REPORT ON COMBINED HELICOPTER BORNE MAGNETIC, ELECTROMAGNETIC AND VLF SURVEY BENOIT & MELBA TOWNSHIPS KIRKLAND LAKE AREA, NORTH EAST ONTARIO

for

CANREOS MINIERALS (1980) LTD.

by

AERODAT LIMITED

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LIST OF MAPS

(Scale 1:10,000)

MAPS: (As described under Appendix "B", Section I)

1. PHOTOMOSAIC BASE MAP;
prepared from an uncontrolled photo laydown, showing registration crosses corresponding to the 1000 metre Universal Transverse Mercator (UTM) co-ordinates shown on topographic maps.

2. FLIGHT LINE MAP;
showing all flight lines, fiducials and time markers, photocombined with the 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 4.6 kHz coaxial coil system.

4. TOTAL FIELD MAGNETIC CONTOURS;
showing magnetic values contoured at 5 nanoTesla intervals, flight lines, fiducials and anomaly peaks.

5. VERTICAL MAGNETIC GRADIENT CONTOURS;
showing magnetic gradient values contoured in nanoTeslas per metre.

6. APPARENT RESISTIVITY CONTOURS;
showing contoured resistivity values, flight lines, fiducials and anomaly peaks.

7. VLF-EM TOTAL FIELD CONTOURS;
showing relative contours of the VLF Total Field response, flight lines, fiducials and anomaly peaks.

1. INTRODUCTION

This report describes an airborne geophysical survey carried out on behalf of Canreos Minerals (1980) Ltd. by Aerodat Limited. Equipment operated included a three frequency electromagnetic system, a high sensitivity cesium vapour magnetometer, a two frequency VLF-EM system, a video tracking camera, an altimeter and an electronic positioning system. Electromagnetic, magnetic and altimeter data were recorded both in digital and analog form. Positioning data were stored in digital form, encoded on the VHS format video tape and recorded at regular intervals in UTM (or equivalent) co-ordinates on the analog trace, as well as being marked on the flight path mosaic by the operator while in flight.

The survey area, comprising a block of ground in the Larder Lake Mining Division (Kirkland Lake District) of north eastern Ontario and situated about 16 kilometres north of Kirkland Lake, was flown on November 21st and 22nd, 1987. Four flights were required to complete the survey with flight lines oriented at Azimuths of 030-210 degrees and flown at a nominal spacing of 100 metres. A portion of the survey that included the now abandoned Melba Mine property was flown with a 50 metre spacing. Coverage and data quality were considered to be well within the specifications described in the contract.

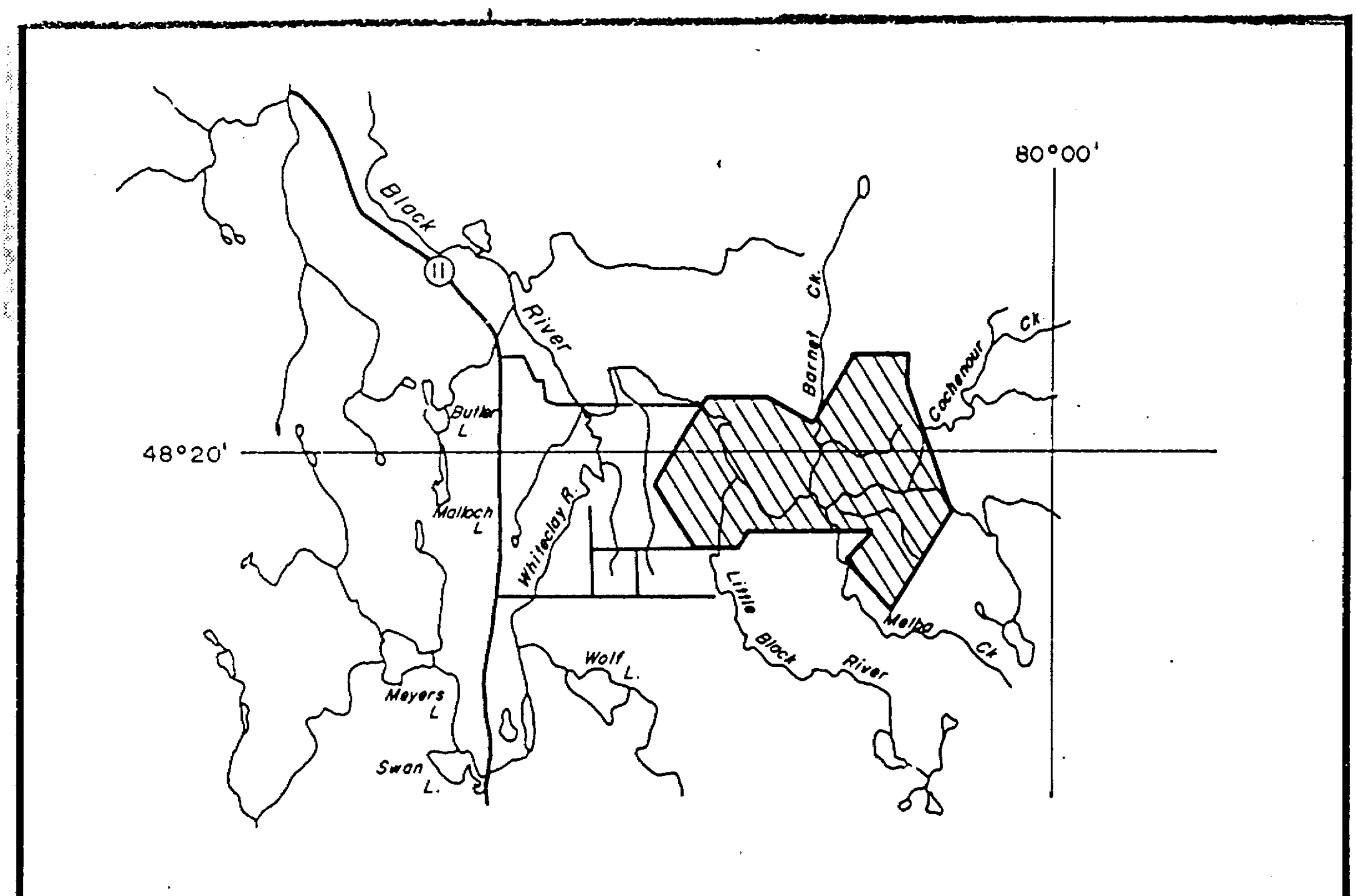
The purpose of the survey was to record airborne geophysical data over a group of approximately 208 claims that is of interest to Canreos Minerals (1980) Ltd.

A total of 525 line kilometres of the recorded data were compiled in map form and are presented as part of this report according to specifications outlined by Canreos Minerals (1980) Ltd.

2. SURVEY AREA LOCATION

The survey area is depicted on the index map shown .It is centred at Latitude 48 degrees 19 minutes north, Longitude 80 degrees 07 minutes west, in the north west portion of Melba Township and the north east corner of Benoit Township, approximately 16 kilometres north of the town of Kirkland Lake in north eastern Ontario (NTS Reference Map No. 42 A/8).

The claim block may be accessed by trails off Highway #11, about seven kilometres to the west of the property. The Ontario Northland Railway passes about five kilometres to the west of the claims. The ground is relatively flat with a few small streams through the area of the survey.



3. AIRCRAFT AND EQUIPMENT

3.1 Aircraft

An Aerospatiale A-Star 350D helicopter, (C-GJIX), owned and operated by Lakeland 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 three frequency system. Two vertical coaxial coil pairs were operated at 935 Hz and 4.6 kHz and a horizontal coplanar coil pair at 4.2 kHz. The transmitter-receiver separation was 7 metres. Inphase and quadrature signals were measured simultaneously for the three 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 12 metres below the helicopter. The transmitters monitored were NAA, Cutler, Maine for the 'Line' station and NLK, Jim Creek, Washington for the 'Ortho' station, broadcasting at 24.0 and 24.8 kHz respectively.

3.2.3 Magnetometer

The magnetometer employed a 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 12 metres below the helicopter.

3.2.4 Magnetic Base Station

An IFG proton precession magnetometer was operated at the base of operations to record diurnal variations of the earth's magnetic field. The clock of the base station was synchronized with that of the airborne system to facilitate later correlation.

3.2.5 Radar Altimeter

A Hoffman HRA-100 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

A Panasonic video flight path recording system was used to record the flight path on standard VHS format video tapes. The system was operated in continuous mode and the flight number, real time and manual fiducial numbers were registered on the picture frame for cross-reference to the analog and digital data.

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
RALT	Altimeter (150 m at top of chart)	3 m/mm
CXI1	935 Hz Coaxial Inphase	2 ppm/mm
CXQ1	935 Hz Coaxial Quadrature	2 ppm/mm
CXI2	4.6 kHz Coaxial Inphase	2 ppm/mm
CXQ2	4.6 kHz Coaxial Quadrature	2 ppm/mm
CPI1	4.2 kHz Coplanar Inphase	8 ppm/mm
CPQ1	4.2 kHz Coplanar Quadrature	8 ppm/mm
VLT	VLF-EM Total Field, Line	2.5 %/mm
VLQ	VLF-EM Quadrature, Line	2.5 %/mm

Channel	Input	Scale
VOT	VLF-EM Total Field, Ortho	2.5 %/mm
VOQ	VLF-EM Quadrature, Ortho	2.5 %/mm
MAGF	Magnetometer, fine	2.5 nT/mm
MAGC	Magnetometer, coarse	25 nT/mm
PWRL	Power line monitor	n/a

3.2.8 Digital Recorder

A DGR 33 recorder in conjunction with a DAC/NAV 2 data system recorded the survey on magnetic tape. Information recorded was as follows:

Equipment	Recording Interval
EM system	0.1 seconds
Magnetometer	0.2 seconds
VLF-EM	0.5 seconds
Altimeter	0.5 seconds
NAV System	1.0 seconds

3.2.9 Radar Positioning System

A Motorola Mini-Ranger (MRS III) radar navigation system was used for both navigation and flight path recovery. Transponders sited at fixed locations were interrogated several times per second and the ranges from these points to the helicopter measured to a high degree of accuracy. A navigational computer triangulates the position of the helicopter and provides the pilot with navigation information. The range/range data were recorded on magnetic tape for subsequent flight path determination.

