATE: MAR 1991
 NTS No: 41 0716
 MAP No: 395293



Vertical Gradient
 Vertical Magnetic Gradient lines
 magnetic intensity in nT/m
 Cassini high sensitivity
 Sensor elevation 45m
 Map contours are multiples of
 1.00 nT/m
 2.00 nT/m
 5.00 nT/m
 10.00 nT/m



FALCONBRIDGE LIMITED

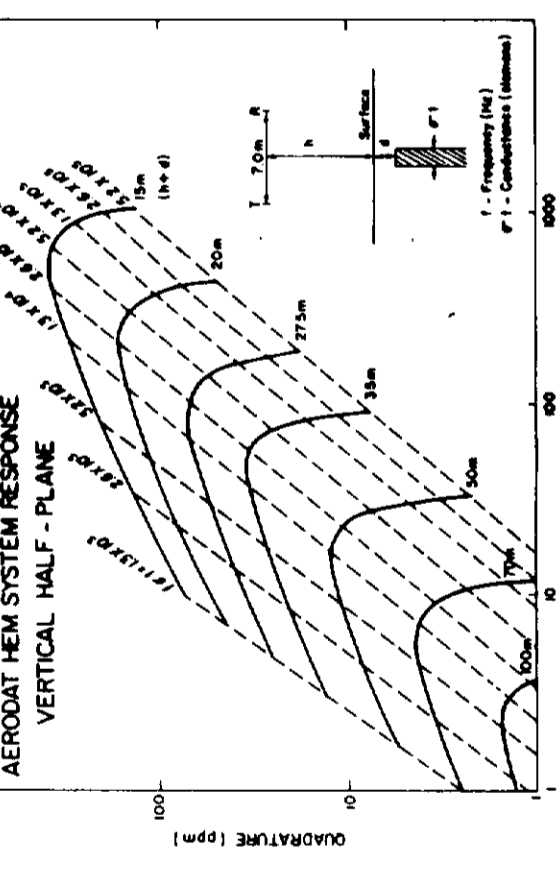
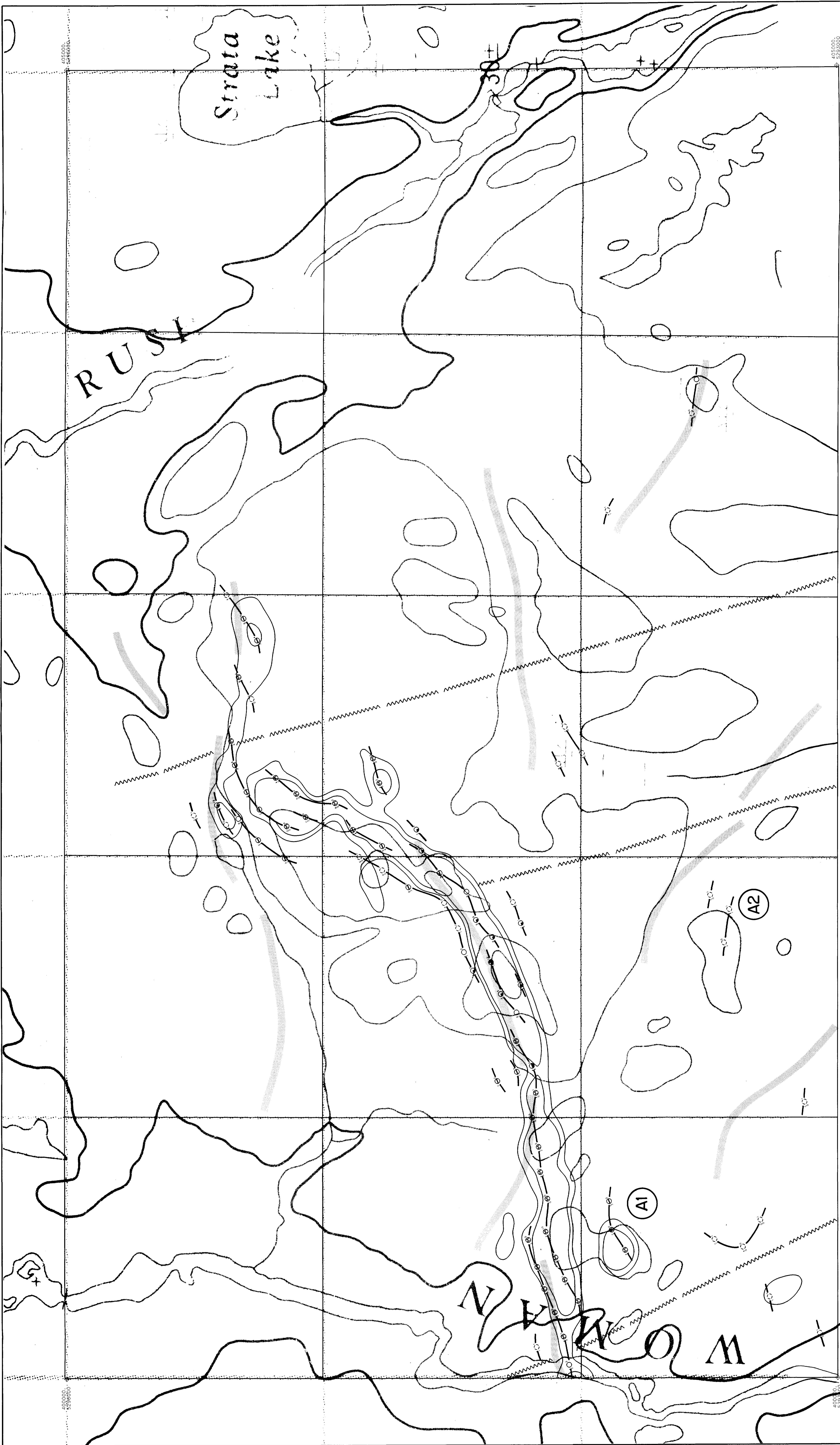
CALCULATED VERTICAL MAGNETIC GRADIENT

2.14949
 GENOA TOWNSHIP CLAIMS (FN 8668)
 HERMAN TOWNSHIP, ONTARIO

SCALE 1:15,000
 0 100 200 300 400 500 METERS

DATE: MAR 1991
 NTS NO: 41 0716
 MAP NO: 3955293

AERODAT LIMITED



INTERPRETATION LEGEND

- Conductor Axis
- Vertical Gradient Contour Lines
- Positive Peak
- Target Label
- VLF Conductor Axis

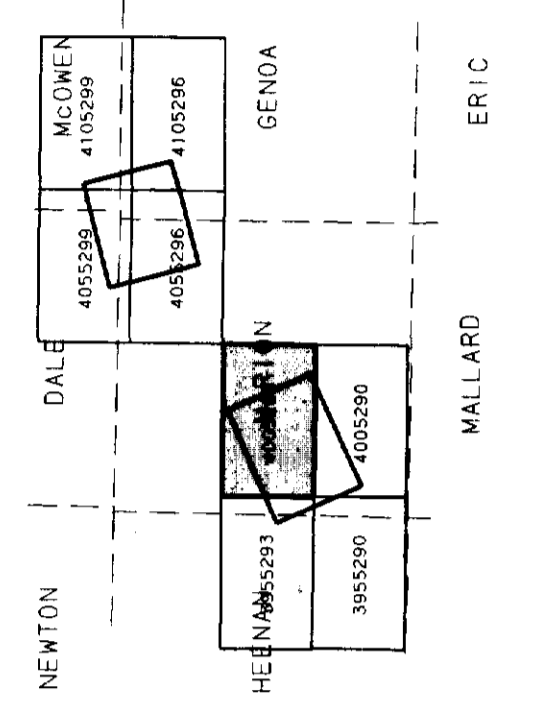
EM Anomalies

CONDUCTIVITY (S/M) VALUES (EMSI)

- 0 - 1
- 1 - 2
- 2 - 4
- 4 - 8
- 8 - 15
- 15 - 30
- > 30

Regularity number

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16
- 17
- 18
- 19
- 20
- 21
- 22
- 23
- 24
- 25
- 26
- 27
- 28
- 29
- 30



FALCONBRIDGE LIMITED

INTERPRETATION

2-14949

GENOA TOWNSHIP CLAIMS (FN 8668)

MARION TOWNSHIP, ONTARIO

SCALE 1:15,000

DATE: MAR 1991

NIS NO: 47 0716

MFP NO: 405523

AERODAT LIMITED

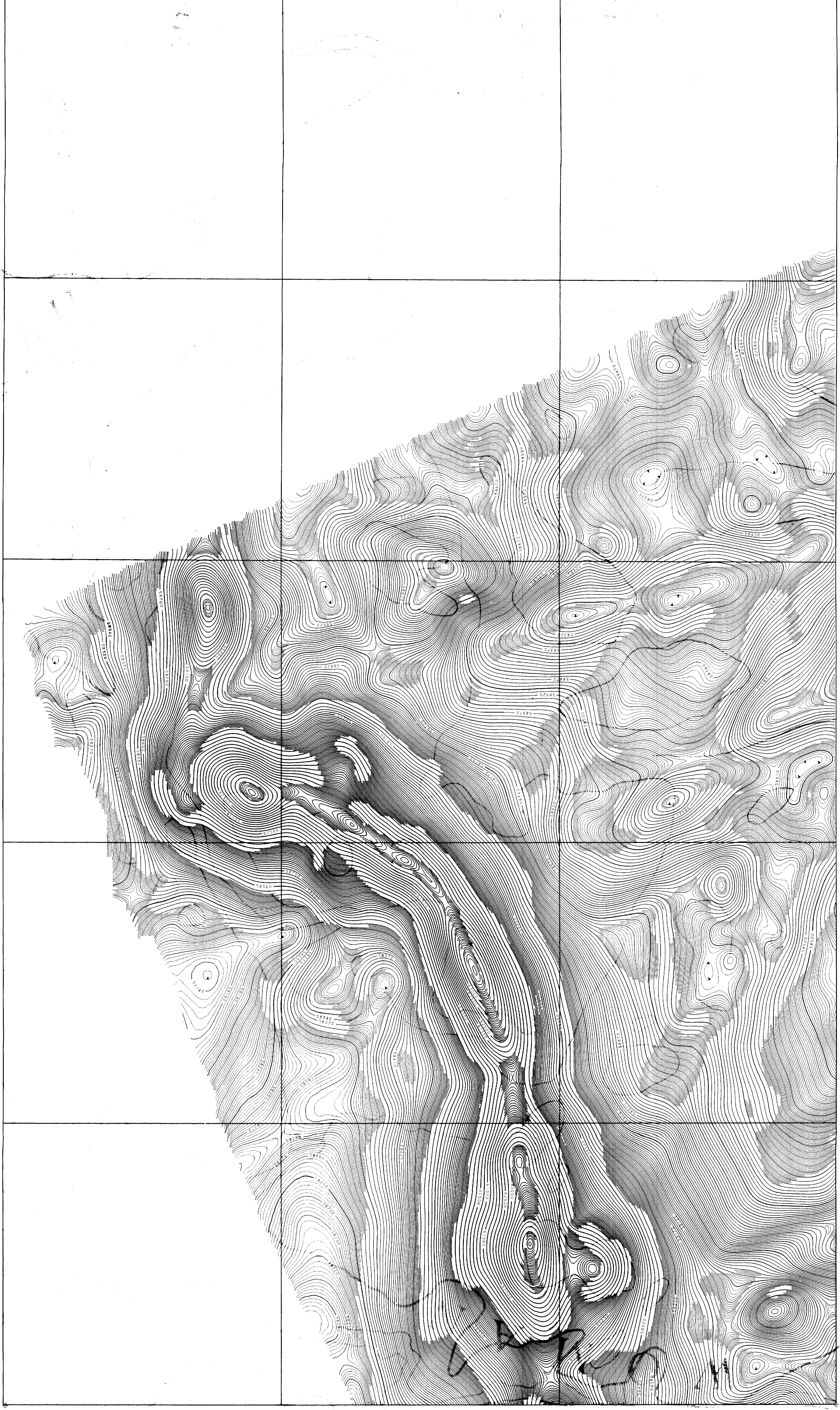
©1991

405000
5296000

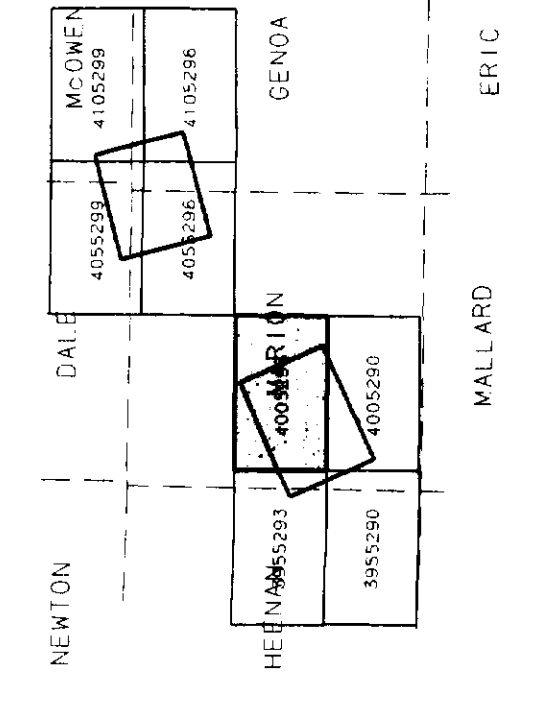
405000
5296000

405000
5296000

405000
5296000



Magnetics
 Total Field Magnetic Intensity
 Contours in nT
 Cassini magnetic declination
 Sensor elevation 45m
 Map contour interval 100 nT
 Contour labels every 50 nT
 Contour interval 100 nT



FALCONBRIDGE LIMITED

TOTAL FIELD MAGNETIC CONTOURS

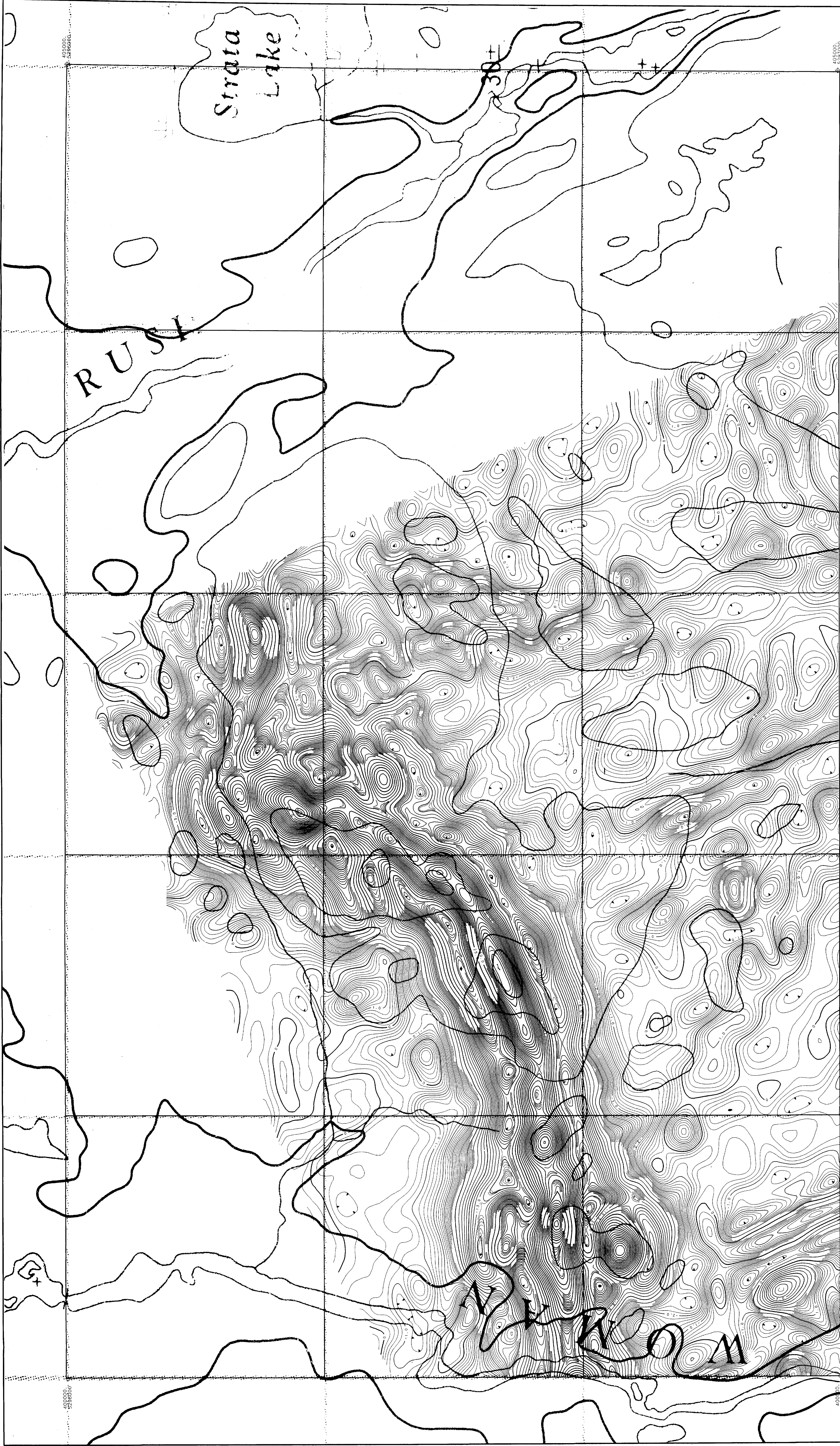
2.14949

GENDA TOWNSHIP CLAIMS (PN 8668)
 MARION TOWNSHIP, ONTARIO

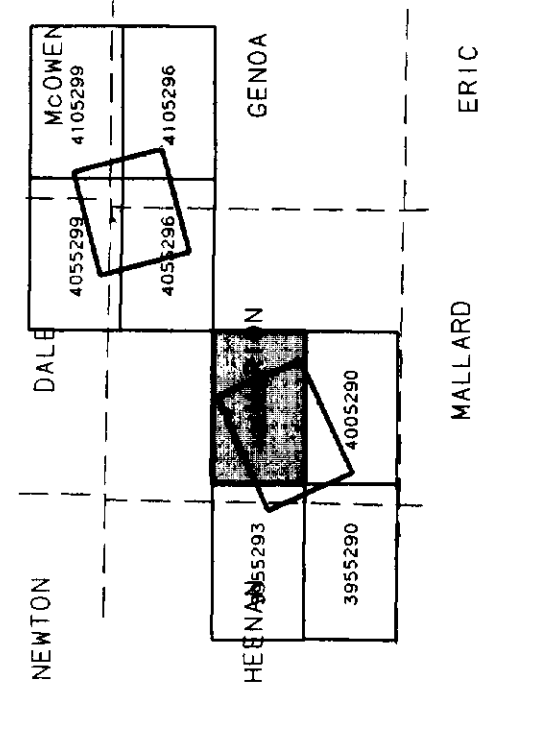
SCALE: 1:5,000
 0 50 100 200 300 400 500 METERS

DATE: MAR 1991
 TMS No: 41 0/16
 MAP No: 4025293 .9100

AERODAT LIMITED



Vertical Gradient
 Magnetic intensity contours are calculated from the total field magnetic intensity in nT/m. Contour interval is 0.2 nT/m. Sensor elevation 45m. Max contours are multiples of:
 0.20 nT/m
 1.00 nT/m
 25.0 nT/m
 100 nT/m



