Report on a Combined Helicopter Borne Magnetic-Electromagnetic-VLF Survey on the Maisonville Property of the **Canuc Project**

Maisonville Township, plan M361
Larder Lake Mining Division

Joutel Resources Ltd.
OMIP Designation No. OM91-019

W. J. McGuinty
January 1992.

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Aerodat Ltd. July, 1991

1.0 Introduction

In 1988, Joutel Resources Ltd., Canuc Resources prospectors Michael Dyment and Jocelyne Kidston began a Joint Venture to explore the base metal potential of the archean volcanics underlying the Bourkes Area between Kirkland Lake and Matheson, Ontario. The joint venture undertook data compilation, land acquisition and preliminary exploration with Dyment and Kidston providing research and recommendations to the two companies. The Canuc joint venture currently consists of 5 groups of unpatented mining claims in Benoit, Black and Maisonville townships.

During 1991, an airborne geophysical program consisting of magnetometer, electromagnetometer and VLF-E.M. surveys evaluated the Wolf lake properties in Maisonville township. Two groups of claims were covered by the survey.

Funding for this survey is enhanced by the Ontario Mineral Incentive Program which will contributed 50% of the cost under OMIP designation No. OM91-019.

2.0 Property Description, Location and Access

The Wolf lake properties consists of two groups of claims each being contiguous blocks of 16 hectare claims staked prior to June 3, 1991. The Wolf lake groups consists of 41 claims in lots 7, 8 Conc 3, Lots 6, 7 and 8, Conc. 4 and Lots 7 and 8, Conc 5. The Goose Egg group, 1km east of the Wolf lake group contains 19 claims in lots 3 and 4, Conc. 5 and lots 3, 4 and 5, Conc.4. The two groups are separated by a narrow package of patented mining claims which are not owned by the joint venture. The claims are detailed

Property	Claim No.	Recorded Date	Work ($)	Expiry Date
Benoit West	1111422	06/28/89	880.00	06/28/92
Benoit West	1111423	06/28/89	880.00	06/28/92
Benoit West	1111424	06/28/89	880.00	06/28/92
Benoit Cent	1111425	07/14/89	880.00	07/14/92
Benoit Cent	1111426	07/14/89	880.00	07/14/92
Benoit Cent	1111427	07/14/89	880.00	07/14/92
Butler Lake	1110252	04/14/89	2200.00	04/14/96
Butler Lake	1110253	04/14/89	2200.00	04/14/95
Butler Lake	1110254	04/14/89	2200.00	04/14/95
Butler Lake	1110255	04/14/89	2200.00	04/14/95
Butler Lake	1110256	04/14/89	1540.00	04/14/93
Butler Lake	1110257	04/14/89	2200.00	04/14/95
Butler Lake	1110259	05/10/89	1760.00	05/10/94
Butler Lake	1110444	05/10/89	1474.00	05/10/93
Butler Lake	1110769	05/31/89	1320.00	05/31/93
Butler Lake	1110770	05/31/89	1320.00	05/31/93
Butler Lake	1110771	05/31/89	1320.00	05/31/93
Butler Lake	1110772	05/31/89	1320.00	05/31/93
Butler Lake	1110773	05/31/89	1320.00	05/31/93
Butler Lake	1111428	10/03/89	1320.00	10/03/93
Butler Lake	1111429	10/03/89	1320.00	10/03/93
Butler Lake	1111430	10/03/89	1320.00	10/03/93
Butler Lake	1136838	10/30/89	1320.00	10/30/93
Butler Lake	1136839	10/30/89	1320.00	10/30/93
Butler Lake	1136840	10/30/89	1320.00	10/30/93
Butler Lake	1136872	10/26/89	1540.00	10/26/93
Butler Lake	1136873	10/26/89	1320.00	10/26/93
Butler Lake	1185727	11/06/91	0.00	11/06/93
Butler Lake	1185728	11/07/91	0.00	11/07/93
Forbes Opt	1180238	05/08/91	1760.00	05/08/96
Forbes Opt	1180239	05/08/91	1760.00	05/08/96
Forbes Opt	1180240	05/08/91	1760.00	05/08/96
Forbes Opt	1180241	05/08/91	1760.00	05/08/96
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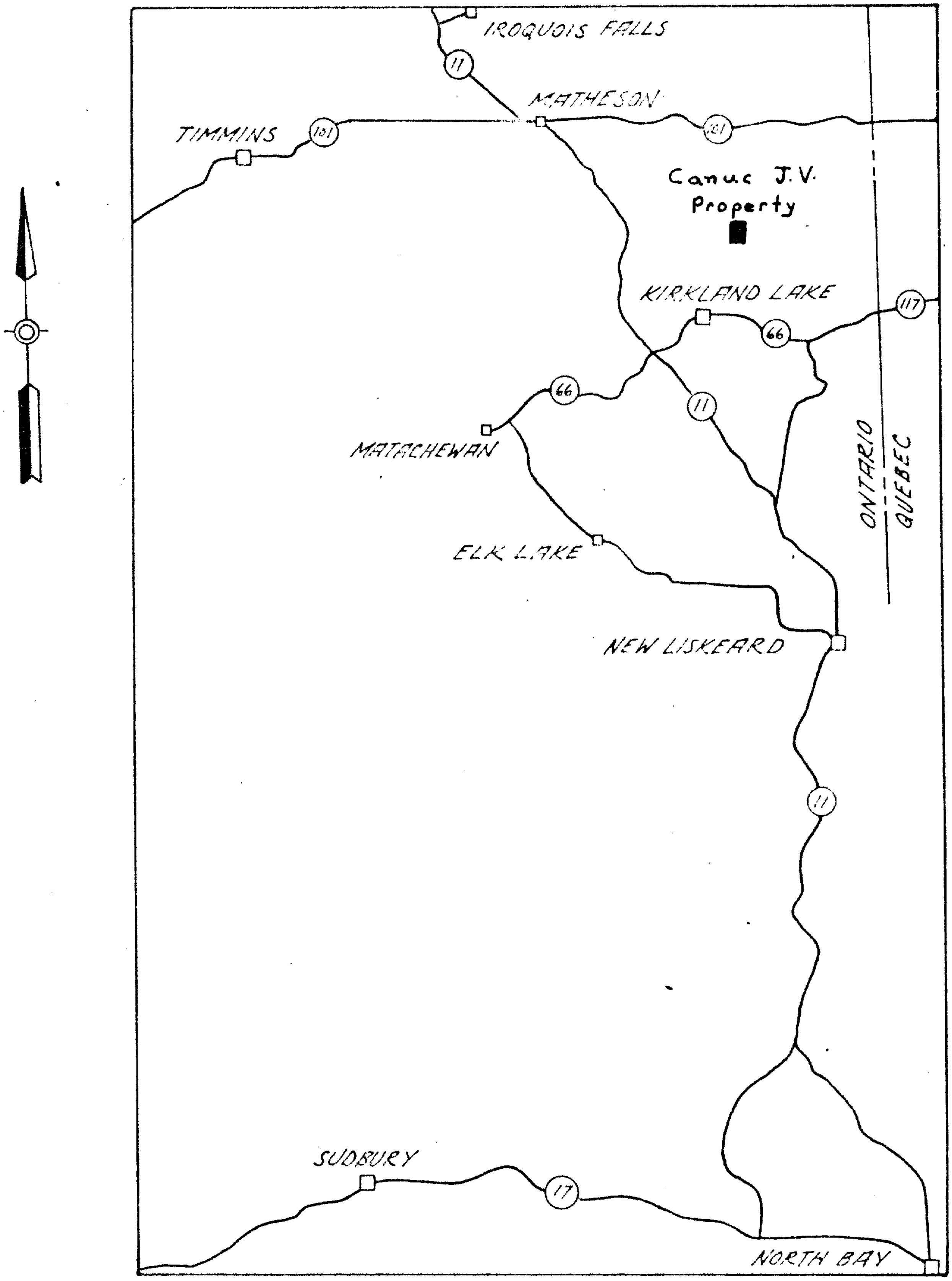
Forbes Opt	1180245	05/10/91	1760.00	05/10/96
Forbes Opt	1180246	05/10/91	1760.00	05/10/96
Forbes Opt	1180247	05/10/91	1760.00	05/10/96
Forbes Opt	1180569	05/09/91	1760.00	05/09/96
Forbes Opt	1180570	05/10/91	1760.00	05/10/96
Goose Egg	1050065	02/14/89	1760.00	02/14/94
Goose Egg	1050066	02/14/89	1760.00	02/14/94
Goose Egg	1050067	02/14/89	1760.00	02/14/94
Goose Egg	1050068	02/14/89	1760.00	02/14/94
Goose Egg	1050104	02/14/89	1760.00	02/14/94
Goose Egg	1050105	02/14/89	1760.00	02/14/94
Goose Egg	1050106	02/14/89	1760.00	02/14/94
Goose Egg	1050107	02/14/89	1760.00	02/14/94
Goose Egg	1050108	02/14/89	1760.00	02/14/94