4. DATA PRESENTATION

4.1 Base Map and Flight Path

A photomosaic base at a scale of 1:10,000 was prepared by enlargement of aerial photographs of the survey area. The base map was registered to the Universal Transverse Mercator (UTM) 1000 metre grid taken from a suitable topographic map.

4.2 Flight Path Map

The flight path was derived from the Mini-Ranger radar positioning system. The distance from the helicopter to two established reference locations was measured several times per second and the position of the helicopter calculated by triangulation. It is estimated that the flight path is generally accurate to about 10 metres with respect to the topographic detail of the base map. The flight path, with a real time scale and navigator's manual fiducials for cross reference to both the analog and digital data, has been photocombined with the base map and is presented on a stable base film.

4.3 Airborne Electromagnetic Survey Interpretation Map

The electromagnetic data were recorded digitally at a sample rate of 10/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 then presented in profile map form.

An interpretation map was prepared showing flight lines, fiducials, peak locations of anomalies and conductivity thickness range along with the Inphase amplitudes. These values were computed from the 4.6 kHz coaxial response. The data have been photocombined with the photomosaic base and flight path and are presented on a suitable stable base film.

4.4 Total Field Magnetic Contours

The aeromagnetic data were corrected for diurnal variations by adjustment with the digitally recorded base station magnetic values. No correction for regional variation was applied. The corrected profile data were interpolated onto a regular grid at a 25 metre true scale interval using a cubic spline technique. The grid provided the basis for threading the presented contours at a 5 nanoTesla interval.

The aeromagnetic data have been presented with flight path and electromagnetic anomaly information on a suitable stable base film photocombined with the photomosaic base.

4.5 Vertical Magnetic Gradient Contours

The vertical magnetic gradient was calculated from the gridded total field magnetic data. Contoured at a 0.5 nT/m interval, the gradient data were presented on a suitable stable base film photocombined with the photomosaic base together with flight path.

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 a 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 coaxial frequency pair.

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 suitable stable base film photocombined with the photomosaic base together with the flight path and electromagnetic anomaly information.

4.8 VLF-EM Total Field

The VLF-EM signals from NAA, Cutler, Maine for the 'Line' station and NLK, Jim Creek, Washington for the 'Ortho' station, broadcasting at 24.0 and 24.8 kHz respectively, were compiled in map form, along with flight lines and EM anomaly information and presented on a suitable stable base film photocombined with the photomosaic base.

5. INTERPRETATION

5.1 Geology

The 1:253,440 Geologic Compilation Series Map No. 2205 (Timmins - Kirkland Lake Sheet) shows the survey area to be underlain largely by an assemblage of mafic to intermediate flows and pyroclastic rocks. A narrow, curved band, somewhat 'S' shaped, of felsic metavolcanics, cuts across the east central portion of the survey with mafic flows across the north eastern arm. A small area of metasediments (greywackes, argillites) is shown to occur in the north central portion of the claim group and a gold, copper, zinc occurrence (the former 'Melba' deposit?) was mapped within these sediments. Several small mafic plugs (gabbros?) occur inside and around the perimeter of the survey and a large basic intrusive mass lies just off the south east corner of the block.

The compilation map shows a north-south fault in the vicinity of Barnet Creek and toward the eastern boundary of the area. North westerly faults, occurring at roughly one kilometre intervals, cut diagonally across the survey area. A system of 'ladder' faults, between the north west faults, is indicated over and beyond the eastern quarter of the survey.

No geologic data were supplied to Aerodat by Canreos Minerals (1980) Ltd. and no other published data was made available to the writer. Also, types of targets sought have not been discussed or identified by Canreos although it is generally assumed that the primary interest is in finding gold mineralization in deposits similar to those of the Kirkland Lake gold camp.

5.2 Magnetics

The magnetic data from the high sensitivity cesium magnetometer provided virtually a continuous magnetic reading when recording at two-tenth second intervals. The system is also noise free for all practical purposes.

The sensitivity of 0.1 nT allows for the mapping of very small inflections in the magnetic field, resulting in a contour map that is comparable in quality to ground data. The analog record shows both fine and coarse magnetic traces.

Two narrow magnetic trends extend across the north east arm of the area along the northern boundary. A system of narrow north-south trends cross the area at frequent intervals. These trends are quite continuous toward the west but become more segmented and gradually swing to a north northeasterly direction over the eastern two thirds of the block. One north westerly trend is of the same order of amplitude as the north-south trends but is definitely not related to them. At least two small, plug-like anomalies, no more than 300 metres in diameter, occur in the north central and south eastern portions of the survey. Somewhat larger but similar anomalies occur in the north eastern corner and along the eastern boundary. Whereas the smaller anomalies are considered to be mafic plugs, the latter may be either diabase or iron formation. In particular, the north eastern anomaly may be part of the mafic stratigraphy just along the northern boundary.

The north-south trends are all thought to be diabase dikes with the more segmented, north northeasterly trends probably representative of older diabase. The north westerly trend may possibly be a diabase but could also be related to the felsic stratigraphy shown on the geologic compilation map. A number of east-west to east northeasterly faults have been inferred throughout the survey with two west northwesterly faults in the eastern third of the area. Considerable displacement is evident in some of the north-south dikes across several of these faults and many of the smaller dikes are terminated by the east-west faults. Note that the small mafic plug centred on Line 370 lies just to the north of the Melba Mine (at least as closely as can be determined from the available information). There is little evidence for the north-south faults shown on the geologic compilation map except in the form of the diabase trends.

Maximum magnetic relief within the survey area is of the order of 600+ nanoTeslas (nT) against an average background level that varies from 58,300 nT in the south to about 58,450 nT in the north. The mafic plugs may be as much as 400 nT above background whereas anomalous values over the diabase trends seldom exceed 120 nT.

5.3 Electromagnetics

The electromagnetic data was first checked by a line-by-line examination of the analog records. Record quality was good to very good with only minor noise levels, primarily on the 935 Hz coaxial trace. This was readily removed from the traces by an appropriate smoothing filter. Geologic noise, in the form of surficial conductors, is present on the higher frequency responses and to a minor extent, on the low frequency quadrature response.

Anomalies were picked off the analog traces of the low and high frequency coaxial responses and then validated on the coplanar profile data. The picked anomalies were then edited and re-plotted on a copy of the 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 bases of magnetic (and lithologic, where applicable) correlations apparent on the analog data and man made or surficial features not obvious on the analog charts.

RESULTS: No bedrock conductors that could be considered as characteristic of massive sulphide or graphite mineralization, were detected within the survey area. All the anomalous responses that have been marked on the Interpretation map may be regarded as possible bedrock conductors. Such conductors would normally be caused by faulting or shearing or by abrupt changes in overburden thickness. The latter are a reflection of bedrock topography possibly resulting from faulting or fracturing in the bedrock. The conductor in the north west corner of the survey appears to be from a power line along a section of a local road or concession line.

None of the selected possible conductors show any perceptible 935 Hz inphase response and are therefore classed as low conductance anomalies. However, most show a coplanar dip coincident with a coaxial peak or high. This is usually taken as an edge effect from a flat, conductive plate but may also be from poor bedrock conductors such as shears. Therefore, these conductive trends, insofar as they outline bedrock lows (i.e., thicker overburden), may be a reflection of structure (shearing and/or faulting) or stratigraphy wherein different lithologies are subject to varying degrees of weathering. Bedrock response on the 935 Hz channel is evident over some of the stronger magnetic anomalies as negative inphase EM anomalies. This is due to inversion caused by rocks of high magnetic permeability and low remnant magnetization.

Three anomalies have been highlighted on the Interpretation map (i.e., I, Ia, II and III) as conductive zones or short, conductive responses that come closest to being rated as bedrock conductors. This selection is based on good 4.6 kHz coaxial responses from both the inphase and quadrature channels and a distinct 935 Hz quadrature peak coincident with fairly clear 4.2 kHz coplanar dips. Some significance may be attached to the occurrence of Zones I and Ia off the ends of the 'mafic' plug centred on Line 370 and the proximity to the Melba Mine. These may be indicative of alteration or shear zones around the intrusive.

There does not appear to be any correlation of the conductive trends with any of the magnetic trends, be they from the diabase dikes or the inferred structures.

5.4 Apparent Resistivity

This map may be considered as an overburden conductance map (i.e., actually, conductivity X thickness distribution). Given a fairly uniform overburden resistivity, this could then be taken as an indication of overburden thickness. Except for the sharp resistivity lows, it does not reflect the conductivity trends shown on the Interpretation map, a result of the averaging or filtering process inherent in the apparent resistivity computation.

5.5 VLF-EM Total Field

Numerous east-west trends are interspersed with north westerly to west northwesterly trends. Whether the former are indicative of lithology and the latter reperesentative of structure, is debatable but the general observation appears to apply. Note that the areas of higher VLF activity corresopond to those areas - as indicated from the Apparent Resistivity map - that show considerable contrast in surficial resistivity with a large proportion of high resistivities. This indicates, to the writer, thin overburden with a number of bedrock troughs, either along lithologic or structural trends.

An east-west positive (i.e., conductive) trend passes through the vicinity of the Melba Mine.

