42A08SE0171 2.14244 MAISONVILLE

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# REPORT ON A
# COMBINED HELICOPTER BORNE
# MAGNETIC, ELECTROMAGNETIC AND VLF
# SURVEY
# CANUC PROPERTY
# MAISONVILLE TOWNSHIP
# LARDER LAKE MINING DIVISION
# ONTARIO

2.14244

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MINING LANDS SECTION

**FOR**
**JOUTEL RESOURCES LIMITED**
**BY**
**AERODAT LIMITED**
**JULY 15, 1991**

**J9127C**

**R.J. de Carle**
**Consulting Geophysicist**

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**(Scale 1:10,000)**

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# 1. INTRODUCTION

This report describes an airborne geophysical survey carried out on behalf of Joutel Resources Limited by Aerodat Limited. Equipment operated included a five frequency electromagnetic system, a high sensitivity cesium vapour magnetometer, a two frequency VLF-EM system, a video tracking camera and a radar altimeter. Electromagnetic, magnetic and altimeter data were recorded both in digital and analog form. Positioning data were recorded on VHS video tapes as well as being marked on the flight path mosaic by the operator while in flight.

The survey area, comprised of a block of ground in the Maisonville Township area, is located approximately 15 kilometres northwest of Kirkland Lake, Ontario. Two (2) flights, which were flown on May 13, 1991, were required to complete the survey. Flight lines were oriented at an Azimuth of 000-180 degrees and flown at a nominal line spacing of 150 metres. Coverage and data quality were considered to be well within the specifications described in the contract.

The survey objective is the detection and location of mineralized zones which can be directly or indirectly related to precious metal or base metal exploration targets. In reference to the electromagnetic data, the writer will pay particular attention to poorly defined EM responses which may reflect poorly mineralized conductors within gold bearing structural features. Weak conductors associated with sheared and altered metavolcanic and ultramafic rock types are also considered primary targets for precious metals. In regards to base metal targets, short isolated or flanking conductors displaying good conductivity and having either magnetic correlation or no magnetic correlation, are all considered to be areas of extreme interest. Interpretation of the magnetic data should reveal cross-cutting or splay-type structures and it may also reveal stratigraphically controlled sheared or deformation zones. An analysis of the VLF-EM data will also be carried out, in order to locate structures, as well as any weakly conductive horizons that may lead to the location of primary precious metal targets.

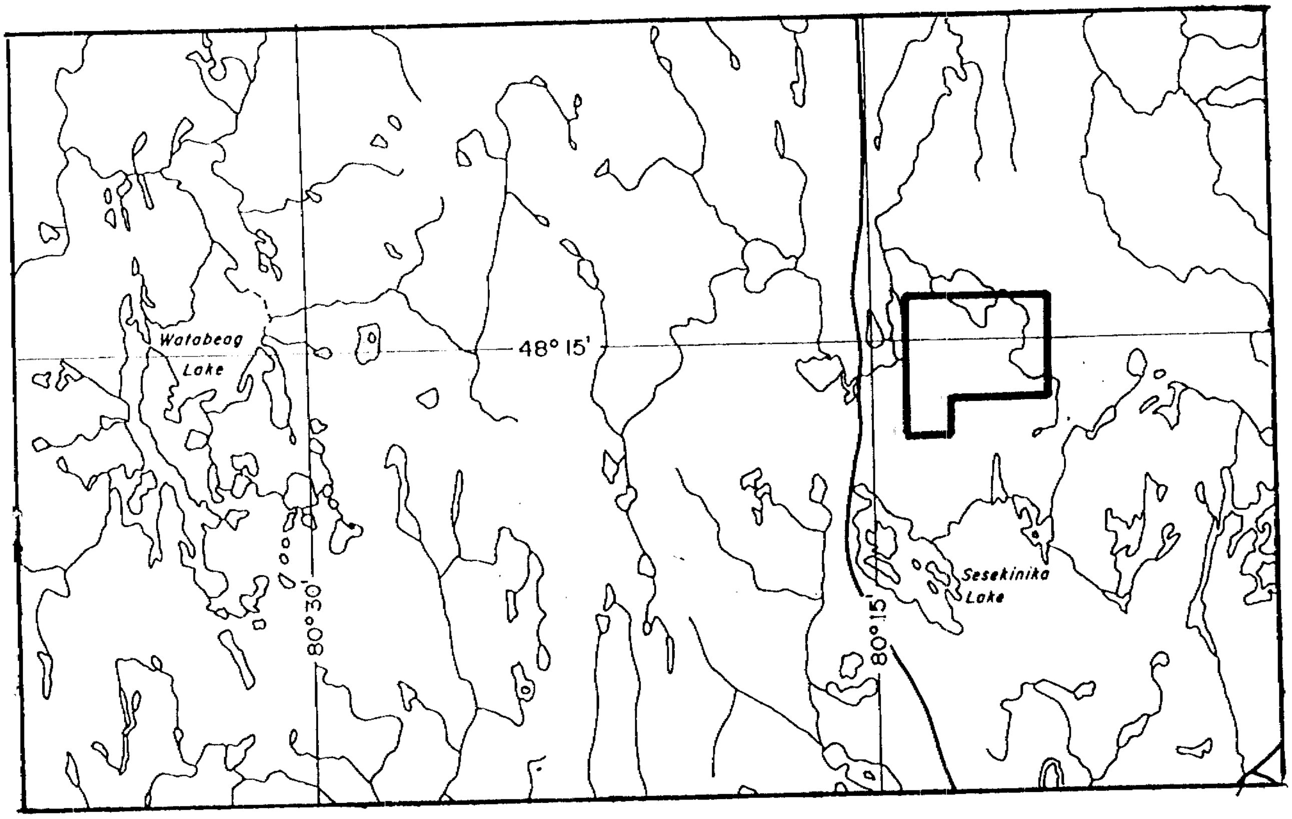
A total of 110 line kilometres of the recorded data were compiled in map form and are presented as part of this report according to specifications outlined by Joutel Resources Limited.

## 2. SURVEY AREA LOCATION

The survey area is depicted on the index map as shown. It is centred at Latitude 48 degrees 15 minutes north, Longitude 80 degrees 12 minutes west, approximately 15 kilometres northwest of Kirkland Lake, Ontario. The survey block is also located within the central portion of Maisonville Township, just east of Highway #11 (N.T.S. Reference Map 42 A 1).

Access to the region can be made from Highway #11, which is located just to the west of the survey area. From the north, there is what is thought to be a lumber road heading south from an area just east of Bourkes. There is also a road from the south, near Seskinika, that can be used as well.

The terrain within the Canuc Property survey is about 1100 feet above sea level. The area is characterized by moderate relief, with relief ranging from as much as 50 - 100 feet. The lowest elevations are located just south of Wolf Lake, where it is 1050 feet above sea level. The highest location within the survey area is situated towards the southwest corner, near Olson Lake, where the terrain is 1250 feet A.S.L.




AIRBORNE GEOPHYSICAL SURVEY
on behalf of
JOUTEL RESOURCES LIMITED

CANUC PROPERTY
MAISONVILLE TOWNSHIP, ONTARIO

BY

AERODAT LIMITED
J9127C

# 3. AIRCRAFT AND EQUIPMENT

## 3.1 Aircraft

An Aerospatiale A-Star 350D helicopter, (C-GIBU), owned and operated by Canadian Helicopters Limited, 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.

## 3.2 Equipment

### 3.2.1 Electromagnetic System

The electromagnetic system was an Aerodat 5-frequency system. Two vertical coaxial coil pairs were operated at 935 Hz. and 4600 Hz. and three horizontal coplanar coil pairs were operated at 865 Hz., 4175 Hz. and 32 kHz. The transmitter-receiver separation was 7 metres. Inphase and quadrature signals were measured simultaneously for the 5 frequencies with a time constant of 0.1 seconds. The electromagnetic bird was towed 30 metres below the helicopter.

### 3.2.2 VLF-EM System

The VLF-EM System was a Herz Totem 2A. This instrument measures the total field and quadrature components of two selected transmitters, preferably oriented at right angles to one another. The sensor was towed in a bird 15 metres below the helicopter. The VLF transmitters monitored were NAA, Cutler, Maine broadcasting at 24.0 kHz for the Line Station and NLK, Seattle, Washington broadcasting at 24.8 kHz for the Orthogonal Station.

### 3.2.3 Magnetometer

The magnetometer employed was an Aerodat/Scintrex Model VIW-2321 H8 cesium, optically pumped magnetometer sensor. The sensitivity of this instrument was 0.1 nanoTeslas at a 0.2 second sampling rate. The sensor was towed in a bird 15 metres below the helicopter.

### 3.2.4 Magnetic Base Station

An IFG (GSM-8) proton precession magnetometer was operated at the base of operations near Kirkland Lake 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.

### 3.2.5 Radar Altimeter

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

### 3.2.6 Tracking Camera

An Aerodat colour video tracking camera was used to record flight path on VHS video tape. The camera was operated in continuous mode and the fiducial numbers and time marks for cross reference to the analog and digital data were encoded on the video tape.

### 3.2.7 Analog Recorder

An RMS dot-matrix recorder was used to display the data during the survey. In addition to manual and time fiducials, the following data were recorded:

| Channel | Input | Scale |
|---|---|---|
| CXI1 | 935 Hz Coaxial Inphase | 2.5 ppm/mm |
| CXQ1 | 935 Hz Coaxial Quadrature | 2.5 ppm/mm |
| CXI2 | 4600 Hz Coaxial Inphase | 2.5 ppm/mm |
| CXQ2 | 4600 Hz Coaxial Quadrature | 2.5 ppm/mm |
| CPI1 | 865 Hz Coplanar Inphase | 10 ppm/mm |
| CPQ1 | 865 Hz Coplanar Quadrature | 10 ppm/mm |
| CPI2 | 4175 Hz Coplanar Inphase | 10 ppm/mm |
| CPQ2 | 4175 Hz Coplanar Quadrature | 10 ppm/mm |
| CPI3 | 32 kHz Coplanar Inphase | 20 ppm/mm |
| CPQ3 | 32 kHz Coplanar Quadrature | 20 ppm/mm |
| PWRL | Power Line | 60 Hz |
| VLT | VLF-EM Total Field, Line | 2.5%/mm |
| VLQ | VLF-EM Quadrature, Line | 2.5%/mm |
| VOT | VLF-EM Total Field, Ortho | 2.5%/mm |
| VOQ | VLF-EM Quadrature, Ortho | 2.5%/mm |

| | | |
|---|---|---|
| RALT | Radar Altimeter | 10 ft/mm |
| MAGF | Magnetometer, fine | 2.5 nT/mm |
| MAGC | Magnetometer, coarse | 25 nT/mm |

### 3.2.8 Digital Recorder

A DGR 33 data system recorded the survey on magnetic tape. Information recorded was as follows:

| Equipment | Recording Interval |
|---|---|
| EM System | 0.1 seconds |
| VLF-EM | 0.2 seconds |
| Magnetometer | 0.2 seconds |
| Altimeter | 0.2 seconds |

### 3.2.9 Global Positioning System

A Trimble (Pathfinder) Global Positioning System (GPS) was used for both navigation and flight path recovery. Navigational satellites were interrogated by the GPS antennae and the navigational computer calculated the position of the helicopter in either UTM co-ordinates or Latitude and Longitudes. The navigational computer used was a Picodas PNAV 2001 display unit and Processor, which also displays to the pilot and navigator the flight path of the helicopter. The positional data were recorded on magnetic tape for subsequent flight path determination.