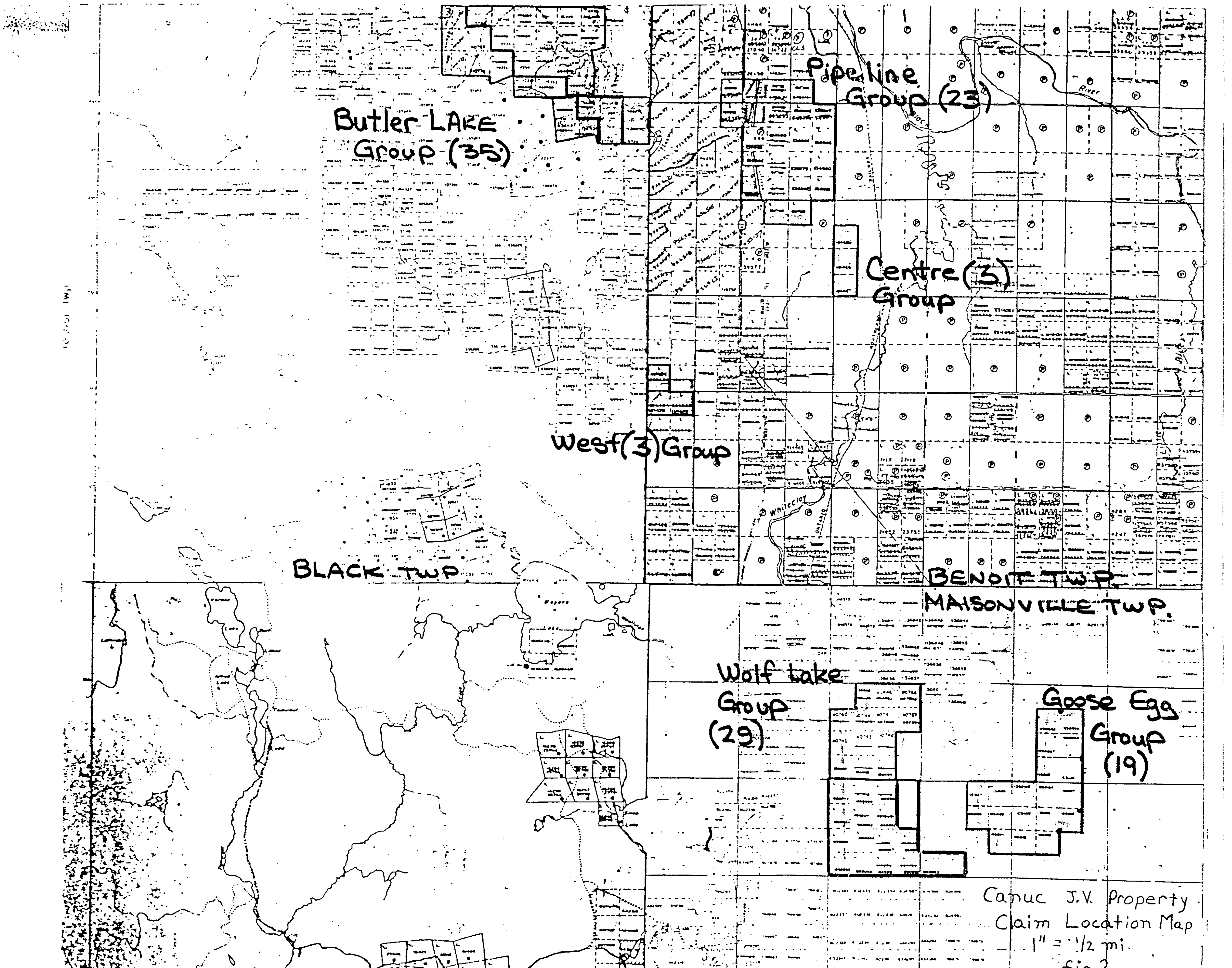
Property	Claim No.	Recorded Date	Work ($)	Expiry Date
Goose Egg	1050109	02/14/89	1760.00	02/14/94
Goose Egg	1050110	02/14/89	1760.00	02/14/94
Goose Egg	1050111	02/14/89	1760.00	02/14/94
Goose Egg	1050112	02/14/89	1760.00	02/14/94
Goose Egg	1050113	02/14/89	1760.00	02/14/94
Goose Egg	1050114	02/14/89	1760.00	02/14/94
Goose Egg	1050115	02/14/89	1760.00	02/14/94
Goose Egg	1050116	02/14/89	1760.00	02/14/94
Goose Egg	1050117	02/14/89	1760.00	02/14/94
Goose Egg	1050118	02/14/89	1760.00	02/14/94
Pipe_Line	1097160	05/30/89	2200.00	05/30/95
Pipe_Line	1097161	05/30/89	2200.00	05/30/95
Pipe_Line	1097162	06/02/89	1320.00	06/02/93
Pipe_Line	1097163	06/02/89	1320.00	06/02/93
Pipe_Line	1097168	04/11/89	3080.00	04/11/98
Pipe_Line	1097169	04/11/89	3080.00	04/11/98
Wolf Lake	1110446	05/18/89	1760.00	05/18/94
Wolf Lake	1110741	05/18/89	1760.00	05/18/94
Wolf Lake	1110742	05/18/89	1760.00	05/18/94
Wolf Lake	1110743	05/18/89	1760.00	05/18/94
Wolf Lake	1110744	05/18/89	1760.00	05/18/94
Wolf Lake	1110745	05/18/89	1760.00	05/18/94
Wolf Lake	1110765	05/18/89	1760.00	05/18/94
Wolf Lake	1110766	05/18/89	1760.00	05/18/94
Wolf Lake	1110767	05/18/89	1760.00	05/18/94
Wolf Lake	1136862	10/25/89	1760.00	10/25/94
Wolf Lake	1136863	10/25/89	1760.00	10/25/94
Wolf Lake	1136864	10/25/89	1760.00	10/25/94
Wolf Lake	1136868	10/25/89	1760.00	10/25/94
Wolf Lake	1137951	03/09/90	1760.00	03/09/95
Wolf Lake	1137952	03/09/90	1760.00	03/09/95
Wolf Lake	1137953	03/09/90	1760.00	03/09/95
Wolf Lake	1137954	03/09/90	1760.00	03/09/95
Wolf Lake	1137955	03/09/90	1760.00	03/09/95
Wolf Lake	1137956	03/09/90	1760.00	03/09/95
Wolf Lake	1137957	03/09/90	1760.00	03/09/95
Wolf Lake	1137958	03/09/90	1760.00	03/09/95
Wolf Lake	1137959	03/09/90	1760.00	03/09/95
Wolf Lake	1137960	03/09/90	1760.00	03/09/95
Wolf Lake	1137961	03/09/90	1760.00	03/09/95
Wolf Lake	1137962	03/09/90	1760.00	03/09/95
Wolf Lake	1137963	03/09/90	1760.00	03/09/95
Wolf Lake	1137964	03/09/90	1760.00	03/09/95
Wolf Lake	1137965	03/09/90	1760.00	03/09/95
Wolf Lake	1137966	03/09/90	1760.00	03/09/95



JOUTEL RESOURCES LTD.
CANUC RESOURCES LTD.
JOINT VENTURE
LOCATION MAP
BLACK, BENOIT TWPS.

Scale: 1" = 20 Mi.

FIG. 1



Canuc J.V. Property
Claim Location Map
1" = 1/2 mi.
fig 2

in Table I.

The Bourkes area is located between Kirkland Lake and Matheson Ontario, roughly 20km southeast of Matheson. Highway 11 follows the eastern boundary of Maisonville township and the common boundary of Black (east limit) and Benoit (west limit) townships, effectively bisecting the research area. The Wolf lake groups can be accessed by several roads and trails which extend westward from Highway 11 to Wolf lake.