5.6 Conclusions

Although no sulphide/graphite type conductors were located by this survey, several weak, possible bedrock anomalies were recorded. These may be simply a reflection of changes in bedrock topography and overburden thickness but at least one or two are considered to be due to faulting and/or shearing in the bedrock. The magnetic data highlight a few details not evident on the geologic map and numerous new faults have been inferred from the magnetics.

The (abandoned) Melba Mine appears to occur just to the south of a small mafic plug (gabbro?) in an area of a weak, possible bedrock conductor. Two or three other zones have been singled out as possible exploration targets. The narrow trends along the north boundary of the survey correspond to the contact area between intermediate flows to the south and mafic flows and pyroclastics to the north. This area should be considered as a possible area for detailed exploration.

5.7 Recommendations

A correlation of the magnetic data and any available detailed geology is recommended. The vertical gradient magnetics should serve as a guide in producing a pseudolithologic map of the area. The writer has taken the liberty of suggesting to

Aerodat that the magnetic map be presented with a 2 nT contour interval in the expectation that more structural detail may be developed from the data. The rectangular area outlined on the interpretation map should also be presented at a 1:5,000 scale if warranted for the compilation map.

The client might also consider an overburden thickness map to assist in laying out sampling sites for an overburden drilling program if this approach is to be used over this claim group.

On the bases of the results of this airborne survey, no specific geophysical follow-up work can be recommended over the area. The outlining of the 'possible' bedrock conductors may be attempted with ground VLF but there is no guarantee that this method will produce the desired results. However, should drilling encounter any gold bearing mineralization, follow-up with the Induced Polarization method is suggested.

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APPENDIX I

GENERAL INTERPRETIVE CONSIDERATIONS

Electromagnetic

The Aerodat three frequency system utilizes two different transmitter-receiver coil geometries. The traditional coaxial coil configuration is operated at two widely separated frequencies and the horizontal coplanar coil pair is operated at a frequency 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 II 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 ratio of 4*.

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

* 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 relative disadvantage of the method lies in its sensitivity to conductive overburden. In conductive ground the depth of exploration is severely limited.

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

The total field 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 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 measureable 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 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 II

ANOMALY LIST

J8782 MELBA TOWNSHIP, ONTARIO

FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM) INPHASE	AMPLITUDE (PPM) QUAD.	CONDUCTOR CTP MHOS	CONDUCTOR DEPTH MTRS	BIRD HEIGHT MTRS
1	90	A	0	13.4	71.7	0.1	0	44
1	90	B	0	13.5	65.0	0.1	0	37
1	170	A	0	24.3	98.6	0.2	0	39
1	180	A	0	14.0	52.9	0.1	0	44
1	200	A	0	25.7	67.6	0.4	0	47
1	200	B	0	19.3	60.8	0.2	0	47
1	210	A	0	23.3	77.6	0.2	0	44
1	230	A	0	19.4	72.4	0.2	0	45
2	260	A	0	47.4	123.8	0.5	0	49
2	270	A	0	60.2	177.8	0.5	0	40
2	280	A	0	37.4	143.0	0.2	0	47
2	280	B	0	42.0	155.8	0.3	0	45
2	280	C	0	55.6	181.6	0.4	0	41
2	280	D	0	45.7	139.2	0.4	0	44
2	290	A	0	43.2	157.7	0.3	0	42
2	300	A	0	42.0	135.2	0.3	0	45
2	310	A	0	39.0	136.7	0.3	0	41
2	320	A	0	14.5	77.4	0.1	0	46
2	320	B	0	28.8	95.2	0.3	0	49
2	330	A	0	26.3	85.5	0.3	0	43
2	330	B	0	24.6	69.2	0.3	0	48
2	340	A	0	28.3	71.8	0.4	0	42
2	350	A	0	29.9	83.0	0.4	0	41
2	350	B	0	25.4	86.9	0.2	0	45
2	360	A	0	20.3	66.4	0.2	0	45
2	360	B	0	51.1	108.0	0.7	0	48
2	370	A	0	26.7	78.0	0.3	0	47

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.

J8782 MELBA TOWNSHIP, ONTARIO

FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM) INPHASE	QUAD.	CONDUCTOR CTP MHOS	DEPTH MTRS	BIRD HEIGHT MTRS
2	370	B	0	17.8	58.3	0.2	0	48
2	370	C	0	54.7	133.2	0.6	0	40
2	380	A	0	17.0	51.3	0.2	0	52
2	380	B	0	26.9	73.8	0.3	0	47
2	390	A	0	36.6	133.4	0.3	0	33
2	390	B	0	21.8	88.0	0.2	0	40
2	390	C	0	50.6	92.0	0.8	0	49
2	390	D	0	52.6	113.4	0.7	0	45
2	400	A	0	5.2	46.0	0.0	0	41
2	400	B	0	38.6	90.8	0.5	0	50
2	400	C	0	45.6	103.5	0.6	0	46
2	410	A	0	41.9	116.0	0.4	0	41
2	410	B	0	7.0	74.4	0.0	0	42
2	420	A	0	25.4	118.9	0.1	0	48
2	420	B	0	7.3	107.5	0.0	0	42
2	430	A	0	9.0	154.6	0.0	0	34
2	430	B	0	33.1	151.9	0.2	0	49
2	440	A	0	26.6	99.8	0.2	0	48
2	440	B	0	34.9	112.3	0.3	0	53
2	440	C	0	17.7	71.1	0.1	0	40
2	460	A	0	23.1	61.3	0.3	0	49
2	470	A	0	16.8	71.1	0.1	0	40
2	480	A	0	16.6	52.9	0.2	0	50
2	480	B	0	20.4	67.1	0.2	0	44
2	480	C	0	12.9	53.0	0.1	0	43
2	490	A	0	15.4	93.2	0.1	0	37
2	500	A	0	19.3	107.5	0.1	0	40
2	500	B	0	19.3	88.2	0.1	0	47
2	510	A	0	19.9	67.5	0.2	0	44
2	520	A	0	26.5	77.9	0.3	0	45
2	520	B	0	21.3	53.2	0.4	0	52

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.

J8782 MELBA TOWNSHIP, ONTARIO

FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM) INPHASE	AMPLITUDE (PPM) QUAD.	CONDUCTOR CTP MHOS	CONDUCTOR DEPTH MTRS	BIRD HEIGHT MTRS
2	520	C	0	8.5	34.5	0.1	0	48
2	520	D	0	26.1	79.7	0.3	0	49
2	530	A	0	22.0	67.7	0.3	0	50
2	540	A	0	44.3	98.7	0.6	0	46
2	550	A	0	50.4	114.5	0.6	0	45
2	570	A	0	20.2	92.1	0.1	0	37
2	570	B	0	5.4	56.7	0.0	0	43
2	580	A	0	12.4	45.2	0.1	0	48
3	590	A	0	11.6	34.2	0.2	0	54
3	590	B	0	18.9	46.7	0.3	0	42
3	600	A	0	12.3	37.8	0.2	0	46
3	600	B	0	23.2	44.0	0.6	0	48
3	610	A	0	53.8	89.7	0.9	0	50
3	610	B	0	12.1	47.0	0.1	0	46
3	620	A	0	26.6	52.3	0.6	0	52
3	620	B	0	11.9	48.7	0.1	0	44
3	620	C	0	10.5	47.5	0.1	0	44
3	630	A	0	9.8	41.1	0.1	0	49
3	630	B	0	12.5	53.2	0.1	0	43
3	630	C	0	22.6	38.5	0.6	0	57
3	640	A	0	4.5	17.5	0.1	0	46
3	640	B	0	27.1	60.6	0.5	0	49
3	650	A	0	6.2	17.4	0.1	0	41
3	650	B	0	18.4	51.0	0.3	0	34
3	650	C	0	19.6	59.3	0.3	0	42
3	660	A	0	3.3	21.9	0.0	0	47
3	660	B	0	10.6	30.3	0.2	0	51
3	670	A	0	16.5	64.3	0.2	0	38
3	670	B	0	7.1	20.8	0.1	0	44
3	680	A	0	6.7	16.1	0.2	0	50

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.

J8782 MELBA TOWNSHIP, ONTARIO

FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM) INPHASE	QUAD.	CONDUCTOR CTP MHOS	DEPTH MTRS	BIRD HEIGHT MTRS
3	690	A	0	23.5	56.4	0.4	0	53
3	690	B	0	22.0	38.5	0.6	0	50
3	690	C	0	44.9	77.7	0.8	0	53
3	700	A	0	20.4	55.5	0.3	0	46
3	700	B	0	17.0	49.6	0.2	0	47
3	700	C	0	26.2	58.1	0.5	0	37
3	710	A	0	17.9	58.8	0.2	0	48
3	710	B	0	12.2	49.4	0.1	0	39
3	710	C	0	13.2	40.6	0.2	0	32
3	730	A	0	16.4	37.4	0.4	0	46
3	730	B	0	16.6	41.7	0.3	0	45
3	740	A	0	7.0	21.0	0.1	0	49
3	740	B	0	13.6	24.4	0.5	0	69
3	750	A	0	18.8	49.7	0.3	0	46
3	750	B	0	10.2	42.5	0.1	0	35
3	760	A	0	1.7	23.7	0.0	0	49
3	760	B	0	11.7	45.2	0.1	0	46
3	760	C	0	9.2	40.2	0.1	0	39
3	770	A	0	10.3	35.6	0.1	0	48
3	780	A	0	3.8	13.0	0.1	0	54
3	780	B	0	11.2	31.5	0.2	0	43
3	790	A	0	8.7	29.4	0.1	0	39
3	790	B	0	7.2	26.6	0.1	0	49
3	800	A	0	25.2	68.0	0.3	0	40
3	800	B	0	12.6	28.3	0.3	0	54
3	810	A	0	16.0	76.5	0.1	0	45
3	810	B	0	15.6	92.1	0.1	0	44
3	810	C	0	14.6	80.4	0.1	0	42
3	810	D	0	10.8	70.6	0.0	0	39
3	820	A	0	8.9	41.6	0.1	0	45
3	820	B	0	17.8	95.1	0.1	0	40
3	820	C	0	21.3	89.8	0.2	0	44

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.