# 4. DATA PRESENTATION

## 4.1 Base Map

A photomosaic base map at a scale of 1:10,000 was prepared from a semi-controlled photo laydown and has been presented on a screened mylar Cronaflex base map.

## 4.2 Flight Path Map

The flight path was derived from the Global Positioning System. The flight lines have the time and the navigator's manual fiducials for cross reference to both analog and digital data.

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 line and flight numbers are given at the start and end of each survey line.

The flight path map is merged with 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.

## 4.3 Airborne Electromagnetic Survey Interpretation Map

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 to reduce system noise.

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

The signal to noise ratio was further enhanced by the application of a low pass digital filter. It 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 permits maximum profile shape resolution.

Following the filtering process, a base level correction was made. 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 interpretation of the electromagnetics. An interpretation map was prepared showing peak locations of anomalies and conductivity thickness ranges along with the Inphase amplitudes (computed from the 4600 Hz coaxial responses). The data are presented on a screened copy of the Cronaflex photomosaic base map.

## 4.4 Magnetic Total Field Contours

The aeromagnetic data were corrected for diurnal variations by adjustment with the digitally recorded base station magnetic values. The corrected profile data were interpolated onto a regular grid at a 25 metre true scale interval using an Akima spline technique. The grid provided the basis for threading the presented contours at a 2 nanoTesla interval.

The contoured aeromagnetic data have been presented on a Cronaflex copy of the photomosaic base map.

## 4.5 Vertical Magnetic Gradient Contours

The vertical magnetic gradient was calculated from the gridded total field magnetic data. Contoured at a 0.1 nT/m interval, based on a 25 metre grid, the gradient data were presented on a Cronaflex copy of the photomosaic base map.

## 4.6 Apparent Resistivity Contours

The electromagnetic information was processed to yield a map of the apparent resistivity of the ground.

The approach taken in computing apparent resistivity was to assume a model of 200 metre thick conductive layer (i.e., effectively a half space) over a resistive bedrock. The computer then generated, from nomograms for this model, the resistivity that would be consistent with the bird elevation and recorded amplitude for the 4600 Hz coaxial frequency of EM data. The apparent resistivity profile data were interpolated onto a regular grid at a 25 metres true scale interval using a cubic spline technique.

The contoured apparent resistivity data were presented on a screened Cronaflex copy of the photomosaic base map with the flight lines.

## 4.7 VLF-EM Total Field Contours

The VLF electromagnetic data derived from Cutler, Maine was processed to produce a total field contour map on a 25 metre grid with a 1% contour interval. The VLF data for the Line Station is presented on a screened copy of the Cronaflex photomosaic base map.

# 5. INTERPRETATION

## 5.1 Geology

The survey area is generally underlain with Keewatin mafic metavolcanics, which are believed to be magnesium-rich and iron-rich tholeiitic basalt lavas. These are the equivalent sequences to the Kenogevis Group rocks that have been reported in other regions of the Abitibi Subprovince. There is a small area in the central portion of the block that is underlain with metasediments.

Intruding all of the above rocks are north-south trending Matachewan type diabase dikes, and ultramafics including gabbro and diorite. Felsic intrusives have intruded portions of the west central and south central regions of the block.

Structurally, north-south trending fault zones traverse through the survey area. The relationship with deformation zones and their proximity to ultramafics will be considered important horizons to pursue.

There are numerous mineral showings within the survey area, including gold, copper, zinc, lead and molybdenite. However, to deliberate on each of these showings would be beyond the scope of this report. Massive sulphide zones, as well as sulphide-gold bearing fracture zones are believed to be the targets sought.

## 5.2 Magnetics

The aeromagnetic data within the survey area displays an obvious range in magnetic intensity, from 57,900 nanoTeslas to as high as 60,500 nanoTeslas. It is believed that most, if not all, of the high intensity magnetic features are related to the ultramafic sills, including the gabbro and diorite. If there are portions within this unit that are norite or peridotite, these rock types will certainly enhance the magnetic features. Therefore, the region towards the southwest corner of the survey area, southwest of Wolf Lake and southeast of Wolf Lake (near the hydro transmission line) are all areas believed to be underlain with ultramafic rocks.

Iron formation, which has been reported in an area northeast of Olson Lake, may be contributing to the general magnetic background in this area, but at this point, without having a more detailed background of the area, the writer is unaware of its contribution.

The felsic intrusives would appear to be exhibiting non-magnetic backgrounds, as do the mafic metavolcanics.

Some of the more subtle magnetic responses that are located towards the eastern third of the survey, may be associated with pyrrhotite, even though there may not be an EM response correlating. If the sulphides are too disseminated, they may not be picked up with the airborne system.

## 5.3 Vertical Gradient Magnetics

The areas of high intensity magnetics have been broken up into unique trends as a result of the computation of the vertical gradient. This interpretation is certainly not as readily obvious when one refers to the magnetic total field map. These are the areas that generally have been indicated as being ultramafic rocks.

It should also be pointed out that the zero contour interval coincides directly or is very close to geological contacts. It is because of this phenomenon that the calculated vertical gradient map can be compared to a pseudo-geological map. Portions of this survey area are overlain with a cover of Pleistocene materials and because of this, the vertical gradient presentation along with various geological publications and mapping, will certainly assist the client with a final pseudo-geological map.

The writer has indicated a few fault zones on the Interpretation Map. These tend to be the stronger, more obvious faults in the survey area. However, the subtle, fractured zones will be somewhat more difficult to interpret from this data set. Any such environments however, would seem to be in close proximity to these stronger structures. One therefore, should be looking in areas near the ultramafics where fracturing may have taken place, with the resulting migration of auriferous materials. Deformation zones may or may not exist in close proximity to these ultramafic sills.

With respect to base metal targets, some of the more subtle magnetic features within the mafic metavolcanics may be of interest.

These subtle magnetic signatures may be associated with disseminated pyrrhotite. If so, they may or may not have been intercepted with a conventional EM system.

It is difficult to entertain the strike direction of the mafic metavolcanics in the region. In some areas, the magnetics indicate an east-west strike direction, while in other areas it is northeast-southwest. One should examine this phenomenon a little more closely, in order to assess the stratigraphical interpretation. This will in turn assist with the follow-up for base metals.

## 5.4 Electromagnetics

The electromagnetic data was first checked by a line-by-line examination of the anomaly records. Record quality was good and any instrument noise was well within the specifications of the contract. Any subtle noise that did exist was removed by an appropriate de-spiking filter. Geologic noise, in the form of surficial conductivity, is present on the high and mid frequency coplanar coils, as well as on the high frequency coaxial coil. These areas tend to be associated with lake bottom sediments, creek bottom silts and swamps.

Anomalies were picked off the analog traces of the low and high frequency coaxial responses and then validated on the coplanar profile data. The data were then edited and re-plotted on a copy of the profile map. This procedure ensured that every anomalous response spotted on the analog data was plotted on the final map and allowed for the rejection - or inclusion if warranted - of obvious surficial conductors. Each conductor or group of conductors was evaluated on the basis of magnetic (and lithologic, where applicable) correlations apparent from the analog data and man-made or surficial features not obvious on the analog charts.

## RESULTS

The results of this airborne survey clearly show an extremely resistive overlying overburden cover, as well as underlying basement rocks, over most of the survey block. Much more apparent is the moderate to highly conductive region towards the northeast quadrant of the survey area. This phenomenon is unexplainable at the moment, except that could this be a portion of the southwestern extent of the so-called Abitibi clay belt?

Another interesting phenomenon with the above "conductive horizon", is that it seems to coincide with a magnetic contact. Refer to the Vertical Gradient presentation for a comparison. In both cases, there seems to be a semi-circular shape to the horizon. Is this phenomenon just a coincidence or could there perhaps be a "graben" in this region.

A phenomenon which is obvious over these types of environments is the so-called "edge effect". This is where there are wide, flat-lying, sheet-like conductors that are displaying EM signatures at the edges, that give the appearance of widely spaced vertical or near vertical bedrock conductors. These phenomenon most often exhibit two widely spaced, positive coaxial responses with one positive coplanar response in between. The writer may have outlined a few of these responses on the Interpretation Map. However, there may be occasions where fault zones exist along the edge of these horizons, such as along the shore of a lake, that may give rise to a little stronger EM response. If the EM responses are sharp enough, there is a very good chance that mineralization is the cause.

It is also interesting to note that in a few areas, the inphase responses are negative over horizons which display high intensity magnetic features. This is a reflection of the magnetite content. The higher the magnetite content, the more pronounced would be the negative electromagnetic response. As can be seen from the EM profile map, this particular phenomena seems to exist in areas that are underlain with ultramafic rocks.

The writer has outlined seven (7) zones on the Interpretation Map, and each have been assigned a letter and a number beside them (eg. C1, C2, etc.) representing the Canuc Property. A few other anomalies have been selected as well, but these are believed to be associated with conductive overlying surficial materials.

Each of the outlined zones do not display very attractive EM responses. They certainly do not have the characteristic vertical to near vertical EM responses where one would find a positive coaxial response coinciding with a negative coplanar response. None of these conductors selected have this characteristic.

One aspect about Zones C1 to C6 is that they tend to be located on the outer edge of the large conductive horizon. The significance of this aspect is unknown, except that this region may be representing a much thicker portion of the "clay", due to a trough within the basement. They certainly are not attractive targets and until further, more encouraging geological information is known about these areas, further work on them should be delayed.

The writer does not have a detailed version of the previous exploration work carried out within this survey area. Until such information is obtained, it is difficult to compare specific areas of interest. Referring to Geological Compilation Map 2205, it would appear that Zones C1 to C3 are located near a lead-zinc showing. However, in this mineralogical environment, it would take other forms of sulphides such as pyrite and/or pyrrhotite to produce an EM response. In the vicinity of Zone C4, there is a zinc-lead-copper showing that also has direct magnetic correlation. There may be correlation between Zones C5 and C6 and a zinc-copper-lead showing as well.