Topography is generally flat and the properties are covered by mixed spruce birch forest of which parts have been logged in the past. Some of the area is covered by esker sands.

3.0 Exploration History

The Bourkes area has undergone 5 distinct periods of exploration activity. The first period was during the Kirkland Lake gold rush in 1914. A second period of gold exploration was undertaken in 1930's on the heels of a resurgence in gold interest in the Timmins area. A third period of activity from 1965-1970 centred on base metal exploration and surface evaluation of new airborne technology findings. Inco, Kerr Addison and Amax were active in the Bourkes area. Junior mining companies followed the base metal theme in 1979 when a government sponsored airborne geophysical survey was issued. Base metals were again the focus of exploration in the mid 1980's when a base metal discovery was made on the current Wolf lake property by Pryme Resources.

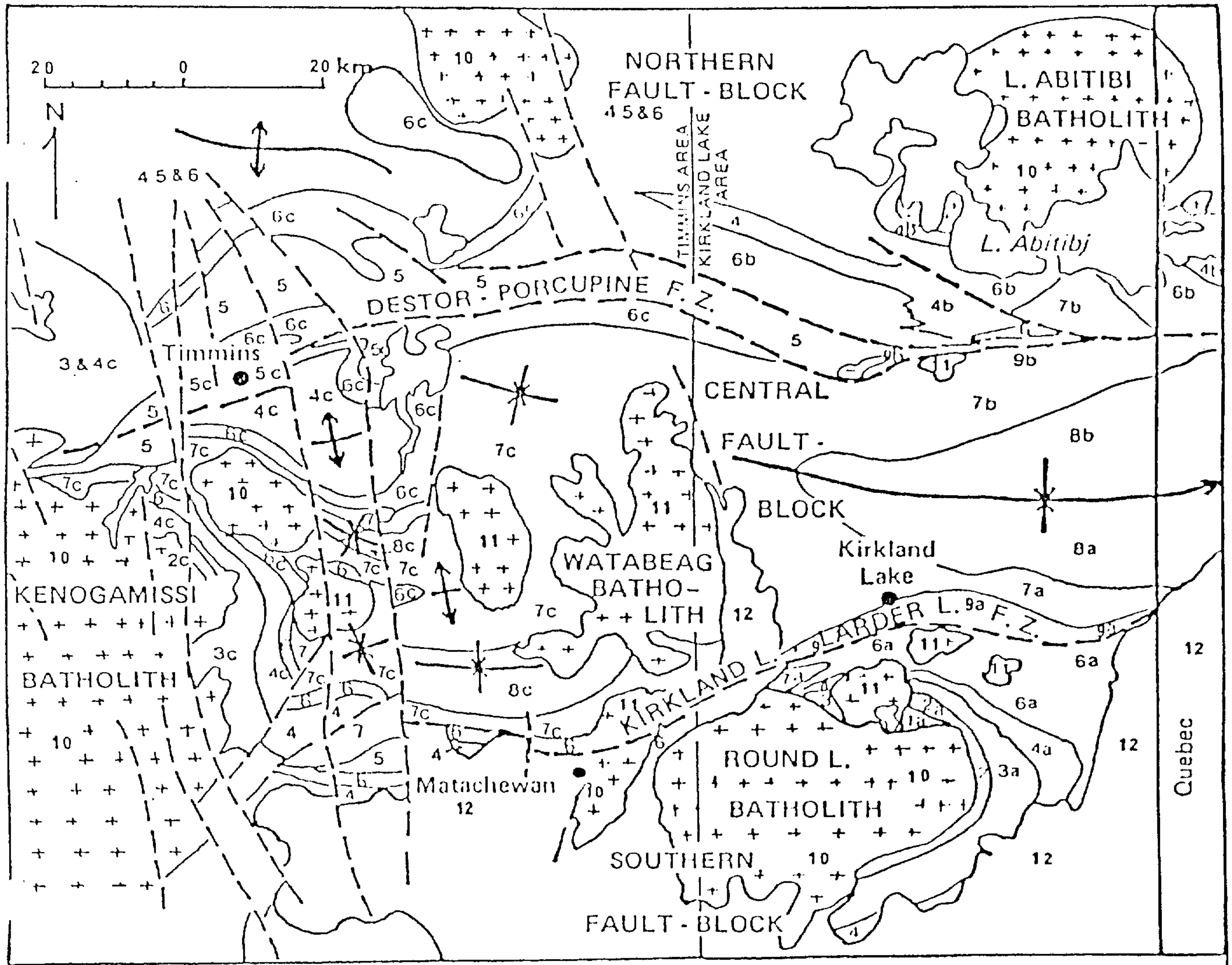
4.0 Bourkes Area Geology

The Bourkes Area is generally underlain by late Archean metavolcanic, metasedimentary and plutonic rocks and by some Proterozoic sedimentary rocks and diabases. The oldest volcanic rocks consist of a tholeiitic suite of basalts of the Kinojevis Group. Tholeiitic andesite, dacite and rhyolite are present in the group as are thin interflow sedimentary units of cherty, and in places carbonaceous siltstones, lithic wackes and some calc-alkalic and crystal tuffs. The majority of the claim holdings in the joint venture are underlain by Kinojevis Group rocks.

The Kinojevis rocks are overlain to the northeast by younger volcanic rocks of the Blake River Group. These rocks generally consist of calc-alkalic basalt, andesite, dacite and rhyolite. The Blake River Group hosts the significant base metal deposits in the Noranda camp.

The volcanic pile has been intruded by subvolcanic gabbroic bodies and dioritic dykes, and small syenitic plugs and associated porphyries. The entire assemblage is cut by north trending Matachewan diabase dykes.

The Bourkes area was mapped by H. L. Lovell for the Ontario Department of Mines and Northern Affairs in 1971 (G.R. 92). A subsequent remapping of the Ramore Area including part of the Bourkes area was undertaken by L. S. Jensen of the Ontario Geological Survey (O.G.S. Preliminary map P3131, 1989). According to Lovell, the Wolf lake area is underlain by a series of southeast trending southerly dipping metavolcanics and metasediments intruded



LEGEND

Proterozoic
- Keeweenawan diabase (not shown)
- 12 Cobalt Group

Archean
- Matachewan diabase (not shown)
- Granitic rocks
  - 11 Granodiorite, monzonite, quartz monzonite, syenite
  - 10 Massive to gneissic quartz diorite, tonalite, trondhjemite
- Upper Supergroup
  - 9 9a* Timiskaming Group, 9b** Destor - Porcupine Complex
  - 8 8a, 8b, Blake River Group, 8c*** Blake River (Upper Fm., Tisdale Group)
  - 7 7a, 7b, Kinojevis Group, 7c Kinojevis Group, (Middle Fm., Tisdale Group)
  - 6 6a Larder Lake Group, 6b Stoughton-Roquemaure Group, 6c Lower Fm., Tisdale Group
  - 5 5c Porcupine Group
- Lower Supergroups
  - 4 4a Skead Group, 4b Hunter Mine Group, 4c Upper Fm., Deloro Group
  - 3 3a Catherine Group, 3c Middle Fm., Deloro Group
  - 2 2a Wabewawa Group, 2c Lower Fm., Deloro Group
  - 1 1a Pacaud tuffs ****

*a refers to Kirkland Lake Area, south limb of synclinorium (Jensen 1978c, 1979).
**b refers to Kirkland Lake Area, north limb of synclinorium (Jensen 1976, 1978b).
***c refers to Timmins Area (Pyke 1980)
**** (Goodwin 1965).

REGIONAL GEOLOGY
AFTER
JENSEN & LANGFORD

FIG. 3

by gabbroic bodies. Metavolcanics consist of pillowed and massive basalts which are the most abundant lithology and minor amounts of dacitic to rhyolitic pyroclastics and flows. Metasediments were identified as being either Timiskaming or Keewatin and are mainly cherts and slates, frequently graphitic. The property is cut by numerous north trending diabase dykes.

Inco Ltd. tested an anomaly on what is now claim L1110741 of the Wolf lake group. This hole intersected massive basalts and a very thick sequence of graphitic tuff and cherty tuff.