J8782 MELBA TOWNSHIP, ONTARIO

FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM) INPHASE	QUAD.	CONDUCTOR CTP MHOS	DEPTH MTRS	BIRD HEIGHT MTRS
3	820	D	0	21.6	66.1	0.3	0	52
3	820	E	0	10.8	31.6	0.2	0	61
3	820	F	0	12.3	40.3	0.2	0	54
3	830	A	0	40.2	100.4	0.5	0	46
3	830	B	0	14.2	39.8	0.2	0	45
3	830	C	0	12.2	72.3	0.0	0	45
3	830	D	0	14.7	42.7	0.2	0	46
3	830	E	0	9.5	39.1	0.1	0	44
3	840	A	0	24.9	66.9	0.3	0	48
3	840	B	0	11.0	36.2	0.2	0	48
3	840	C	0	7.6	41.1	0.0	0	47
3	840	D	0	13.4	60.0	0.1	0	52
3	840	E	0	1.0	19.0	0.0	0	56
3	840	F	0	3.9	44.9	0.0	0	48
3	840	G	0	10.8	37.4	0.1	0	50
3	850	A	0	13.5	50.4	0.1	0	47
3	850	B	0	10.5	57.7	0.1	0	47
3	850	C	0	14.9	50.4	0.2	0	46
3	860	A	0	19.1	49.9	0.3	0	50
3	860	B	0	16.3	53.0	0.2	0	51
3	860	C	0	7.5	28.2	0.1	0	52
3	860	D	0	12.0	57.4	0.1	0	42
3	860	E	0	12.7	57.5	0.1	0	43
3	860	F	0	15.5	78.6	0.1	0	44
3	870	A	0	11.6	39.1	0.2	0	49
3	880	A	0	20.7	68.1	0.2	0	44
3	880	B	0	17.7	58.9	0.2	0	51
3	880	C	0	2.0	21.1	0.0	0	52
3	880	D	0	33.3	73.9	0.5	0	49
3	890	A	0	1.7	9.9	0.0	0	45
3	890	B	0	8.9	44.8	0.1	0	49
3	900	A	0	2.8	20.9	0.0	0	51
3	900	B	0	17.4	53.8	0.2	0	48
3	900	C	0	9.7	44.1	0.1	0	46
3	900	D	0	9.4	44.7	0.1	0	45
3	900	E	0	5.5	31.9	0.0	0	51
3	910	A	0	13.4	55.8	0.1	0	49

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.

J8782 MELBA TOWNSHIP, ONTARIO

FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM) INPHASE	AMPLITUDE (PPM) QUAD.	CONDUCTOR CTP MHOS	CONDUCTOR DEPTH MTRS	BIRD HEIGHT MTRS
3	910	B	0	6.3	49.6	0.0	0	39
3	920	A	0	0.7	12.9	0.0	0	43
3	920	B	0	10.2	52.2	0.1	0	43
3	920	C	0	14.6	62.3	0.1	0	42
3	920	D	0	6.1	36.3	0.0	0	48
3	920	E	0	3.7	26.2	0.0	0	46
3	920	F	0	6.9	29.3	0.1	0	57
4	930	A	0	16.9	58.3	0.2	0	54
4	930	B	0	6.4	20.7	0.1	0	55
4	930	C	0	4.3	22.7	0.0	0	53
4	940	A	0	9.0	37.4	0.1	0	52
4	940	B	0	2.8	23.8	0.0	0	54
4	940	C	0	2.5	21.5	0.0	0	50
4	940	D	0	3.3	30.5	0.0	0	50
4	940	E	0	6.4	36.4	0.0	0	50
4	940	F	0	8.4	36.2	0.1	0	48
4	950	A	0	5.6	22.0	0.1	0	48
4	950	B	0	6.9	33.6	0.0	0	46
4	960	A	0	6.6	20.0	0.1	0	46
4	960	B	0	17.6	59.4	0.2	0	48
4	970	A	0	19.4	60.2	0.2	0	51
4	970	B	0	8.5	19.3	0.3	0	54
4	980	A	0	17.3	65.0	0.2	0	45
4	980	B	0	7.1	27.9	0.1	0	38
4	990	A	0	9.4	31.3	0.1	0	49
4	990	B	0	4.4	14.6	0.1	0	39
4	990	C	0	7.7	30.3	0.1	0	46
4	1020	A	0	9.5	37.3	0.1	0	51
4	1020	B	0	7.2	21.6	0.1	0	63
4	1020	C	0	7.7	27.7	0.1	0	62
4	1030	A	0	9.4	24.9	0.2	0	67
4	1030	B	0	6.6	23.4	0.1	0	63
4	1040	A	0	10.4	28.1	0.2	0	67

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

APPENDIX III

CERTIFICATE OF QUALIFICATIONS

I, GEORGE PODOLSKY, certify that:

1. I am registered as a Professional Engineer in the Province of Ontario and work as a Professional Geophysicist.

2. I reside at 172 Dunwoody Drive in the town of Oakville, Halton County, Ontario.

3. I hold a B. Sc. in Engineering Physics from Queen's University, having graduated in 1954.

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

5. I have been an active member of the Society of Exploration Geophysicists since 1960 and hold memberships on other professional societies involved in the minerals extraction and exploration industry.

6. The accompanying report was prepared from material supplied by Canreos Minerals (1980) Ltd. and from a review of the proprietary airborne geophysical survey flown by Aerodat Ltd. for Canreos Minerals (1980) Ltd. I have not visited the property.

7. I have no interest in the property described nor in the immediate area of the claims.

REGISTERED PROFESSIONAL ENGINEER
G. PODOLSKY
PROVINCE OF ONTARIO

Signed,

Oakville, Ontario
January 4, 1988

G. Podolsky P. Eng.
GEOPOD ASSOCIATES INC.

APPENDIX IV

PERSONNEL

FIELD

Flown November, 1987

Pilot - Roger Morrow

Operator - Bert Simon

OFFICE

Processing - Keith Fisk

Report - George Podolsky

Ministry of Northern Development and Mines

Ontario

Report of Work

(Geophysical, Geological, Geochemical and Expenditures)

Mining Act

42A08SE0020 2.10775 MELBA

900

W8808-004 2.10775

— Do not use shaded areas —

Type of Survey(s): AIRBORNE MAGNETICS AND EM/VLF

Township or Area: MELBA TOWNSHIP & BENOIT

Claim Holder(s): NORDEX EXPLOSIVES LTD.

Prospector's Licence No.: T-4977

Address: P.O. BOX 790, KIRKLAND LAKE, ONTARIO P2N 3K4

Survey Company: AERODAT 3883 NASHUA DRIVE, MISSISSAUGA, ONT. L4V 1R3

Date of Survey (from & to): 18 (Day) 11 (Mo.) 87 (Yr.) | 22 (Day) 11 (Mo.) 87 (Yr.)

Total Miles of line ~~Cut~~ Flown: 500 KM.

Name and Address of Author (of Geo-Technical report): GEORGE PODOLSKY, AERODAT 3883 NASHUA DRIVE, MISSISSAUGA, ONT. L4V 1R3

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:	- Radiometric	
Enter 20 days (for each)	- Other	
	Geological	
	Geochemical	

RECEIVED JAN 18 1988 MINING LANDS SECTION

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

LARDER LAKE MINING DIV. RECEIVED JAN 05 1988 AM 1:30 PM 7|8|9|10|11|12|1|2|3|4|5|6

Airborne Credits		Days per Claim
Note: Special provisions credits do not apply to Airborne Surveys.	Electromagnetic	40
	Magnetometer	40
	Radiometric	

Expenditures (excludes power stripping)

Type of Work Performed

Performed on Claim(s)

ONTARIO GEOLOGICAL SURVEY ASSESSMENT FILES RESEARCH OFFICE FEB 8 1988 RECEIVED

Calculation of Expenditure Days Credits

Total Expenditures				Total Days Credits
$	÷	15	=	

Instructions

Total Days Credits may be apportioned at the claim holder's choice. Enter number of days credits per claim selected in columns at right.

Mining Claims Traversed (List in numerical sequence)

Prefix	Number	Expend. Days Cr.	Prefix	Number	Expend. Days Cr.
L	642943		L	998284	
	643399			998285	
	667459			998286	
	667460			998287	
	714721			998288	
	891918			998289	
	891919			998290	
	891920			998291	
	891921			998292	
	998270			998293	
	998271			998294	
	998272			998295	
	998273			998296	
	998274			998297	
	998275			998298	
	998276			998299	
	998277			998300	
	998278			998301	
	998279			998302	
	998280			998303	
	998281			998304	
	998282			998305	
	998283			998306	

Total number of mining claims covered by this report of work: 172

For Office Use Only		
Total Days Cr. Recorded: 13,760	Date Recorded: JAN 5, 1988	Mining Recorder: [signature]
	Date Approved as Recorded: 24 Feb 88	Branch Director: [signature]

Date	Recorded Holder or Agent (Signature)
Dec 30/87	[signature]

Certification Verifying Report of Work

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

Name and Postal Address of Person Certifying: ALEXANDER Y. PO, 27 SWORDBILL DR. ISLINGTON, ONT. M9A 4V3

Date Certified: Dec. 30/87

Certified by (Signature): [signature]

1362 (85/12)

PAGE 2

Ministry of Northern Development and Mines
Ontario

Report of Work
(Geophysical, Geological, Geochemical and Expenditures)

Mining Act

Instructions: – Please type or print.
– If number of mining claims traversed exceeds space on this form, attach a list.
Note: – Only days credits calculated in the "Expenditures" section may be entered in the "Expend. Days Cr." columns.
– Do not use shaded areas below.