FALCONBRIDGE LIMITED

CALCULATED VERTICAL MAGNETIC GRADIENT

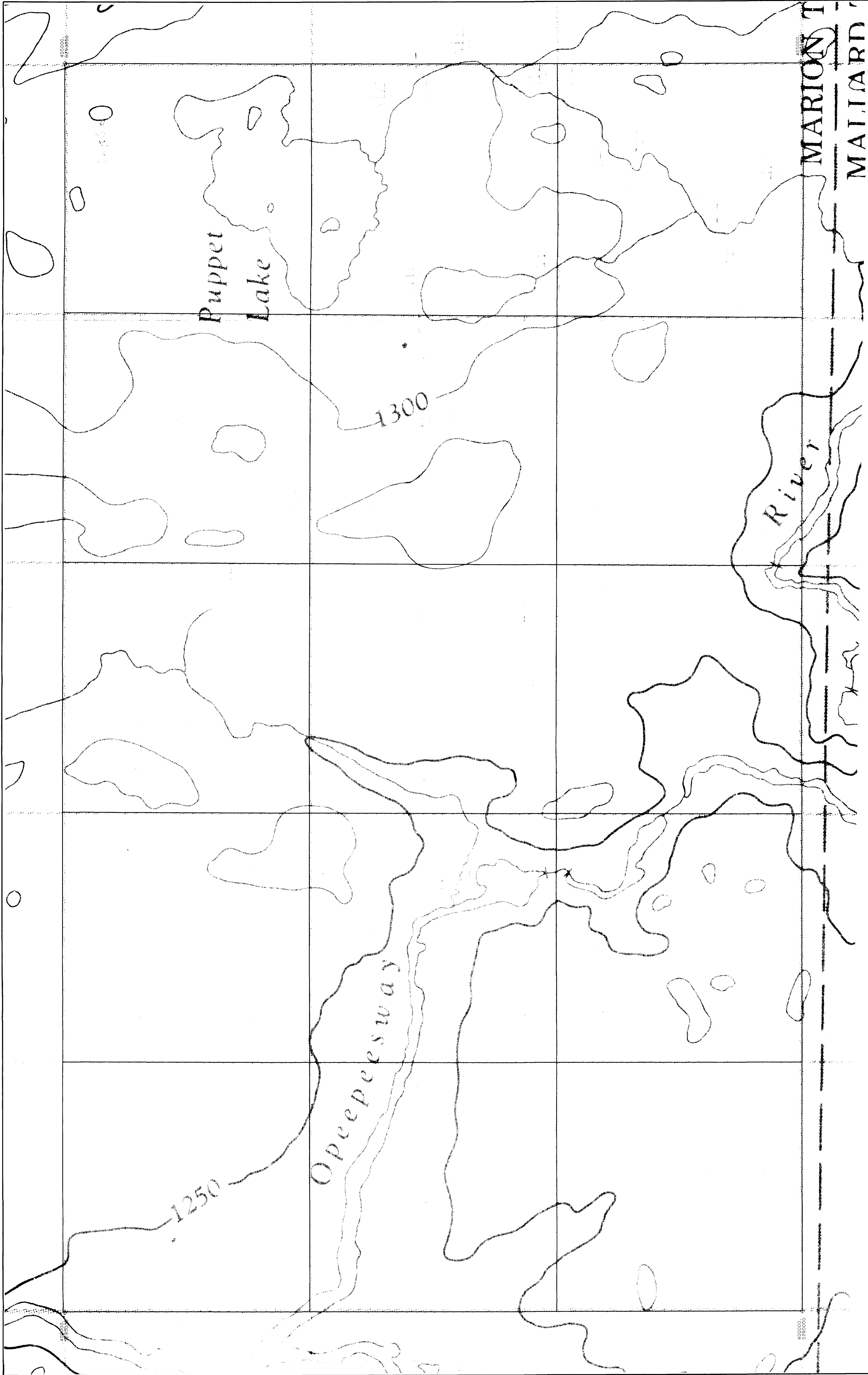
2.14949

GENOVA TOWNSHIP CLAIMS (PN 8668)
 MATION TOWNSHIP, ONTARIO

SCALE 1:5,000
 0 100 200 300 Feet
 0 50 100 150 Meters

AERODAT LIMITED

DATE: MAR 1991
 NTS No: 41 0/16
 MAP No: 405253



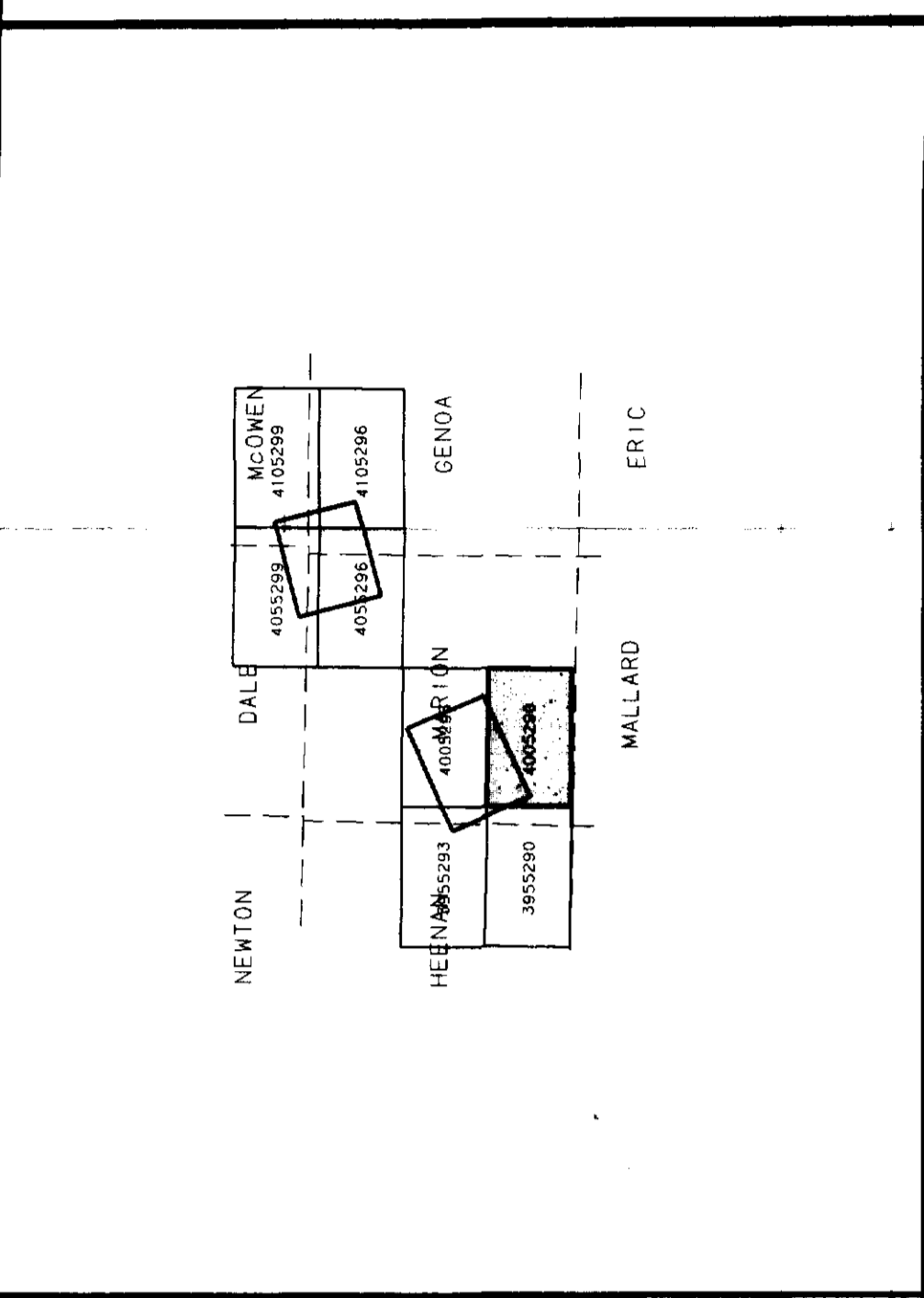
FALCONBRIDGE LIMITED

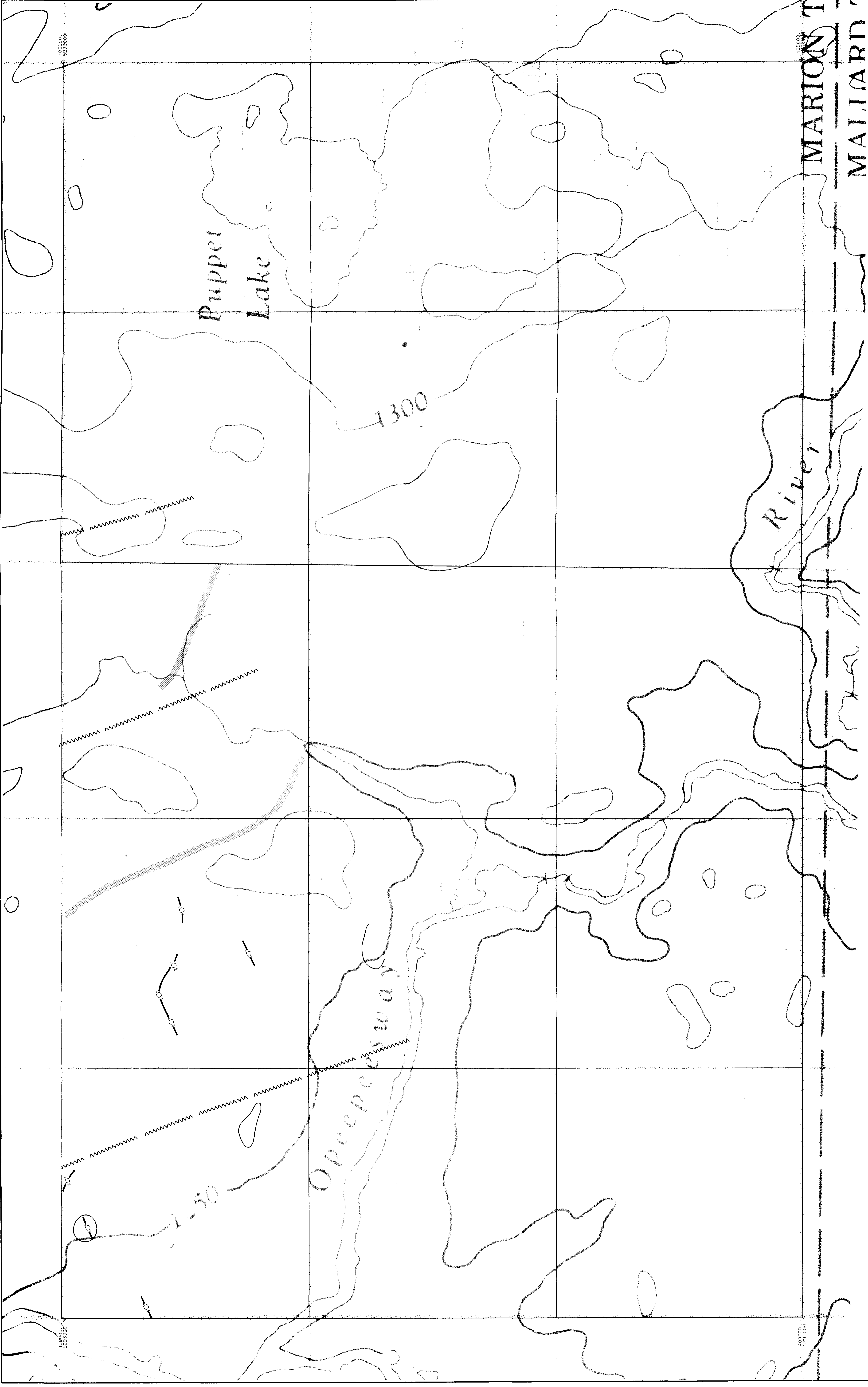
BASE MAP
2.14949
 GENOA TOWNSHIP CLAIMS (PN 8668)
 MARION TOWNSHIP, ONTARIO

SCALE: 1:15,000
 0 100 200 300 METERS

DATE: MAR 1991
 NTS NO.: 41 07/16
 MAP NO.: 4055290 (P101)

AERODAT LIMITED





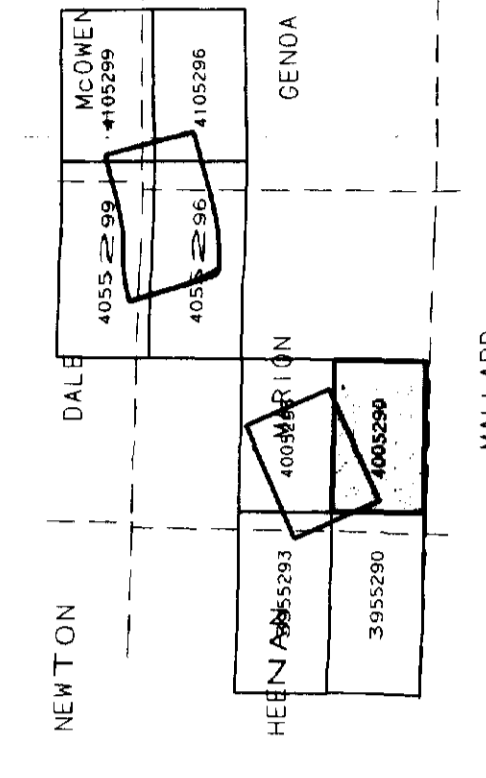
FALCONBRIDGE LIMITED

INTERPRETATION
2.14949
 GENOA TOWNSHIP CLAIMS (PN 8668)
 MARION TOWNSHIP, ONTARIO

SCALE 1:5,000
 0 100 200 300 400 500 METERS

DATE: MAR 1991
 NIS No: 41 0/16
 MAP No: 4005290 (910)

AERODAT LIMITED



EM ANOMALIES

Conductivity Thickness (mhos)

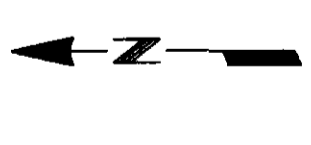
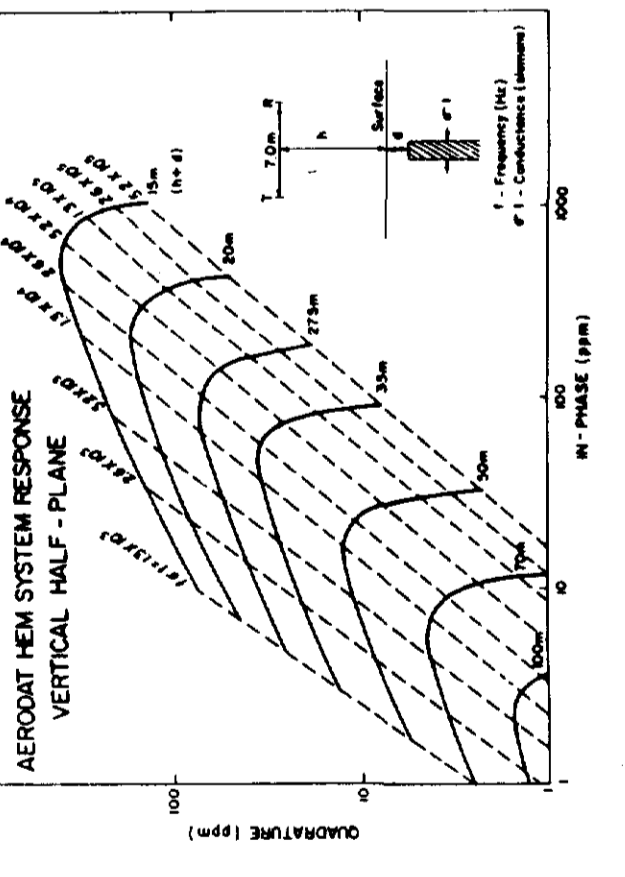
0 - 1
1 - 2
2 - 3
3 - 4
4 - 5
5 - 10
10 - 20
20 - 30

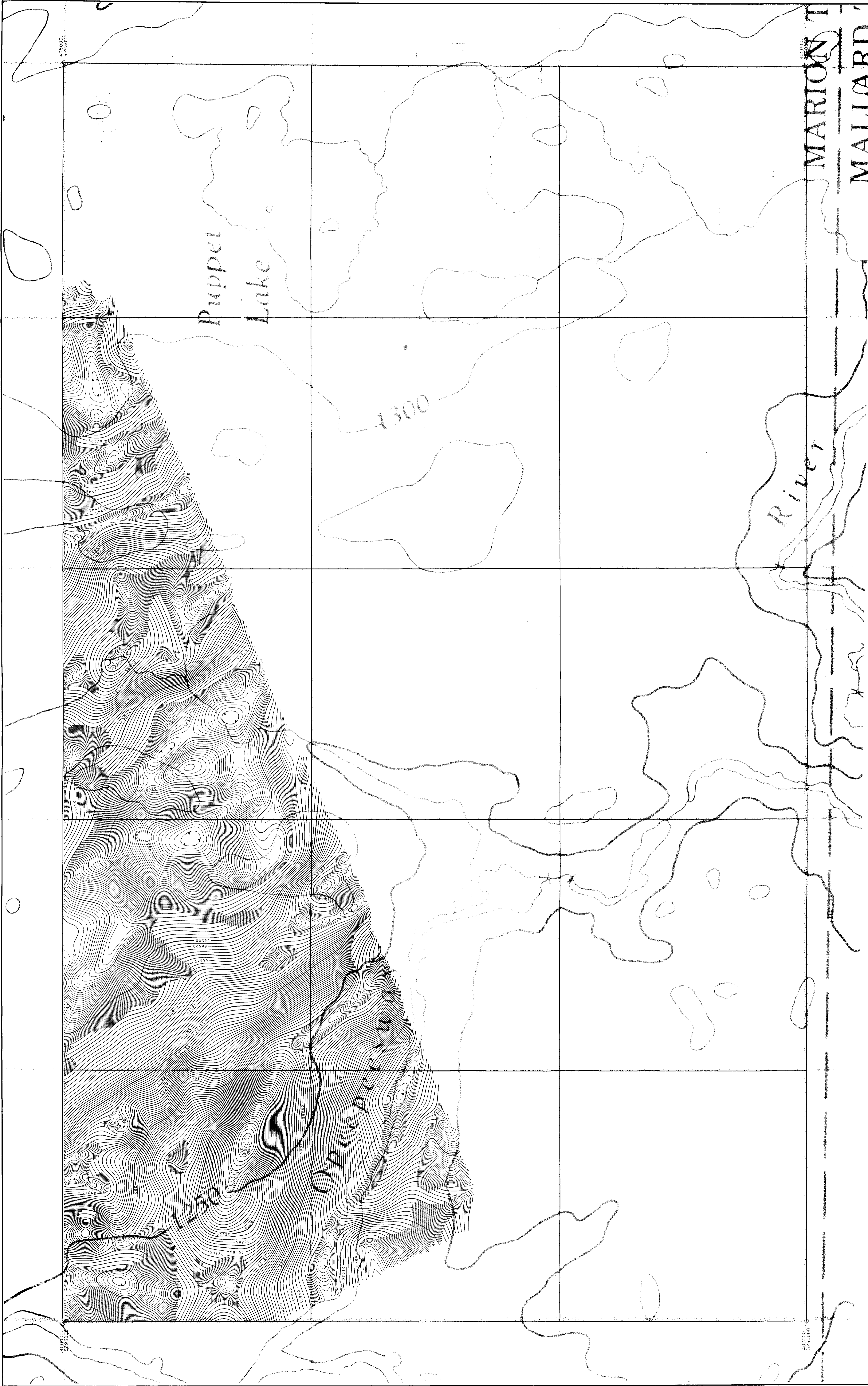
Magnetically Anomaly

Dr. James A. Orr, Jr.
 Geophysicist
 Falconbridge Limited
 7 West 1st Street

INTERPRETATION LEGEND

- Contour Area
- Vertical Gradient Contour Lines
- Positive Fault
- Target Lake
- VLF Conductor Area





MARION T
MALLARD

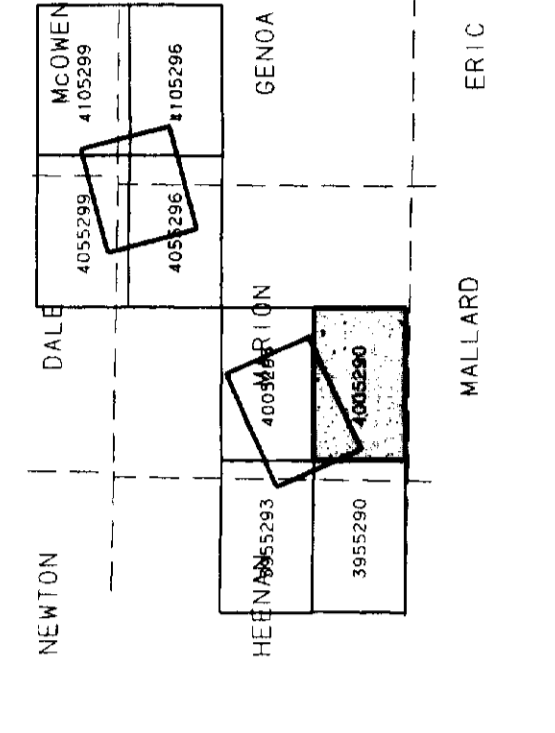
FALCONBRIDGE LIMITED

TOTAL FIELD MAGNETIC CONTOURS
2-14949
 GENOA TOWNSHIP CLAIMS (PN 8668)
 MARION TOWNSHIP, ONTARIO

SCALE: 1:15,000
 0 100 200 300 Feet
 0 100 200 300 METERS

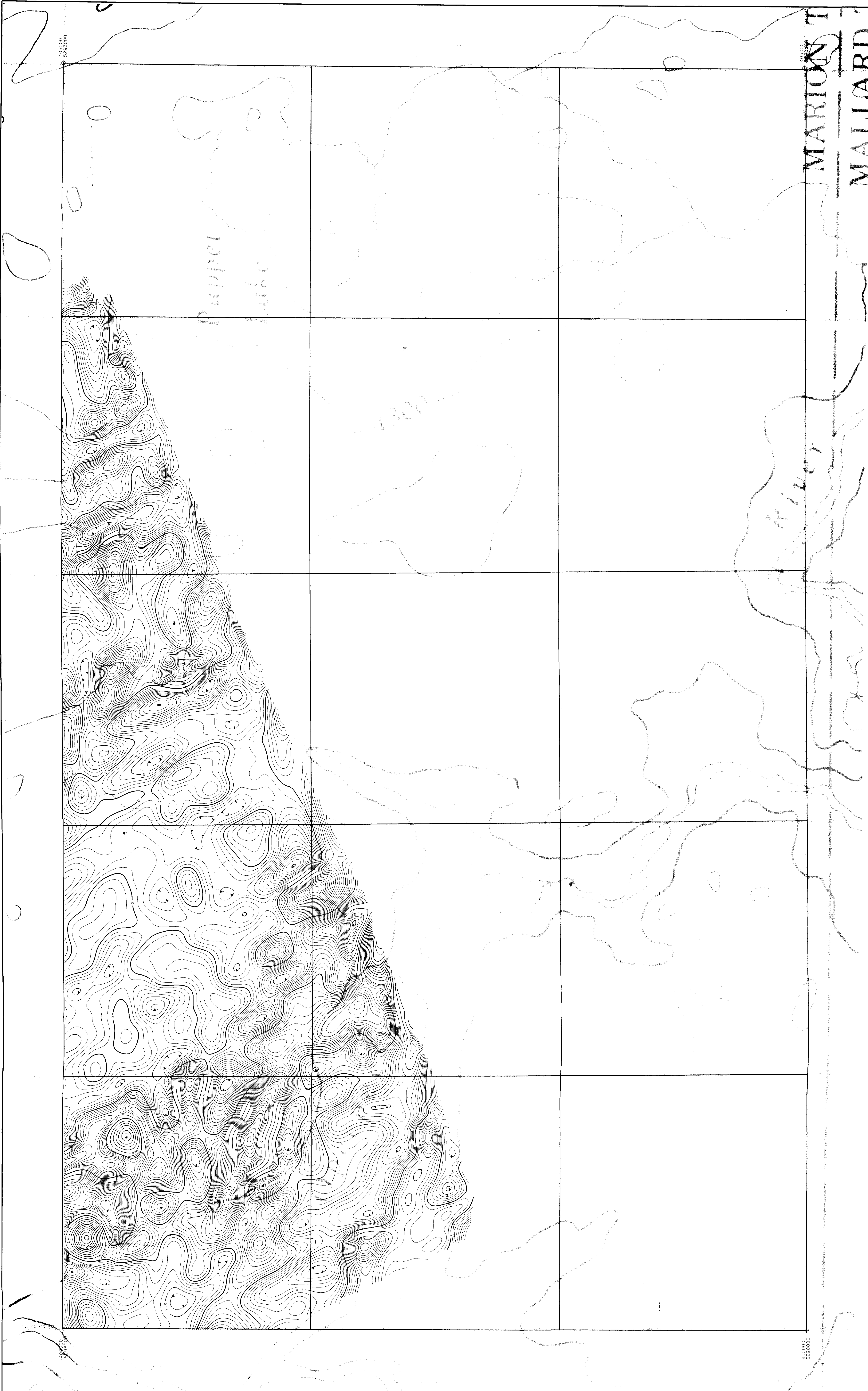
DATE: MAR 1991
 NTS NO: 41 0716
 MAP NO: 4005280 (P1)

AERODAT LIMITED



Magnetics

Total Field Magnetic Intensity
 Contour interval 5m
 Sensor elevation 45m
 Those listed below
 10 FT
 200 FT
 1000 FT



MARION T
MALLARD

FALCONBRIDGE LIMITED

CALCULATED VERTICAL MAGNETIC GRADIENT

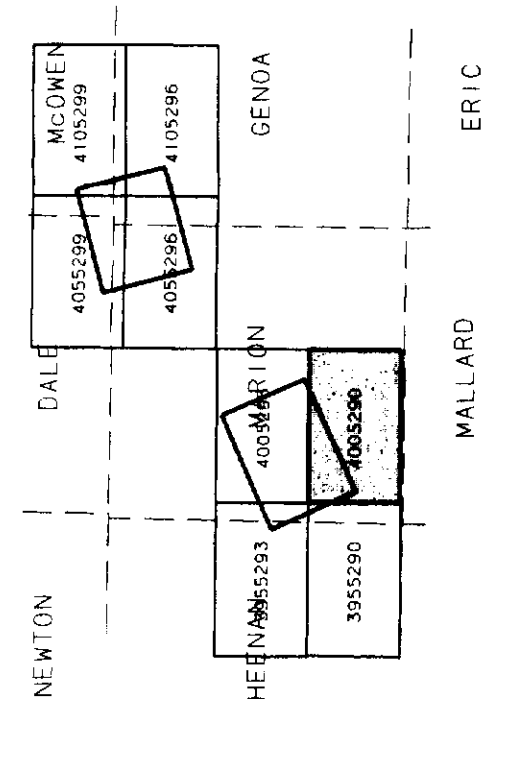
2.14949

GENOA TOWNSHIP CLAIMS (PN 8668)
MARION TOWNSHIP, ONTARIO

SCALE 1:5,000
0 100 200 300 400 500 METERS

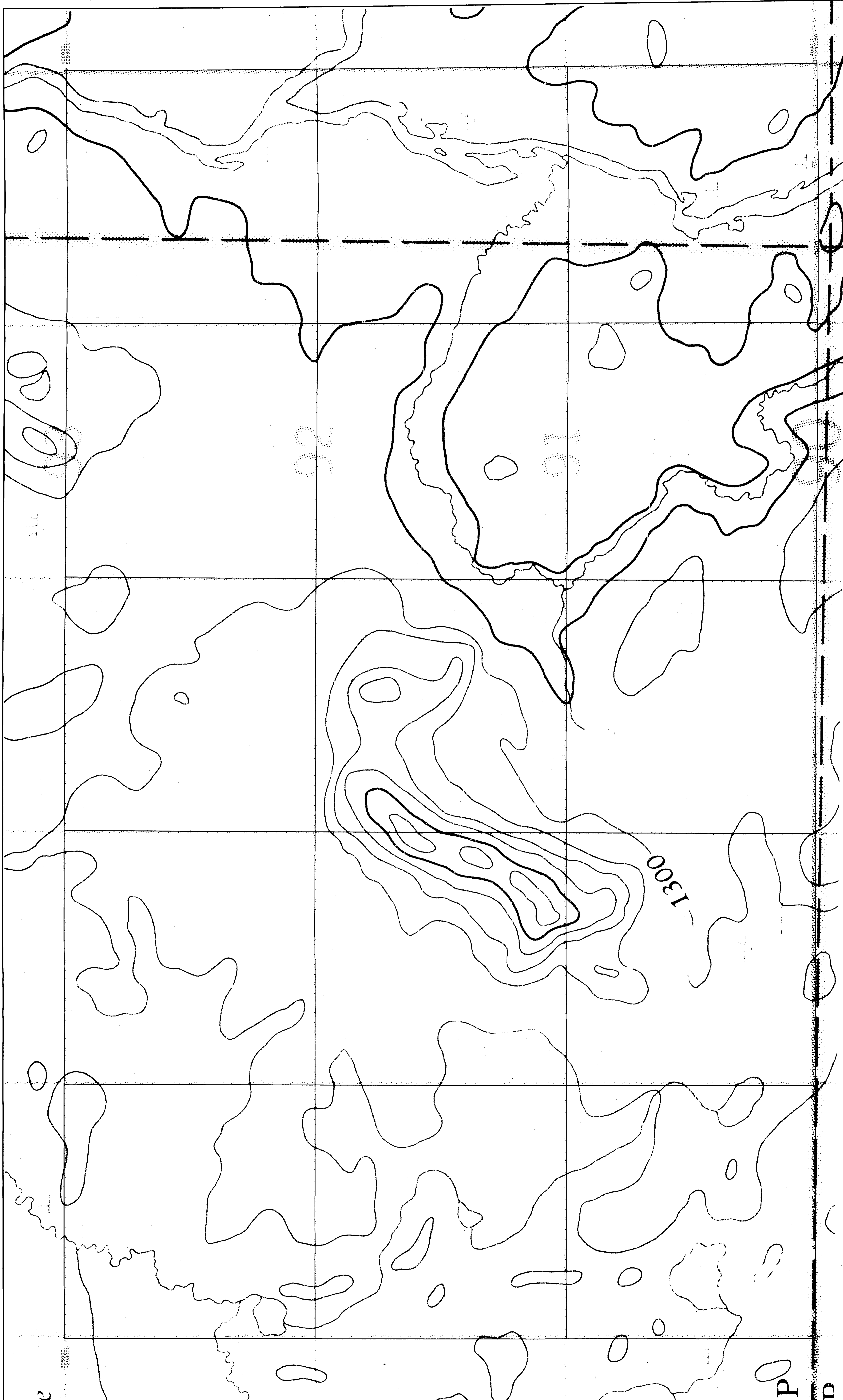
AERODAT LIMITED

DATE: MAR 1991
NTS No: 41 0/16
MAP No: 40029D
JOB#



Vertical Gradient

Vertical magnetic gradient field
Magnetic intensity in nT/m
Cesium high sensitivity
Sensor elevation 45m
Map contours are multiples of
those listed below
1.00 nT/m
1.50 nT/m
2.00 nT/m
2.50 nT/m
3.00 nT/m
100 nT/m