Further to the southwest, where a molybdenite and copper-nickel showing have been indicated, there were no EM responses intercepted in these two areas. A lack of mineralization was the probable reason. Zone C7 is in the general region where an iron formation has been indicated. However, the exact location is unknown. Also, note that Zone C7 does not have any magnetic correlation. A reconnaissance survey is suggested however, for Zone C7.

## 5.5 Apparent Resistivity

This data presentation did not extract any new information from that of the 5 frequency EM profile presentation. As a result of a 200 metre model being used in the calculation of the apparent resistivity data set, it is clear from the targets selected that there is a total absence of any resolution, even though some of the so-called "edge effects" may be done to mineralized fault zones, or isolated sulphide targets.

It will be noted that each of the lakes within the survey area, including Wolf Lake, Olson Lake and Goose Egg Lake, all display high conductivities. Both Wolf Lake and Goose Egg Lake, being located within what is thought to be a portion of the "clay belt", display apparent resistivities as low as 10 ohm-metres. It would be extremely difficult to detect a poorly mineralized fracture zone or a sulphide zone that contains a high sphalerite content beneath this cover with this type of EM system.

In areas of outcrop, the apparent resistivities are at least or higher that 6000 ohm-metres, an extremely resistive environment. Locating mineralized environments within these horizons should be rather easy.

One will note that river bottom sediments, creek bottom silts and swamps all display ranges of conductivity.

An area that perhaps could be looked at further is located approximately 200 metres north of Olson Lake. It would seem to be within terrain that outcrops, indicating that conductive overburden is probably not the source. Two other apparent resistivity anomalous features located approximately 900 metres and 1200 metres respectively north of Olson Lake should also be looked at. Some of the more isolated features located towards the northwest corner of the survey block, could also be looked at further as well. The writer does not have the detailed geology in this area, however ultramafics are believed to be located to the north and south of these anomalous features.

## 5.6 VLF-EM Total Field

There is no semblance of correlation with the magnetic data at all, suggesting an absence of any relationship with the basement rocks. One point in contention here, of course, is that most of the large magnetic features within the survey area are associated with the ultramafics. Some of the more subtle magnetic features may be associated with mafic metavolcanics which seem to be striking generally in the same direction as the VLF-EM.

In comparing the VLF data with the apparent resistivity data presentation, it will be seen that there is reasonable correlation. Based on this comparison, this would tend to suggest that the VLF-EM system has responded to the conductive lake bottom sediments, as well as to the swamps. In fact, the correlation is quite good. There are some discrepancies however, and these may be the areas that are bedrock related. However, it is felt that the apparent resistivity more accurately outlines the conductive surficial materials compared with the VLF data.

With respect to the selected targets, the VLF has apparently outlined each of these zones. However, as indicated earlier, these conductors are interpreted as probably being related to conductive overburden. The VLF data would certainly seem to suggest this interpretation. In any event, there are no VLF trends that are recommended for further follow-up.

## 5.7 Conclusion and Recommendations

On the basis of the results of this airborne survey, ground reconnaissance surveys are suggested for a few of the areas previously mentioned. Using the magnetics as a guide, it may also be of interest to assess the contact regions between the ultramafics and the mafic metavolcanic rocks for deformation or alteration zones. Any evidence of fracturing in these regions will be important horizons for the migration of hydrothermal fluids.

It is not known if any of these ultramafic sills would be conducive for the formation of disseminated, porphyry type mineralization as large, open pit zones. Copper and molybdenite have been reported within one of the sills, but the writer is unaware of its extent. Fracture zones within the sills would certainly be of interest to pursue.

Because of the absence of any strong electromagnetic responses, it is concluded that there will probably not be any large, massive base metal prospects located within the survey area. If there are, then the mineralization is too disseminated for this EM system to intercept or they are at depth, beyond the reach of this airborne system.

Further structural information may be obtained through a more comprehensive evaluation of the magnetic data. Some fault zones have been interpreted, most being either cross-cutting faults or splay-type faults. These are extremely important horizons with respect to any precious metal mineralogical controls.

Prospecting and soil geochemical sampling could be carried out in the vicinity of the contacts between the ultramafic sills and the surrounding mafic metavolcanics, with any subsequent anomalous areas being prime targets for diamond drilling.

An assessment between the geophysical data sets from this airborne survey and the latest geological information, including all previous exploration work, is recommended. Since there are known showings in the region, one must come up with a model, if any, of what some of these showings look like. For base metals, the magnetics may be indicating pyrrhotite.

Providing the overlying Pleistocene materials do not act in such a manner to mask the radioactive effects from the basement rocks, a ground reconnaissance spectrometer survey could be carried out in regions of known or interpreted fault zones. Potassium-rich alteration zones within any deformation zone that may exist within the bedrock may respond to such a survey. However, this would not seem to be an effective type of survey in the region towards the northeast, where there is believed to be a thick "clay" cover.

It is a matter of using all resources, including the various geophysical data presentations, previous drill hole and geological information, that may lead to an interesting on-going exploration program.

Respectfully submitted,

R. J. de Carle

Robert J. de Carle
Consulting Geophysicist
for
**AERODAT LIMITED**
July 15, 1991

**J9127C**

## APPENDIX I

### REFERENCES

MERQ-OGS
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## APPENDIX II

## PERSONNEL

### FIELD

| | |
|---|---|
| Flown | May 14 & 15, 1991 |
| Pilots | Greg Charbonneau |
| Operators | Scott Wessler |

### OFFICE

| | |
|---|---|
| Processing | Tom Furuya<br>George McDonald |
| Report | R.J. de Carle |

## APPENDIX III

CERTIFICATE OF QUALIFICATIONS

I, ROBERT J. DE CARLE, certify that: -

1. I hold a B. A. Sc. in Applied Geophysics with a minor in geology from Michigan Technological University, having graduated in 1970.

2. I reside at 28 Westview Crescent in the town of Palgrave, Ontario.

3. I have been continuously engaged in both professional and managerial roles in the minerals industry in Canada and abroad for the past twenty years.

4. I have been an active member of the Society of Exploration Geophysicists since 1967 and hold memberships on other professional societies involved in the minerals extraction and exploration industry.

5. The accompanying report was prepared from information published by government agencies, materials supplied by Joutel Resources Limited and from a review of the proprietary airborne geophysical survey flown by Aerodat Limited for Joutel Resources Limited. I have not personally visited the property.

6. I have no interest, direct or indirect, in the property described nor do I hold securities in Joutel Resources Limited.

Signed,

R. J. de Carle

Palgrave, Ontario
July 15, 1991

Robert J. de Carle
Consulting Geophysicist
for
AERODAT LIMITED

# APPENDIX IV

## 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 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 a non-magnetic vertical half-plane model on the accompanying phasor diagram. 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 at selected anomalies. The results of this calculation are presented in table form in Appendix IV and the conductance and inphase amplitude are presented in symbolized form on the map presentation.

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, 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.

Most overburden will have an indicated conductance of less than 2 mhos; however, more conductive clays may have an apparent conductance of say 2 to 4 mhos. Also in the low conductance range will be electrolytic conductors in faults and shears.

The higher ranges of conductance, greater than 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 sulphide or graphite bearing rocks.

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 consideration in association with minor conductive sulphides, and the electromagnetic response 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, but minor accessory sulphide mineralization could 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; however, 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.

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. As the dip of the conductor decreased 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.

As the thickness of the conductor increases, induced current flow across the thickness of the conductor becomes relatively significant and complete null coupling with the coplanar coils is no longer possible. 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 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*.

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.

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. In most cases, the response of the coplanar coils closely follows that of the coaxial coils with a relative amplitude ration 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.

* 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.

## 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 elliptically polarized in the vicinity of electrical conductors. The Herz Totem uses three coils in the X, Y, Z configuration to measure the total field and vertical quadrature component of the polarization ellipse.

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 to 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 response is an indicator of the existence and position of a conductivity anomaly.

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.

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 amplitude of the quadrature response, as opposed to shape is function of target conductance and depth as well as the conductivity of the overburden and host rock. As the primary field travels down to the conductor through conductive material it is both attenuated and phase shifted in a negative sense. The secondary field produced by this altered field at the target also has an associated phase shift. This phase shift is positive and is larger for relatively poor conductors. This secondary field is attenuated and phase shifted in a negative sense during return travel to the surface. The net effect of these 3 phase shifts determine the phase of the secondary field sensed at the receiver.

A relatively poor conductor in resistive ground will yield a net positive phase shift. A relatively good conductor in more conductive ground will yield a net negative phase shift. A combination is possible whereby the net phase shift is zero and the response is purely in-phase with no quadrature component.

A net positive phase shift combined with the geometrical cross-over shape will lead to a positive quadrature response on the side of approach and a negative on the side of departure. A net negative phase shift would produce the reverse. A further sign reversal occurs with a 180 degree change in instrument orientation as occurs on reciprocal line headings. During digital processing of the quadrature data for map presentation this is corrected for by normalizing the sign to one of the flight line headings.

# APPENDIX V

# ANOMALY LIST

JOUTEL RESOURCES LIMITED - CANUC PROPERTY

| FLIGHT | LINE | ANOMALY | CATEGORY | AMPLITUDE (PPM) INPHASE | QUAD. | CONDUCTOR CTP MHOS | DEPTH MTRS | BIRD HEIGHT MTRS |
|---|---|---|---|---|---|---|---|---|
| 2 | 10090 | A | 2 | 39.6 | 21.7 | 3.6 | 50 | -10 |
| 1 | 10100 | A | 2 | 17.6 | 10.1 | 2.6 | 60 | -8 |
| 1 | 10100 | B | 0 | 5.6 | 8.3 | 0.4 | 64 | -10 |
| 1 | 10110 | A | 2 | 29.3 | 14.8 | 3.6 | 54 | -9 |
| 1 | 10120 | A | 2 | 26.6 | 19.9 | 2.1 | 50 | -8 |
| 1 | 10120 | B | 0 | 19.2 | 24.0 | 0.9 | 46 | -8 |
| 1 | 10120 | C | 1 | 26.2 | 27.9 | 1.3 | 46 | -9 |
| 1 | 10130 | A | 0 | 2.4 | 13.5 | 0.0 | 40 | -9 |
| 1 | 10130 | B | 1 | 45.2 | 69.3 | 1.0 | 38 | -13 |
| 1 | 10140 | A | 0 | 4.6 | 9.2 | 0.2 | 56 | -8 |
| 1 | 10150 | A | 0 | -0.1 | 2.4 | 0.0 | 8 | -8 |
| 1 | 10150 | B | 0 | 6.6 | 23.5 | 0.1 | 39 | -9 |
| 1 | 10160 | A | 0 | 2.6 | 11.2 | 0.0 | 42 | -6 |
| 1 | 10170 | A | 0 | 2.9 | 11.7 | 0.0 | 44 | -8 |
| 1 | 10190 | A | 1 | 29.2 | 29.3 | 1.5 | 45 | -8 |
| 1 | 10210 | A | 0 | 11.1 | 21.7 | 0.4 | 43 | -7 |
| 1 | 10220 | A | 0 | 4.6 | 12.4 | 0.1 | 44 | -4 |
| 1 | 10220 | B | 0 | 3.9 | 10.5 | 0.1 | 47 | -5 |
| 1 | 10220 | C | 0 | 6.5 | 9.8 | 0.4 | 55 | -5 |
| 1 | 10230 | A | 1 | 48.7 | 68.6 | 1.1 | 37 | -12 |
| 1 | 10230 | B | 1 | 9.4 | 7.1 | 1.4 | 67 | -6 |
| 1 | 10240 | A | 1 | 12.5 | 13.4 | 1.0 | 53 | -5 |
| 1 | 10240 | B | 0 | 12.8 | 26.8 | 0.4 | 42 | -9 |
| 1 | 10240 | C | 0 | 6.7 | 17.5 | 0.2 | 44 | -8 |
| 1 | 10250 | A | 0 | 7.7 | 13.8 | 0.4 | 50 | -7 |
| 1 | 10250 | B | 0 | 14.4 | 21.9 | 0.6 | 47 | -9 |
| 1 | 10260 | A | 0 | 2.9 | 19.7 | 0.0 | 34 | -8 |
| 1 | 10260 | B | 0 | 17.3 | 24.3 | 0.7 | 45 | -8 |
| 1 | 10270 | A | 0 | 16.9 | 26.0 | 0.6 | 44 | -8 |

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.