Drilling by Bronson-Goliath Mines Ltd. in 1980 tested the northwestern strike extension of the E.M. response drilled by Inco Ltd. Drill hole G-4 is located on current claim L1136868 and intersects intermediate amygdaloidal volcanics which are epidotized and mineralized with brown carbonate and minor pyrite over its entire length.

Pryme Energy and New Jay Minerals drill tested several conductors around near the Inco and Bronson holes and in Wolf lake itself. Seven holes returned interbedded mafic flows and flow breccias mafic to felsic pyroclastics and graphitic sediments with sphalerite,chalcopyrite and galena mineralization. Noranda Ltd. drilled five holes further testing Pryme/New jay targets. Similar geology and mineralization was noted in these holes with P-85-3 returning 0.37% zinc over 18 feet. Other anomalous intersections of zinc, associated with silicification and graphitic mineralization

Drilling on the Goose Egg lake property occurred mainly on current claims L1051105 and L1051106 directly over Goose Egg lake. Graphitic felsic volcanics with pyrrhotite, pyrite, sphalerite, galena and chalcopyrite were intersected. This unit of altered and mineralized volcanics appears to strike south southwest. No felsic volcanics were identified at surface by geological mapping.

5.0 Airborne Geophysical Survey

110 line kilometres of combined magnetic-electromagnetic-VLF survey were completed over the two Maisonville claim groups and the intervening area. Aerodat Ltd. was contracted to perform the survey in May 1991. A complete report and commentary on the survey is found in appendix 1.

Results of the magnetometer survey appear to indicate broad scale folding of strata across the Maisonville claims. In lots 7 and 8 Conc. 3, a concentric pattern of magnetic highs and lows corresponds to a series of basalt flows arrayed about a gabbroic intrusive core on map 2215. No orientations are available to determine if the structure is synformal or antiformal. Another broad open fold appears to span lots 3 to 5 in Conc. 4. The fold appears to be synformal and open northward with its apex at the south end of Wolf lake. The magnetics display a jog at this point which is coincident with a fault structure inferred by Lovell (1971). Lithologies plotted on map 2215 correspond well with magnetic units.

2 major conductive trends are apparent in the property area from Aerodat survey results. The main fracture is a 4km long E.M.

response which spans the Wolf lake and Goose Egg lake claim groups as well as the intervening patents. The conductor is weak to moderate but is persistent across the survey area. On the Wolf lake claims this anomaly C1 represent the geological target evaluated by Noranda and Pryme Energy. Anomalies C2, C3 and C4 represent specific parts of this anomaly. The response does not appear conformable to strata. This anomaly appears to trend into Good Egg lake and across a north south series of responses which appear to have been tested by the Kerr Addison drilling. The responses tested by Kerr indicated a south-south westerly strike to anomalous mineralization which is supported by the north to south responses. It is possible that mineralization in Goose Egg lake is keyed to a fault rather than the X trend of the C1-C4 axis. Two other east west conductive trends occur in the north end of the survey area in lots 4, 5 and 6, Conc. 5. The bulk of these anomalies occurs in the central patented area not controlled by the joint venture. No stratigraphic or structural features can be immediately related to these anomalies.

6.0 Conclusions and Recommendations

The combined airborne survey succeeded in defining several weak but consistent electromagnetic conductors with the Wolf lake survey area. Two of these conductors coincide with known occurrence of sulphide mineralization often associated to graphite. Two are of unknown character. Also, results of the magnetometer survey indicate a strong possibility of open folded sequences.

It is recommended that a detailed field study of the claim groups be undertaken by geophysical, geological and lithogeochemical methods to ascertain the reliability of the fold structure theme and to evaluate the known anomalies more clearly. Only limited portions of the main conductors have been tested by drilling and further testing of strike extensions is warranted.

References

Dyment L.M., Kidston J.	Compilation report on Black Maisonville and Benoit townships, Canuc Joint Venture private Company Report.
Jensen L. S.	Geology of the Ramore Area O.G.S. preliminary map P3131, 1989.
Lovell H. L.	Geology of the Bourkes Area, District of Timiskaming. Ontario Department of Mines and Northern Affairs Geological Report 91, 1971.

CERTIFICATE OF QUALIFICATIONS

I, William John McGuinty of 63 Rand Avenue, West in the town of Kirkland Lake in the Province of Ontario,

Do hereby certify:

1. That I am a graduate of the University of Ottawa (1983) with a degree of Bachelor of Science (B.Sc.) with Honours in Geology.

2. That I have been practicing my profession as a geologist and been engaged in mineral exploration since 1981.

3. That this report is based on visits to the property and personal appraisal of available data.

4. That I have disclosed in this report all relevant material which to the best of my knowledge might have a bearing on the viability or recommendations to the project.

5. That I do not have, nor do I expect to receive, directly or indirectly any interest in the property reported on herein.

6. That I am exploration manager for Joutel Resources Ltd.

January 1992

W. J. McGuinty,

Kirkland Lake

Appendix I

Report on a Combined Helicopter Borne Magnetic,
Electromagnetic and VLF Survey, Canuc Property,
Maisonville township, Larder Lake Mining Division
Aerodat Ltd. July, 1991

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

FOR
JOUTEL RESOURCES LIMITED
BY
AERODAT LIMITED
JULY 15, 1991

J9127C

R.J. de Carle
Consulting Geophysicist

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LIST OF MAPS
(Scale 1:10,000)

MAPS: (As listed under Appendix "B" of the Agreement)

1. **PHOTOMOSAIC BASE MAP;**
   prepared from a semi-controlled photo laydown, showing registration crosses on the map corresponding to UTM co-ordinates.

2. **FLIGHT LINE MAP;**
   showing all flight lines, anomalies and fiducials with the photomosaic base map.

3. **AIRBORNE ELECTROMAGNETIC SURVEY INTERPRETATION MAP;**
   showing flight lines, fiducials, conductor axes and anomaly peaks along with inphase amplitudes and conductivity thickness ranges for the 4600 Hz coaxial coil system with the photomosaic base map.

4. **TOTAL FIELD MAGNETIC CONTOURS;**
   showing magnetic values contoured at 2 nanoTesla intervals, flight lines and fiducials with the photomosaic base map.

5. **VERTICAL MAGNETIC GRADIENT CONTOURS;**
   showing magnetic gradient values contoured at 0.1 nanoTeslas per metre with the photomosaic base map.

6. **APPARENT RESISTIVITY CONTOURS;**
   showing contoured apparent resistivity values for the 4600 Hz. coaxial coil, flight lines and fiducials with the base map.

7. **VLF-EM TOTAL FIELD CONTOURS;**
   showing VLF-EM values contoured at 1% intervals, flight lines and fiducials with the photomosaic base map.

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.