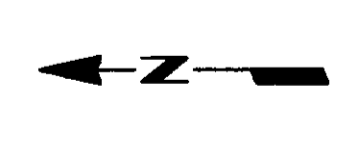
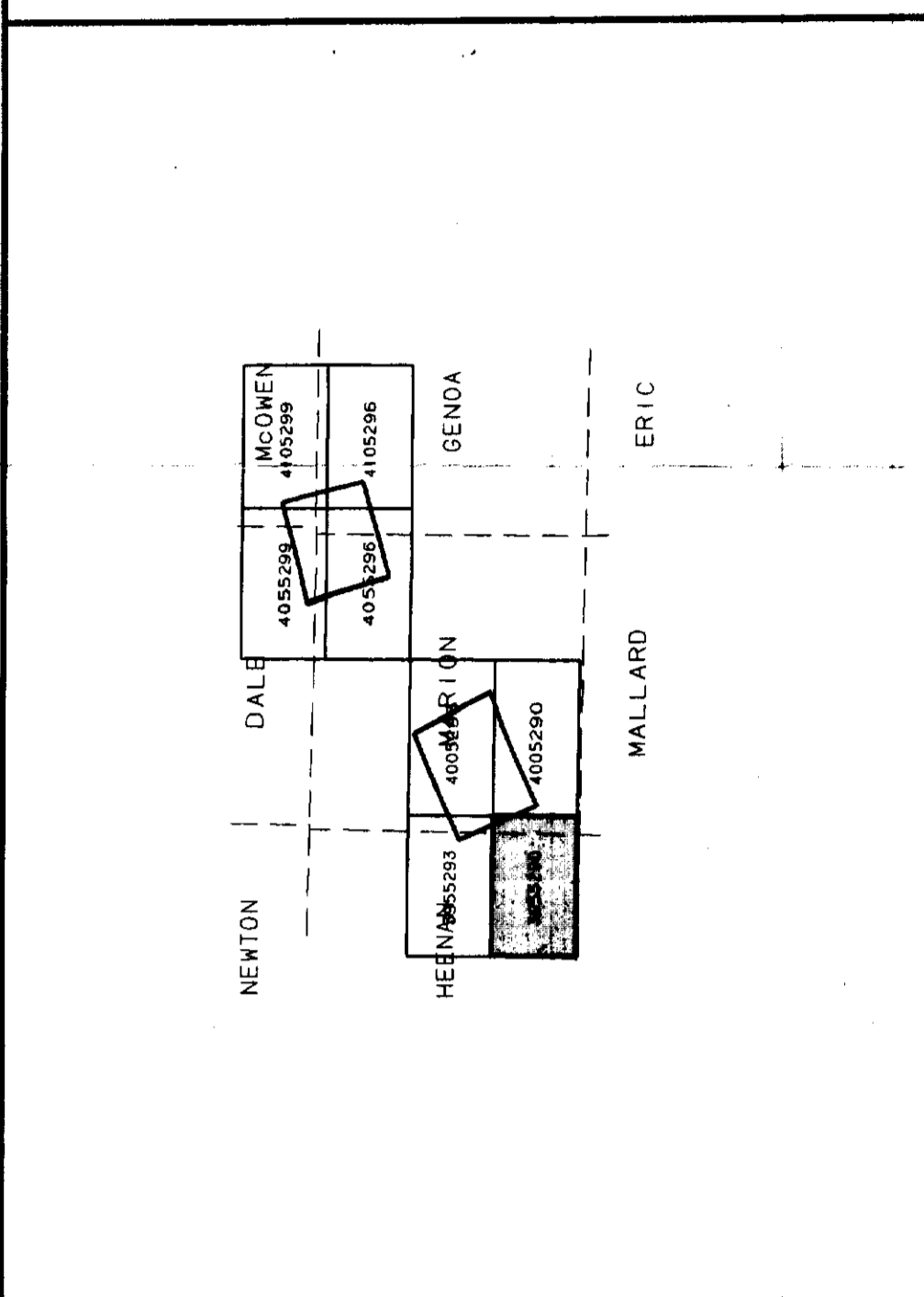


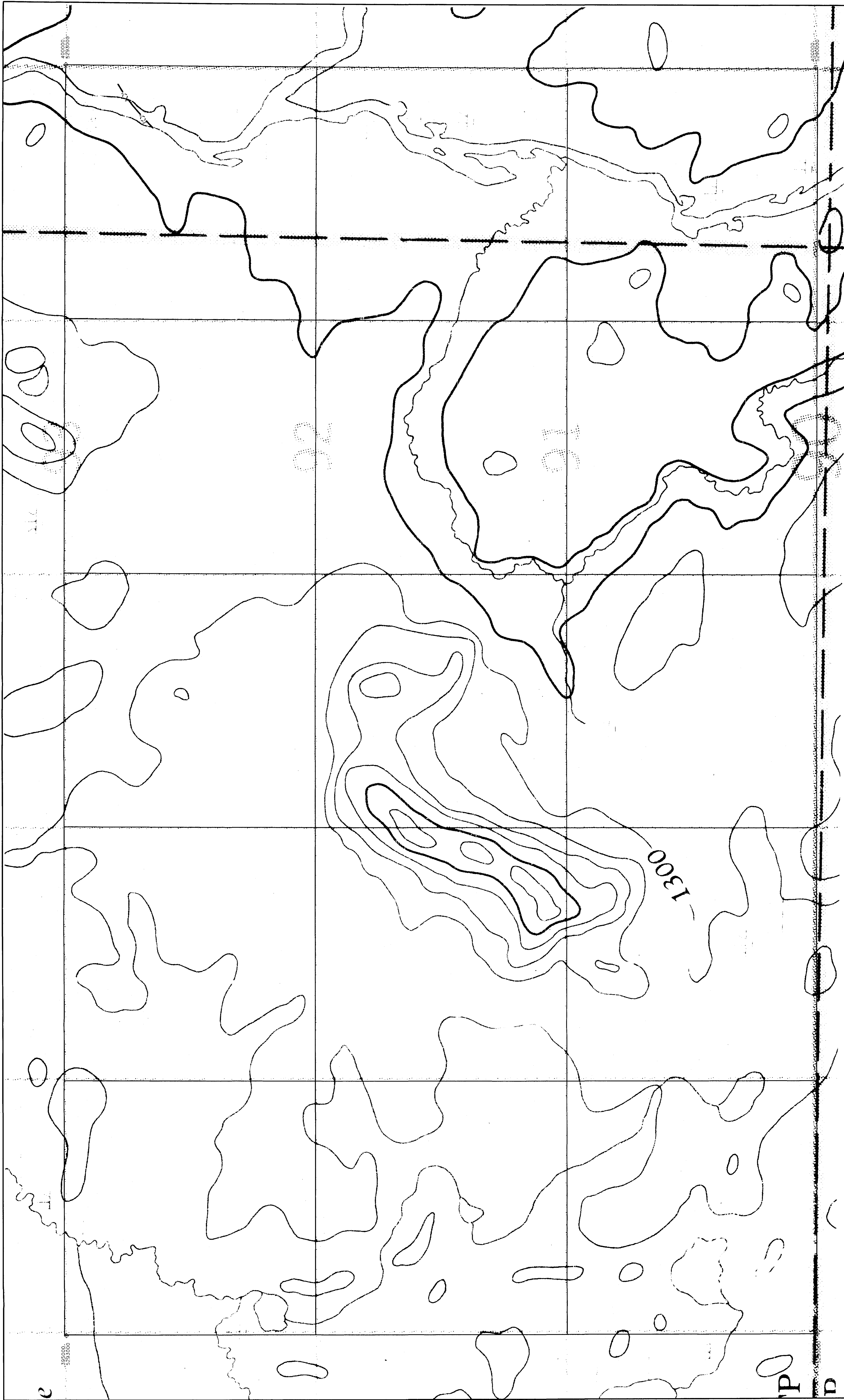
FALCONBRIDGE LIMITED

BASE MAP
2.14949
 GENOA TOWNSHIP CLAIMS (PN 8668)
 MARION TOWNSHIP, ONTARIO

SCALE 1:5,000
 0 100 200 300 400 500 METRES

AERODAT LIMITED
 DATE: MAR 1997
 NET No: 41 0716
 MAP No: 3952290 49101





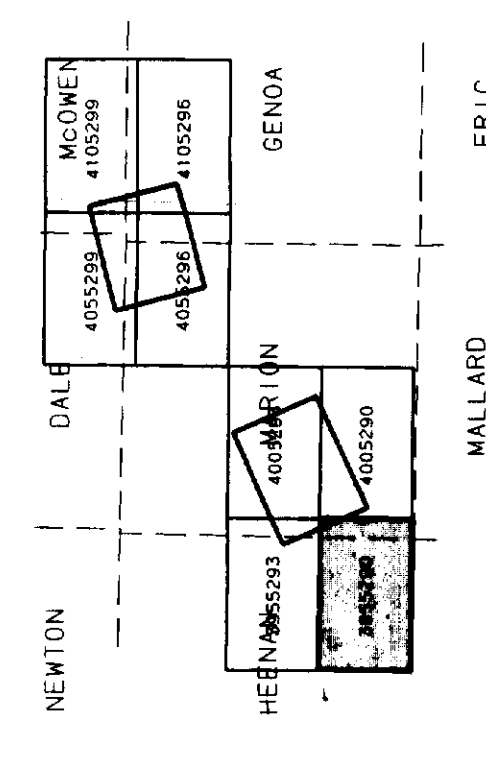
FALCONBRIDGE LIMITED

INTERPRETATION
2.14949
 GENDA TOWNSHIP CLAIMS (PN 8668)
 MARION TOWNSHIP, ONTARIO

SCALE 1:5,000
 0 100 200 300 METERS

DATE: MAR 1991
 NTS No: 41 D/16
 MAP No: 3955290 #101

AERODAT LIMITED



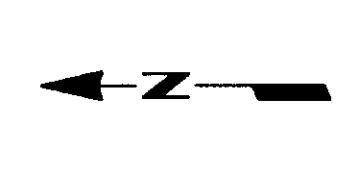
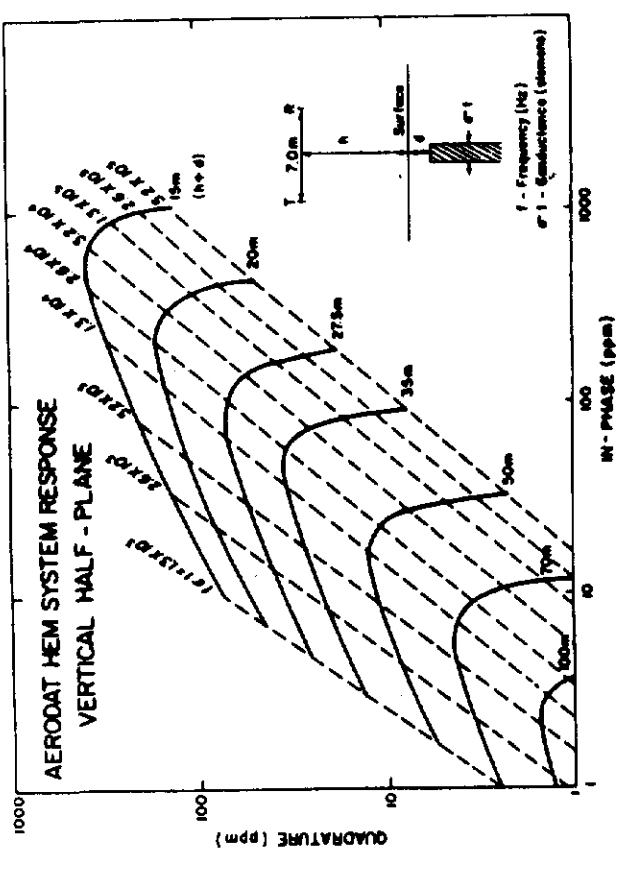
EM ANOMALIES

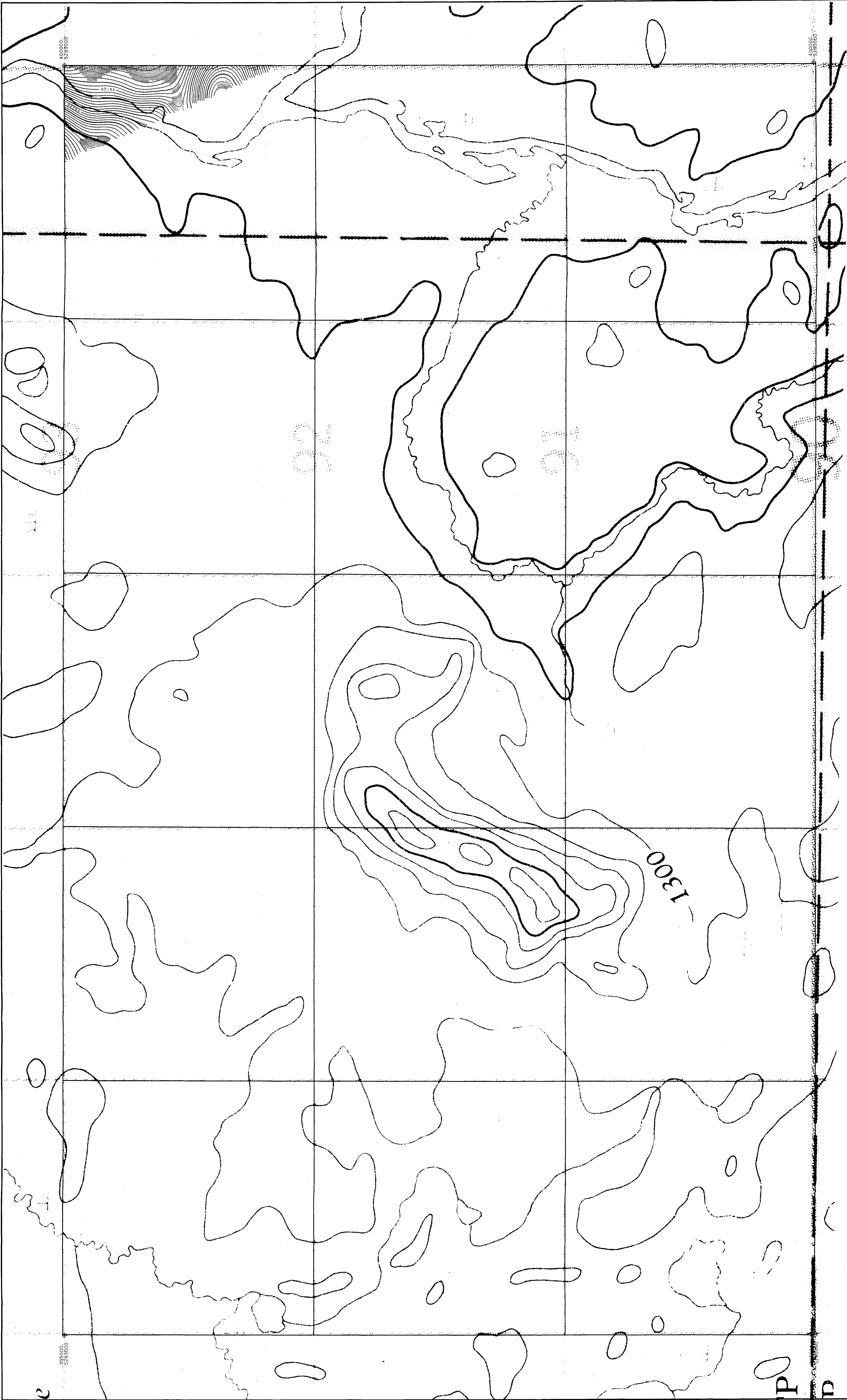
CONDUCTIVITY THICKNESS (MS)

0	0 - 1
1	2 - 4
2	4 - 8
3	8 - 16
4	16 - 32
5	32 - 64
6	64 - 128
7	128 - 256
8	256 - 512
9	512 - 1024
10	1024 - 2048
11	2048 - 4096
12	4096 - 8192
13	8192 - 16384
14	16384 - 32768
15	32768 - 65536
16	65536 - 131072
17	131072 - 262144
18	262144 - 524288
19	524288 - 1048576
20	1048576 - 2097152
21	2097152 - 4194304
22	4194304 - 8388608
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INTERPRETATION LEGEND

CONDUCTOR AXIS
 VERTICAL GRADIENT CONTROL LINE
 ±500m and ±2500m
 POSSIBLE FAULT
 TARGET ZONE
 VLF CONDUCTOR AXIS





FALCONBRIDGE LIMITED

TOTAL FIELD MAGNETIC CONTOURS

2-14949

GENDA TOWNSHIP CLAIMS (PN 8668)

MARION TOWNSHIP, ONTARIO

SCALE 1:5,000 1:20,000 1:50,000

0 100 200 300 400 500 METERS

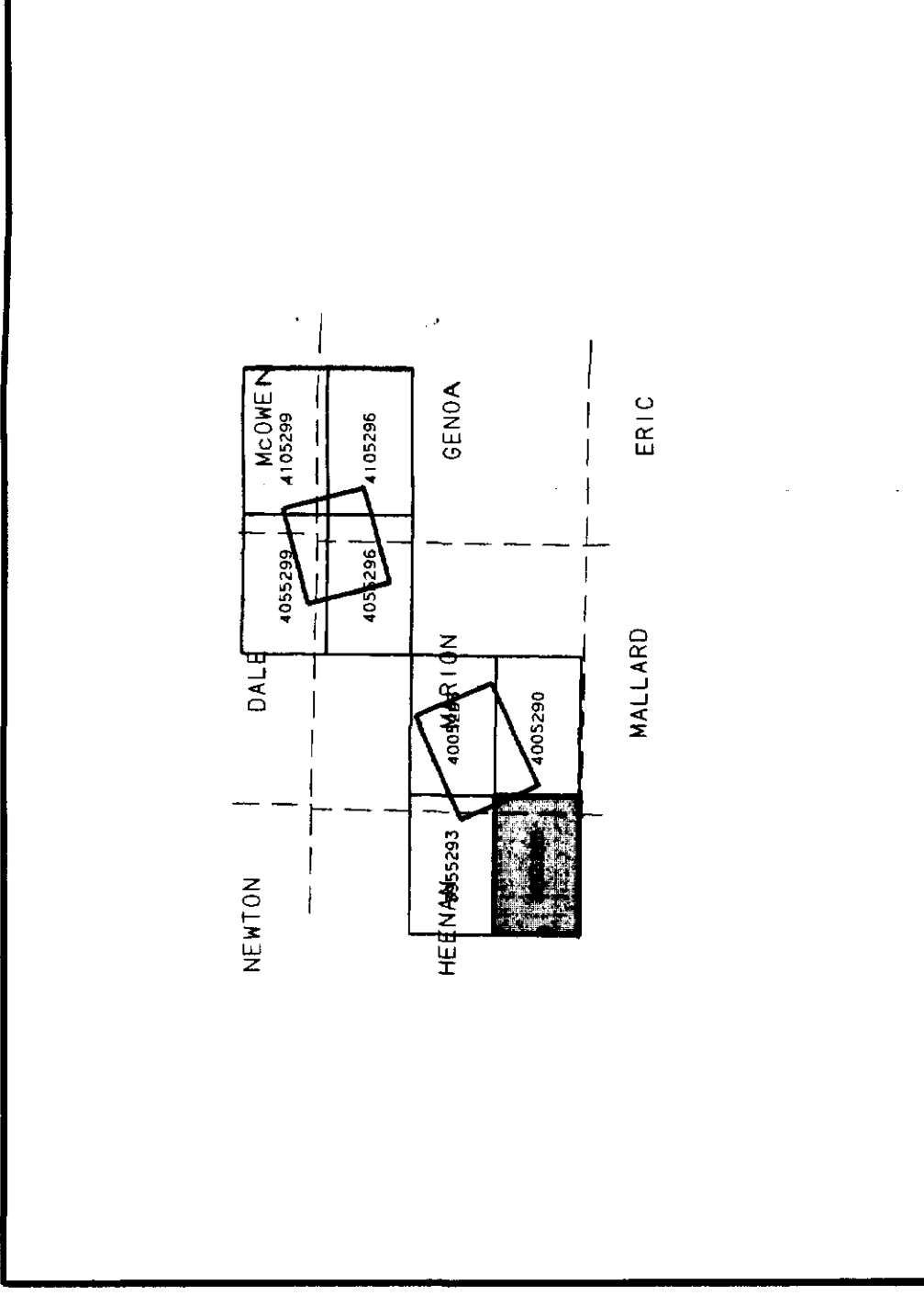
0 100 200 300 400 500 FEET

AERODAT LIMITED

DATE: MAR 1991

NTS No: 41 D/16

MAP No: 3055290



Magnetics

Total Field Magnetic Intensity
Contours in nT

Cesium High Sensitivity
Sensor elevation 45m

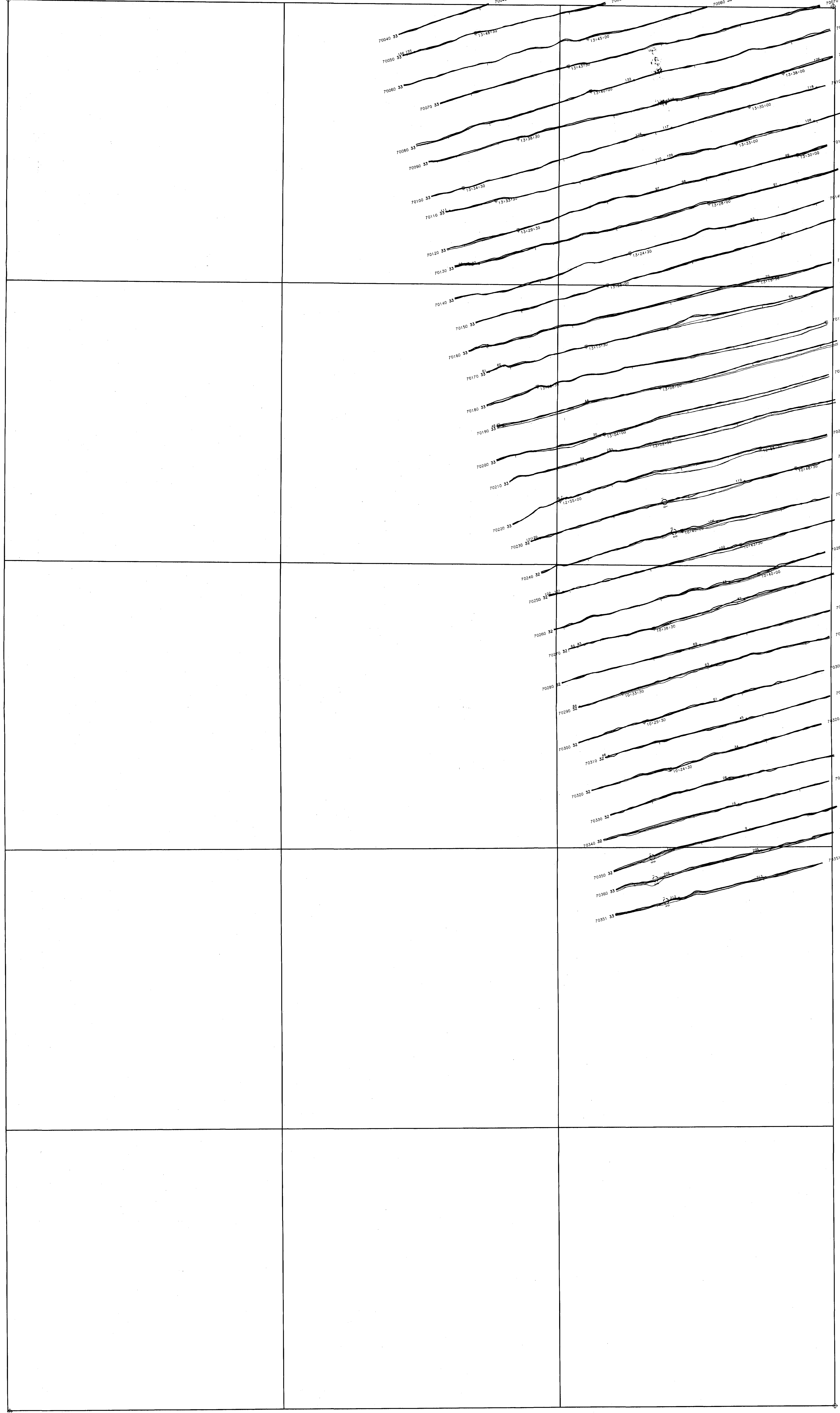
Map contours are multiples of
100 nT
50 nT
2 nT