JOUTEL RESOURCES LIMITED - CANUC PROPERTY

| FLIGHT | LINE | ANOMALY | CATEGORY | AMPLITUDE (PPM) INPHASE | QUAD. | CONDUCTOR CTP MHOS | DEPTH MTRS | BIRD HEIGHT MTRS |
|---|---|---|---|---|---|---|---|---|
| 1 | 10280 | A | 0 | 21.2 | 31.8 | 0.7 | 41 | -8 |
| 1 | 10290 | A | 0 | 19.7 | 37.6 | 0.5 | 39 | -9 |
| 1 | 10300 | A | 0 | 5.5 | 16.0 | 0.1 | 43 | -7 |
| 1 | 10310 | A | 0 | 3.9 | 11.0 | 0.1 | 48 | -7 |
| 1 | 10321 | A | 0 | 12.9 | 19.9 | 0.6 | 47 | -8 |

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.

Ministry of Northern Development and Mines
Ontario

W9100-00259

WORK

Instructions

42A08SE0171 2.14244 MAISONVILLE 900

# Report of Work
(Geophysical, Geological and Geochemica

**Mining Act**

Type of Survey(s): Airborne Mag., EM + VLF

Mining Division / Township: Larder Lake / Maisonville

Recorded Holder(s): K.A. MacGregor

Prospector's Licence No.: K-15070

Address: 29 Ford St. Sault Ste Marie Ont

Telephone No.: 949-5928

Survey Company: Aerodat Ltd.

2.14244

Name and Address of Author (of Geo-Technical Report): Doug Pitcher 3883 Nashua Dr. Mississauga

Date of Survey (from & to): 1 5 91 31 5 91 (Day Mo Yr Day Mo Yr)

## Credits Requested per Each Claim in Columns at right

| Special Provisions | | Days per Claim |
|---|---|---|
| For first survey: Enter 40 days. (This includes line cutting) | Geophysical | |
| | - Electromagnetic | |
| | - Magnetometer | |
| For each additional survey using the same grid: Enter 20 days (for each) | - Other | |
| | Geological | |
| | Geochemical | |

| Man Days | | Days per Claim |
|---|---|---|
| Complete reverse side and enter total(s) here | Geophysical | |
| | - Electromagnetic | |
| | - Magnetometer | |
| | - Other | |
| | Geological | |
| | Geochemical | |

| Airborne Credits | | Days per Claim |
|---|---|---|
| Note: Special provisions credits do not apply to Airborne Surveys | Electromagnetic | 40 |
| | Magnetometer | 40 |
| | Other | |

Total miles flown over claim(s).

Date: May 31/91 — Recorded Holder or Agent (Signature): [signature]

## Mining Claims Traversed (List in numerical sequence)

| Prefix | Number | Prefix | Number | Prefix | Number |
|---|---|---|---|---|---|
| L | 1136856 | | | | |
| | 1136857 | | | | |
| | 1136858 | | | | |
| | 1136859 | | | | |
| | 1136860 | | | | |
| | 1136861 | | | | |

ONTARIO GEOLOGICAL SURVEY
GIS - ASSESSMENT FILES
RECEIVED

RECEIVED
JUL 02 1991
MINING LANDS SECTION

Total number of mining claims covered by this report of work: 6

## Certification Verifying Report of Work

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

Name and Address of Person Certifying: K.A. MacGregor 29 Ford St Sault Ste Marie

Telephone No: 949-5928 — Date: May 31/91 — Certified By (Signature): [signature]

## For Office Use Only

Received Stamp: LARDER LAKE MINING DIVISION ... MAY 31 PM 3 51 RECEIVED

| Total Days Cr. Recorded | Date Recorded | Mining Recorder |
|---|---|---|
| 480 | May 31/91 | [signature] |
| | Date Approved as Recorded: Aug 9/91 | Provincial Manager, Mining Lands: Ron C Gashinski |

1362 (89/06)

Ministry of Northern Development and Mines
Ontario

W9180·00223 (WORK)

July 27

Instructions
- Please type or print.
- Refer to Section 77, the Mining Act for assessment work requirements and maximum credits allowed per survey type.
- If number of mining claims traversed exceeds space on this form, attach a list.
- Technical Reports and maps in duplicate should be submitted to Mining Lands Section, Mineral Development and Lands Branch.

# Report of Work
## Mining Act
(Geophysical, Geological and Geochemical Surveys)

| Type of Survey(s) | Mining Division | Township or Area |
|---|---|---|
| Airborne EM VLF Mag | Larder Lake | Maisonville |

Recorded Holder(s): Joutel Resources ~~Ltd.~~ Limited, L. M. Dyment
Prospector's Licence No.: T1943, K 18042
Address: Box 193 Kirkland Lake, Ontario P2N 3H7
Telephone No.: (705) 567-3261
Survey Company: Aerodat Limited

2.14244

Name and Address of Author (of Geo-Technical Report): D. Pitcher-Aerodat Limited
Date of Survey (from & to): 13 05 91 | 13 05 91 (Day Mo. Yr.)

Credits Requested per Each Claim in Columns at right

| Special Provisions | | Days per Claim |
|---|---|---|
| For first survey: Enter 40 days. (This includes line cutting) | Geophysical | |
| | - Electromagnetic | |
| | - Magnetometer | |
| For each additional survey: using the same grid: Enter 20 days (for each) | - Other | |
| | Geological | |
| | Geochemical | |
| **Man Days** | Geophysical | Days per Claim |
| Complete reverse side and enter total(s) here | - Electromagnetic | |
| | - Magnetometer | |
| | - Other | |
| | Geological | |
| | Geochemical | |
| **Airborne Credits** | | Days per Claim |
| Note: Special provisions credits do not apply to Airborne Surveys. | Electromagnetic | 40 |
| | Magnetometer | 40 |
| | Other | |

(See notes with claims)

Total miles flown over claim(s): 84.0

Date: 27/05/91 — Recorded Holder or Agent (Signature)

Mining Claims Traversed (List in numerical sequence)

| Prefix | Number (Days) | Prefix | Number (Days) | Prefix | Number (Days) |
|---|---|---|---|---|---|
| L | 1110445 (40) | L | 1050104 (40) | L | 1137951 (80) |
| | 1110741 (40) | | 1050105 (40) | | 1137952 (80) |
| | 1110742 (40) | | 1050106 (40) | | 1137953 (80) |
| | 1110743 (40) | | 1050107 (40) | | 1137954 (80) |
| | 1110744 (40) | | 1050108 (40) | | 1137955 (80) |
| | 1110745 (40) | | 1050109 (40) | | 1137956 (80) |
| | 1110765 (40) | | 1050110 (40) | | 1137957 (80) |
| | 1110766 (40) | | 1050111 (40) | | 1137958 (80) |
| | 1110767 (40) | | 1050112 (40) | | 1137959 (80) |
| | 1136862 (40) | | 1050113 (40) | | 1137960 (80) |
| | 1136863 (40) | | 1050114 (40) | | 1137961 (80) |
| | 1136864 (40) | | 1050115 (40) | | 1137962 (80) |
| | 1136868 (40) | | 1050116 (40) | | 1137963 (80) |
| | 1050065 (40) | | 1050117 (40) | | 1137964 (80) |
| | 1050066 (40) | | 1050118 (40) | | 1137965 (80) |
| | 1050067 (40) | | | | |
| | 1050068 (40) | | | | |

(att page 2)

Total number of mining claims covered by this report of work: 60

RECEIVED
JUN 24 1991
MINING LANDS SECTION

Certification Verifying Report of Work

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

Name and Address of Person Certifying: W. J. McGuinty Box 193 Kirkland Lake, Ontario P2N 3H7
Telephone No.: (705) 567-3261
Date: 27/05/91 — Certified By (Signature)

## For Office Use Only

| Total Days Cr. Recorded | Date Recorded | Mining Recorder |
|---|---|---|
| 3520 | May 28, 1991 | |
| | Date Approved as Recorded | Provincial Manager, Mining Lands |
| | Aug 9/91 | |

Received Stamp: 91 MAY 28 PM 1 14 LARDER LAKE

1362 (89/06)

Schedule 2

Maisonville Township

Con't Page 2

| | |
|---|---|
| L 1137966 | (80) |
| 1180238 | (80) |
| 1180239 | (80) |
| 1180240 | (80) |
| 1180241 | (80) |
| 1180242 | (80) |
| 1180243 | (80) |
| 1180244 | (80) |
| 1180245 | (80) |
| 1180246 | (80) |
| 1180247 | (80) |
| 1180569 | (80) |
| 1180570 | (80) |

Ministry of Northern Development and Mines

Ontario

# Geophysical-Geological-Geochemical Technical Data Statement

File ____________

**TO BE ATTACHED AS AN APPENDIX TO TECHNICAL REPORT**
**FACTS SHOWN HERE NEED NOT BE REPEATED IN REPORT**
**TECHNICAL REPORT MUST CONTAIN INTERPRETATION, CONCLUSIONS ETC.**

2.14244

Type of Survey(s) Combined Helicopter Borne Magnetic Electromagnetic and VLF

Township or Area Maisonville

Claim Holder(s) Joutel Resouces Limited/L. M. Dyment

Survey Company Aerodat Ltd., 3883 Nashua Drive, Mississauga, Ontario L4V 1R3

Author of Report R. J. de Carle/D. Pitcher

Address of Author 3883 Nashua Drive, Mississauga, Ont.