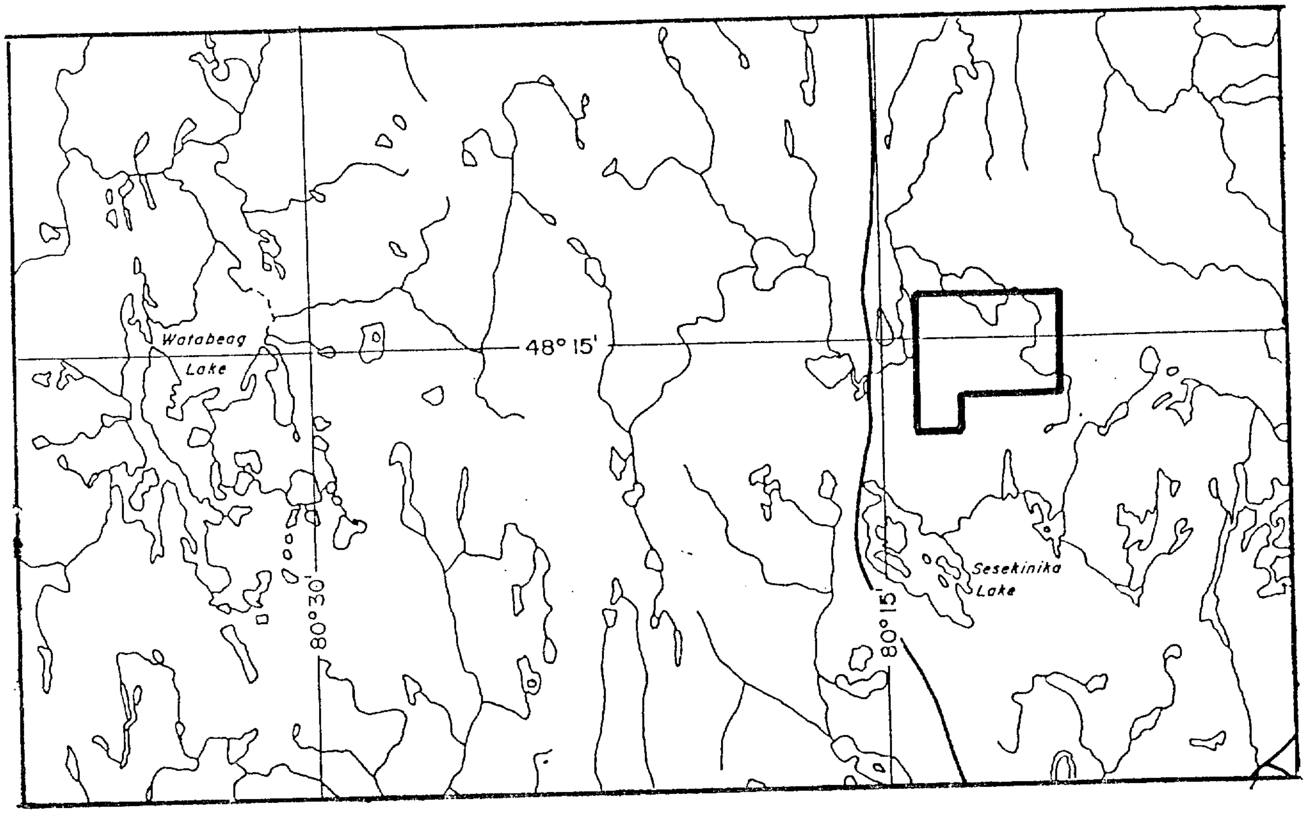
A total of 110 line kilometres of the recorded data were compiled in map form and are presented as part of this report according to specifications outlined by Joutel Resources Limited.

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,

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

J9127C

APPENDIX I

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MERQ-OGS
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Pyke, D. R., Ayres, L. D., Innes, D. G.
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APPENDIX II

PERSONNEL

FIELD

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

OFFICE

Processing	Tom Furuya 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,

Robert J. de Carle
Consulting Geophysicist
for
AERODAT LIMITED

Palgrave, Ontario
July 15, 1991

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

						CONDUCTOR		BIRD
				AMPLITUDE (PPM)		CTP	DEPTH	HEIGHT
FLIGHT	LINE	ANOMALY	CATEGORY	INPHASE	QUAD.	MHOS	MTRS	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

				AMPLITUDE (PPM)		CONDUCTOR		BIRD
						CTP	DEPTH	HEIGHT
FLIGHT	LINE	ANOMALY	CATEGORY	INPHASE	QUAD.	MHOS	MTRS	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

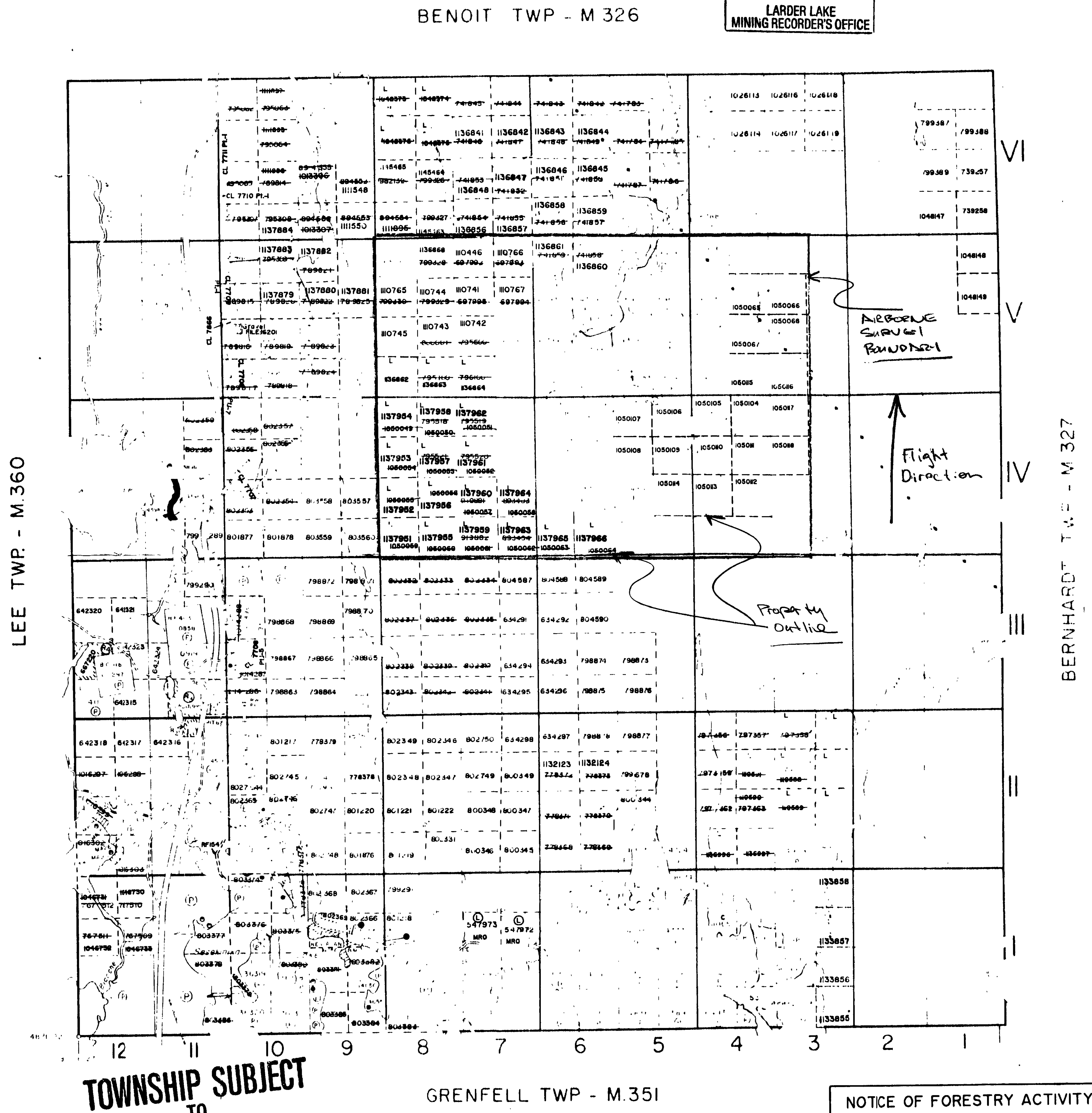
Estimated depth may be unreliable because the stronger part of the conductor may be deeper or to one side of the flight line, or because of a shallow dip or overburden effects.

OM91-19

DATE OF ISSUE

MAR 5 1991

LARDER LAKE
MINING RECORDER'S OFFICE



MAISONVILLE

DISTRICT OF TIMISKAMING

LARDER LAKE MINING DIVISION

SCALE 1 INCH

LEGEND

NOTE

PENDING APPLICATION UNDER PUBLIC LANDS ACT

ALL ISLANDS IN SESEKINIKA LAKE ARE WITHDRAWN FROM STAKING BY ORDER-IN-COUNCIL DATED DEC 7, 19

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

(R3) SURFACE RIGHTS WITHDRAWN 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