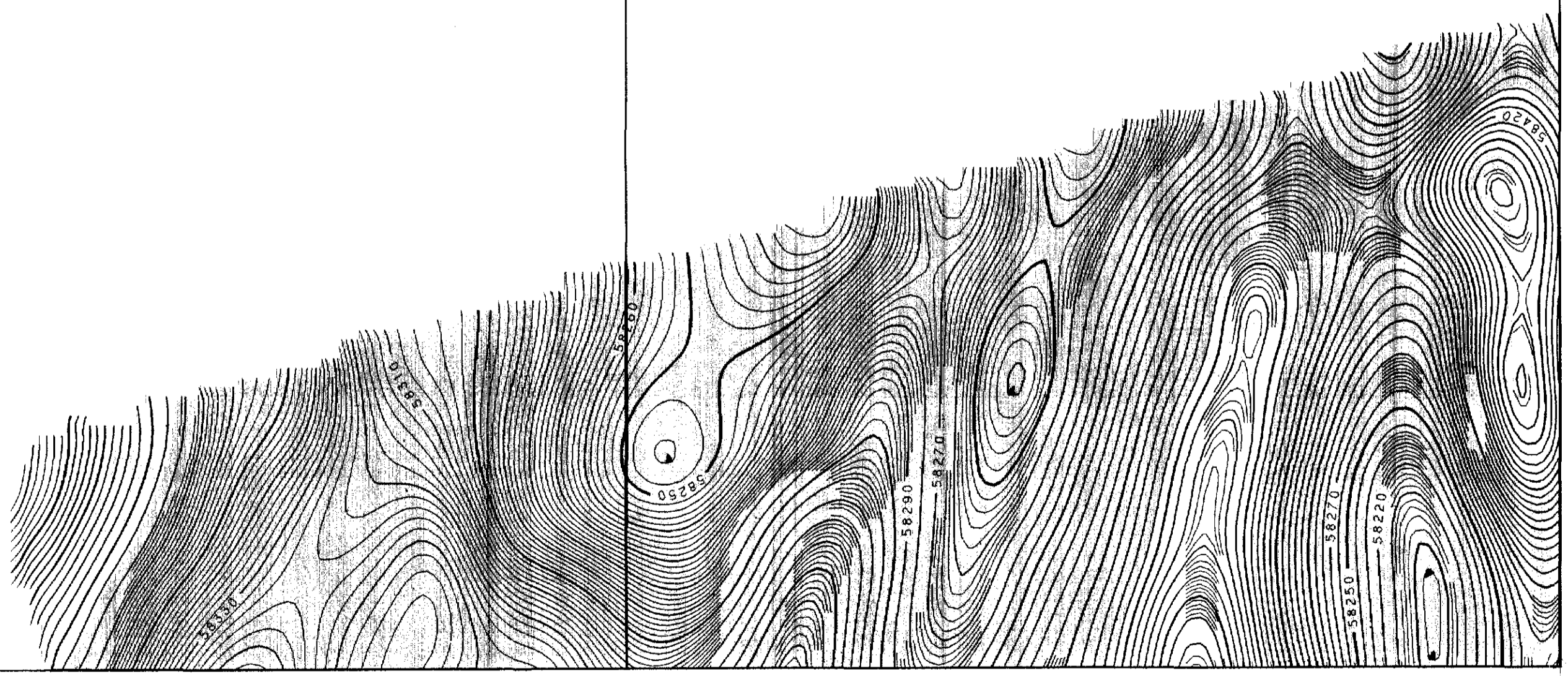
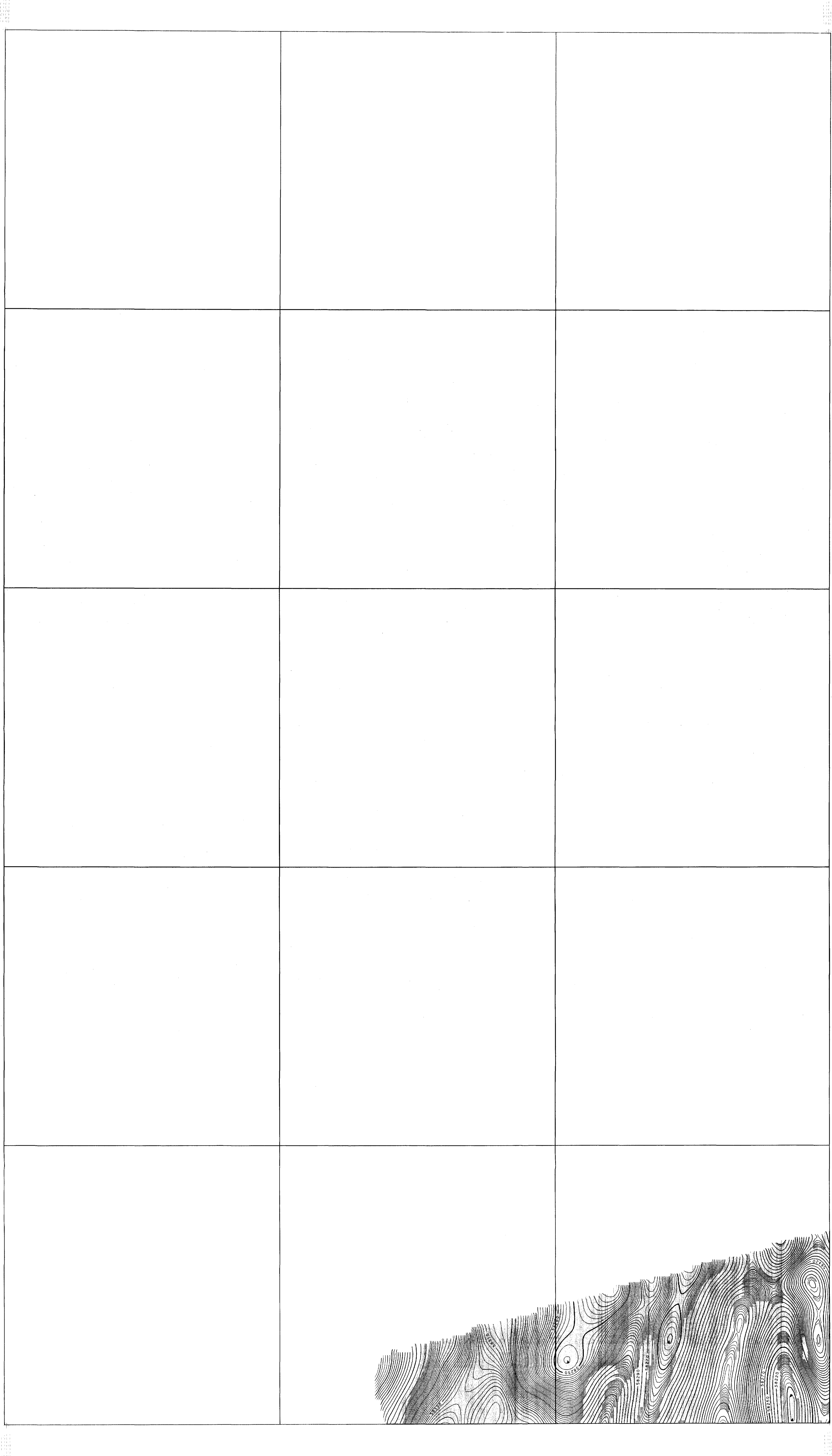
410000
528000

405000
528000

410000
528000

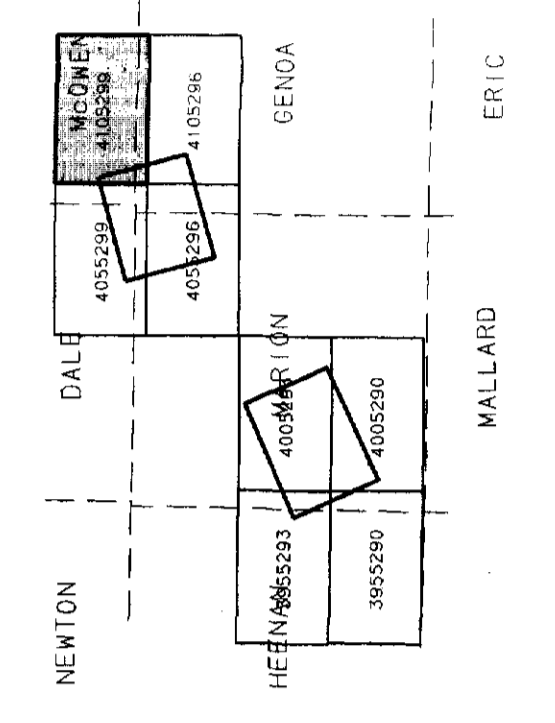
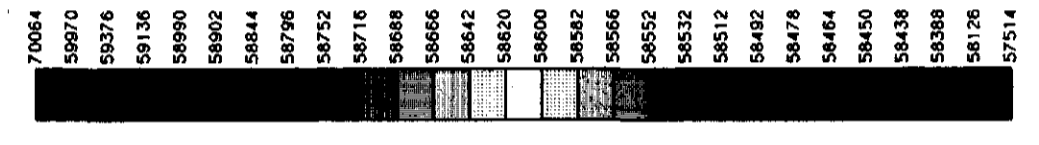
405000
528000





EM Anomalies
 Conductivity (thickness (m))
 0 - 1
 1 - 2
 2 - 4
 4 - 8
 8 - 15
 15 - 30
 30 - 50
 Negative Anomaly
 Conductivity > 100 F/m
 Conductivity > 100 F/m
 Conductivity > 100 F/m

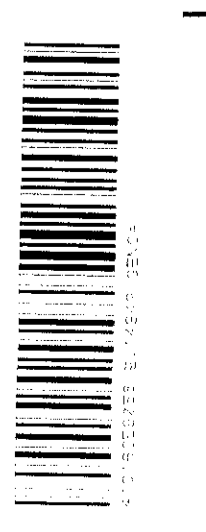
Magnetics
 Total Field Magnetic Intensity
 Contours in nT
 Cassini high sensitivity
 Colour distributed on
 an equal area basis.
 Sensor elevation 45m
 Map contours are multiples of
 2 nT
 50 nT
 100 nT
 1000 nT

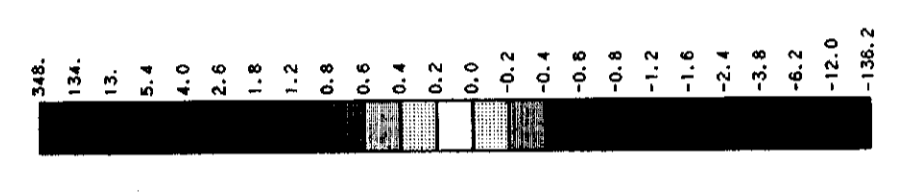
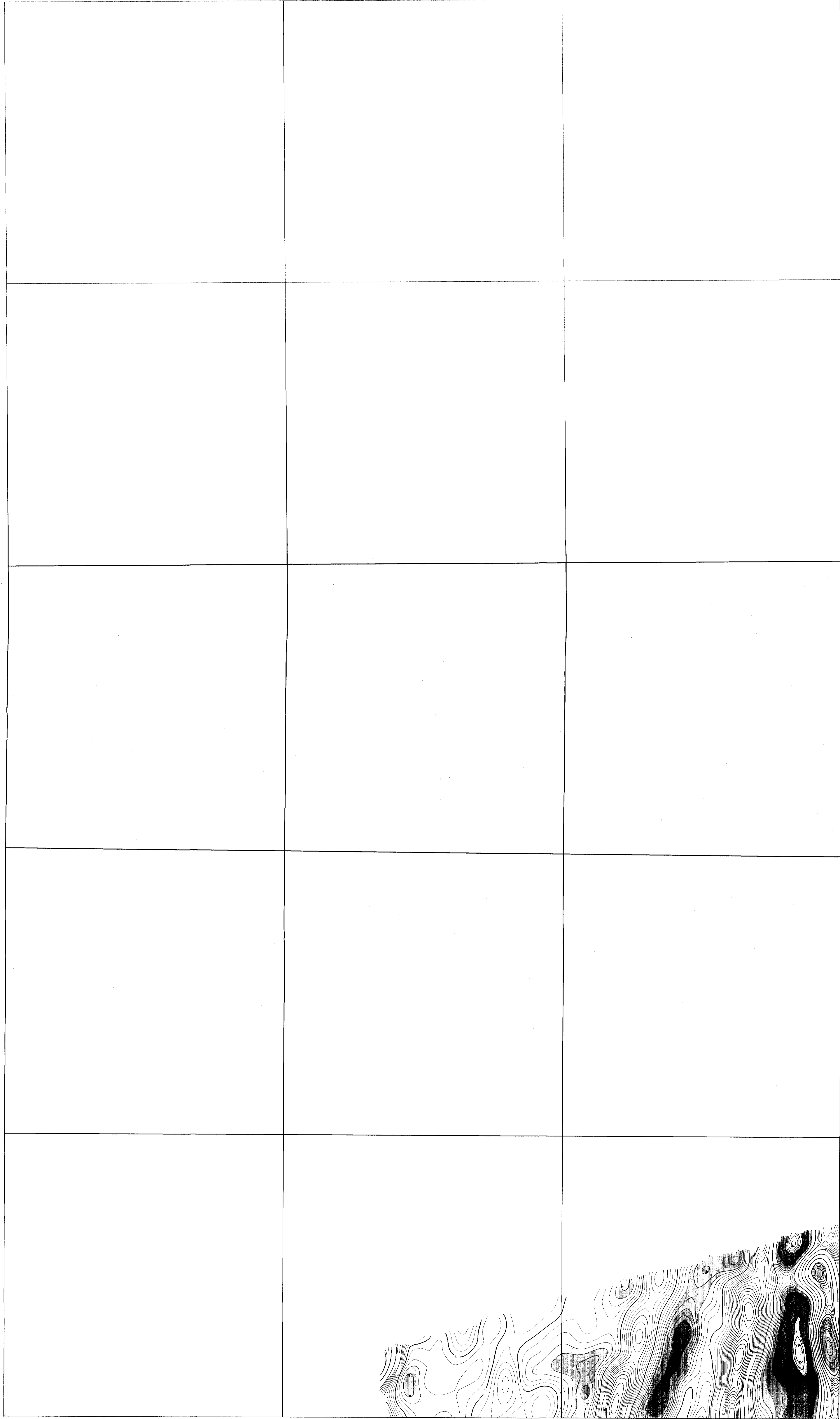


FALCONBRIDGE LIMITED
TOTAL FIELD MAGNETICS
CONTOURS AND COLOURS
 GENOA PROJECT (PN 8668)
 WILKIN TOWNSHIP, ONTARIO

AERODAT LIMITED

DATE: 11/11/11
 TIME: 10:00 AM
 PROJECT: GENOA
 CLIENT: FALCONBRIDGE LIMITED



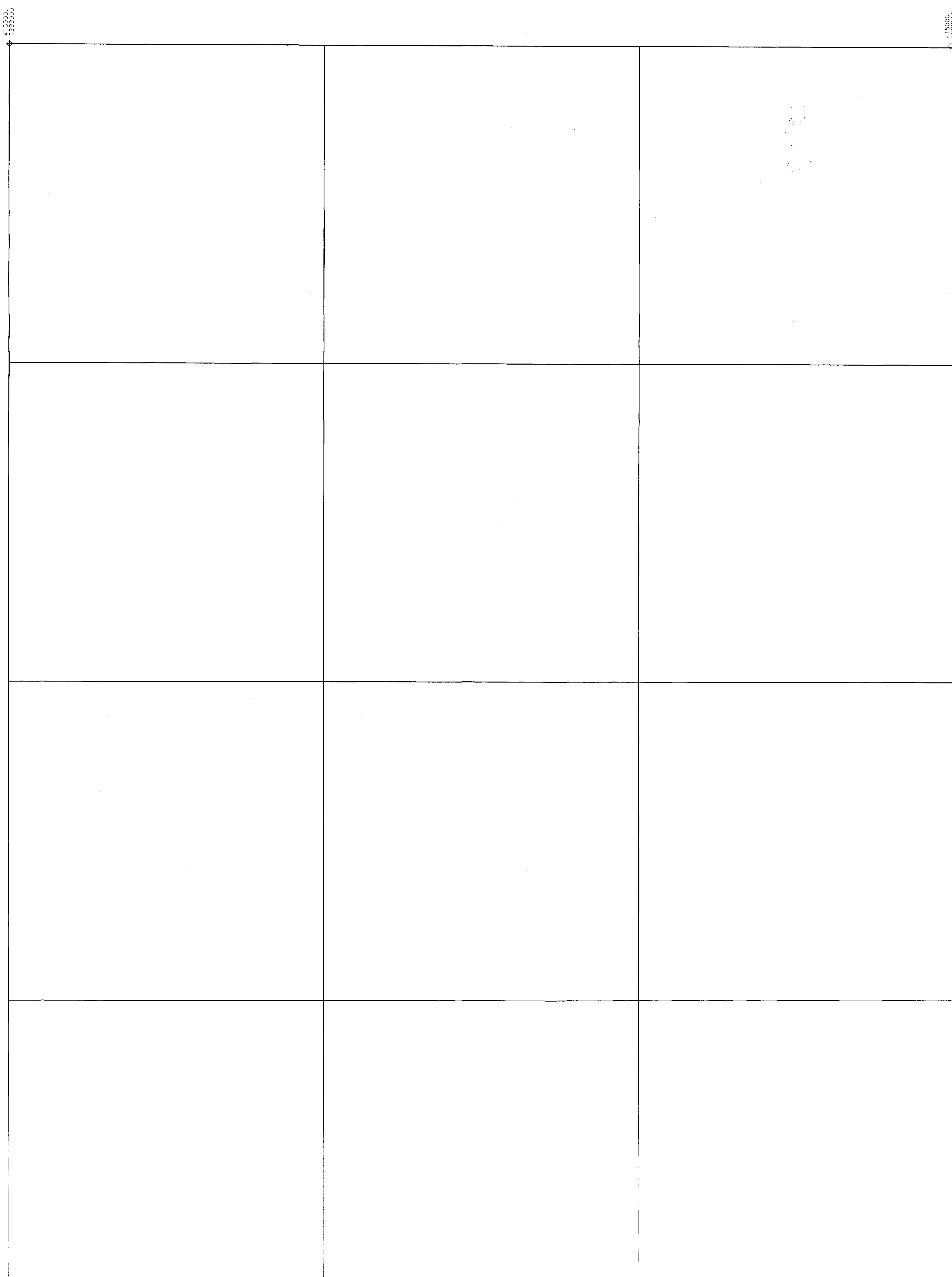
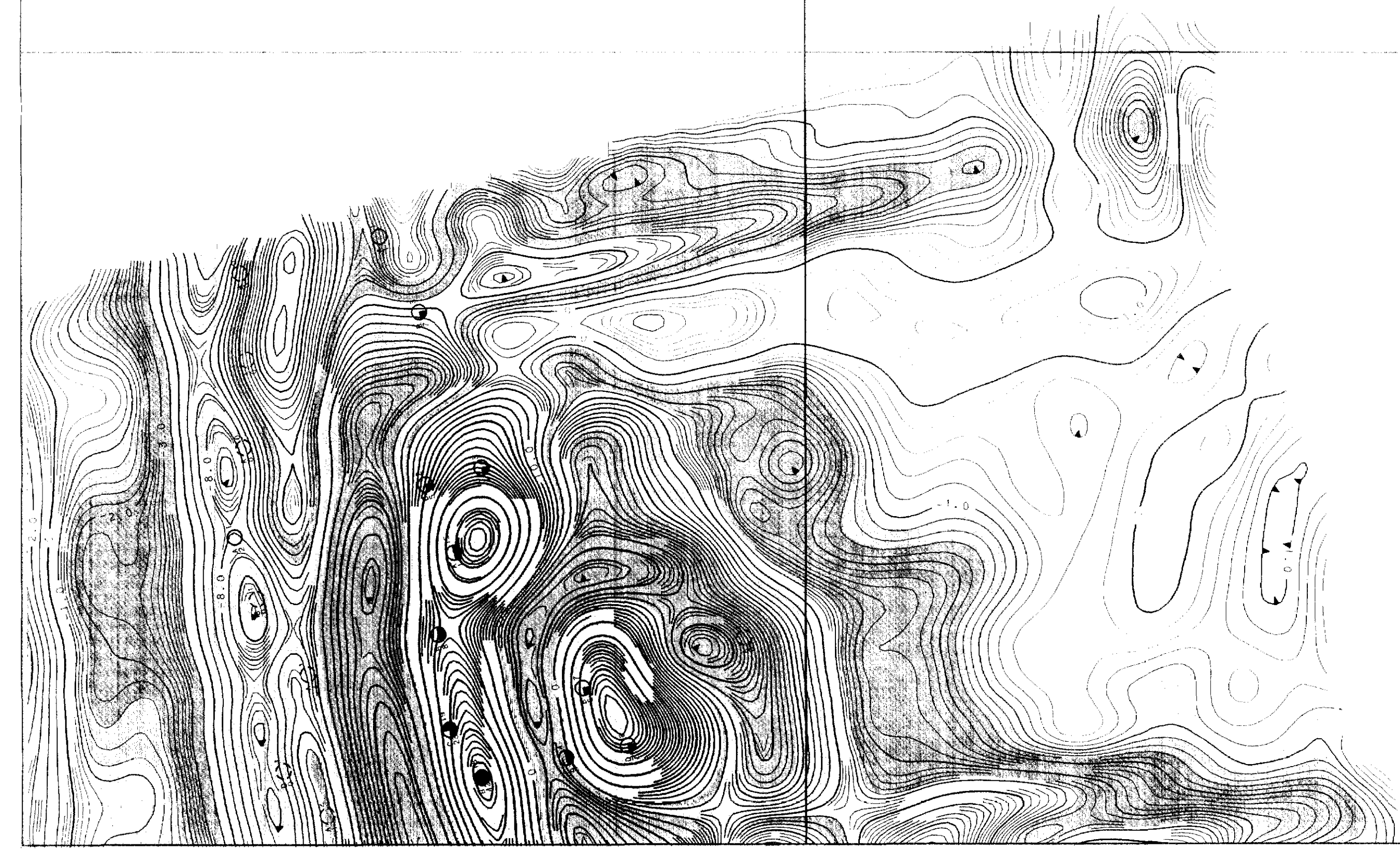


Vertical Gradient
 Vertical Magnetic Gradient
 calculated from the total field
 anomaly (magnetic intensity) in
 Gauss high sensitivity
 magnetometer.
 Sensor elevation 45m

Map contours are multiples of
 those listed below:
 0.20 nT/m
 1.00 nT/m
 5.00 nT/m
 25.0 nT/m
 100 nT/m

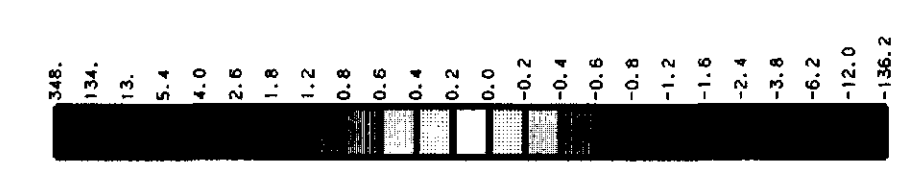
EM Anomalies
 Conductivity thickness (mas)
 0 - 1
 1 - 2
 2 - 4
 4 - 8
 8 - 16
 16 - 32

Magnetic anomaly
 0 - 100 nT/m
 100 - 200 nT/m
 200 - 400 nT/m
 400 - 800 nT/m
 800 - 1600 nT/m
 1600 - 3200 nT/m
 3200 - 6400 nT/m
 6400 - 12800 nT/m
 12800 - 25600 nT/m
 25600 - 51200 nT/m
 51200 - 102400 nT/m
 102400 - 204800 nT/m
 204800 - 409600 nT/m
 409600 - 819200 nT/m
 819200 - 1638400 nT/m
 1638400 - 3276800 nT/m
 3276800 - 6553600 nT/m
 6553600 - 13107200 nT/m
 13107200 - 26214400 nT/m
 26214400 - 52428800 nT/m
 52428800 - 104857600 nT/m
 104857600 - 209715200 nT/m
 209715200 - 419430400 nT/m
 419430400 - 838860800 nT/m
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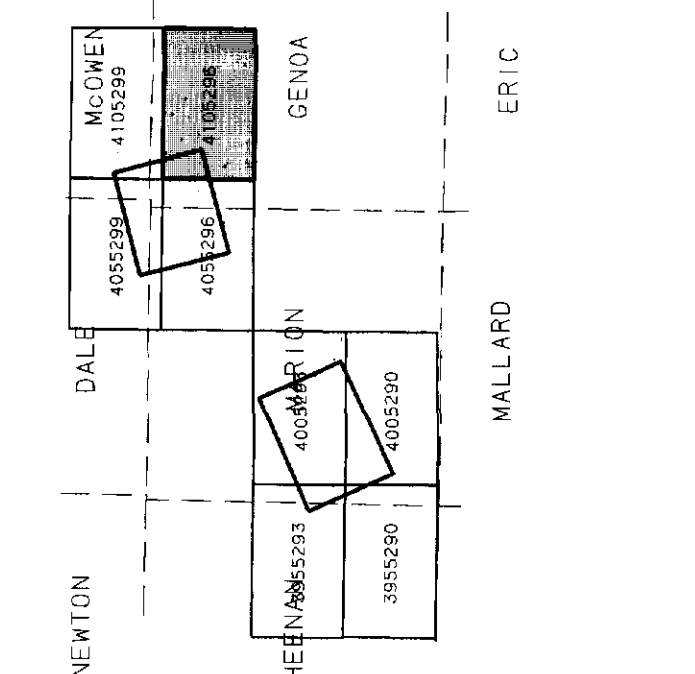


Vertical Gradient
 Vertical Magnetic Gradient
 magnetic intensity in nT/m
 Contour interval 0.20 nT/m
 Sensor elevation 45m

Map contours are multiples of
 0.20 nT/m
 0.40 nT/m
 1.00 nT/m
 2.00 nT/m
 5.00 nT/m
 10.00 nT/m

EM Anomalies
 Intensity (nT/m)

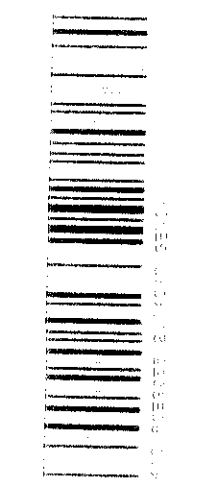
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FALCONBRIDGE LIMITED
CALCULATED VERTICAL MAGNETIC GRADIENT
CONTOURS AND COLOURS
 1999
 GENA PROJECT (PN 8668)
 GENA TOWNSHIP, ONTARIO