Type of Survey(s): AIRBORNE MAGNETICS AND EM/VLF	Township or Area: MELBA TWP
Claim Holder(s): NORDEX EXPLOSIVES LTD	Prospector's Licence No.: T-4977
Address: P.O. BOX 790 KIRKLAND LAKE, ONTARIO P2N 3K4	
Survey Company: AERODAT 3883 NASHUA DRIVE, MISSISSAUGA, ONT. L4V 1R3	Date of Survey (from & to): 18 Day 11 Mo. '87 Yr. – 22 Day 11 Mo. '87 Yr. ; Total Miles of line ~~Cut~~ FLOWN: 500 KM.
Name and Address of Author (of Geo-Technical report): GEORGE PODOLSKY, AERODAT 3883 NASHUA DRIVE, MISSISSAUGA, ONT. L4V 1R3	

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)	- Radiometric	
	- Other	
	Geological	
	Geochemical	

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

Airborne Credits		Days per Claim
Note: Special provisions credits do not apply to Airborne Surveys.	Electromagnetic	40
	Magnetometer	40
	Radiometric	

Expenditures (excludes power stripping)

Type of Work Performed:

Performed on Claim(s):

Calculation of Expenditure Days Credits

Total Expenditures $ ÷ 15 = Total Days Credits

Instructions
Total Days Credits may be apportioned at the claim holder's choice. Enter number of days credits per claim selected in columns at right.

Date	Recorded Holder or Agent (Signature)
Dec. 30/87	[signature]

Mining Claims Traversed (List in numerical sequence)

Prefix	Number	Expend. Days Cr.	Prefix	Number	Expend. Days Cr.
L	998307		L	998330	
	998308			998331	
	998309			998332	
	998310			998333	
	998311			998334	
	998312			998395	
	998313			998396	
	998314			998397	
	998315			998398	
	998316			998399	
	998317			998400	
	998318			998401	
	998319			998402	
	998320			998403	
	998321			998404	
	998322			998405	
	998323			998406	
	998324			998407	
	998325			998408	
	998326			998409	
	998327			998410	
	998328			998411	
	998329			998412	

Total number of mining claims covered by this report of work.

For Office Use Only		
Total Days Cr. Recorded	Date Recorded	Mining Recorder
	Date Approved as Recorded	Branch Director

Certification Verifying Report of Work

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

Name and Postal Address of Person Certifying	Date Certified	Certified by (Signature)
ALEXANDER Y. PO, 27 SWORDBILL DR. ISLINGTON, ONT. M9A 4V3	DEC. 30/87	[signature]

PAGE 3

Ministry of Northern Development and Mines
Ontario

Report of Work
(Geophysical, Geological, Geochemical and Expenditures)

Mining Act

Instructions: – Please type or print.
– If number of mining claims traversed exceeds space on this form, attach a list.
Note: – Only days credits calculated in the "Expenditures" section may be entered in the "Expend. Days Cr." columns.
– Do not use shaded areas below.

Type of Survey(s): AIRBORNE MAGNETICS AND EM/VLF	Township or Area: MELBA TWP
Claim Holder(s): NORDEK EXPLOSIVES LTD.	Prospector's Licence No.: T-4977
Address: P.O. BOX 790, KIRKLAND LAKE, ONTARIO P2N 3K4	
Survey Company: AERODAT, 3883 NASHUA DRIVE, MISSISSAUGA, ONT. L4V 1R3	Date of Survey (from & to): 18 (Day) 11 (Mo.) '87 (Yr.) – 22 (Day) 11 (Mo.) '87 (Yr.); Total Miles of line ~~Cut~~ Flown: 500 KM.
Name and Address of Author (of Geo-Technical report): GEORGE PODOLSKY, AERODAT 3883 NASHUA DRIVE, MISSISSAUGA, ONT L4V 1R3	

Credits Requested per Each Claim in Columns at right

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

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

Airborne Credits		Days per Claim
Note: Special provisions credits do not apply to Airborne Surveys.	Electromagnetic	40
	Magnetometer	40
	Radiometric	

Expenditures (excludes power stripping)

Type of Work Performed:

Performed on Claim(s):

Calculation of Expenditure Days Credits

Total Expenditures $ ______ ÷ 15 = Total Days Credits ______

Instructions
Total Days Credits may be apportioned at the claim holder's choice. Enter number of days credits per claim selected in columns at right.

Mining Claims Traversed (List in numerical sequence)

Prefix	Number	Expend. Days Cr.	Prefix	Number	Expend. Days Cr.
L	998413		L	1014161	
	998414			1014162	
	998415			1014163	
	998416			1014164	
	998417			1014165	
	998418			1014166	
	998419			1014167	
	998420			1014168	
	998421			1014169	
	998422			1014170	
	998423			1014171	
	998424			1014172	
	998425			1014173	
	998426			1014174	
	998443			1014175	
	998444			1014176	
	998445			1014177	
	843229			1014178	
	843230			1014179	
	859776			1014180	
	859777			1014181	
	859778			1014182	
	859779			1014183	

Total number of mining claims covered by this report of work.

For Office Use Only		
Total Days Cr. Recorded	Date Recorded	Mining Recorder
	Date Approved as Recorded	Branch Director

Date	Recorded Holder or Agent (Signature)
Dec. 30/87	[signature]

Certification Verifying Report of Work

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Name and Postal Address of Person Certifying	Date Certified	Certified by (Signature)
ALEXANDER Y. PO, 27 SWORDBILL DR. ISLINGTON, ONT. M9A 4V3	DEC. 30/87	[signature]

PAGE 4

Ministry of Northern Development and Mines
Ontario

Report of Work

(Geophysical, Geological, Geochemical and Expenditures)

Mining Act

Instructions: – Please type or print.
– If number of mining claims traversed exceeds space on this form, attach a list.
Note: – Only days credits calculated in the "Expenditures" section may be entered in the "Expend. Days Cr." columns.
– Do not use shaded areas below.

Type of Survey(s): AIRBORNE MAGNETICS AND EM/VLF	Township or Area: MELBA TOWNSHIP
Claim Holder(s): NORDEX EXPLOSIVES LTD.	Prospector's Licence No.: T-4977
Address: P.O. BOX 790 KIRKLAND LAKE, ONTARIO P2N 3K4	
Survey Company: AERODAT 3883 NASHUA DRIVE, MISSISSAUGA, ONT. L4V 1R3	Date of Survey (from & to): 18 (Day) 11 (Mo.) '87 (Yr.) – 22 (Day) 11 (Mo.) '87 (Yr.)
Total Miles of line ~~Cut~~ Flown: 500 KM.	
Name and Address of Author (of Geo-Technical report): GEORGE PODOLSKY, AERODAT 3883 NASHUA DRIVE, MISSISSAUGA, ONT. L4V 1R3	

Credits Requested per Each Claim in Columns at right

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

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

Airborne Credits		Days per Claim
Note: Special provisions credits do not apply to Airborne Surveys.	Electromagnetic	40
	Magnetometer	40
	Radiometric	

Mining Claims Traversed (List in numerical sequence)

Mining Claim Prefix	Mining Claim Number	Expend. Days Cr.
L	1014184	
	1014185	
	1014186	
	1014187	
	1014188	
	1014189	

Total number of mining claims covered by this report of work.

Expenditures (excludes power stripping)

Type of Work Performed

Performed on Claim(s)

Calculation of Expenditure Days Credits

Total Expenditures $ ÷ 15 = Total Days Credits

Instructions
Total Days Credits may be apportioned at the claim holder's choice. Enter number of days credits per claim selected in columns at right.

For Office Use Only		
Total Days Cr. Recorded	Date Recorded	Mining Recorder
	Date Approved as Recorded	Branch Director

Date: DEC. 30/87

Recorded Holder or Agent (Signature): [signature]

Certification Verifying Report of Work

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

Name and Postal Address of Person Certifying: ALEXANDER Y. PO
27 SWORDBILL DR.
ISLINGTON, ONT. M9A 4V3

Date Certified: DEC. 30/87

Certified by (Signature): [signature]

PAGE 5

Ministry of Northern Development and Mines

Ontario

Report of Work

(Geophysical, Geological, Geochemical and Expenditures)

Mining Act

Instructions: – Please type or print.
– If number of mining claims traversed exceeds space on this form, attach a list.

Note: – Only days credits calculated in the "Expenditures" section may be entered in the "Expend. Days Cr." columns.
– Do not use shaded areas below.

Type of Survey(s): AIRBORNE MAGNETICS AND EM/VLF	Township or Area: BENOIT TOWNSHIP
Claim Holder(s): NORDEX EXPLOSIVES LTD.	Prospector's Licence No.: T-4977
Address: P.O. BOX 790, KIRKLAND LAKE, ONT. P2N 3K4	
Survey Company: AERODAT AIRBORNE GEOPHYSICAL SURVEY 3883 NASHUA DRIVE, MISSISSAUGA, ONT. L4V 1R3	Date of Survey (from & to): 18 (Day) 11 (Mo.) '87 (Yr.) – 22 (Day) 11 (Mo.) '87 (Yr.); Total Miles of line ~~Cut~~ FLOWN: 500 km.
Name and Address of Author (of Geo-Technical report): GEORGE PODOLSKY, AERODAT 3883 NASHUA DRIVE, MISSISSAUGA, ONT. L4V 1R3	

Credits Requested per Each Claim in Columns at right

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

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

Airborne Credits		Days per Claim
Note: Special provisions credits do not apply to Airborne Surveys.	Electromagnetic	40
	Magnetometer	40
	Radiometric	

Mining Claims Traversed (List in numerical sequence)

Prefix	Number	Expend. Days Cr.	Prefix	Number	Expend. Days Cr.
L	998427			996540	
	998428			996541	
	998429			996542	
	998430			996543	
	998431			996544	
	998432				
	998433				
	998434				
	998435				
	998436				
	998437				
	998438				
	998439				
	998440				
	998441				
	998442				
	996533				
	996534				
	996535				
	996536				
	996537				
	996538				
	996539				

Total number of mining claims covered by this report of work: [redacted]

Expenditures (excludes power stripping)

Type of Work Performed

Performed on Claim(s)

Calculation of Expenditure Days Credits

Total Expenditures				Total Days Credits
$	÷	15	=	

Instructions

Total Days Credits may be apportioned at the claim holder's choice. Enter number of days credits per claim selected in columns at right.