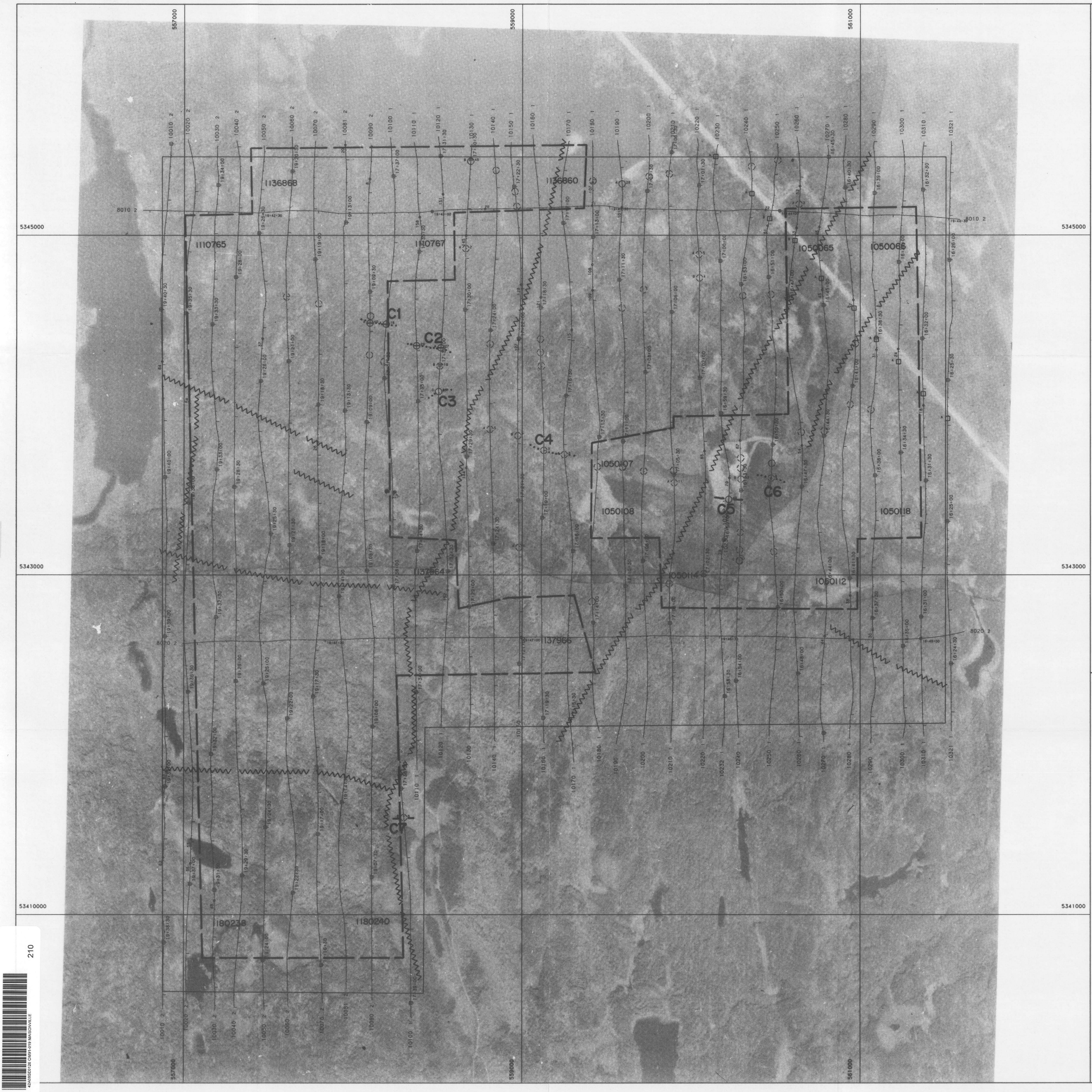
THE INFORMATION THAT APPEARS ON THIS MAP HAS BEEN COMPILED FROM VARIOUS SOURCES, AND ACCURACY IS NOT GUARANTEED. THOSE WISHING TO STAKE MINING CLAIMS SHOULD CONSULT WITH THE MINING RECORDER, MINISTRY OF NORTHERN DEVELOPMENT AND MINES, FOR ADDITIONAL INFORMATION ON THE STATUS OF THE LANDS SHOWN HEREON

TOWNSHIP SUBJECT TO FORESTRY OPERATIONS

NOTICE OF FORESTRY ACTIVITY

THIS TOWNSHIP / AREA FALLS WITHIN THE TIMISKAMING MANAGEMENT UNIT AND MAY BE SUBJECT OF FORESTRY OPERATONS, THE MNR UNIT FORESTER FOR THIS AREA CAN BE CONTACTED AT: P.O. BOX 129
SWASTIKA, ONT.
P0K 1T0
705-642-3222

42A08SE0126 OM91-019 MAISONVILLE



Flight Path

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

Average terrain clearance 60m
Average line spacing 150m

EM Anomalies

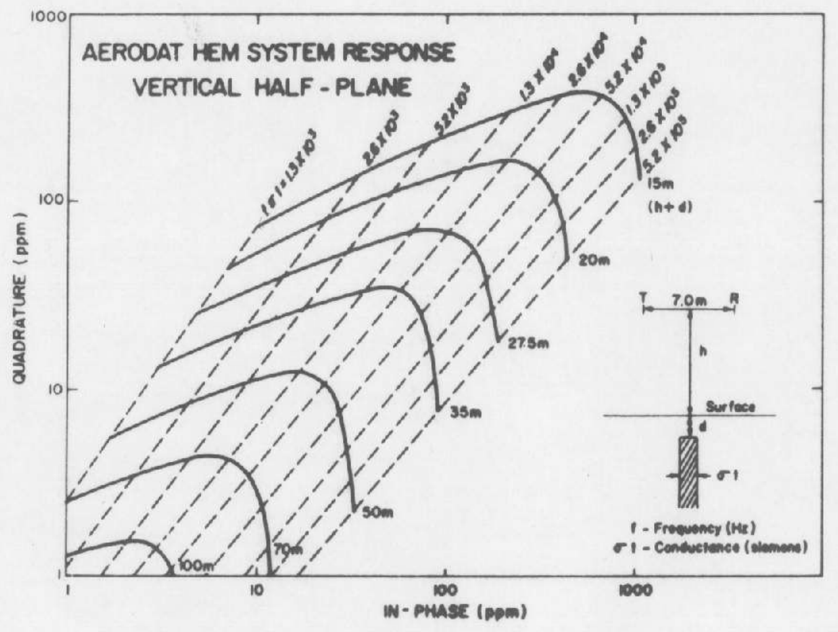
Conductivity Thickness (mhos)

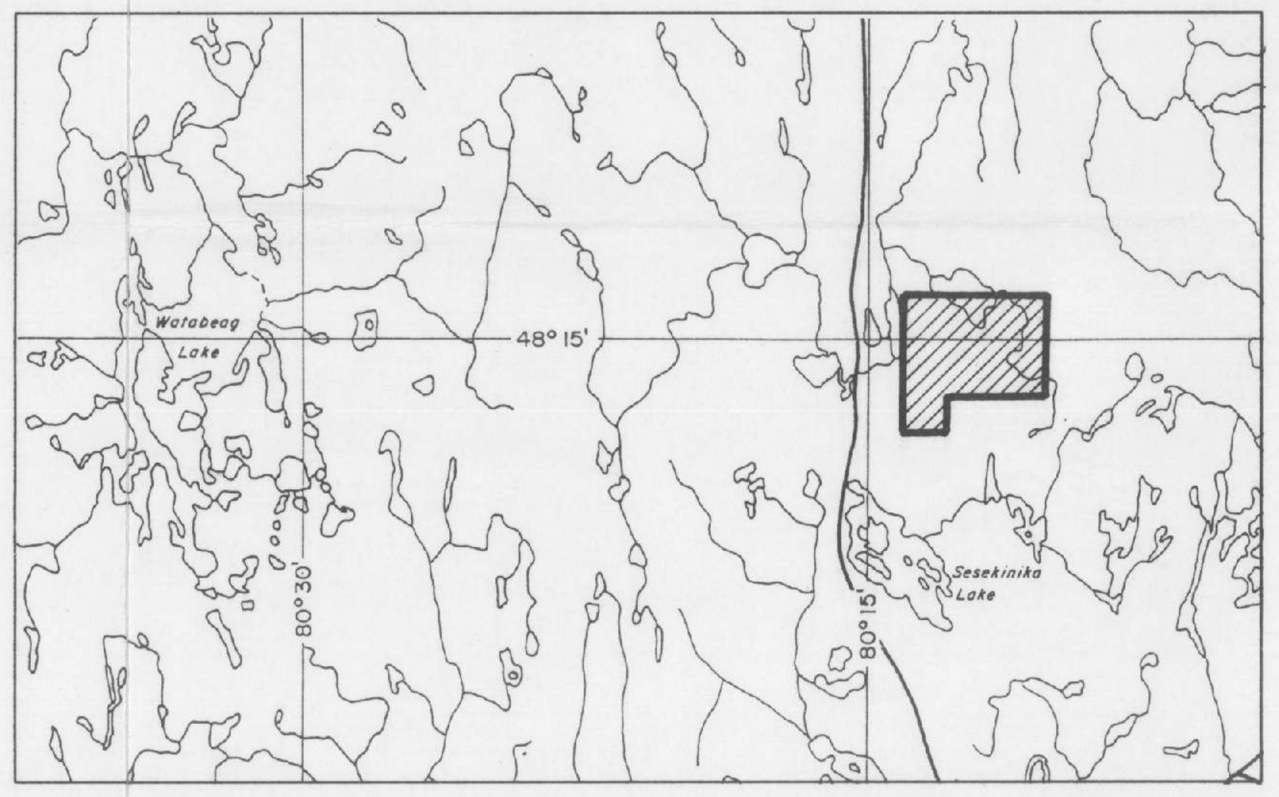
◌	0 - 1
○	1 - 2
⊖	2 - 4
◕	4 - 8
◒	8 - 15
◕	15 - 30
●	> 30