SCALE 1:15,000

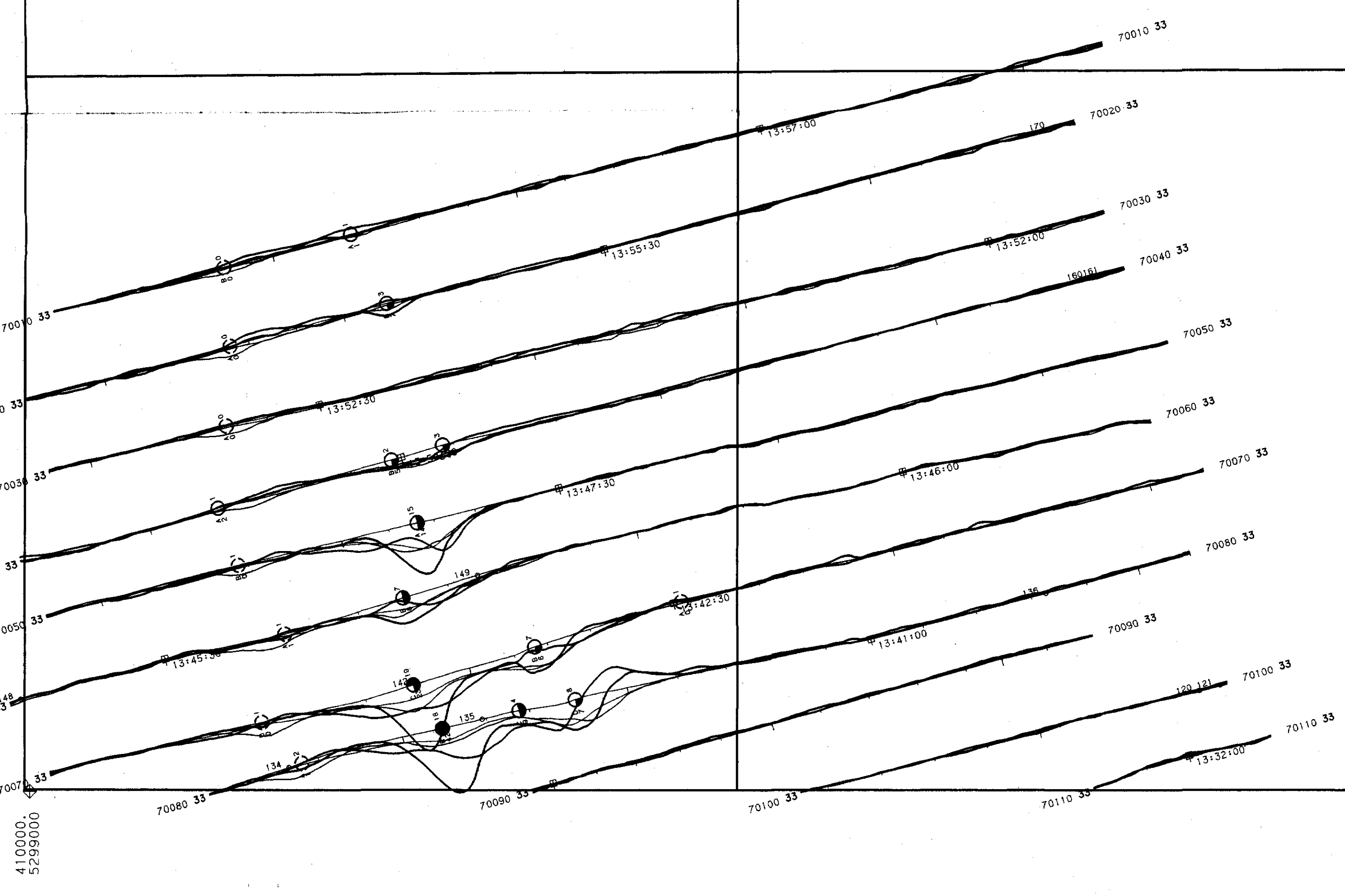
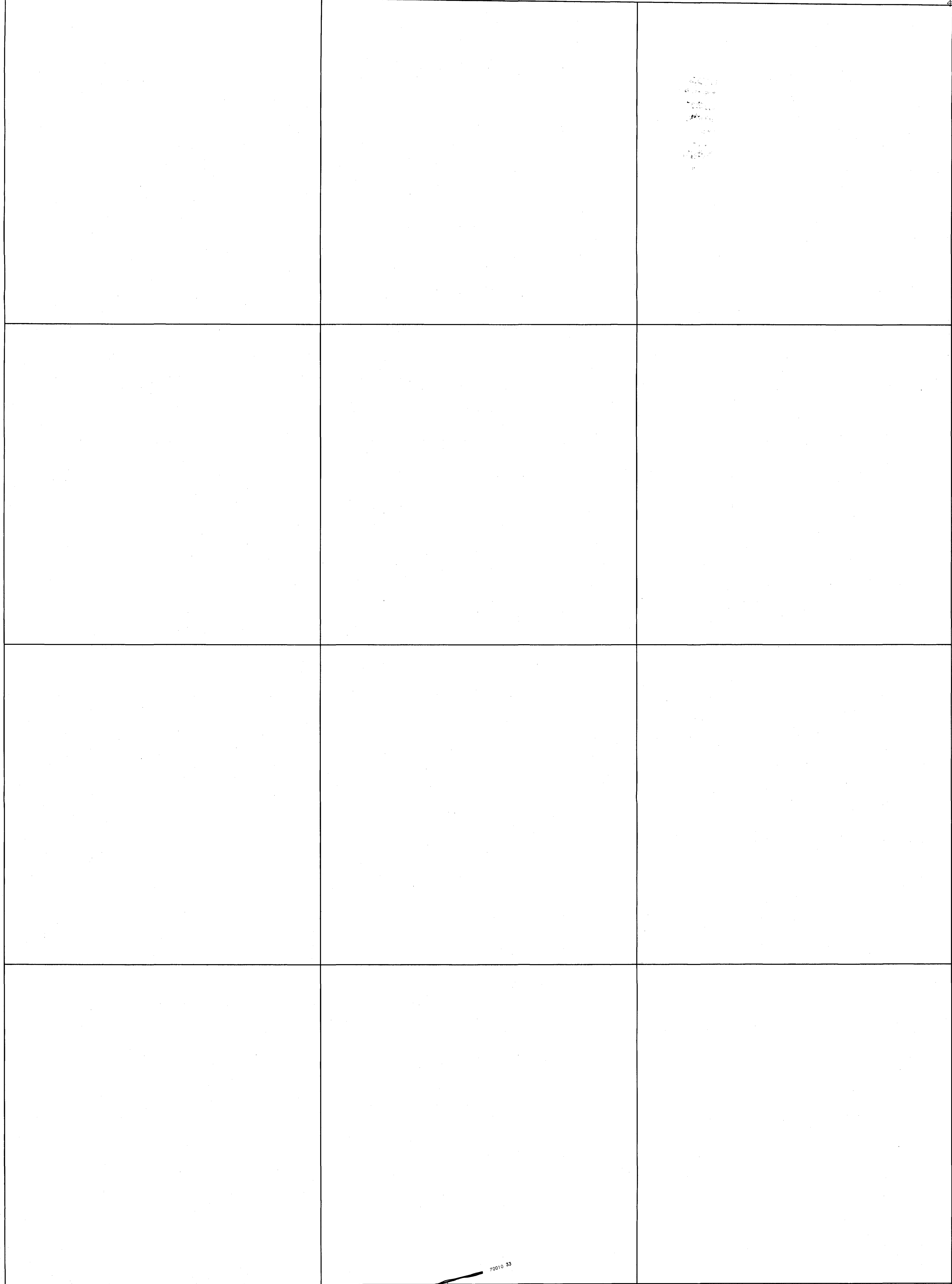
DATE: MAR 1991
 INTS. NO.: 41 0716
 MAP NO.: 4105296



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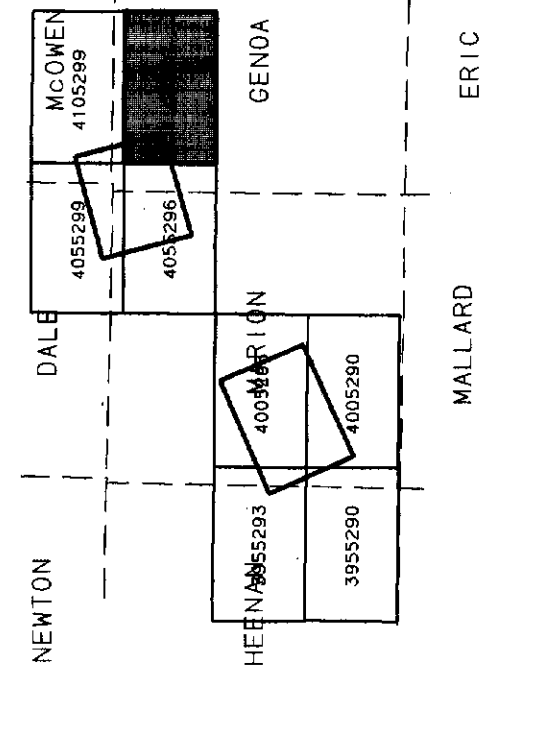
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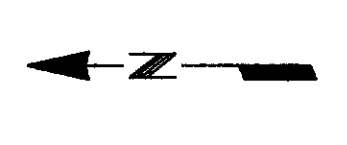
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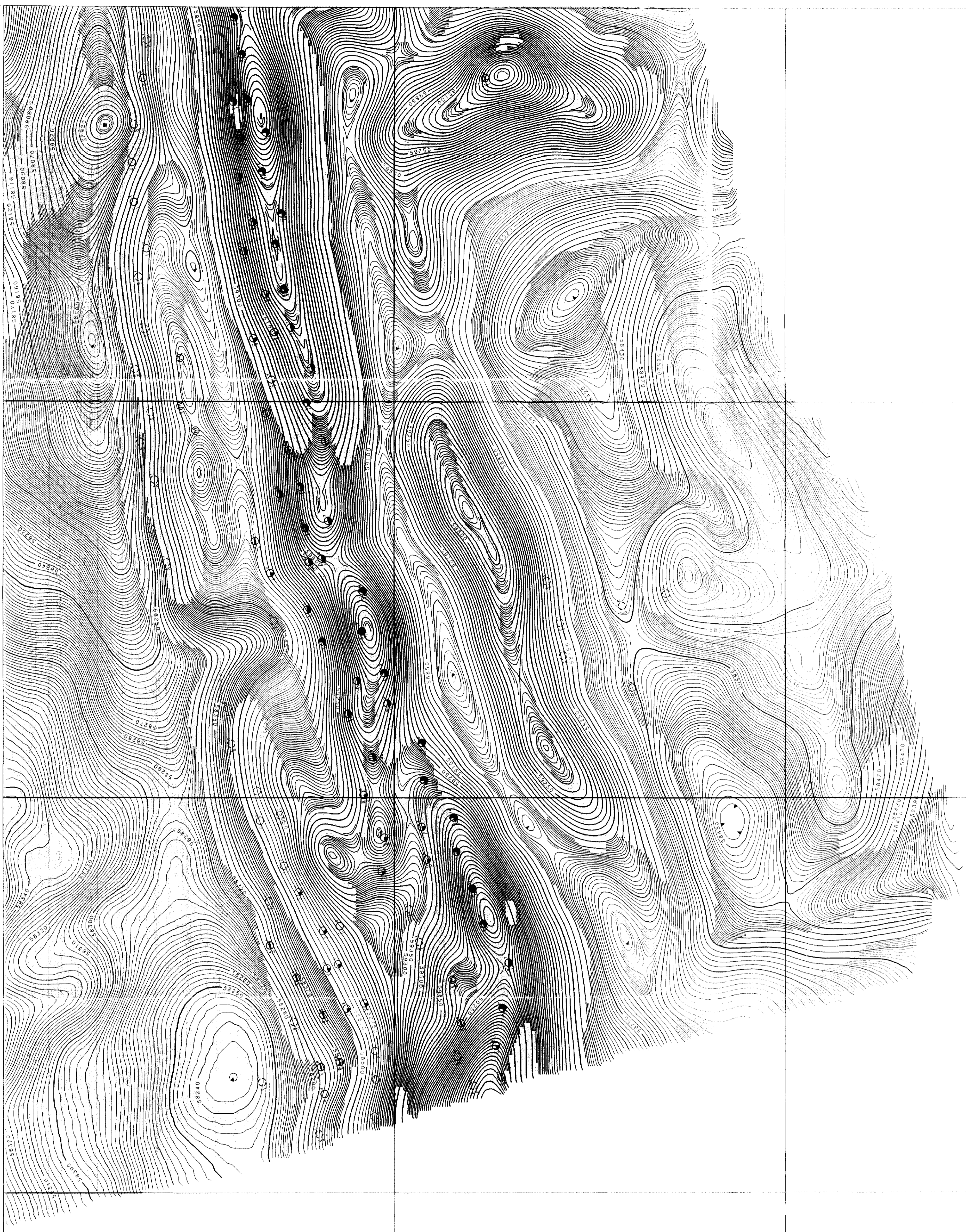


FALCONBRIDGE LIMITED
ELECTROMAGNETIC PROFILES
 935 Hz Coaxial, 850 Hz Coplanar
2.14949
 GENOA PROJECT (PN 8668)
 GENOA TOWNSHIP, ONTARIO
 SCALE: 1:5,000
 DATE: MAR 1991
 MAP NO.: 4105296
 PROJECT NO.: J101

EM Profiles
 935 Hz Coaxial 1 ppm/mm
 850 Hz Coplanar 4 ppm/mm
 Sensor elevation.....30m
 Coil separation.....7m

EM Anomalies
 Conductivity (times)
 0 - 2
 3 - 4
 5 - 8
 9 - 15
 16 - 30
 31 - 50
 51 - 100
 101 - 200
 201 - 500
 500+
 Magnetic Anomaly
 1000
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10000

10000

10000

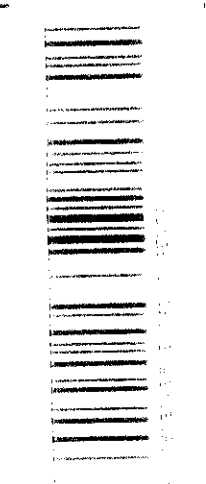
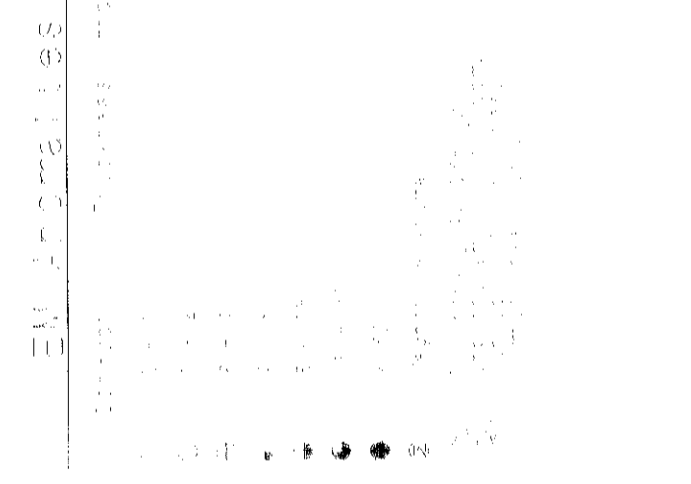
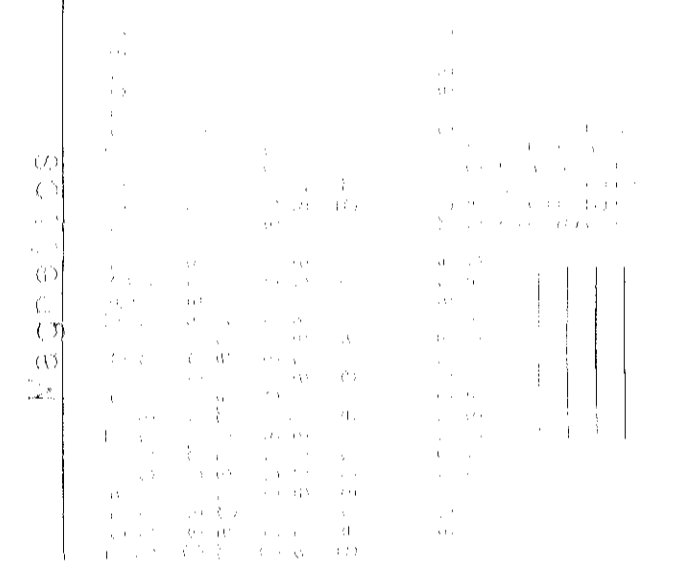
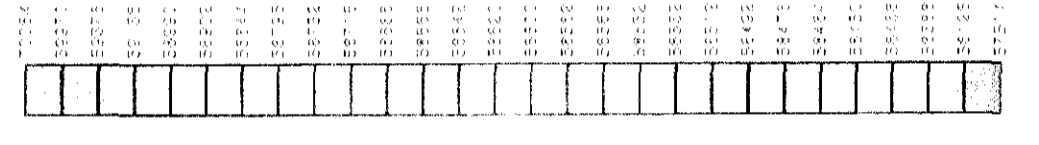
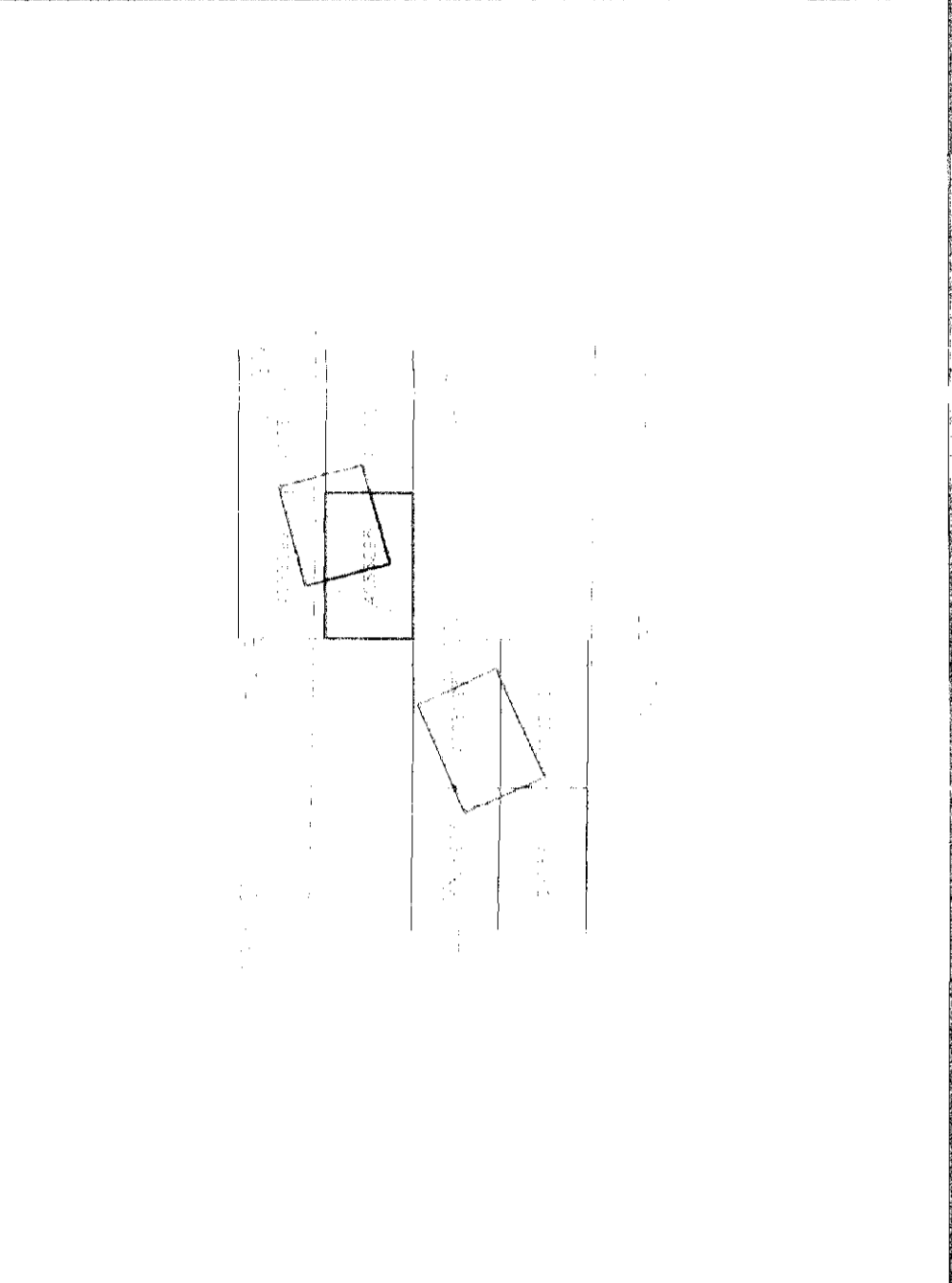
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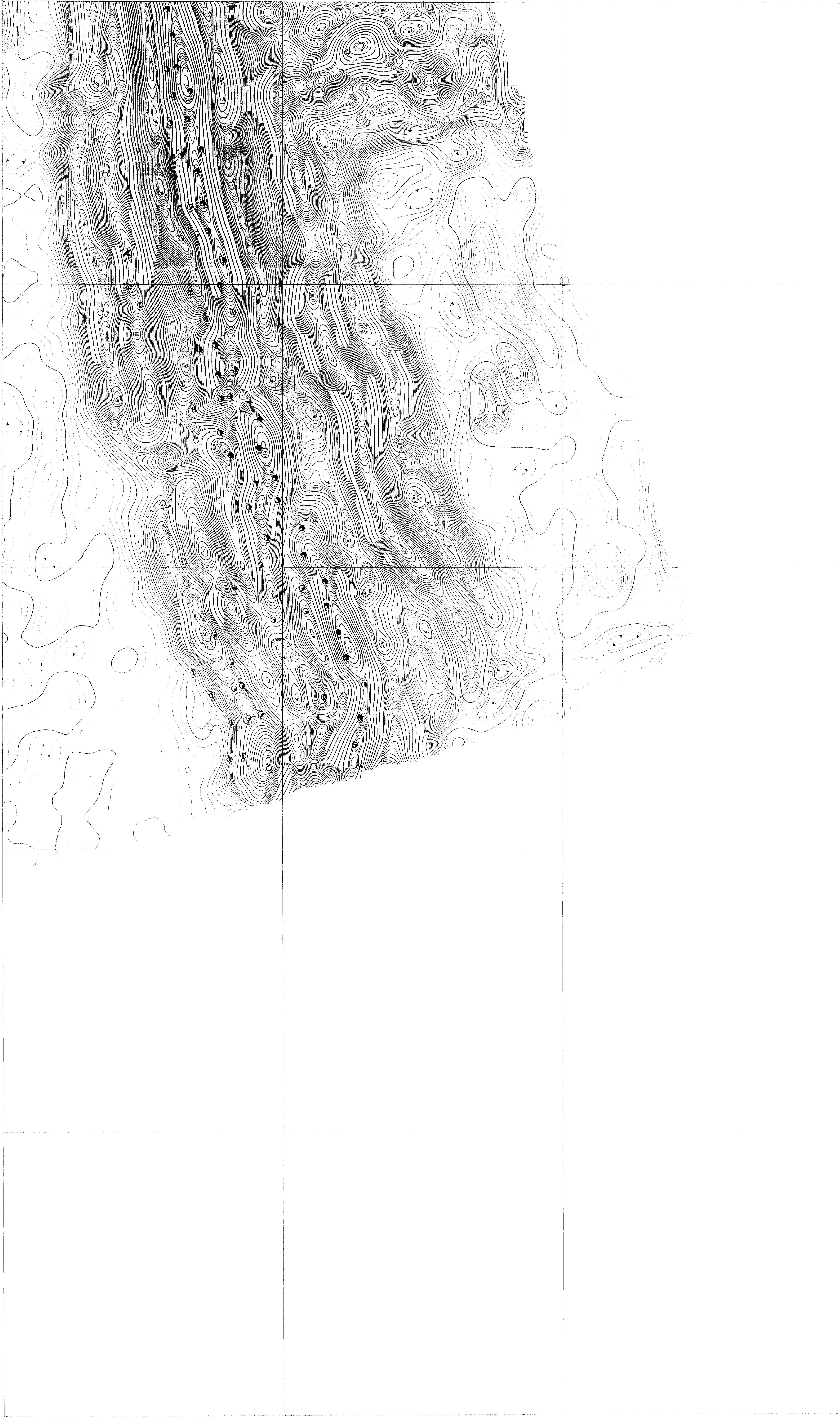
FALCONBRIDGE LIMITED

TOTAL FIELD MAGNETICS
CONTOURS AND COLOURS

BENGA PROJECT (PH 8666)
DLE TANKS, DMP12

AERODAT LIMITED

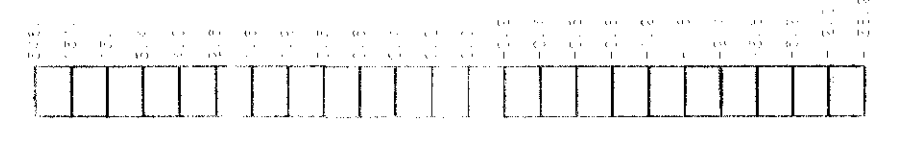
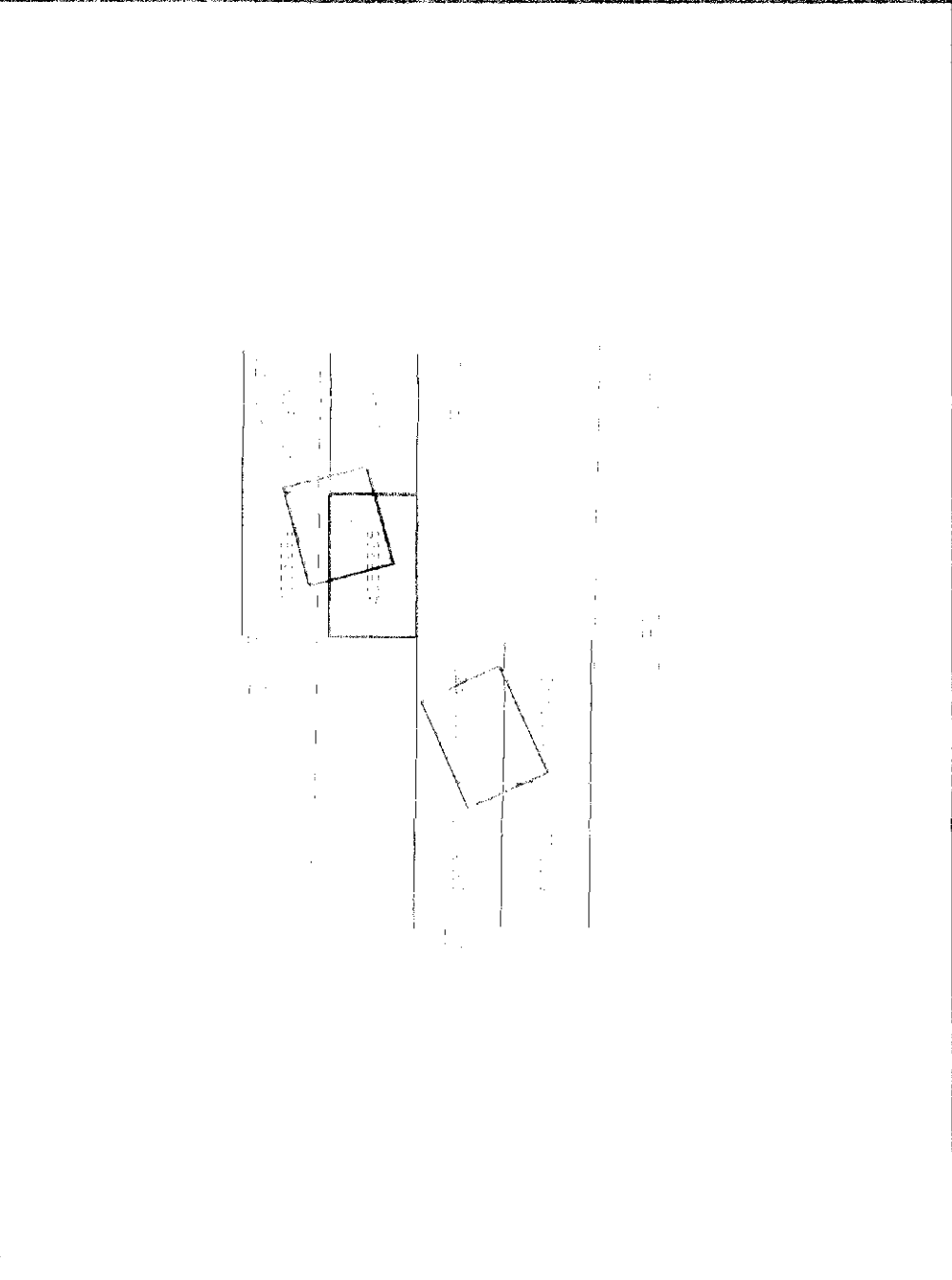