Covering Dates of Survey May 14-15, 1991
(linecutting to office)

Total Miles of Line Cut ____________

**SPECIAL PROVISIONS CREDITS REQUESTED**

ENTER 40 days (includes line cutting) for first survey.

ENTER 20 days for each additional survey using same grid.

| | DAYS per claim |
|---|---|
| Geophysical | |
| --Electromagnetic | |
| --Magnetometer | |
| --Radiometric | |
| --Other | |
| Geological | |
| Geochemical | |

**AIRBORNE CREDITS** (Special provision credits do not apply to airborne surveys)

Magnetometer 40 Electromagnetic 40 Radiometric ______
(enter days per claim)

DATE: July 23, 1991 SIGNATURE: [signature] per [signature]
Author of Report or Agent

**MINING CLAIMS TRAVERSED**
**List numerically**

| (prefix) | (number) | # days |
|---|---|---|
| L | 1050065 | 40 |
| | 1050066 | 40 |
| | 1050067 | 40 |
| | 1050068 | 40 |
| | 1050104 | 40 |
| | 1050105 | 40 |
| | 1050106 | 40 |
| | 1050107 | 40 |
| | 1050108 | 40 |
| | 1050109 | 40 |
| | 1050110 | 40 |
| | 1050111 | 40 |
| | 1050112 | 40 |
| | 1050113 | 40 |
| | 1050114 | 40 |
| | 1050115 | 40 |
| | 1050116 | 40 |
| | 1050117 | 40 |
| | 1050118 | 40 |
| | 1110446 | 40 |
| | 1110741 | 40 |
| | 1110742 | 40 |

TOTAL CLAIMS con't on attached

If space insufficient, attach list

OFFICE USE ONLY

Res. Geol. ____________ Qualifications ____________

Previous Surveys

| File No. | Type | Date | Claim Holder |
|---|---|---|---|
| | | | |

RECEIVED
JUL 24 1991
MINING LANDS SECTION

837 (85/12)

# GEOPHYSICAL TECHNICAL DATA

GROUND SURVEYS — If more than one survey, specify data for each type of survey

Number of Stations ______ Number of Readings ______
Station interval ______ Line spacing ______
Profile scale ______
Contour interval ______

**MAGNETIC**

Instrument ______
Accuracy — Scale constant ______
Diurnal correction method ______
Base Station check-in interval (hours) ______
Base Station location and value ______

**ELECTROMAGNETIC**

Instrument ______
Coil configuration ______
Coil separation ______
Accuracy ______
Method: ☐ Fixed transmitter ☐ Shoot back ☐ In line ☐ Parallel line
Frequency ______ (specify V.L.F. station)
Parameters measured ______

**GRAVITY**

Instrument ______
Scale constant ______
Corrections made ______
Base station value and location ______
Elevation accuracy ______

**INDUCED POLARIZATION**
**RESISTIVITY**

Instrument ______
Method ☐ Time Domain ☐ Frequency Domain
Parameters – On time ______ Frequency ______
– Off time ______ Range ______
– Delay time ______
– Integration time ______
Power ______
Electrode array ______
Electrode spacing ______
Type of electrode ______

## SELF POTENTIAL

Instrument ______________________ Range ______________________

Survey Method ______________________

______________________

Corrections made ______________________

______________________

## RADIOMETRIC

Instrument ______________________

Values measured ______________________

Energy windows (levels) ______________________

Height of instrument ______________________ Background Count ______________________

Size of detector ______________________

Overburden ______________________

(type, depth – include outcrop map)

## OTHERS (SEISMIC, DRILL WELL LOGGING ETC.)

Type of survey ______________________

Instrument ______________________

Accuracy ______________________

Parameters measured ______________________

______________________

Additional information (for understanding results) ______________________

______________________

______________________

## AIRBORNE SURVEYS

Type of survey(s) Combined Helicopter Borne Magnetic, Electromagnetic & VLF

Instrument(s) Aerodat 5-frequency system, Herz Totem 2A, Aerodat/Scintrex Model VIW-2321 H8 cesium, optically pumped magnetometer sensor.

(specify for each type of survey)

Accuracy ______________________

(specify for each type of survey)

Aircraft used Aerospatiale 4-Star 350D Helicopter

Sensor altitude EM-(30m) 98.4' VLF-Em (45m) 147.6' MAG (45m) 147.6'

Navigation and flight path recovery method Trimble (Pathifinder) Global positioning system

______________________

Aircraft altitude (60m) 196.8' Line Spacing (150m) 492.1'

Miles flown over total area (110km) 68.4mi Over claims only (46.9km) 29.1 mi

# GEOCHEMICAL SURVEY – PROCEDURE RECORD

Numbers of claims from which samples taken ______________________________

______________________________

______________________________

Total Number of Samples ______________________________

Type of Sample ______________________________
(Nature of Material)

Average Sample Weight ______________________________

Method of Collection ______________________________

______________________________

Soil Horizon Sampled ______________________________

Horizon Development ______________________________

Sample Depth ______________________________

Terrain ______________________________

______________________________

Drainage Development ______________________________

Estimated Range of Overburden Thickness ______________________________

______________________________

______________________________

## SAMPLE PREPARATION

(Includes drying, screening, crushing, ashing)

Mesh size of fraction used for analysis ______________________________

______________________________

______________________________

______________________________

General ______________________________

______________________________

______________________________

______________________________

______________________________

______________________________

______________________________

______________________________

______________________________

______________________________

## ANALYTICAL METHODS

Values expressed in: per cent ☐ p. p. m. ☐ p. p. b. ☐

Cu, Pb, Zn, Ni, Co, Ag, Mo, As,-(circle)

Others ______________________________

Field Analysis (______________________________ tests)

Extraction Method ______________________________

Analytical Method ______________________________

Reagents Used ______________________________

Field Laboratory Analysis

No. (______________________________ tests)

Extraction Method ______________________________

Analytical Method ______________________________

Reagents Used ______________________________

Commercial Laboratory (______________________________ tests)

Name of Laboratory ______________________________

Extraction Method ______________________________

Analytical Method ______________________________

Reagents Used ______________________________

General ______________________________

______________________________

______________________________

______________________________

______________________________

______________________________

______________________________

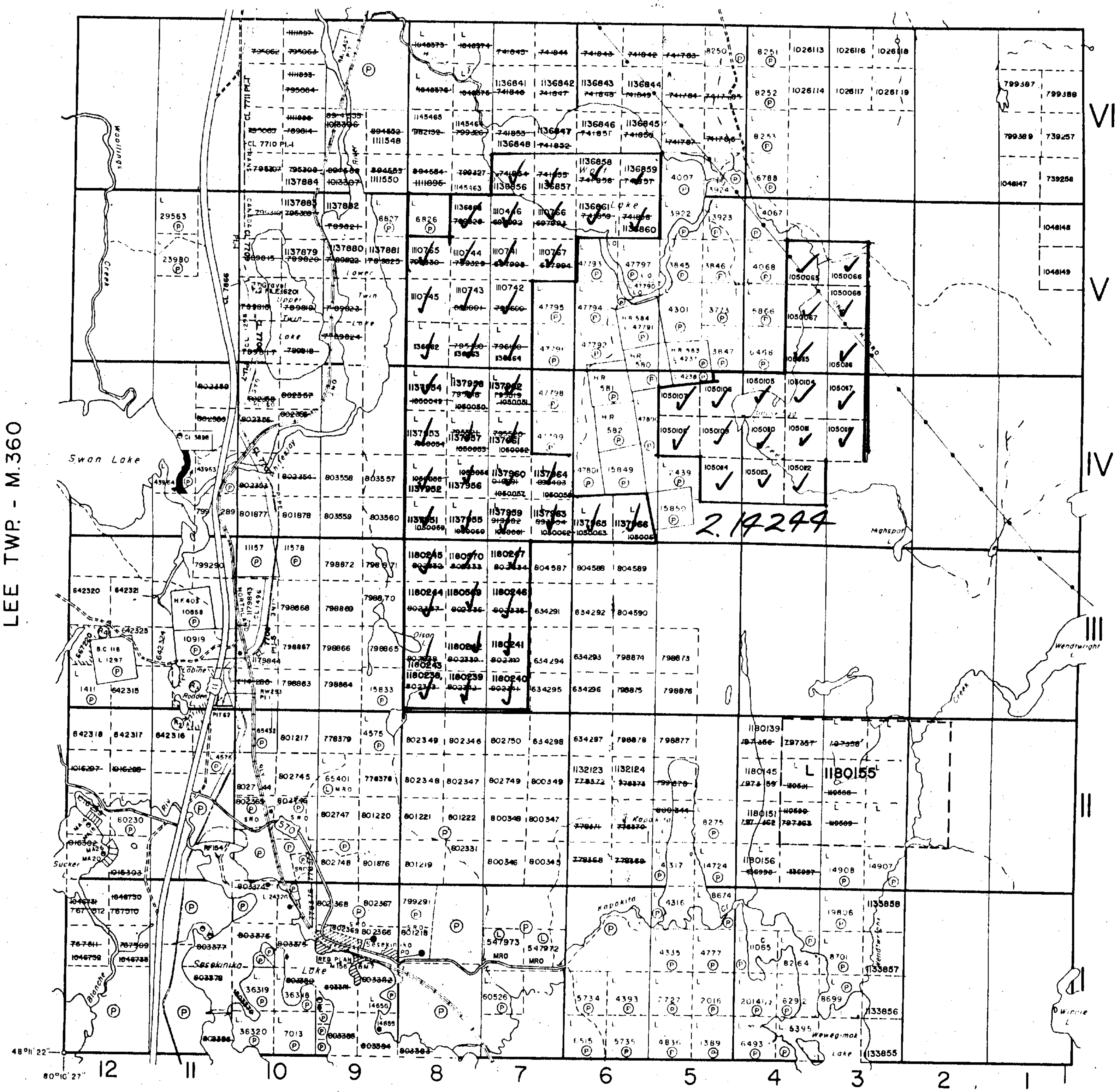
______________________________

______________________________

______________________________

TOWNSHIP SUBJECT TO FORESTRY OPERATIONS

DATE OF ISSUE JUN 7 1991 LARDER LAKE MINING RECORDER'S OFFICE




42A08SE0171 2.14244 MAISONVILLE

200

THE TOWNSHIP OF

# MAISONVILLE

DISTRICT OF TIMISKAMING

LARDER LAKE MINING DIVISION

SCALE: 1-INCH 40 CHAINS

## LEGEND

| | |
|---|---|
| PATENTED LAND | ● or Ⓟ |
| CROWN LAND SALE | C.S |
| LEASES | Ⓛ |
| 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 | |
| CANCELLED | C |
| PATENTED SRO | |