A 7 -○- 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

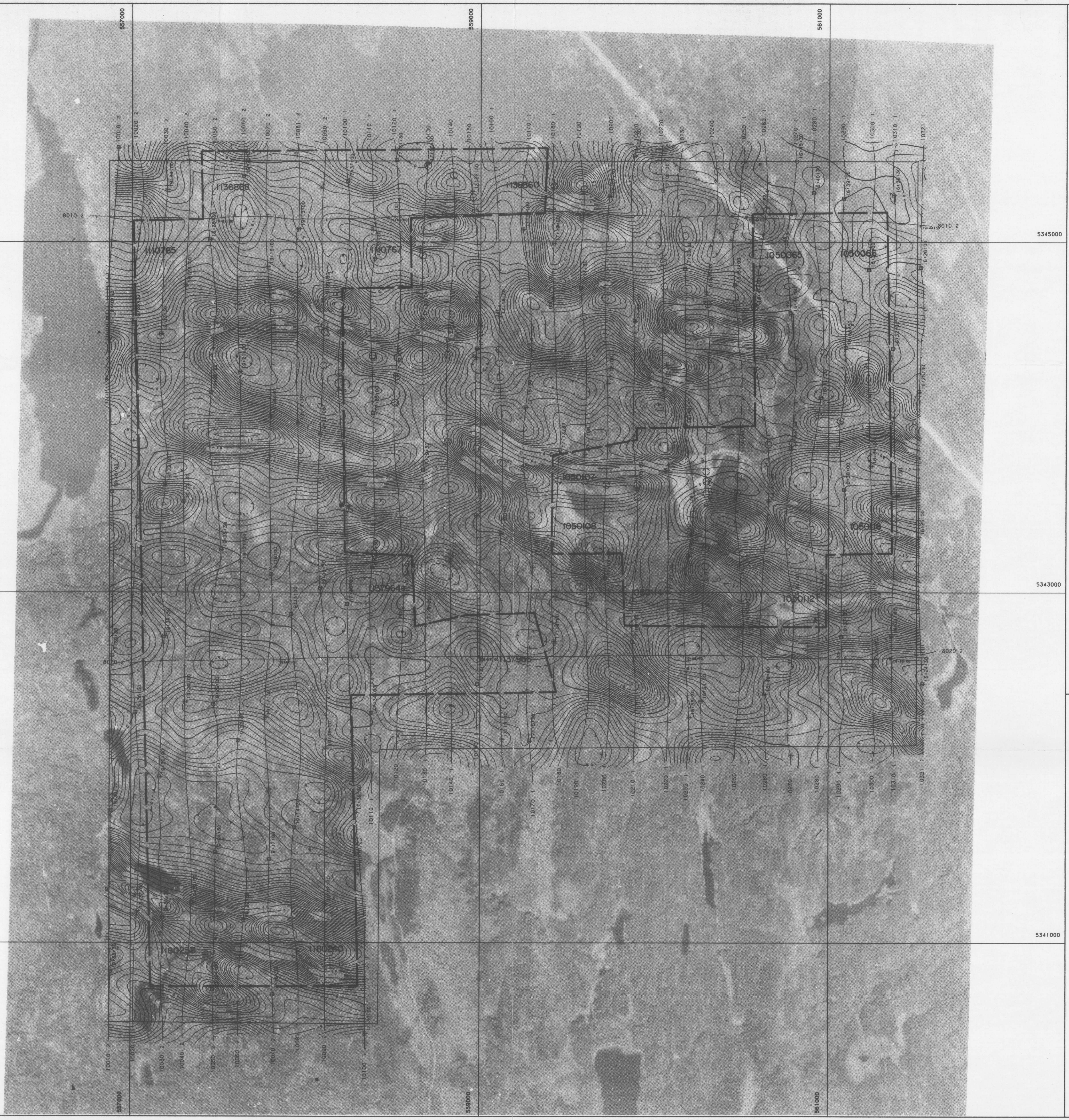
SCALE 1:10,000

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



Flight Path

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

Average terrain clearance 60m
Average line spacing 150m

VLF-EM

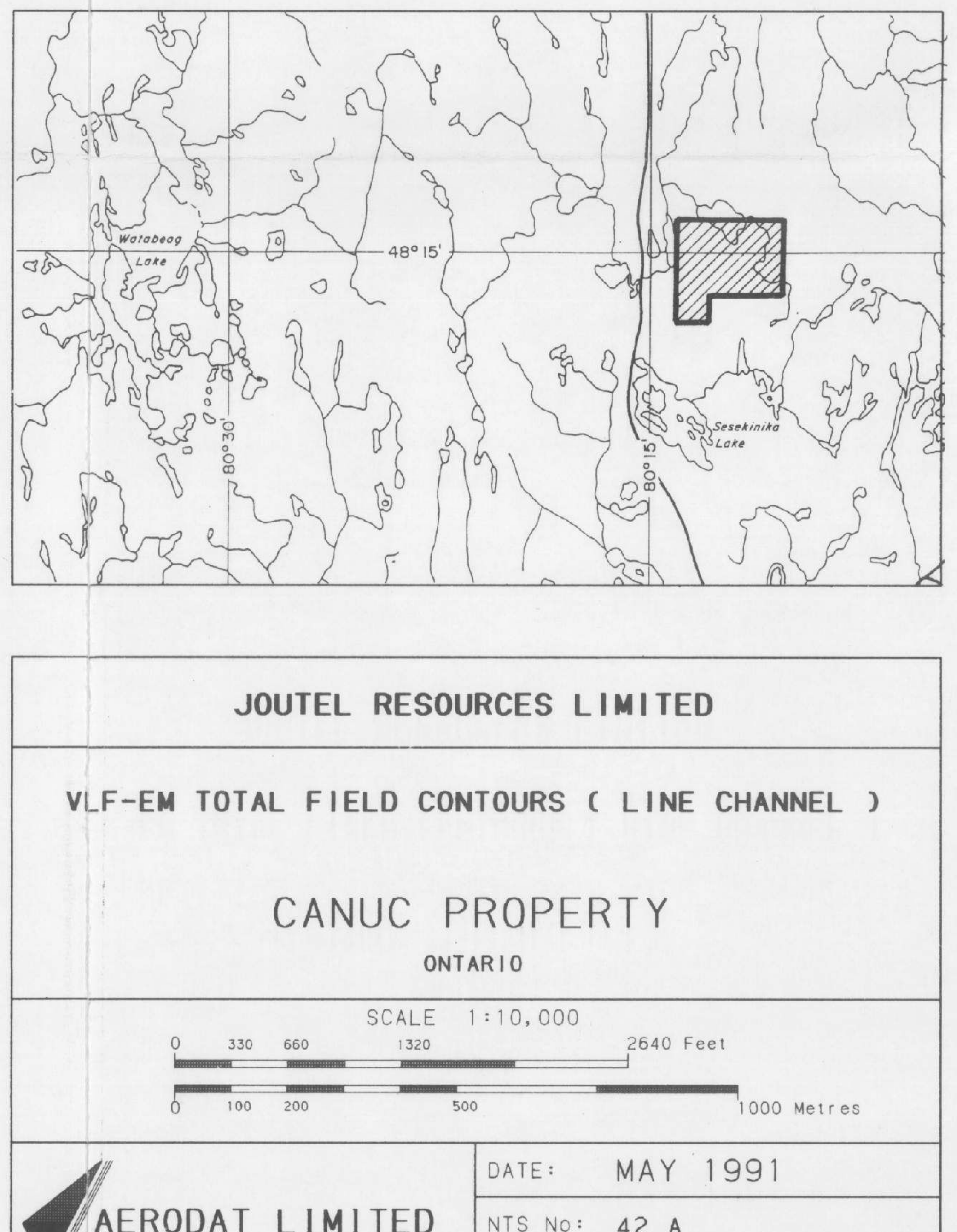
VLF-EM Total Field Intensity in percent.