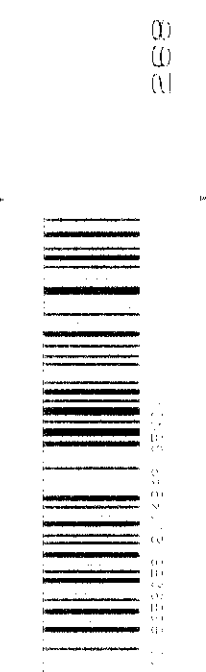
FALCONBRIDGE LIMITED
 CALCULATED VERTICAL MAGNETIC GRADIENT
 CONTOURS AND COLOURS

GENOA PROJECT (EN 0000)
 FILE NUMBER: 00001

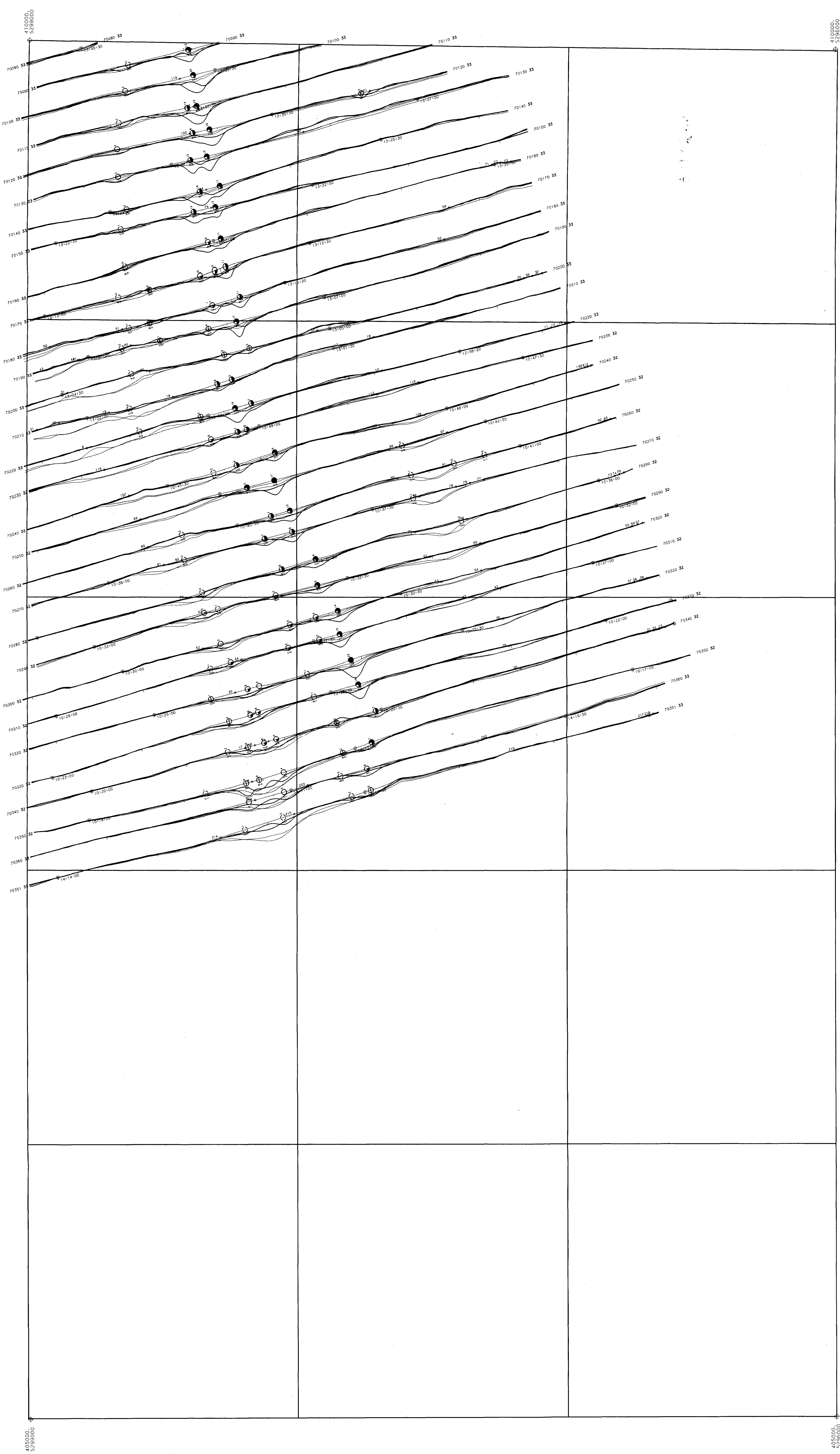
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Contour Value	Color
100	Blue
200	Green
300	Yellow
400	Orange
500	Red
600	Dark Red
700	Black



888



FALCONBRIDGE LIMITED

ELECTROMAGNETIC PROFILES
 (4600 Hz Coaxial, 4175 Hz Coplanar)

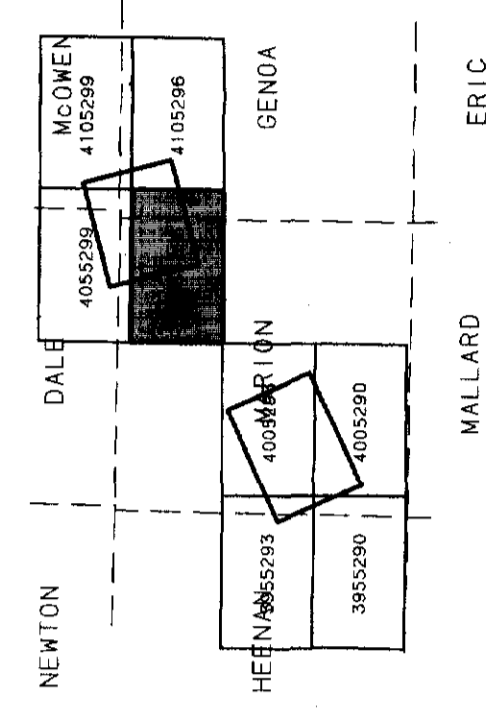
2-14949

GENOA PROJECT (PN 8668)
 DALE TOWNSHIP, ONTARIO

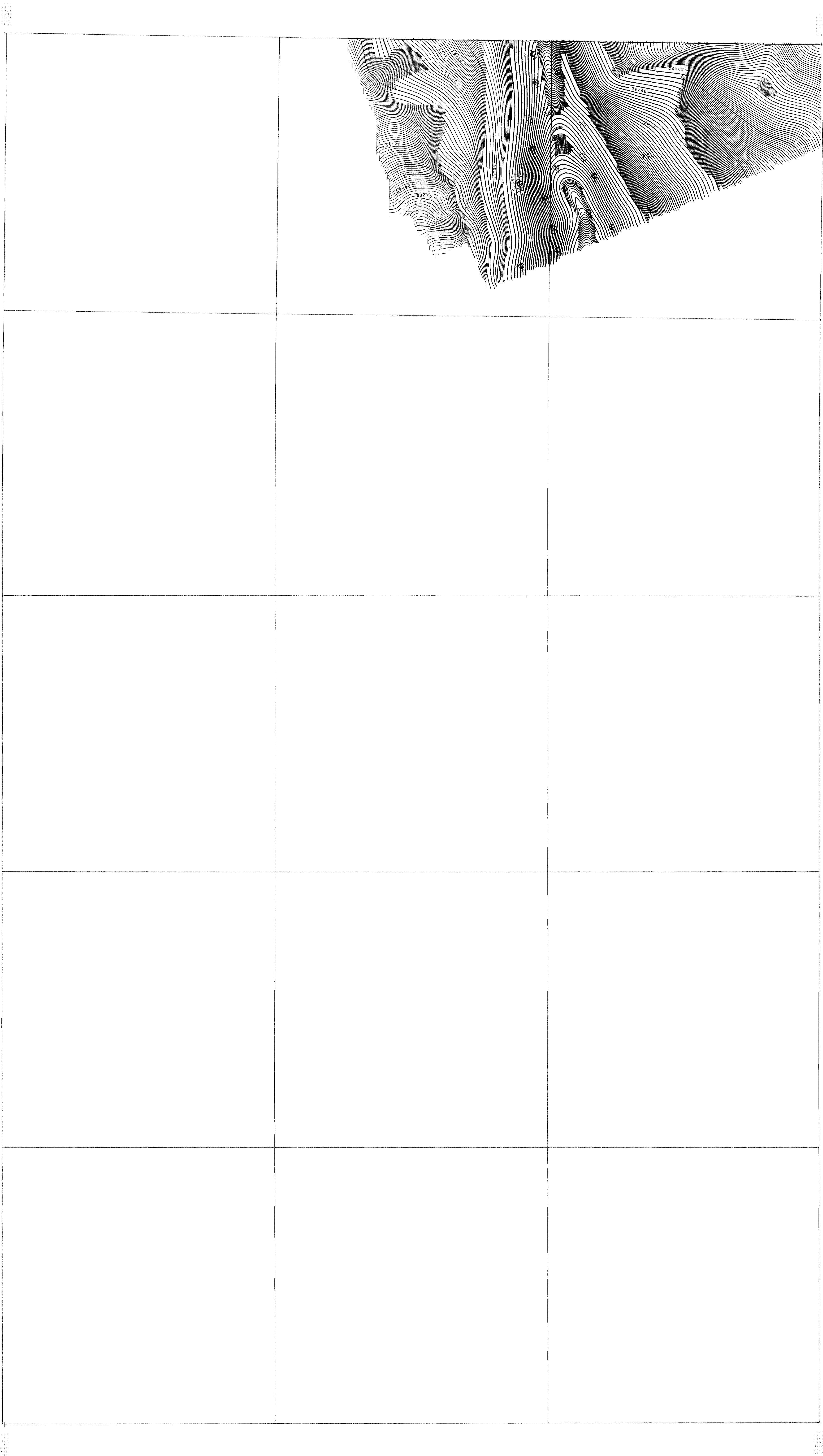
SCALE 1:25,000

DATE: MAR 1991
 NTS No: 41-07/16
 MAP No: 4052906

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- EM Profiles**
- 4600 Hz Coaxial 2 mV/mm in-phase component
 - 4175 Hz Coplanar 8 mV/mm quadrature component
 - 4600 Hz Coaxial 2 mV/mm in-phase component
 - 4175 Hz Coplanar 8 mV/mm quadrature component
 - 4600 Hz Coaxial 2 mV/mm in-phase component
 - 4175 Hz Coplanar 8 mV/mm quadrature component
- EM Anomalies**
- Conductivity Thickness (mms)
 - 0 - 1
 - 1 - 2
 - 2 - 4
 - 4 - 8
 - 8 - 15
 - 15 - 30
 - 30 - 60
 - 60 - 120
 - 120 - 240
 - 240 - 480
 - 480 - 960
 - 960 - 1920
 - 1920 - 3840
 - 3840 - 7680
 - 7680 - 15360
 - 15360 - 30720
 - 30720 - 61440
 - 61440 - 122880
 - 122880 - 245760
 - 245760 - 491520
 - 491520 - 983040
 - 983040 - 1966080
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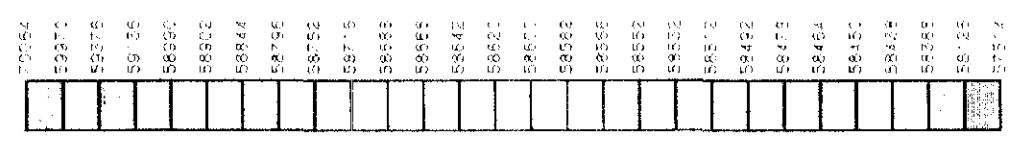


1111
1112
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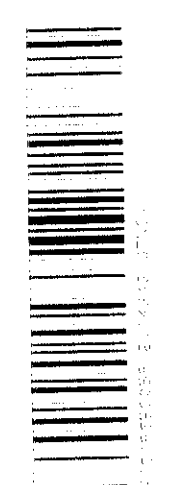


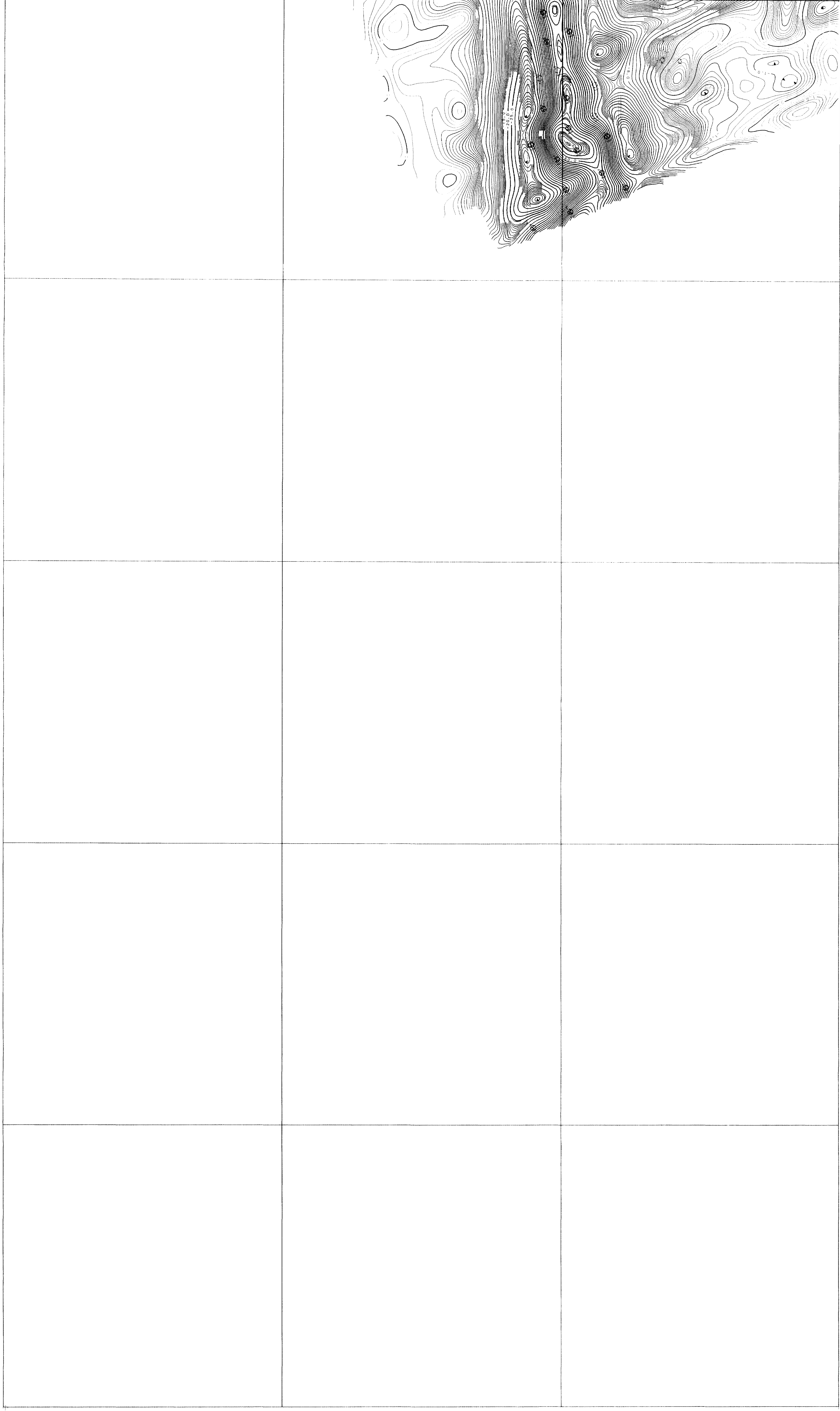
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 1131 1132 1133 1134 1135
 1136 1137 1138 1139 1140
 1141 1142 1143 1144 1145
 1146 1147 1148 1149 1150

EM Anomalies
 0 100 200 300 400 500 600 700 800 900 1000
 1111 1112 1113 1114 1115
 1116 1117 1118 1119 1120
 1121 1122 1123 1124 1125
 1126 1127 1128 1129 1130
 1131 1132 1133 1134 1135
 1136 1137 1138 1139 1140
 1141 1142 1143 1144 1145
 1146 1147 1148 1149 1150



FALCONBRIDGE LIMITED
TOTAL FIELD MAGNETICS
CONTOURS AND COLOURS
 GENDA PROJECT (PN 8668)
 HEDMAN, TWINSHIP, ONTARIO
 AERODAT LIMITED



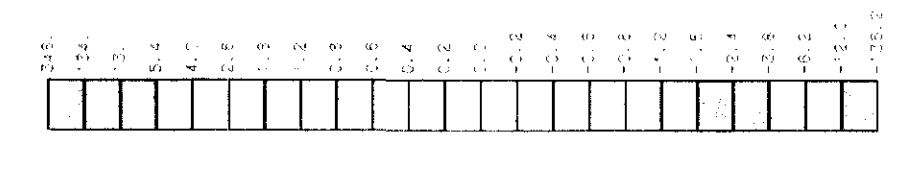


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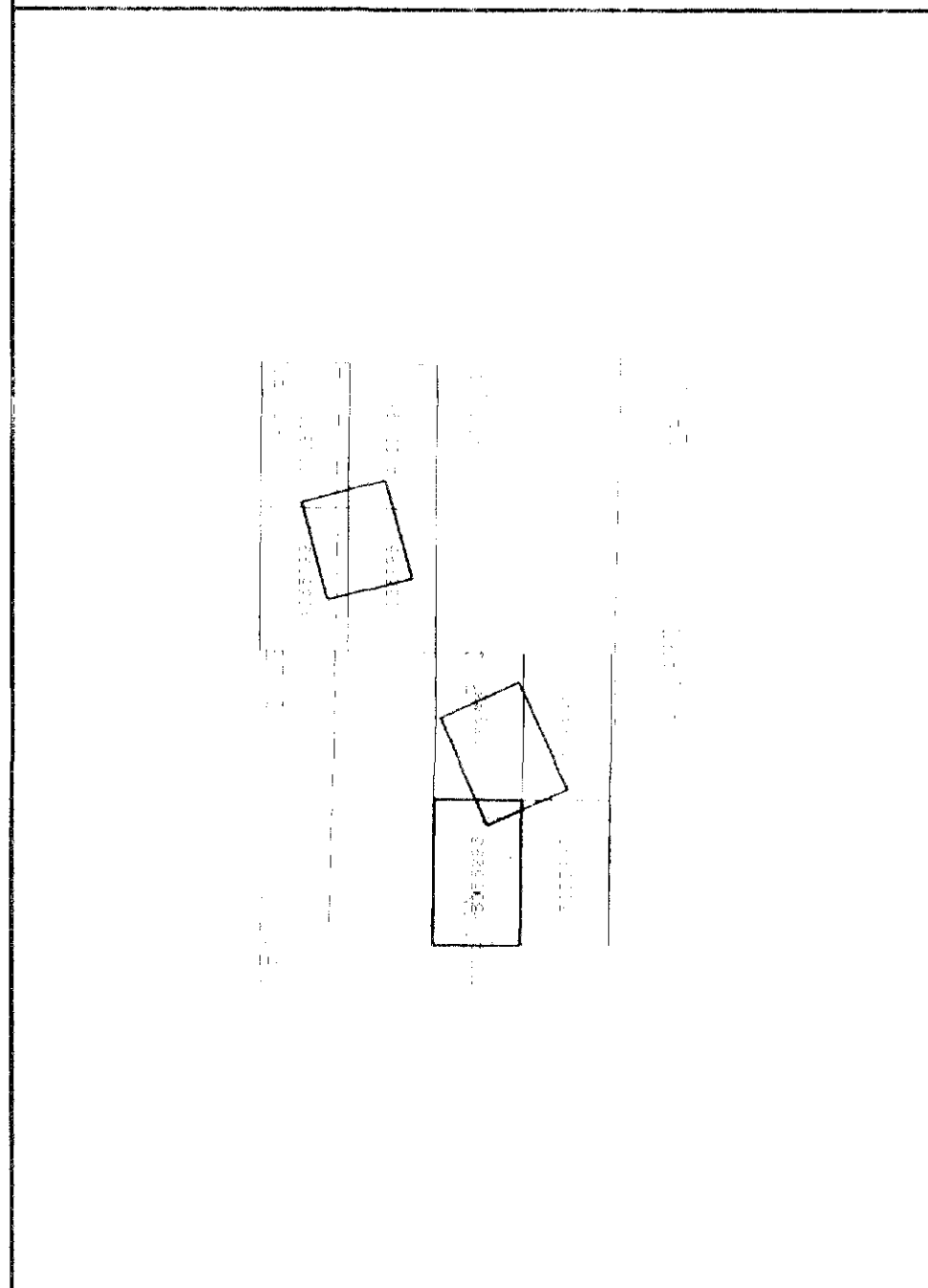
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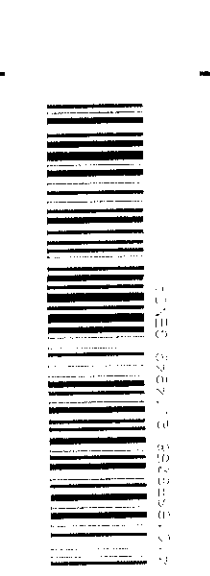


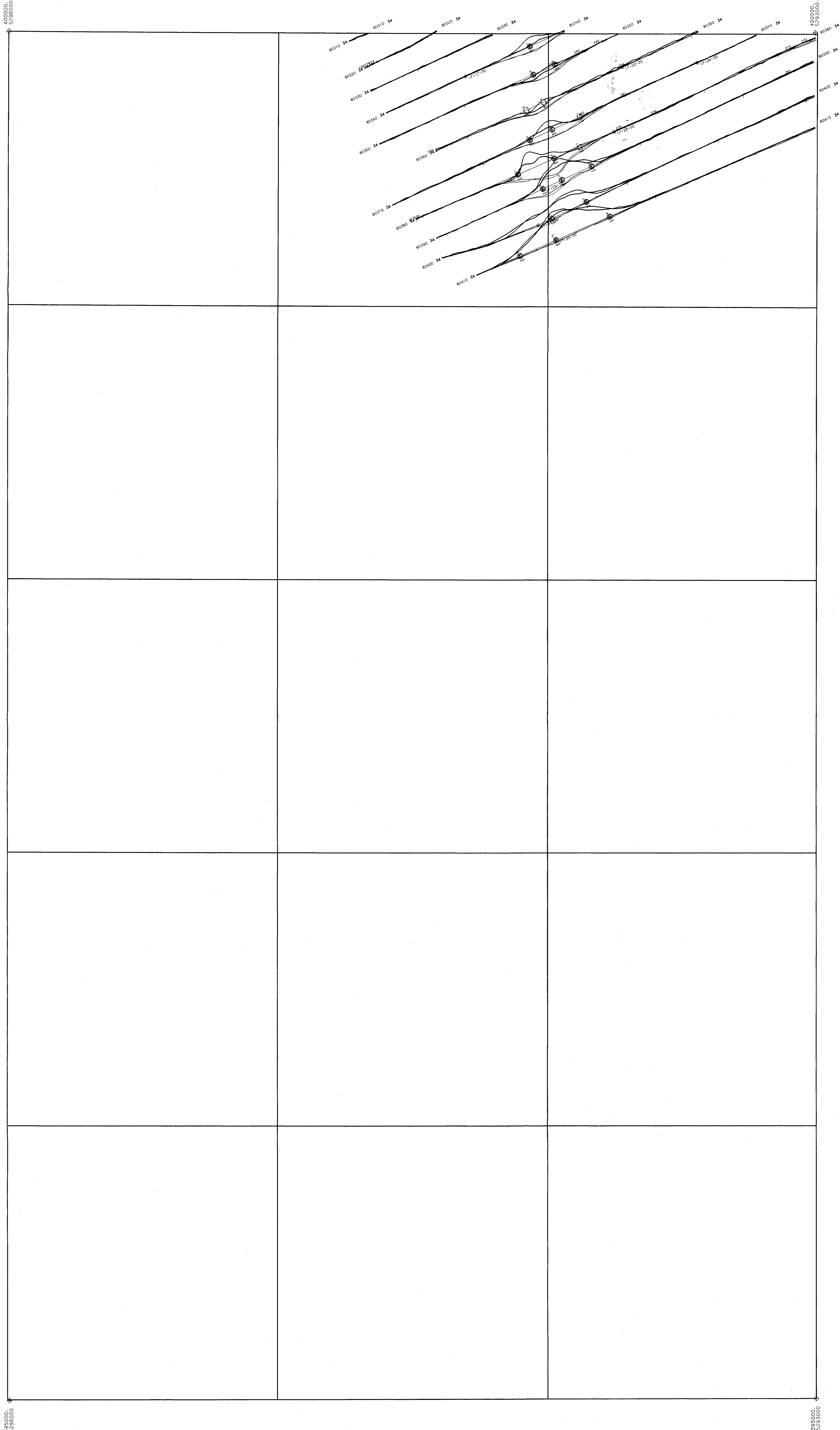
VERTICAL GRADIENT
 The vertical magnetic gradient is calculated from the magnetic field strength and the magnetic declination. The vertical magnetic gradient is expressed in units of microtesla per meter (μT/m). The vertical magnetic gradient is a measure of the rate of change of the magnetic field strength with height. The vertical magnetic gradient is a function of the magnetic field strength and the magnetic declination. The vertical magnetic gradient is a function of the magnetic field strength and the magnetic declination.