Date	Recorded Holder or Agent (Signature)
Dec. 30/87	[signature]

For Office Use Only		
Total Days Cr. Recorded	Date Recorded	Mining Recorder
	Date Approved as Recorded	Branch Director

Certification Verifying Report of Work

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

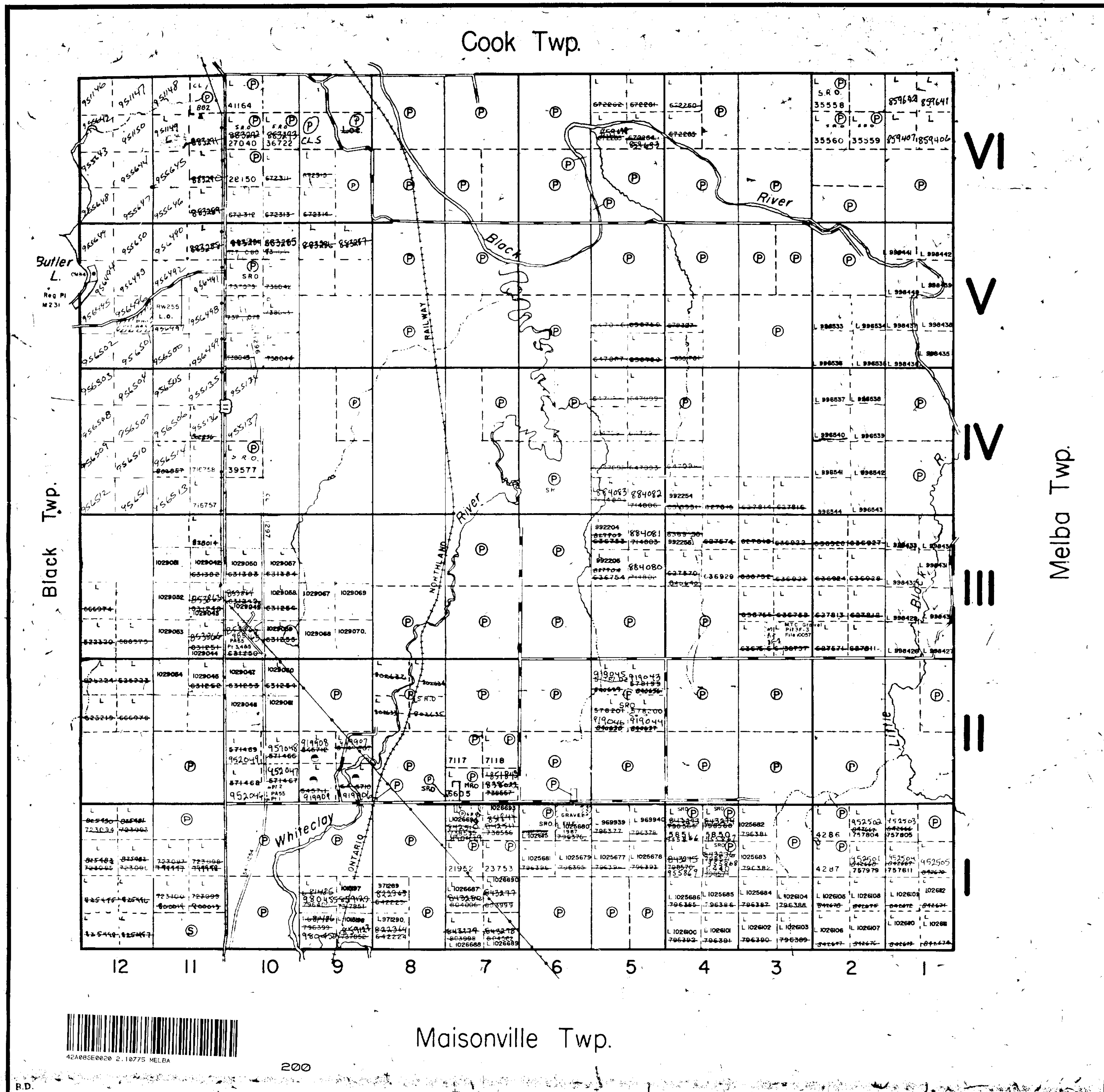
Name and Postal Address of Person Certifying

ALEXANDER Y. PO

27 SWORDBILL DR.

ISLINGTON, ONT. M9A 4V3

Date Certified	Certified by (Signature)
Dec. 30/87	[signature]



THE TOWNSHIP OF BENOIT

DISTRICT OF COCHRANE

LARDER LAKE MINING DIVISION

SCALE: 1-INCH = 40 CHAINS

LEGEND

PATENTED LAND	● or Ⓟ
CROWN LAND SALE	Ⓢ or 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	
PATENTED S.R.O. CANCELLED	

NOTES

400' Surface rights reservation around all lakes & rivers.

Gravel Reserve Shown Thus:

400' frontage on Butler Lake withdrawn from disposition for proposed summer resort development. File 164586

Areas withdrawn from staking under Section of the Mining Act

File	Date	Disposition

PLAN NO.- M.326#10

ONTARIO
MINISTRY OF NATURAL RESOURCES
SURVEYS AND MAPPING BRANCH

REFERENCES

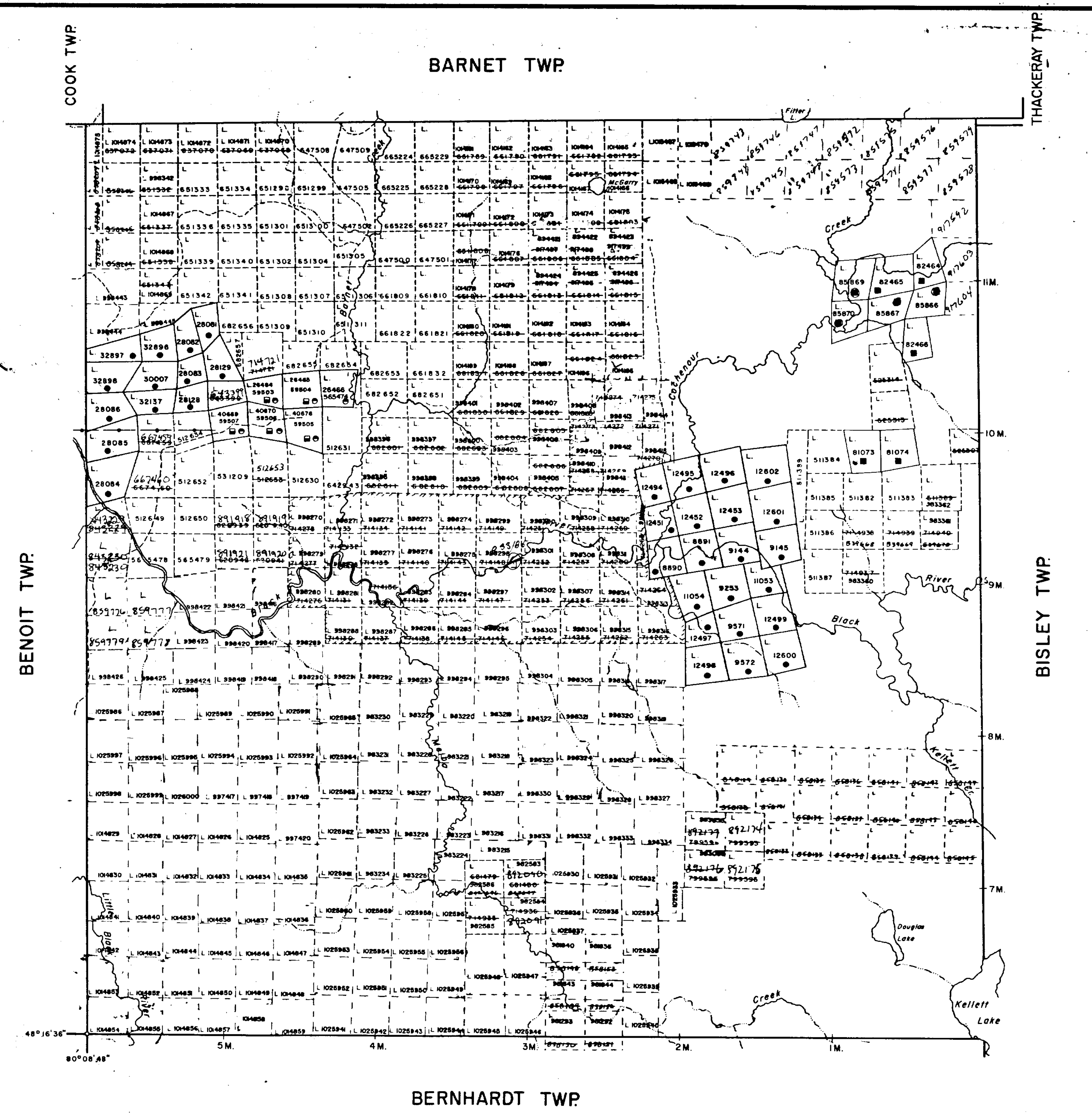
AREAS WITHDRAWN FROM DISPOSITION

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

Description	Order No.	Date	Disposition	File
~~Sec 36/80~~	~~W 9/80~~	~~24/01/80~~	~~S+M~~	
Sec 36/20	039/86	07/07/86 9:00 am.	S+M	