## NOTES

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

Areas withdrawn from staking

WITHDRAWN FROM STAKING, SECTION 31-6 PENDING APPLICATION UNDER PUBLIC LANDS ACT

ALL ISLANDS IN SESEKINIKA LAKE ARE WITHDRAWN FROM STAKING BY ORDER-IN-COUNCIL DATED DEC. 7, 1921

(R2) SURFACE RIGHTS WITHDRAWN FROM STAKING, SEC. 43/70 NOV. 8, 1970. FILE 22032

(R3) SURFACE RIGHTS WITDRAWN FROM STAKING, SEC. 43/70. N.R.W. 5/81 JAN. 23, 1981. FILE 22032

(R4) SURFACE AND MINING RIGHTS WITHDRAWN FROM STAKING SEC. 36/80, W. 8/86, JAN. 20, 1986

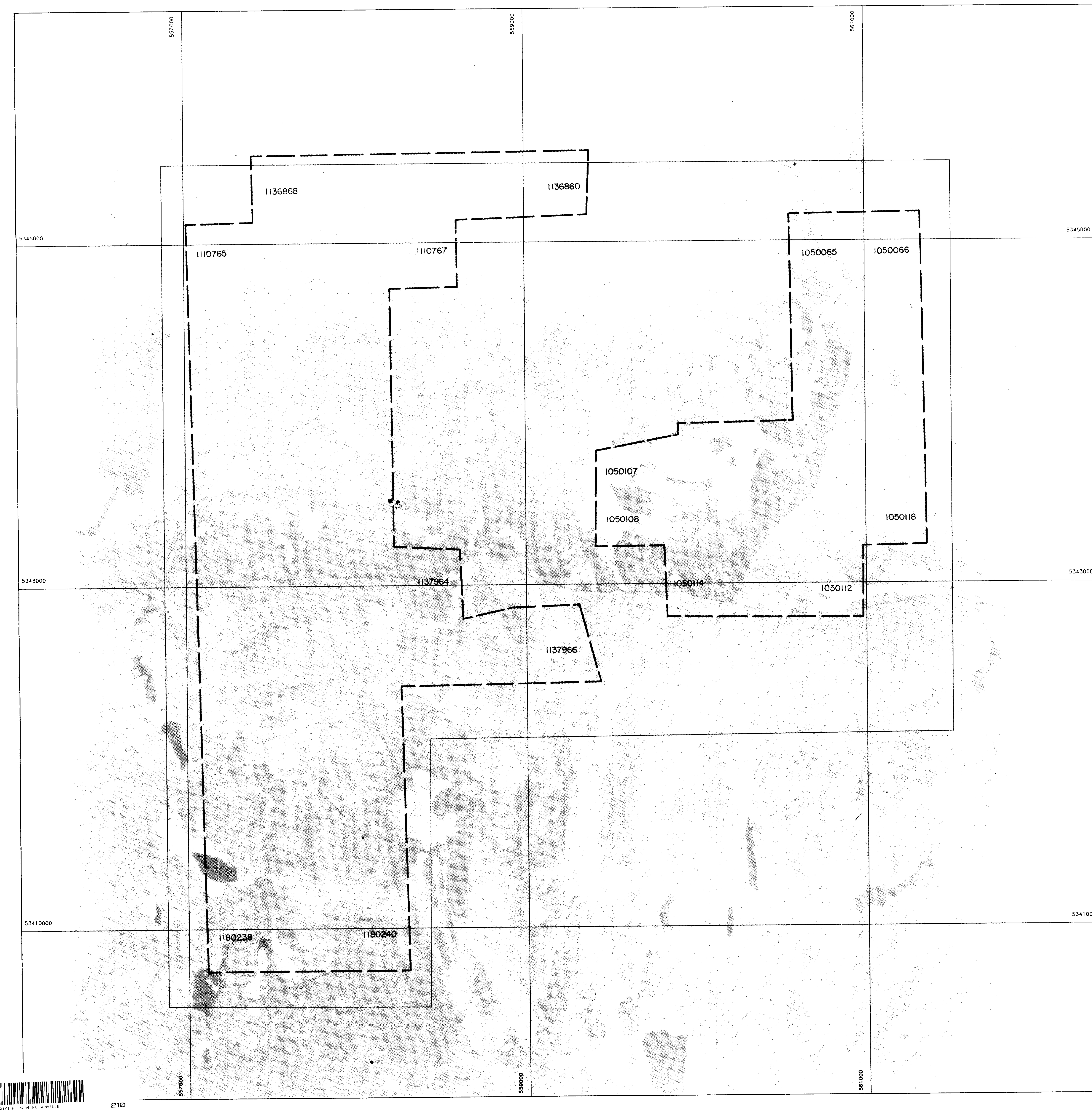
DATE RECEIVED JAN 20/89

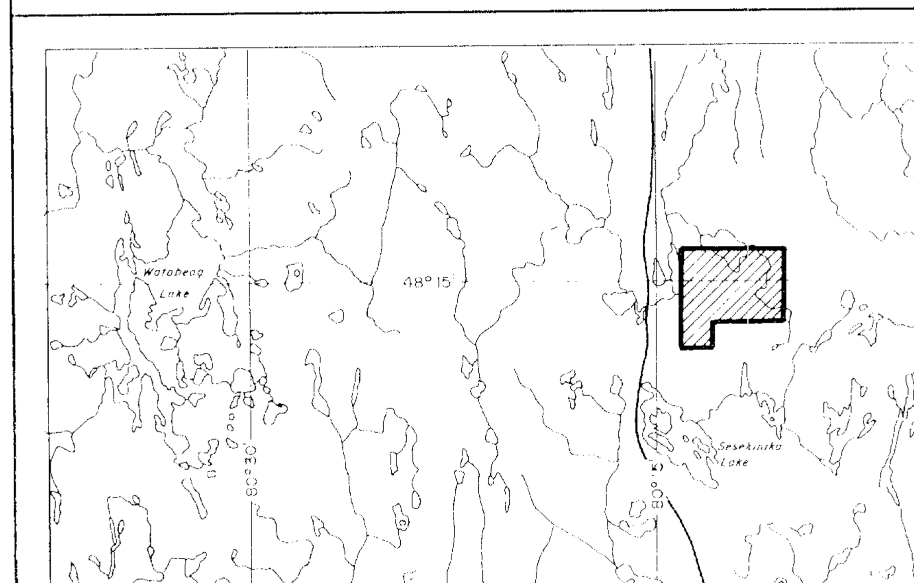
PLAN NO. G-3669

MINISTRY OF NORTHERN DEVELOPMENT AND MINES

NOTICE OF FORESTRY ACTIVITY

THIS TOWNSHIP / AREA FALLS WITHIN THE TIMISKAMING MANAGEMENT UNIT



**JOUTEL RESOURCES LIMITED**

**BASE MAP**

CANUC PROPERTY

ONTARIO

SCALE 1:10,000

AERODAT LIMITED

| | |
|---|---|
| DATE: | MAY 1991 |
| NTS No: | 42 A |
| MAP No: | 1 J9127-1 |

210

Flight Path
Navigation and recovery using a Global Positioning (GPS) navigation system.
Average terrain clearance 60m
Average line spacing 150m
EM Anomalies
Conductivity Thickness (mhos)
0 - 1
1 - 2
2 - 4
4 - 8
8 - 15
15 - 30
> 30
EM Anomaly A, 4600 Hz inphase amplitude 7 ppm. Conductivity thickness 1 2 mhos (see code).
1136868
1136860
1110765
1110767
1050065
1050066
1050107
1050108
1050118
1137964
1050114
1050112
1137966
1180238
1180240
557000
559000
561000
5345000
5343000
5341000
JOUTEL RESOURCES LIMITED
FLIGHT PATH
CANUC PROPERTY
ONTARIO
SCALE 1:10,000
AERODAT LIMITED
DATE: MAY 1991
NTS No: 42 A
MAP No: 2
J9127- 1


220


## Flight Path

Navigation and recovery using a Global Positioning (GPS) navigation system.

Average terrain clearance 60m
Average line spacing 150m

## EM Anomalies

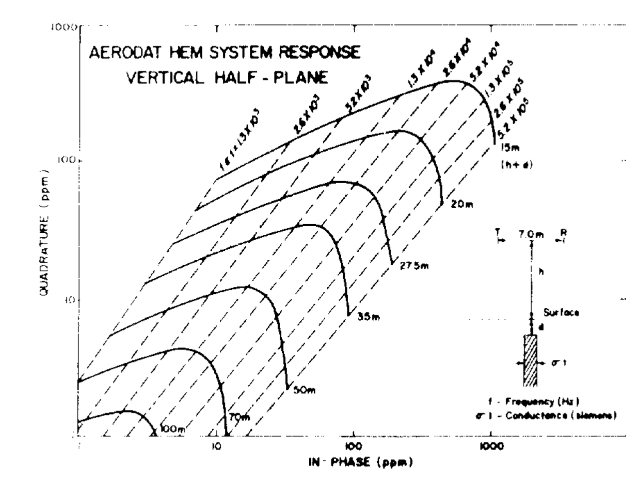
Conductivity Thickness (mhos)

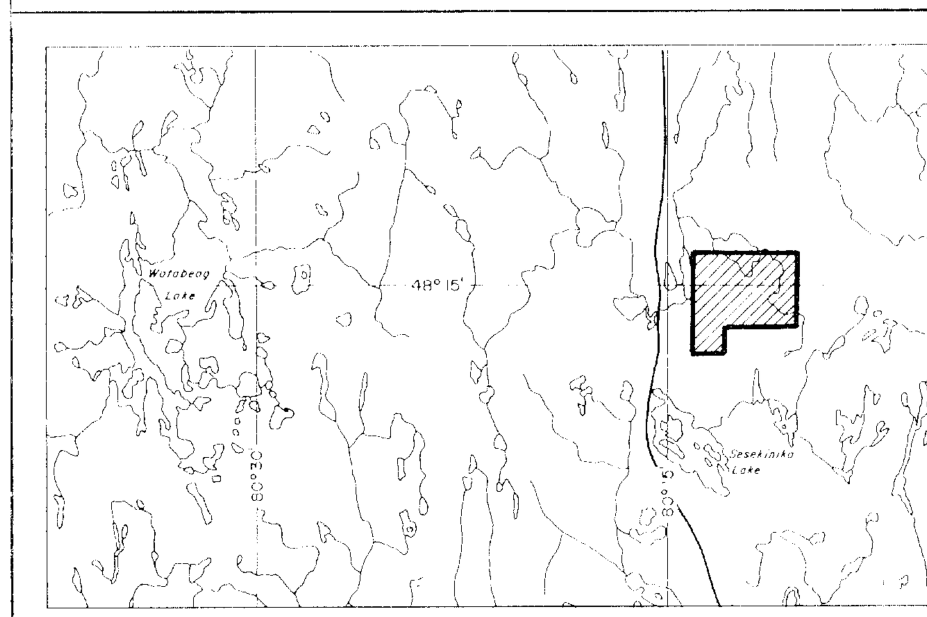
| | |
|---|---|
| ○ | 0 - 1 |
| ○ | 1 - 2 |
| ⊖ | 2 - 4 |
| ◔ | 4 - 8 |
| ◒ | 8 - 15 |
| ◕ | 15 - 30 |
| ● | > 30 |

EM Anomaly A, 4600 Hz inphase amplitude 7 ppm. Conductivity thickness 1 - 2 mhos (see code).