EM FIELDS
 The electromagnetic field (EMF) is a vector field that is composed of an electric field and a magnetic field. The EMF is a function of the electric field and the magnetic field. The EMF is a function of the electric field and the magnetic field. The EMF is a function of the electric field and the magnetic field.



FALCONBRIDGE LIMITED
CALCULATED VERTICAL MAGNETIC GRADIENT CONTOURS AND COLOURS
 GEMDA PROJECT (PN 8668)
 HECMA TOWNSHIP, ONTARIO
 AERODAT LIMITED



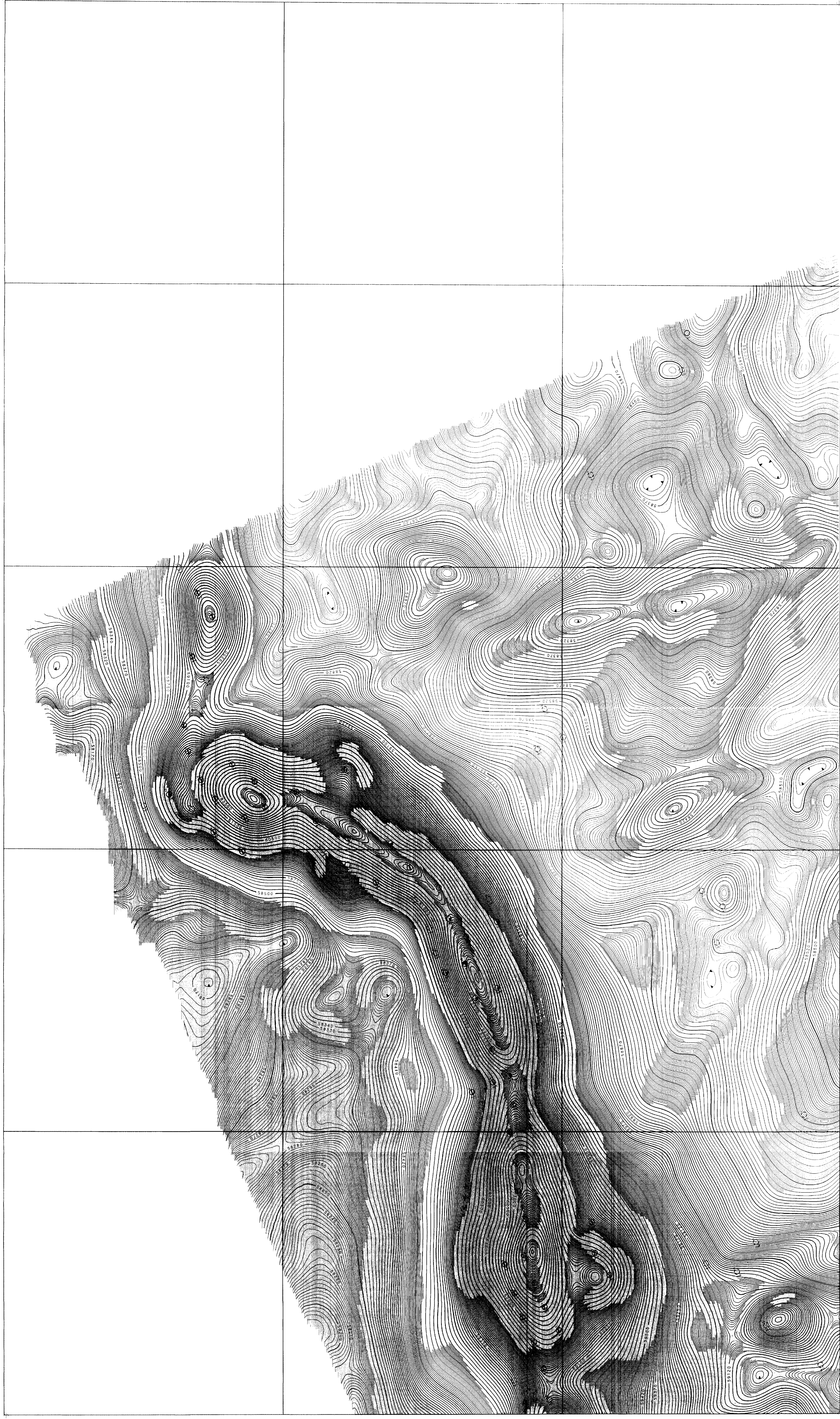


EM Profiles

- 935 Hz Coaxial 1 pole/mm
- Inphase component
- Quadrature component
- 850 Hz Coaxial 4 pole/mm
- Inphase component
- Quadrature component
- Sensor elevation 30m
- Coil separation 7.7m

EM Anomalies

- Conductivity Thickness (mhos)
- 1 - 2
- 2 - 4
- 4 - 8
- 8 - 16
- 16 - 32
- 32 - 64
- 64 - 128
- 128 - 256
- 256 - 512
- 512 - 1024
- 1024 - 2048
- 2048 - 4096
- 4096 - 8192
- 8192 - 16384
- 16384 - 32768
- 32768 - 65536
- 65536 - 131072
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11111111

11111111

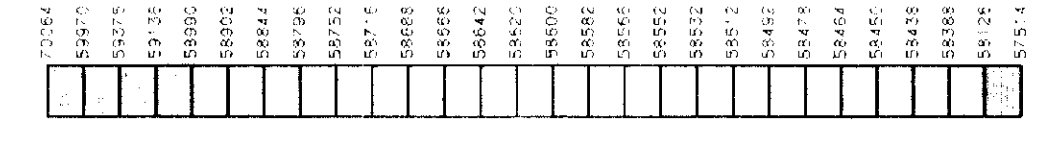
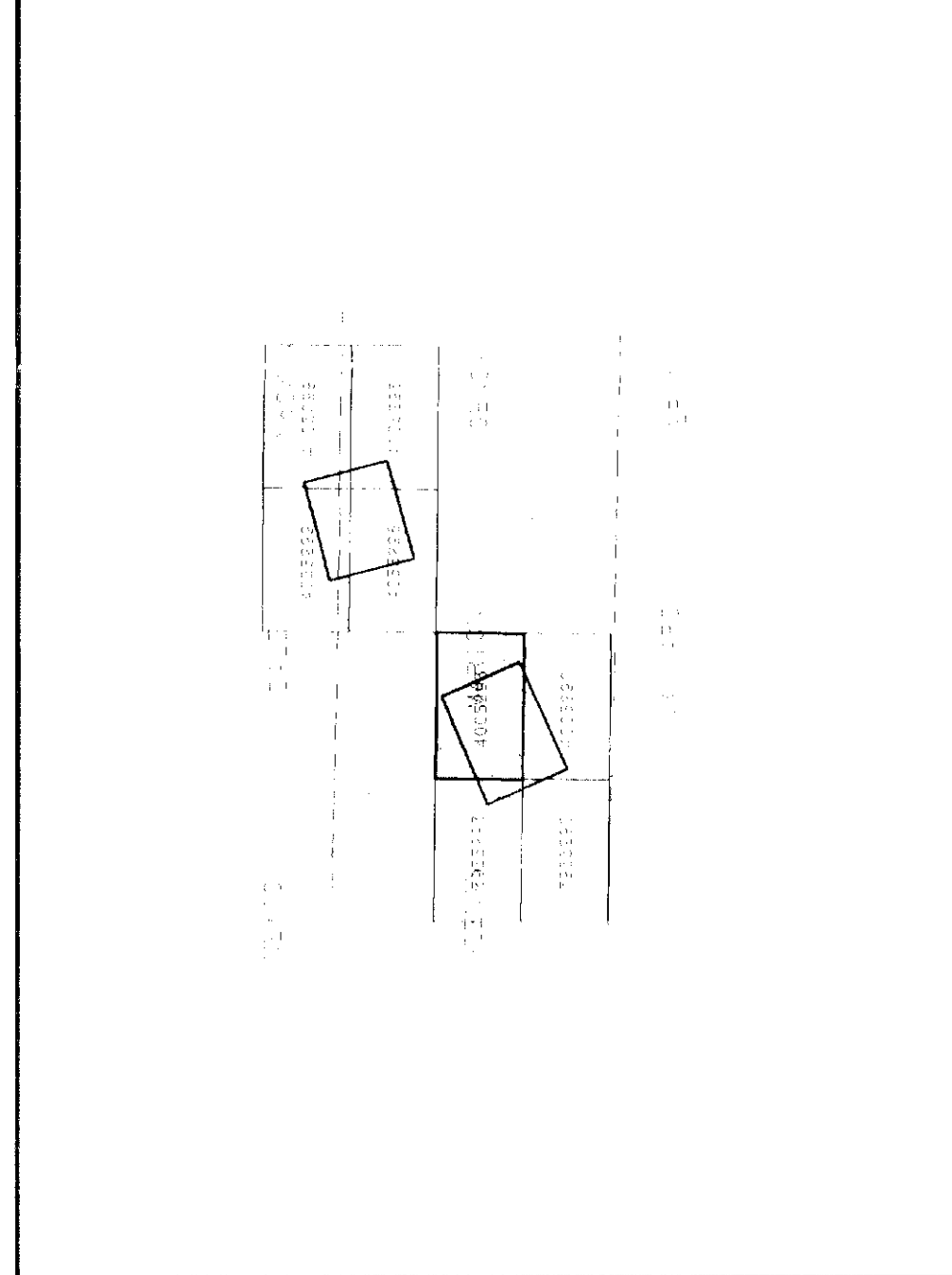
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FALCONBRIDGE LIMITED
TOTAL FIELD MAGNETICS
CONTOURS AND COLOURS

GENDA PROJECT (PN 8668)
 MARTIN TOWNSHIP, ONTARIO

DATE: 2008-08-22
 SCALE: 1:50,000
 PROJECT NO.: 8668
 SHEET NO.: 1

AERODAT LIMITED

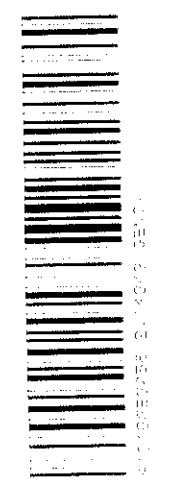


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 800000
 700000
 600000
 500000
 400000
 300000
 200000
 100000
 0
 -100000
 -200000
 -300000
 -400000
 -500000
 -600000
 -700000
 -800000
 -900000
 -1000000

EM Anomalies

1000000
 900000
 800000
 700000
 600000
 500000
 400000
 300000
 200000
 100000
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 -100000
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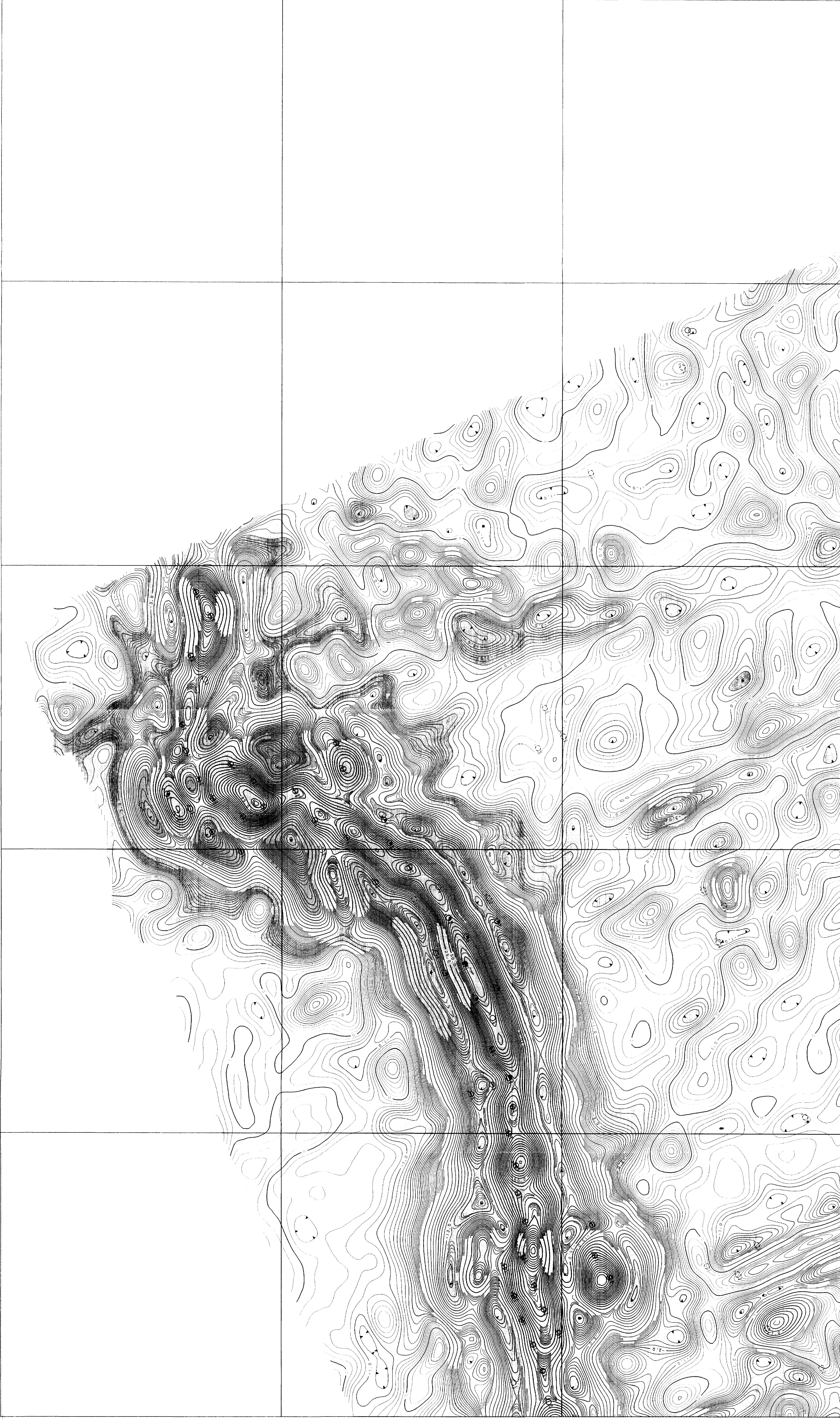


431111

431111

431111

431111



Vertical Gradient

Vertical Gradient
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 8000
 6000
 4000
 2000
 0
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 -4000
 -6000
 -8000
 -10000

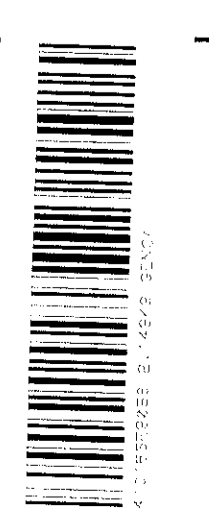
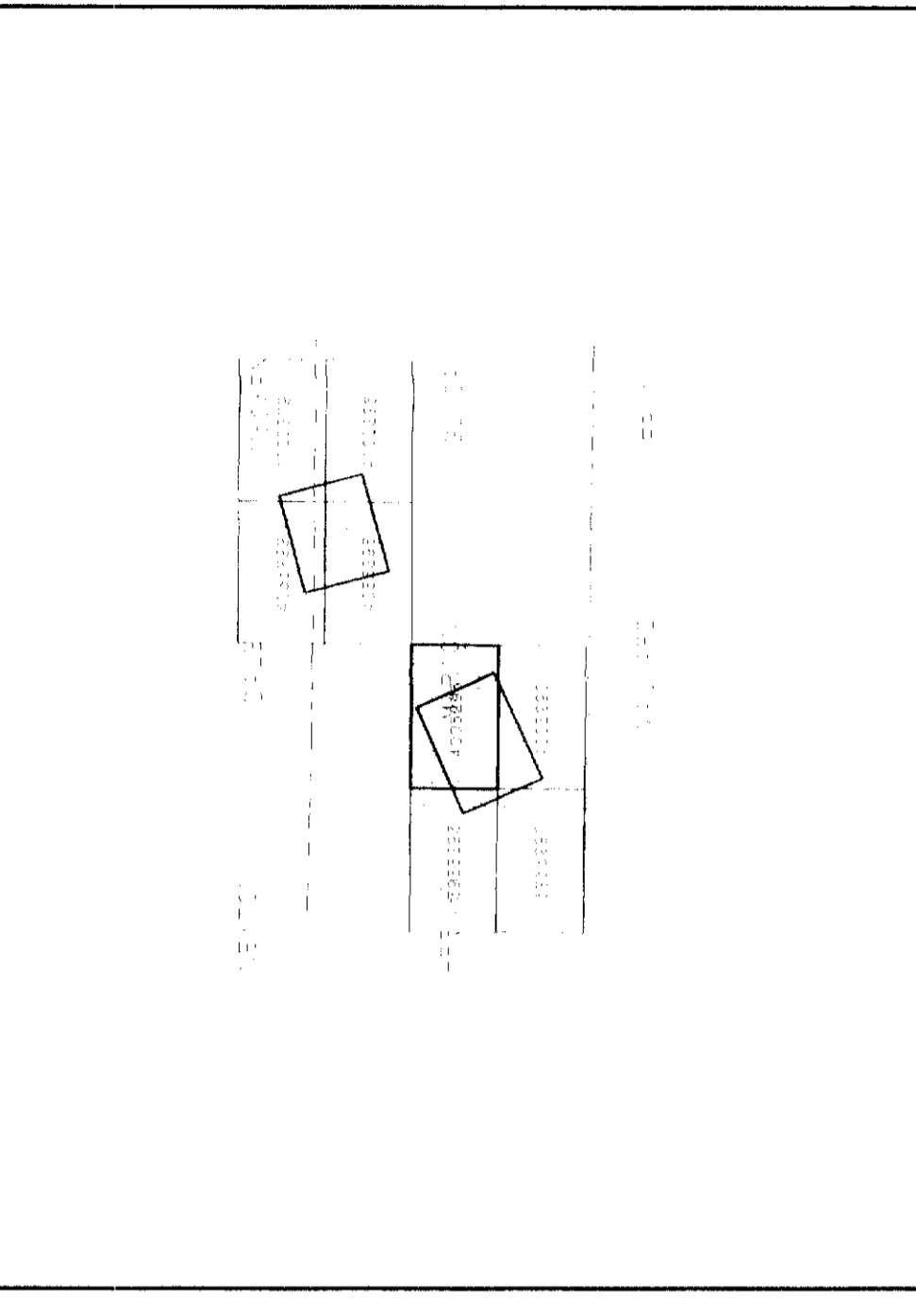
EM Anomalies

EM Anomalies
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 800
 600
 400
 200
 0
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 -400
 -600
 -800
 -1000

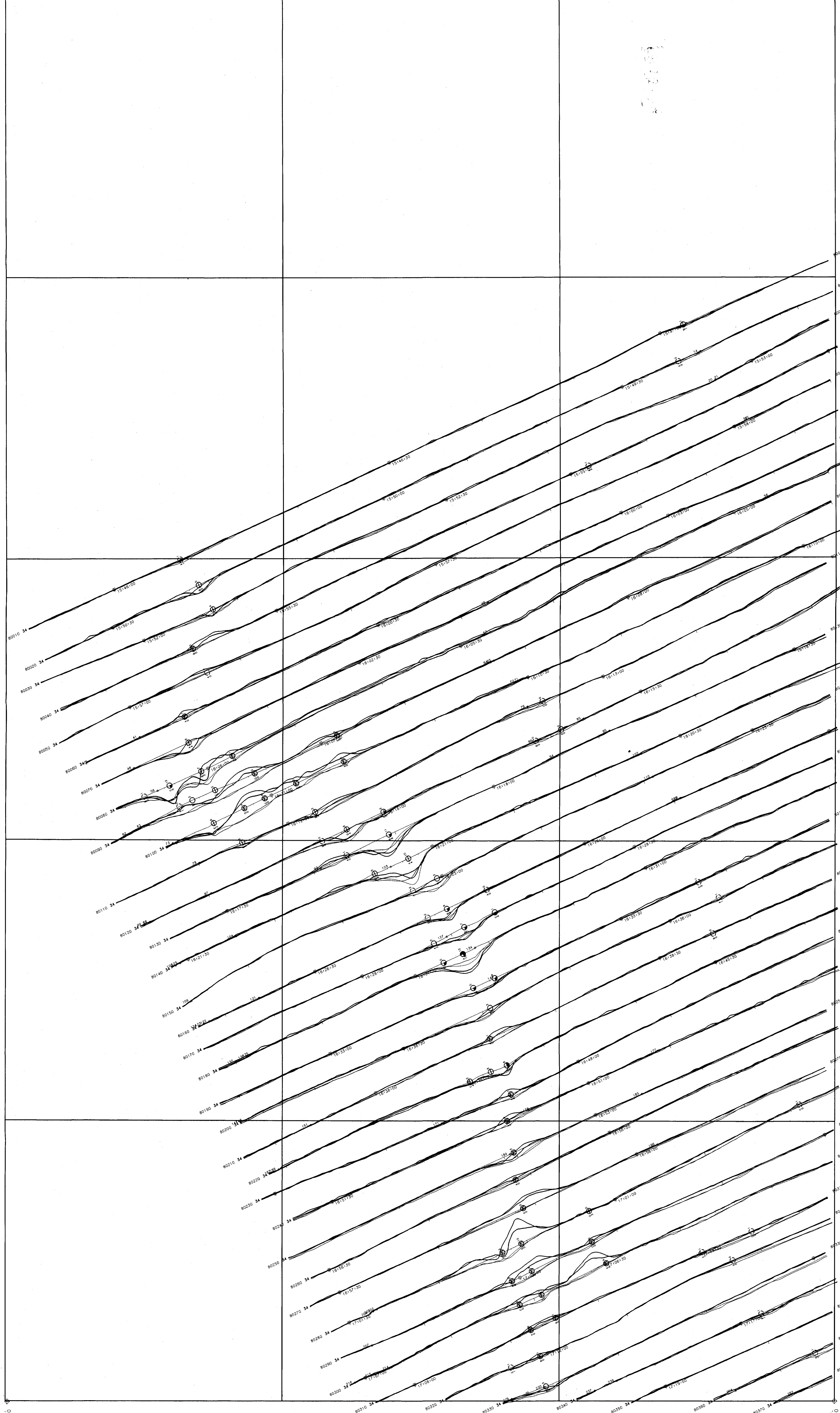


FALCONBRIDGE LIMITED
 CALCULATED VERTICAL MAGNETIC GRADIENT
 CONTOURS AND COLOURS
 GENDA PROJECT (PN 8068)
 MATHON TOWNSHIP, ONTARIO

AERODAT LIMITED



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5296000



495000
5296000

495000
5296000

495000
5296000

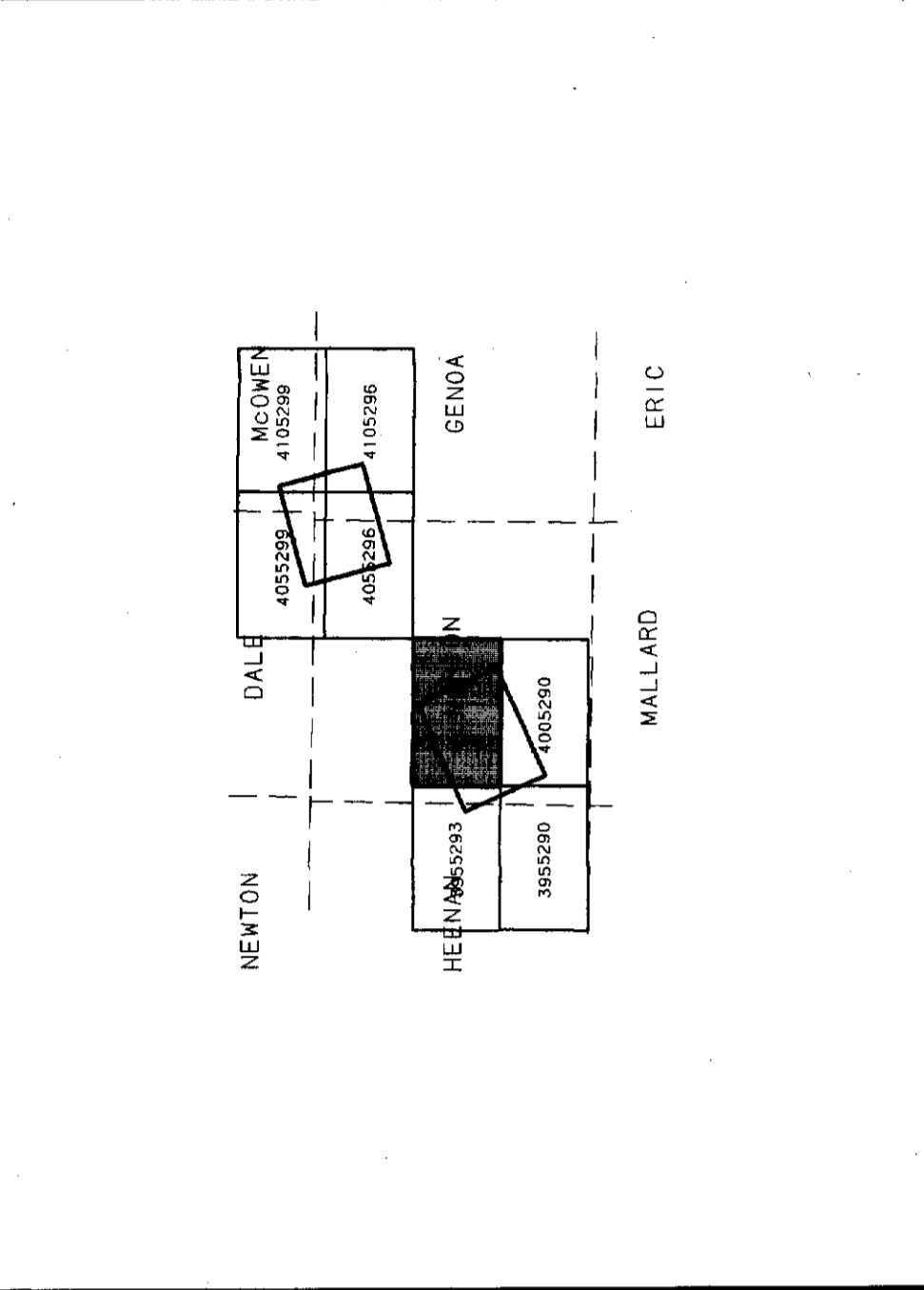
FALCONBRIDGE LIMITED
 ELECTROMAGNETIC PROFILES
 935 Hz Coaxial, 1 ppm/m
 850 Hz Coaxial, 4 ppm/m