42A08SE0022 2.10775 MELBA

210



LEGEND

- HIGHWAY AND ROUTE No.
- OTHER ROADS
- TRAILS
- SURVEYED LINES:
  - TOWNSHIPS, BASE LINES, ETC.
  - LOTS, MINING CLAIMS, PARCELS, ETC.
- UNSURVEYED LINES:
  - LOT LINES
  - PARCEL BOUNDARY
  - MINING CLAIMS ETC.
- RAILWAY AND RIGHT OF WAY
- UTILITY LINES
- NON-PERENNIAL STREAM
- FLOODING OR FLOODING RIGHTS
- SUBDIVISION OR COMPOSITE PLAN
- RESERVATIONS
- ORIGINAL SHORELINE
- MARSH OR MUSKEG
- MINES
- TRAVERSE MONUMENT

DISPOSITION OF CROWN LANDS

TYPE OF DOCUMENT	SYMBOL
PATENT, SURFACE & MINING RIGHTS	●
" , SURFACE RIGHTS ONLY	⊖
" , MINING RIGHTS ONLY	⊖
LEASE, SURFACE & MINING RIGHTS	■
" , SURFACE RIGHTS ONLY	⊟
" , MINING RIGHTS ONLY	⊟
LICENCE OF OCCUPATION	▼
ORDER-IN-COUNCIL	OC
RESERVATION	ⓡ
CANCELLED	⊗
SAND & GRAVEL	ⓢ

NOTE: MINING RIGHTS IN PARCELS PATENTED PRIOR TO MAY 6, 1913, VESTED IN ORIGINAL PATENTEE BY THE PUBLIC LANDS ACT, R.S.O. 1970, CHAP. 380, SEC. 63, SUBSEC 1.

SCALE: 1 INCH = 40 CHAINS

FEET 0 1000 2000 4000 6000 8000
METRES 0 200 1000 (1 KM) 2000 (2 KM)

DATE OF ISSUE
DEC 11 1987
LARDER LAKE MINING RECORDER'S OFFICE

TOWNSHIP

MELBA

M.N.R. ADMINISTRATIVE DISTRICT

KIRKLAND LAKE

MINING DIVISION

LARDER LAKE

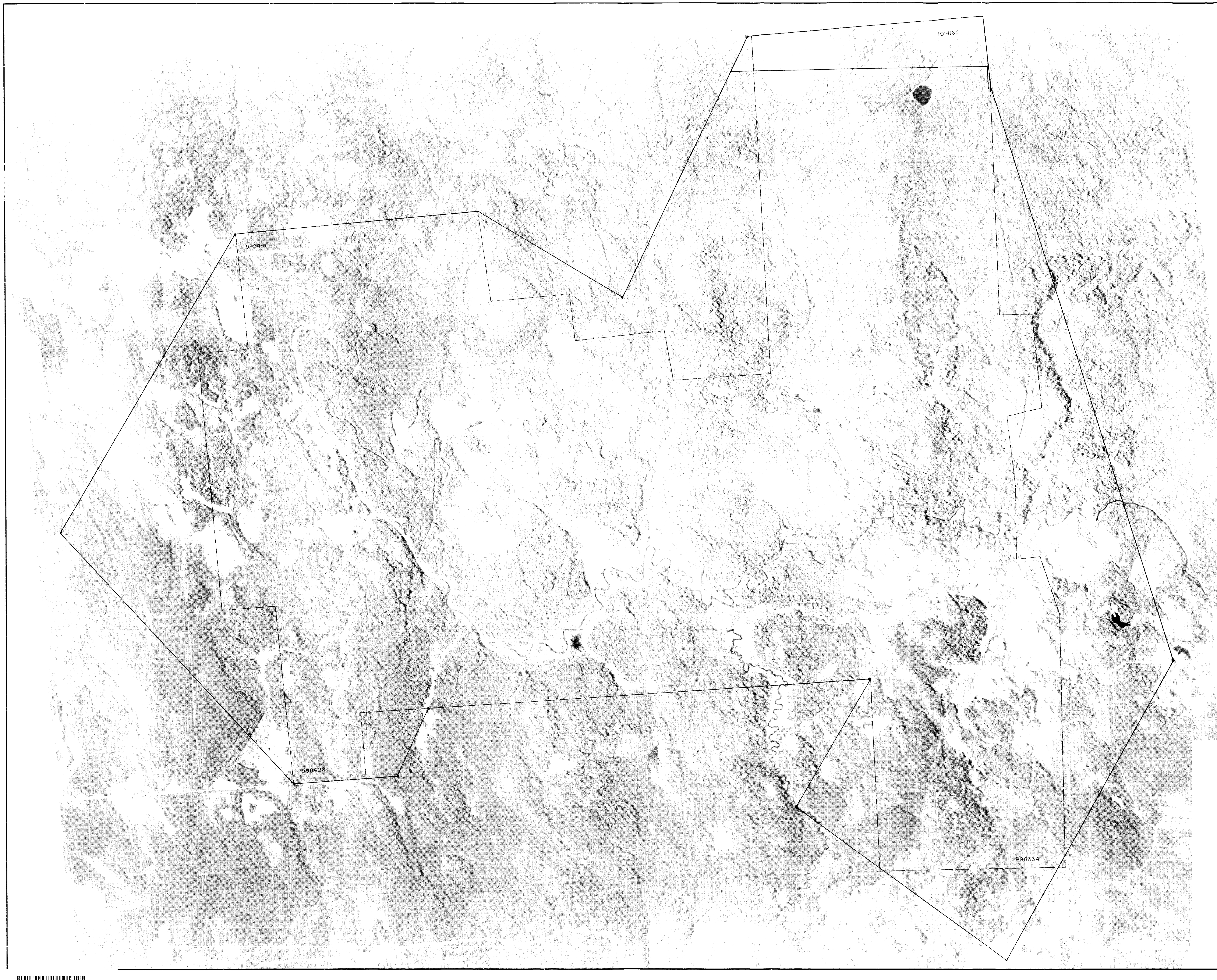
LAND TITLES / REGISTRY DIVISION

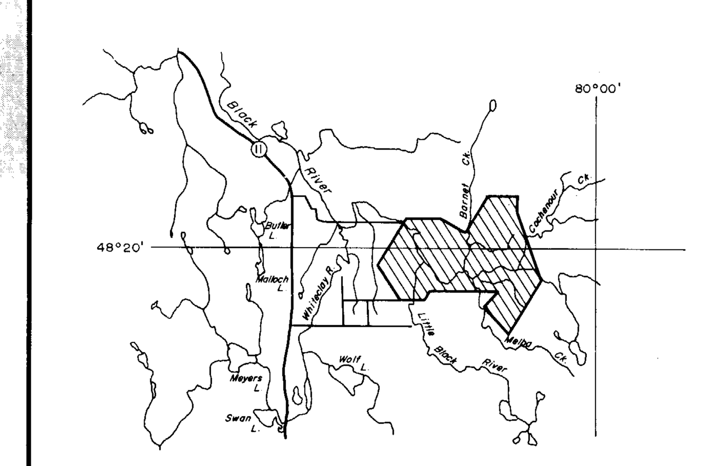
COCHRANE

Ministry of Natural Resources — Land Management Branch
Ontario

Date JANUARY, 1985

Number G-3216





CANREOS MINERALS LTD.