**INTERPRETATION LEGEND**

| | |
|---|---|
| ——○—— | Interpreted bedrock conductor axis |
| • • • ○ • • • | Possible bedrock conductor axis |
| ∧∧∧∧∧ | Fault |




**JOUTEL RESOURCES LIMITED**

**INTERPRETATION**

# CANUC PROPERTY

ONTARIO

SCALE 1:10,000

0 330 660 1320 2640 Feet

0 100 200 500 1000 Metres

AERODAT LIMITED

| | |
|---|---|
| DATE: | MAY 1991 |
| NTS No: | 42 A |
| MAP No: | 3 J9127- 1 |

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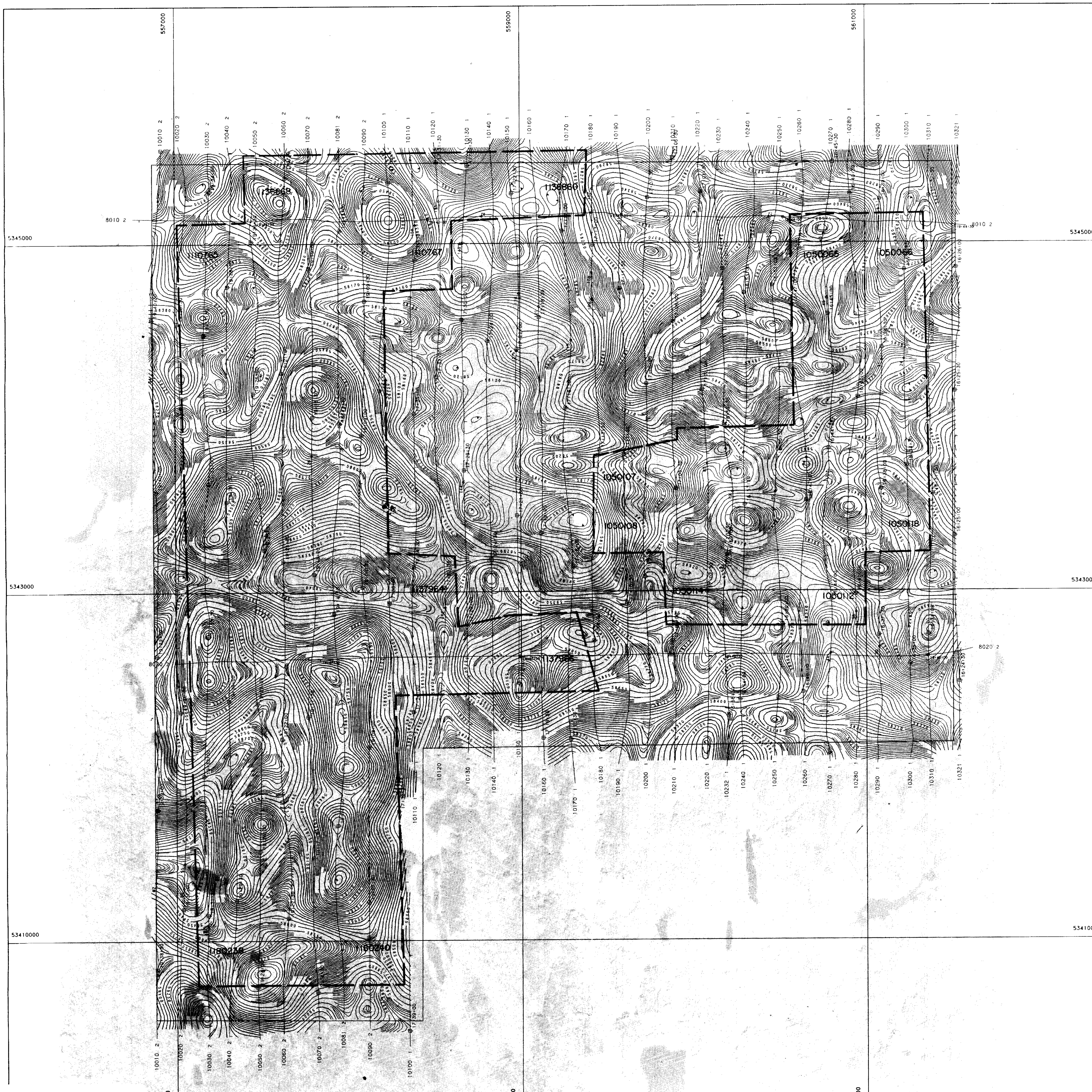


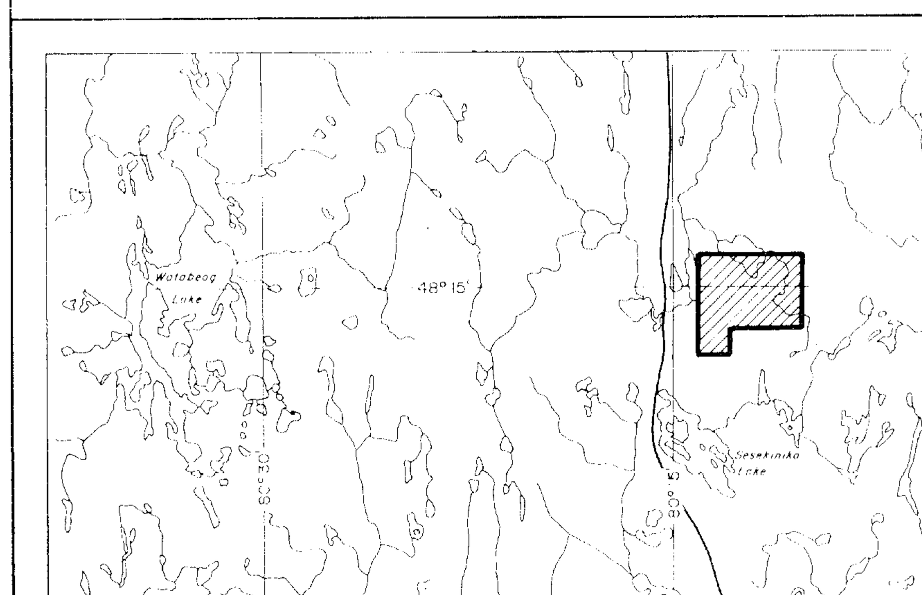


## Flight Path

Navigation and recovery using a Global Positioning (GPS) navigation system.

Average terrain clearance 60m
Average line spacing 150m

## Magnetics

Total Field Magnetic Intensity Contours in nT.

Cesium high sensitivity magnetometer.

Sensor elevation 45m

Map contours are multiples of those listed below

2 nT
10 nT
50 nT
250 nT
1000 nT

**JOUTEL RESOURCES LIMITED**

**TOTAL FIELD MAGNETIC CONTOURS**

# CANUC PROPERTY

ONTARIO

SCALE 1:10,000

0 330 660 1320 2640 Feet

0 100 200 500 1000 Metres

AERODAT LIMITED

DATE: MAY 1991

NTS No: 42 A

MAP No: 4 J9127- 1

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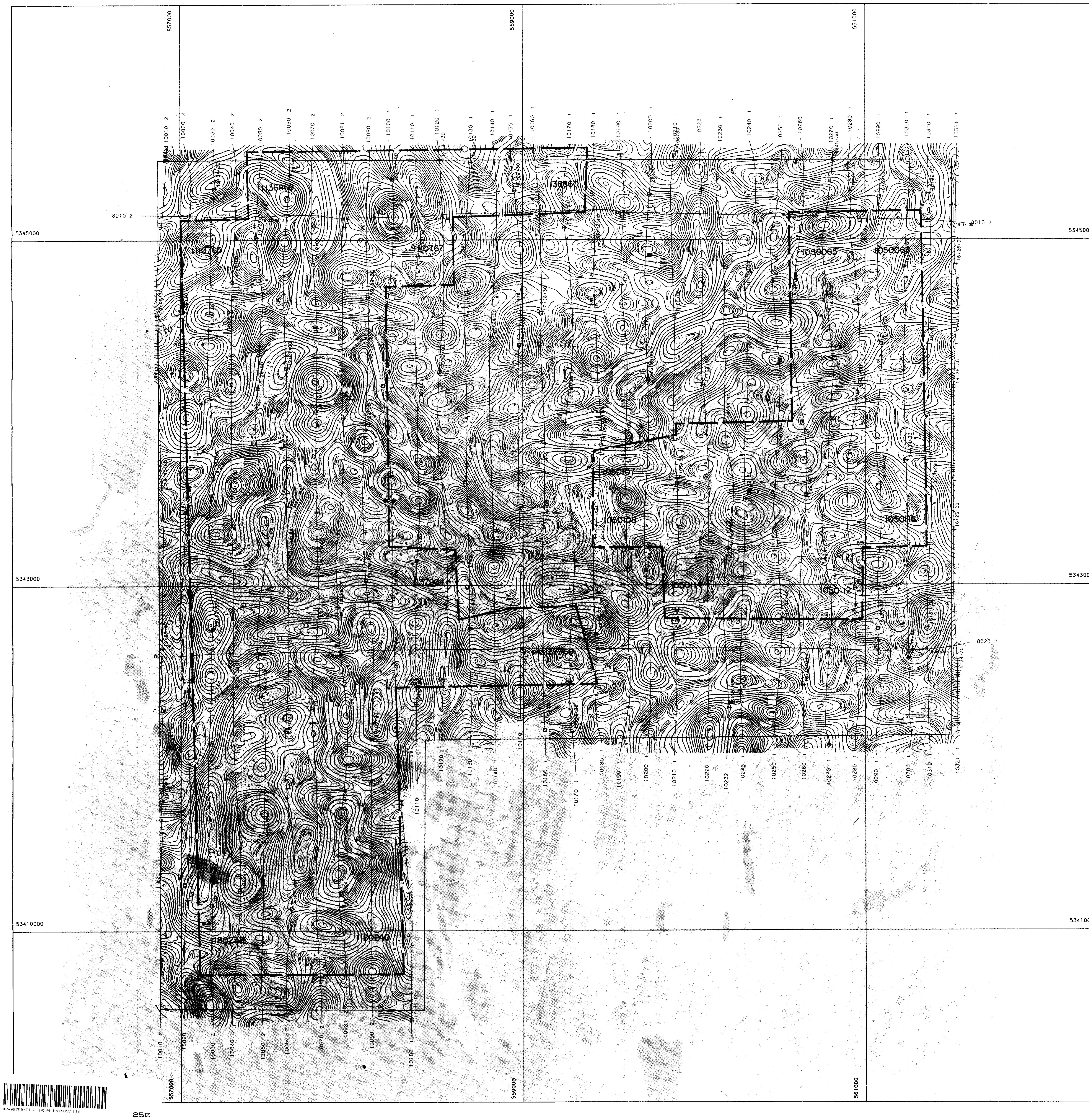



## Flight Path

Navigation and recovery using a Global Positioning (GPS) navigation system.