2.14949
 GENDA PROJECT (PN 8668)
 MARION TOWNSHIP, ONTARIO

SCALE 1:125,000
 0 100 200 300 400 500 Feet
 0 50 100 150 Meters

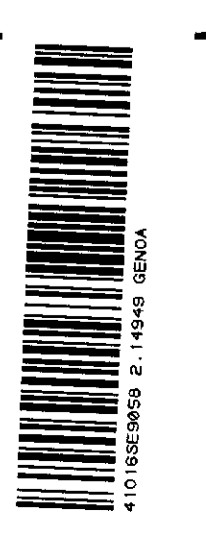
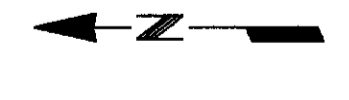
DATE: MAR 1981
 NTS No: 41 0716
 MAP No: 4805233

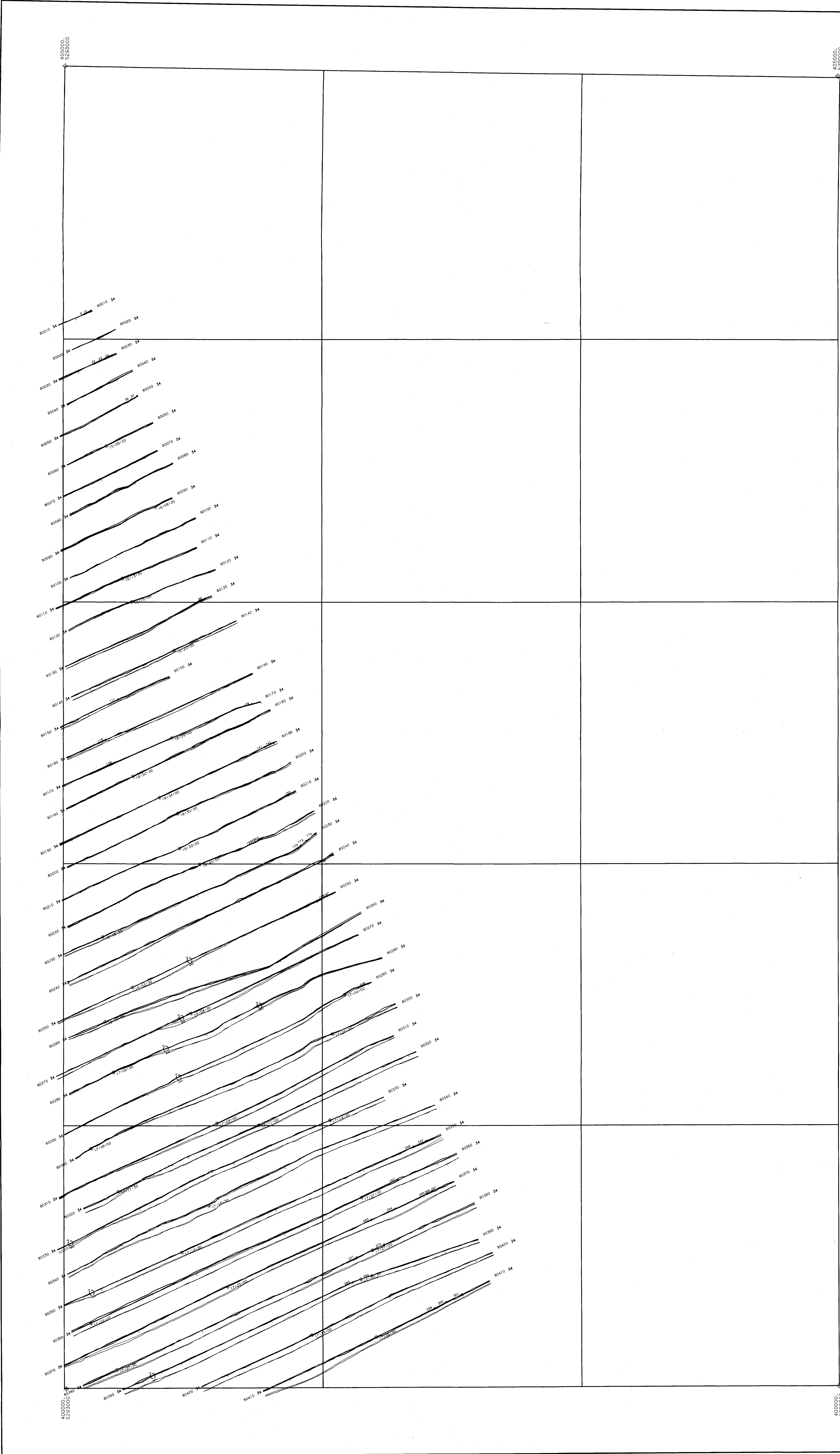
AERODAT LIMITED



EM PROFILES
 935 Hz Coaxial 1 ppm/m
 Inphase component
 850 Hz Coaxial 4 ppm/m
 Inphase component
 Sensor separation 15-20
 Cell separation 1.7m

EM ANOMALIES
 Conductivity thickness (cm)
 0-1
 2-4
 4-8
 15-20
 20-30
 Magnetite assembly
 Coaxial wire loop 2.0m
 Coaxial wire loop 1.7m
 2 meter tape loop



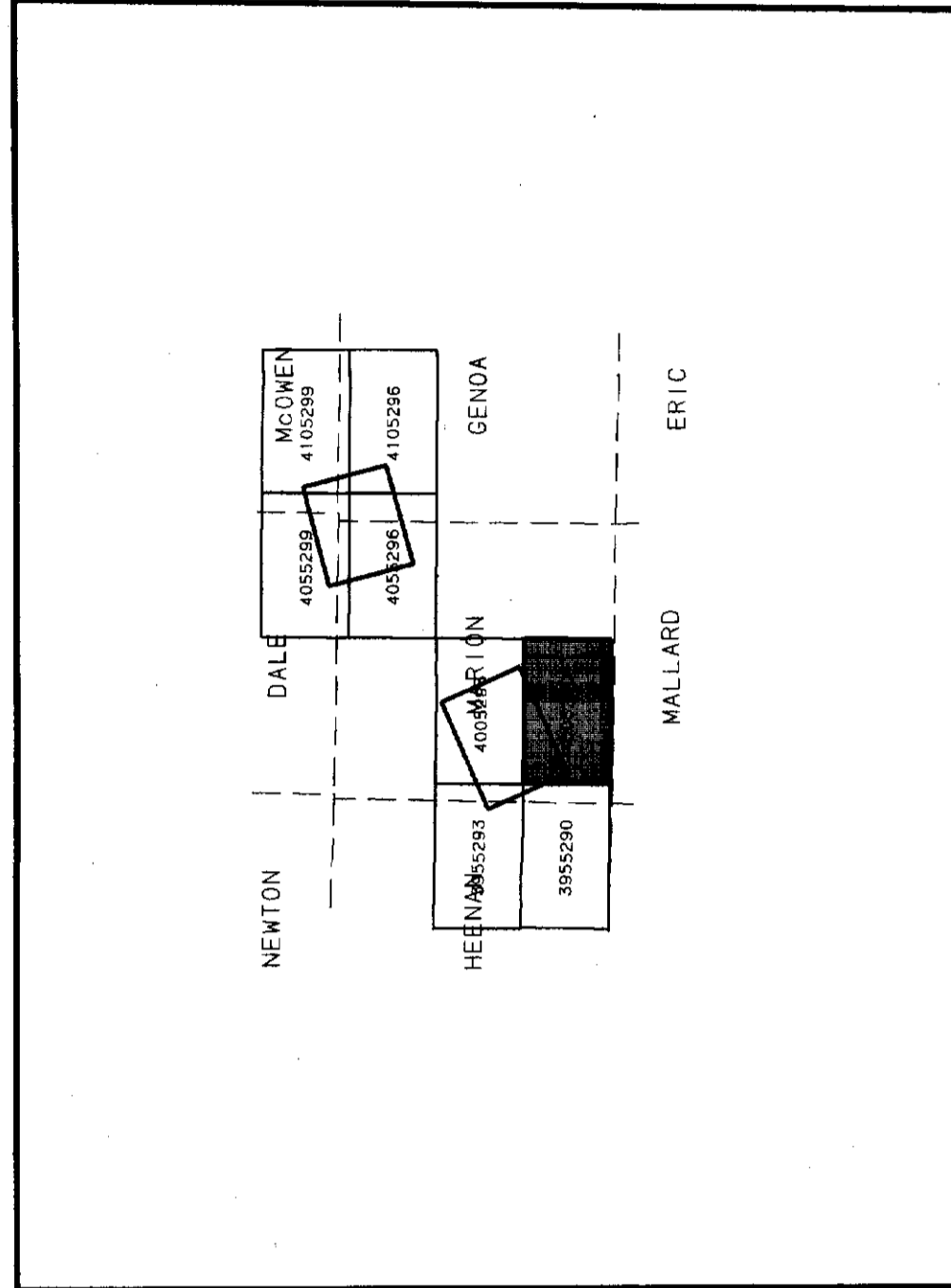


FALCONBRIDGE LIMITED
 ELECTROMAGNETIC PROFILES
 (955 Hz Coaxial, 850 Hz Coplanar)
2.14949
 GENDA PROJECT (PN 8668)
 MARION TOWNSHIP, ONTARIO

SCALE: 1:125,000
 0 100 200 300 400 500 Feet
 0 100 200 300 400 500 Meters

DATE: MAR 1991
 NTS No: 41 0716
 MAP No: 4005290

AERODAT LIMITED



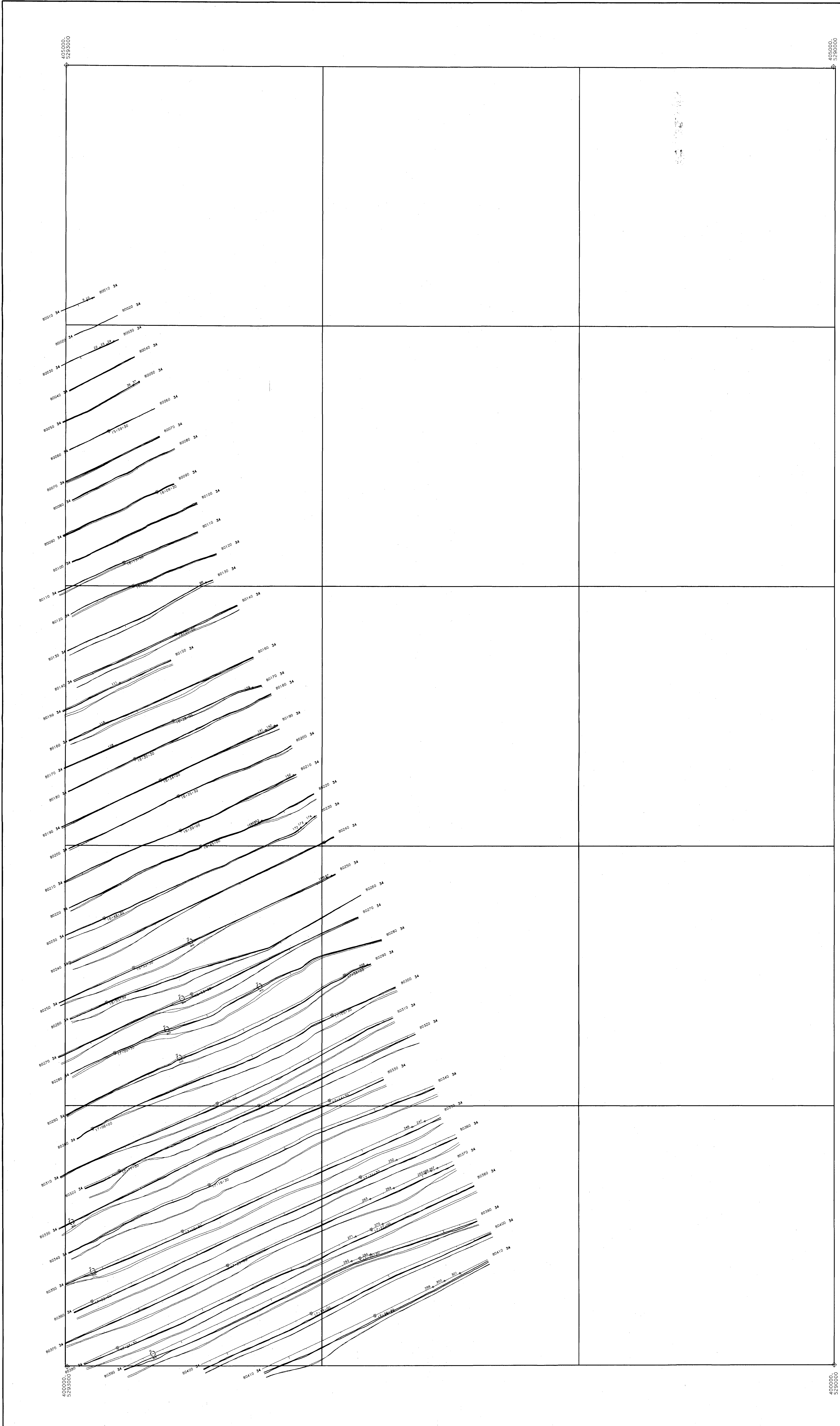
EM PROFILES

- 955 Hz Coaxial 1 gpm/mm
- Inphase component
- Quadrature component
- 850 Hz Coplanar 4 gpm/mm
- Inphase component
- Quadrature component
- Sensor elevation 30°
- Coil separation 7m

EM ANOMALIES

Conductivity thickness (m)

- 1 - 2
- 2 - 4
- 4 - 8
- 8 - 15
- 15 - 30
- 30 - 60
- 60 - 120
- 120 - 240
- 240 - 480
- 480 - 960
- 960 - 1920
- 1920 - 3840
- 3840 - 7680
- 7680 - 15360
- 15360 - 30720
- 30720 - 61440
- 61440 - 122880
- 122880 - 245760
- 245760 - 491520
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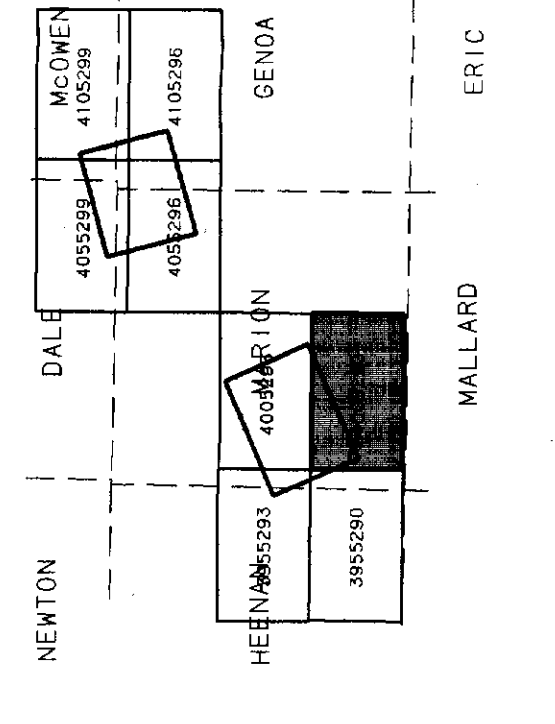
FALCONBRIDGE LIMITED
ELECTROMAGNETIC PROFILES
 (4600 Hz Coaxial, 4175 Hz Coplanar)

GENOA PROJECT (PN 8668)
 MARION TOWNSHIP, ONTARIO

SCALE 1:5,000
 0 100 200 300 400 500 Metres

DATE: 1 MAR 1991
 NTS No: 41 0716
 MAP No: 4005290
 J0101

AERODAT LIMITED



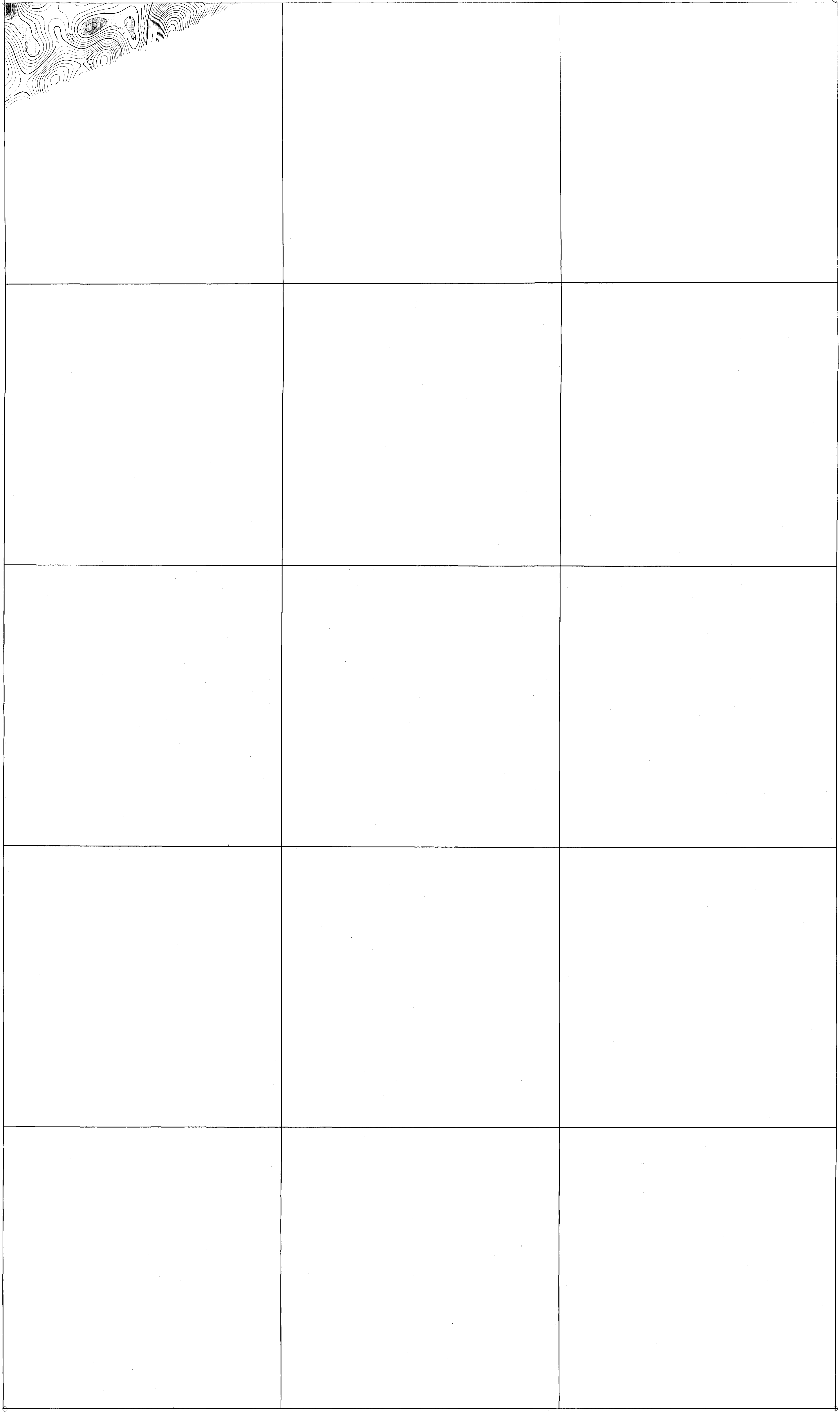
EM PROFILES

- 4600 Hz Coaxial: 2 ppm/mm inphase component
- 4175 Hz Coplanar: 8 ppm/mm inphase component
- Sensor elevation: 30m
- Cell separation: 7m

EM ANOMALIES

- Conductivity (mhos/m): 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 30
- Resistivity (ohm-m): 100, 200, 300, 400, 500, 600, 700, 800, 900, 1000
- Scale: 1:5,000
- Cell separation: 7m



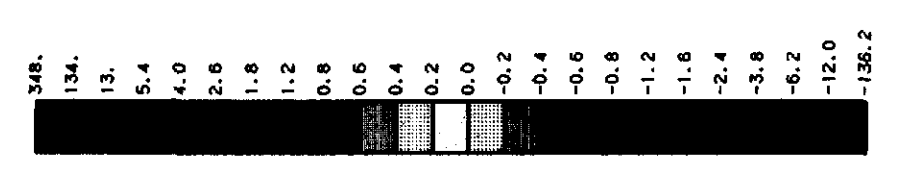


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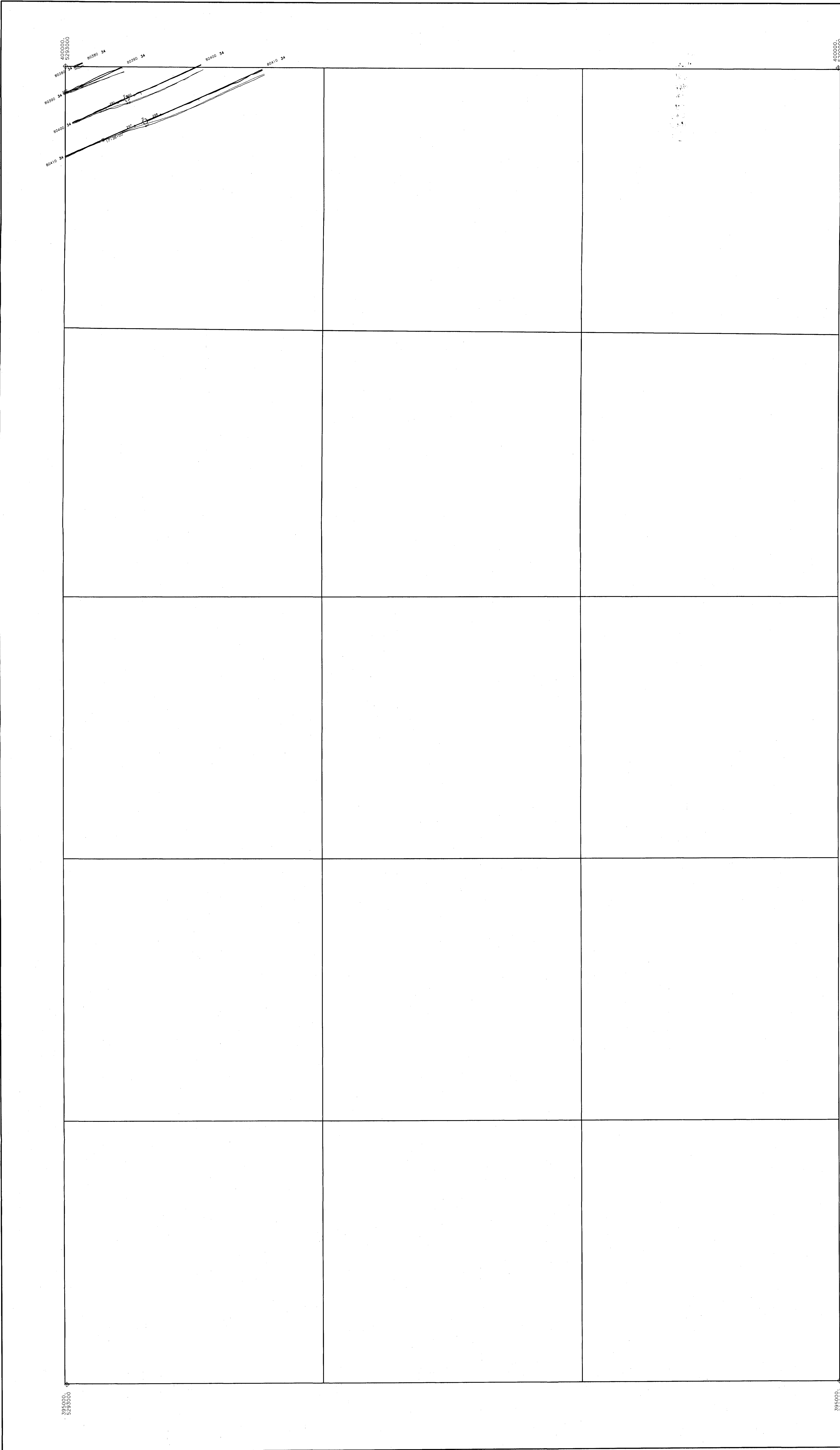
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Vertical Gradient
Vertical Magnetic Gradient
calculated from the total field
anomaly using the following
assumptions:
Cesium high sensitivity
magnetometer.
Sensor elevation 45m

Map contours are multiples of
those listed:
1.00 nT/m
0.20 nT/m
0.10 nT/m
0.05 nT/m
0.02 nT/m

EM Anomalies
Conductivity Thickness (meas)
C 0-1
D 2-4
E 4-8
F 8-15
G 15-30
H 30-60
I 60-120
J 120-240
K 240-480
L 480-960
M 960-1920
N 1920-3840
O 3840-7680
P 7680-15360
Q 15360-30720
R 30720-61440
S 61440-122880
T 122880-245760
U 245760-491520
V 491520-983040
W 983040-1966080
X 1966080-3932160
Y 3932160-7864320
Z 7864320-15728640
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395000
524000

395000
524000

EM ANOMALIES

Conductivity (ppm) (ms)

0 - 1
1 - 2
2 - 4
4 - 8
8 - 15
15 - 30
30 - 60
60 - 120
120 - 240
240 - 480
480 - 960
960 - 1920
1920 - 3840
3840 - 7680
7680 - 15360
15360 - 30720
30720 - 61440
61440 - 122880
122880 - 245760
245760 - 491520
491520 - 983040
983040 - 1966080
1966080 - 3932160
3932160 - 7864320
7864320 - 15728640
15728640 - 31457280
31457280 - 62914560
62914560 - 125829120
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