Station: NAA
Cutler, Maine
24.0 kHz

Sensor elevation 45m

Map contours are multiples of those listed below

———	1 %
———	5 %
———	25 %
———	100 %



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VLF-EM TOTAL FIELD CONTOURS (LINE CHANNEL)

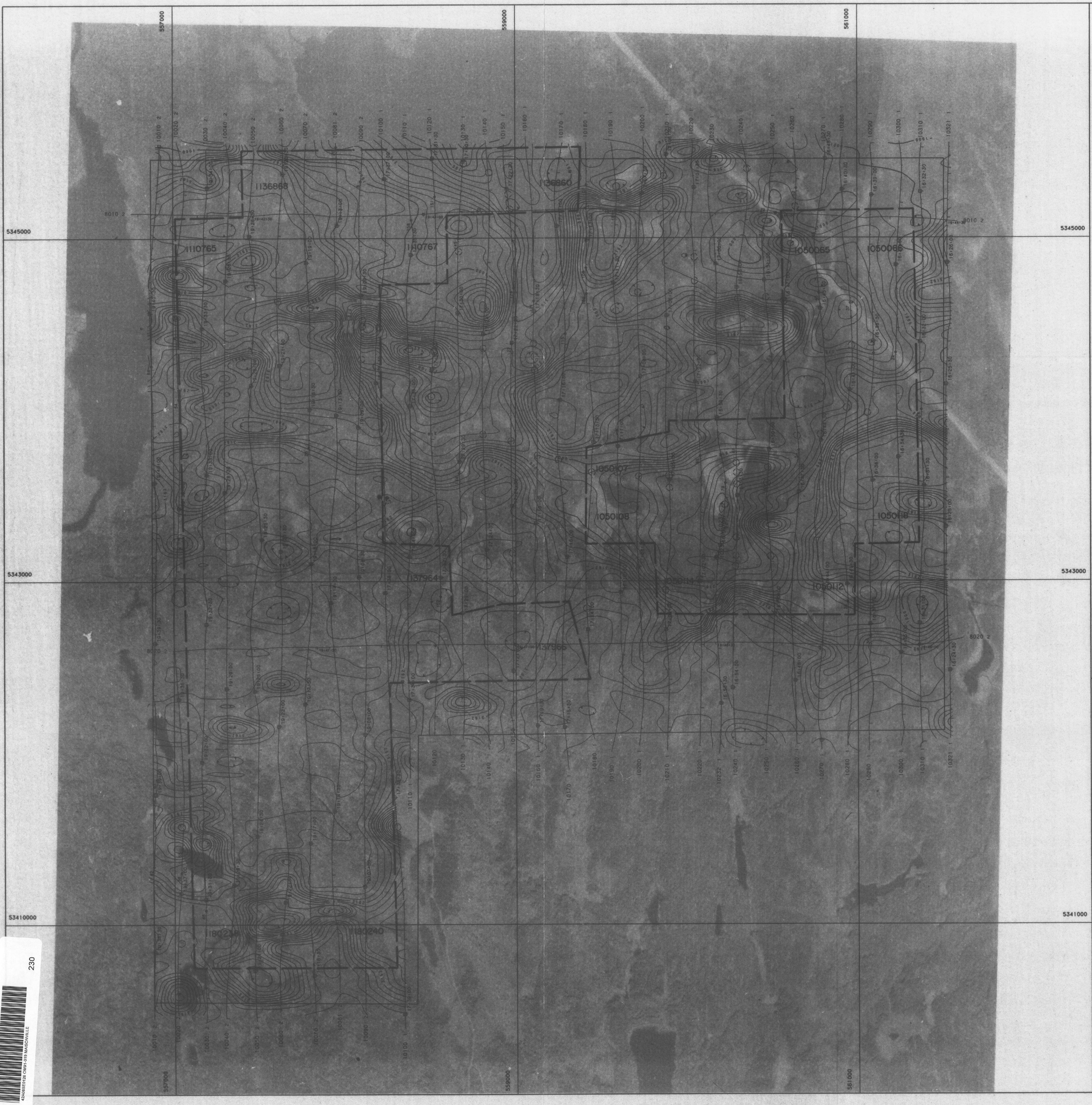
CANUC PROPERTY

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

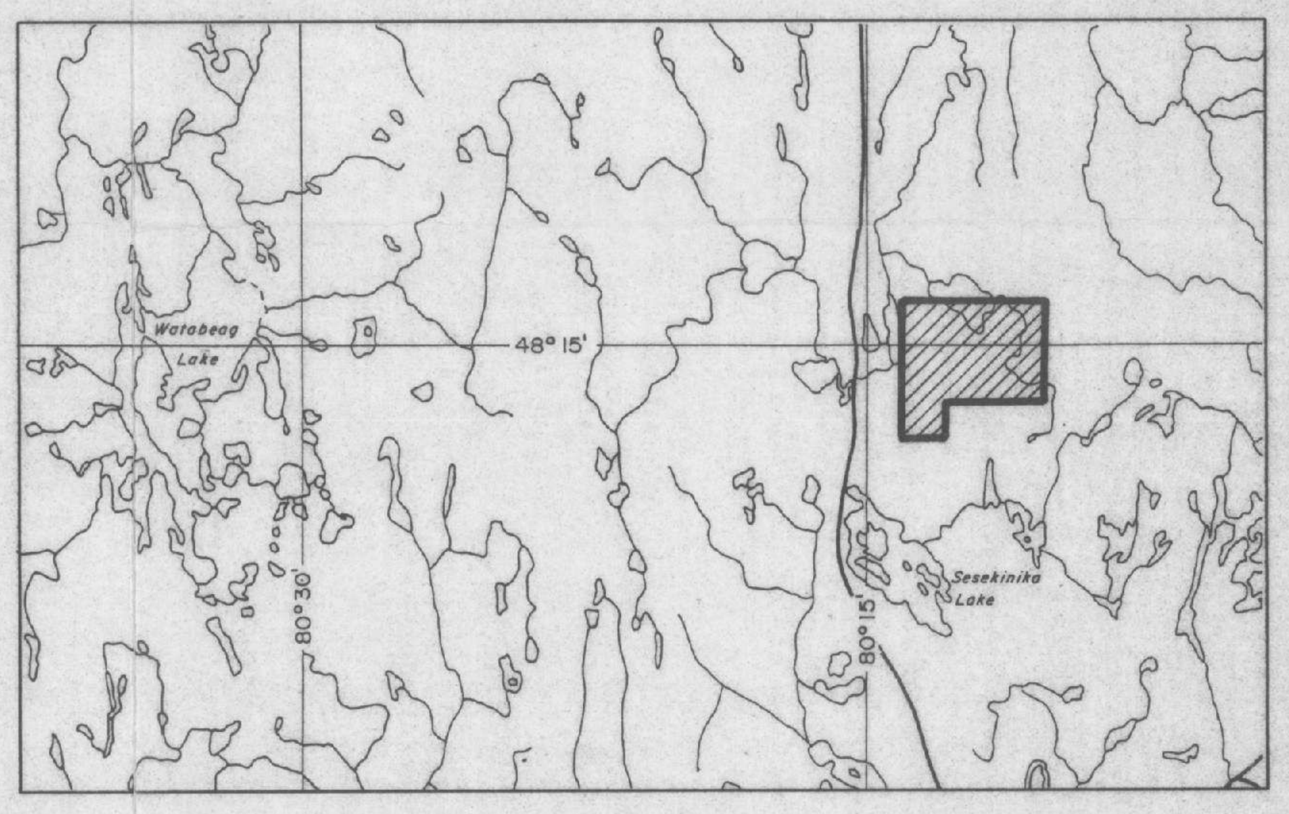
Calculated from 4600 Hz coaxial EM response assuming a 200 m conductive layer.

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

0 330 660 1320 2640 Feet

0 100 200 500 1000 Metres

AERODAT LIMITED

DATE:	MAY 1991
NTS No:	42 A
MAP No:	7 J9127- 1