Average terrain clearance 60m
Average line spacing 150m

## Vertical Gradient

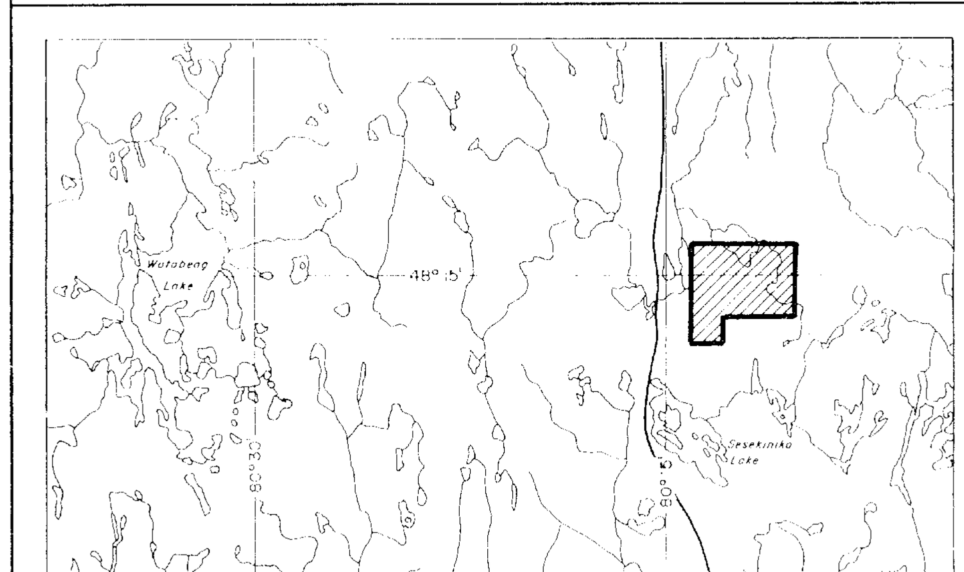
Vertical Magnetic Gradient calculated from the total field magnetic intensity in nT/m.

Cesium high sensitivity magnetometer.

Sensor elevation 45m

Map contours are multiples of those listed below

0.10 nT
0.50 nT
2.50 nT
10.0 nT
50.0 nT




**JOUTEL RESOURCES LIMITED**

**CALCULATED VERTICAL MAGNETIC GRADIENT**

CANUC PROPERTY

ONTARIO

SCALE 1:10,000

0 330 660 1320 2640 Feet

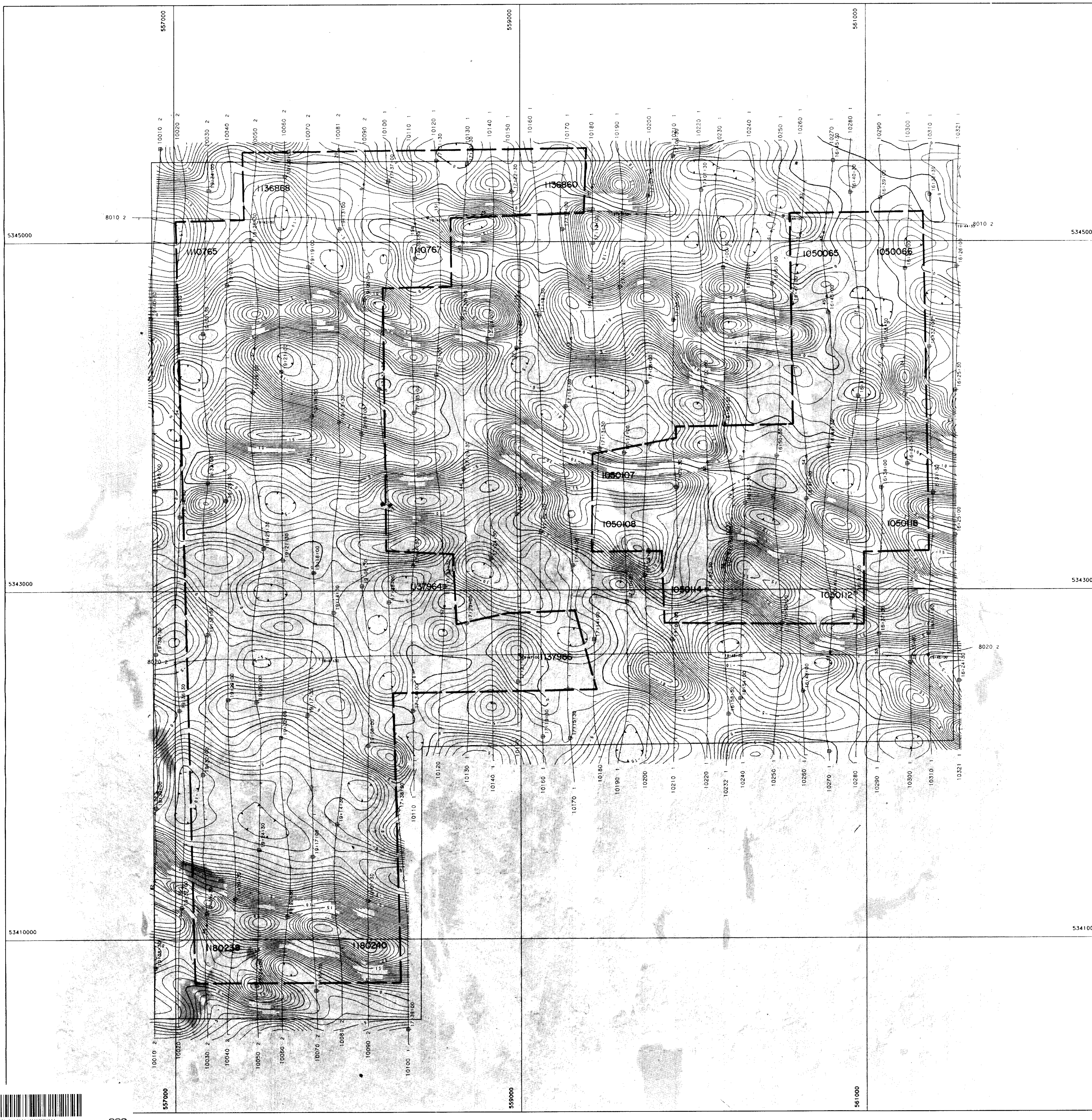
0 100 200 500 1000 Metres

AERODAT LIMITED

DATE: MAY 1991

NTS No: 42 A

MAP No: 5 J9127- 1




## Flight Path

Navigation and recovery using a Global Positioning (GPS) navigation system.

Average terrain clearance 60m
Average line spacing 150m

## VLF-EM

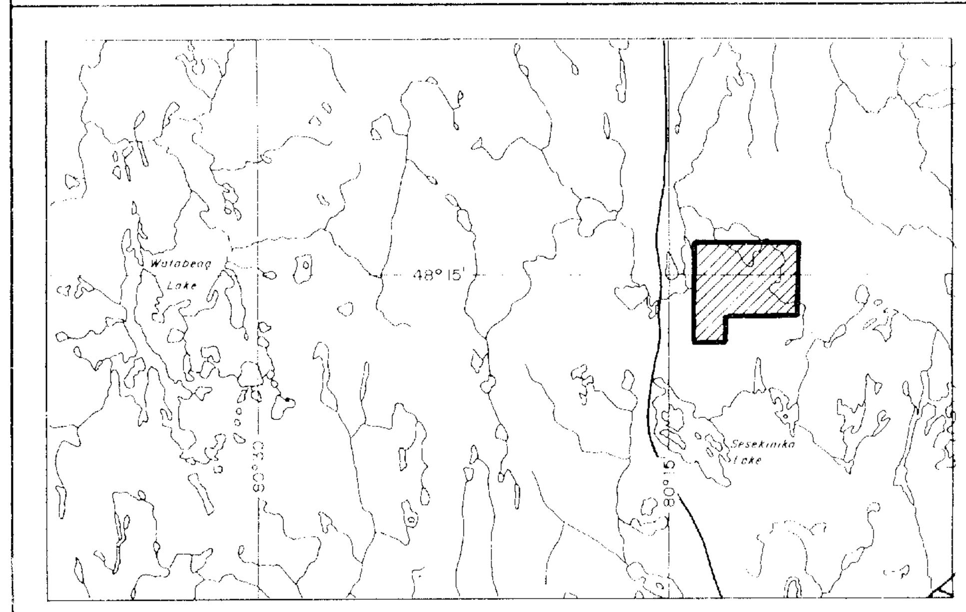
VLF-EM Total Field Intensity in percent.

Station: NAA
Cutler, Maine
24.0 kHz

Sensor elevation 45m

Map contours are multiples of those listed below

1 %
5 %
25 %
100 %




**JOUTEL RESOURCES LIMITED**

**VLF-EM TOTAL FIELD CONTOURS ( LINE CHANNEL )**

# CANUC PROPERTY

ONTARIO

SCALE 1:10,000

0 330 660 1320 2640 feet

0 100 200 500 1000 Metres

AERODAT LIMITED

| | |
|---|---|
| DATE: | MAY 1991 |
| NTS No: | 42 A |
| MAP No: | 6 J9127- 1 |

Flight Path
Navigation and recovery using a Global Positioning (GPS) navigation system.
Average terrain clearance 60m
Average line spacing 150m
Apparent Resistivity
Calculated from 4600 Hz coaxial EM response assuming a 200 m conductive layer.
Contouring in ohm*m at logarithmic intervals.
Sensor elevation 30m
Map contours are multiples of those listed below
0.1 log(ohm*m)
0.5 log(ohm*m)
1.0 log(ohm*m)
5.00 log(ohm*m)
JOUTEL RESOURCES LIMITED
APPARENT RESISTIVITY CONTOURS ( 4600 Hz )
CANUC PROPERTY
ONTARIO
SCALE 1:10,000
2640 Feet
1000 Metres
AERODAT LIMITED
DATE: MAY 1991
NTS No: 42 A
MAP No: 7
J9127- 1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