BASE MAP 2.10175

BENOIT/MELBA TOWNSHIPS

ONTARIO

SCALE 1:10,000

1/2 MILE

KILOMETRE

AERODAT LIMITED

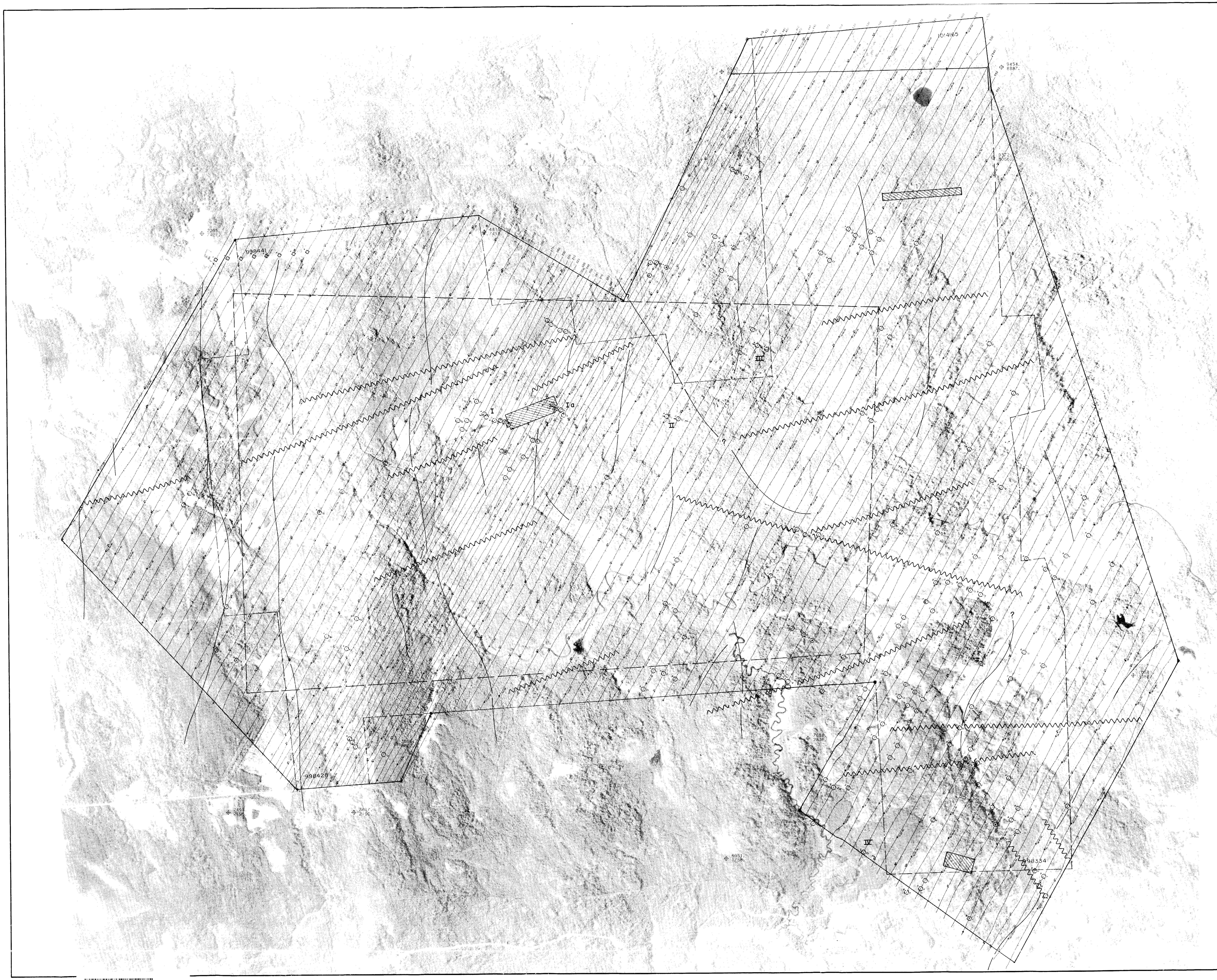
DATE: NOV 1987

NTS No: 42 A

MAP No: 1

J8782

220



N

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).

Culture eg. Power line

INTERPRETATION LEGEND

Area recommended for more detailed magnetic map

Intrusive ?

Inferred structures

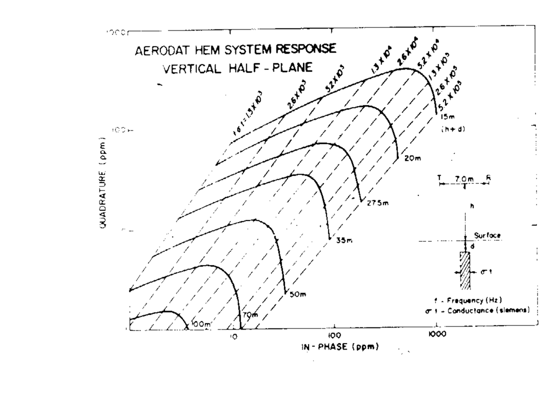
Diabase dikes

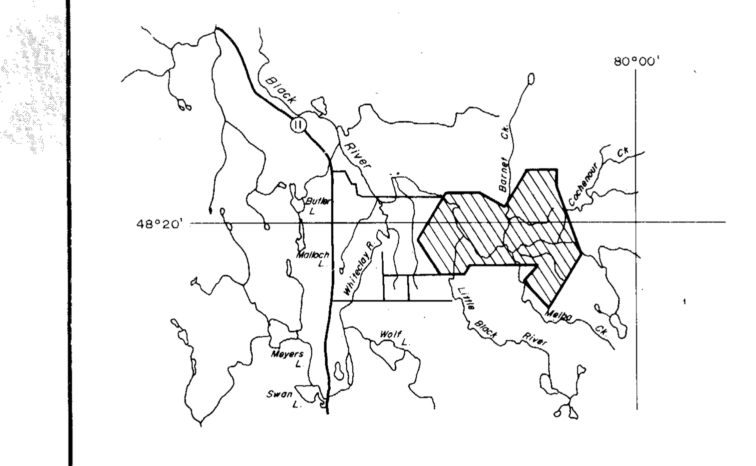
Possible bedrock conductor axis

Flight Path

Navigation and recovery using Motorola Mini-Ranger (MRS III) radar navigation system

Average terrain clearance 60m
Line spacing = 100m





CANREOS MINERALS LTD.

INTERPRETATION

2-10775

BENOIT/MELBA TOWNSHIPS

ONTARIO

SCALE 1:10,000

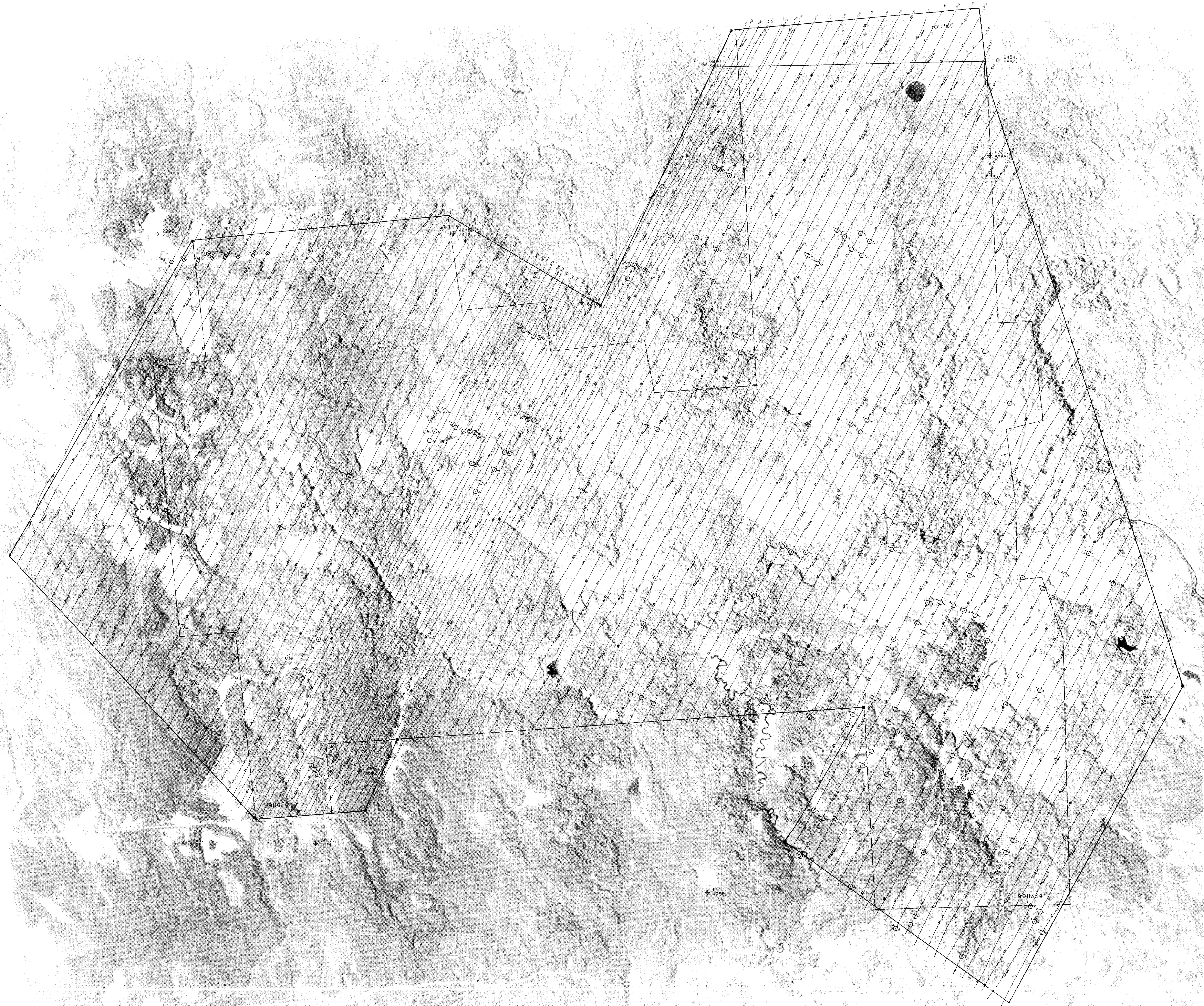
0 330 660 1320 1/2 MILE

0 100 200 500 1 KILOMETRE

AERODAT LIMITED

DATE:	NOV. 1987
NTS No:	42 A
MAP No:	2 J8782

230



EM Anomalies

Conductivity Thickness (mhos)

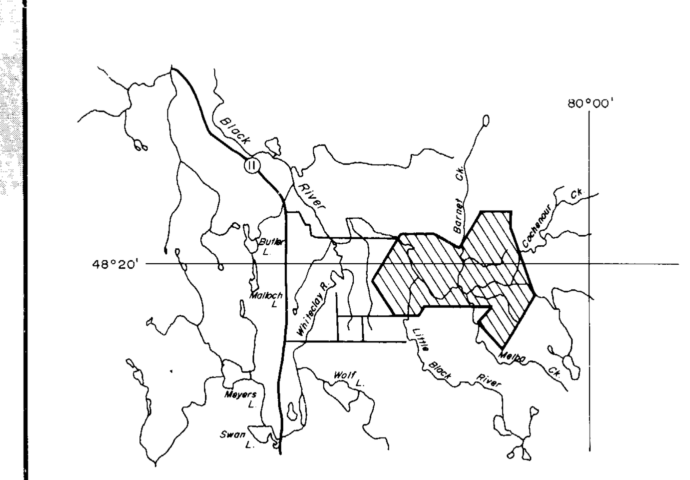
○	0 - 1
○	1 - 2
⊖	2 - 4
●	4 - 8
●	8 - 15
●	15 - 30
●	> 30

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

Flight Path

Navigation and recovery using Motorola Mini-Ranger (MRS III) radar navigation system

Average terrain clearance 60m
Line spacing = 100m



CANREOS MINERALS LTD.

FLIGHT PATH

2.10775

BENOIT/MELBA TOWNSHIPS

ONTARIO

SCALE 1:10,000

0 330 660 1320 1/2 MILE

0 100 200 500 KILOMETRE

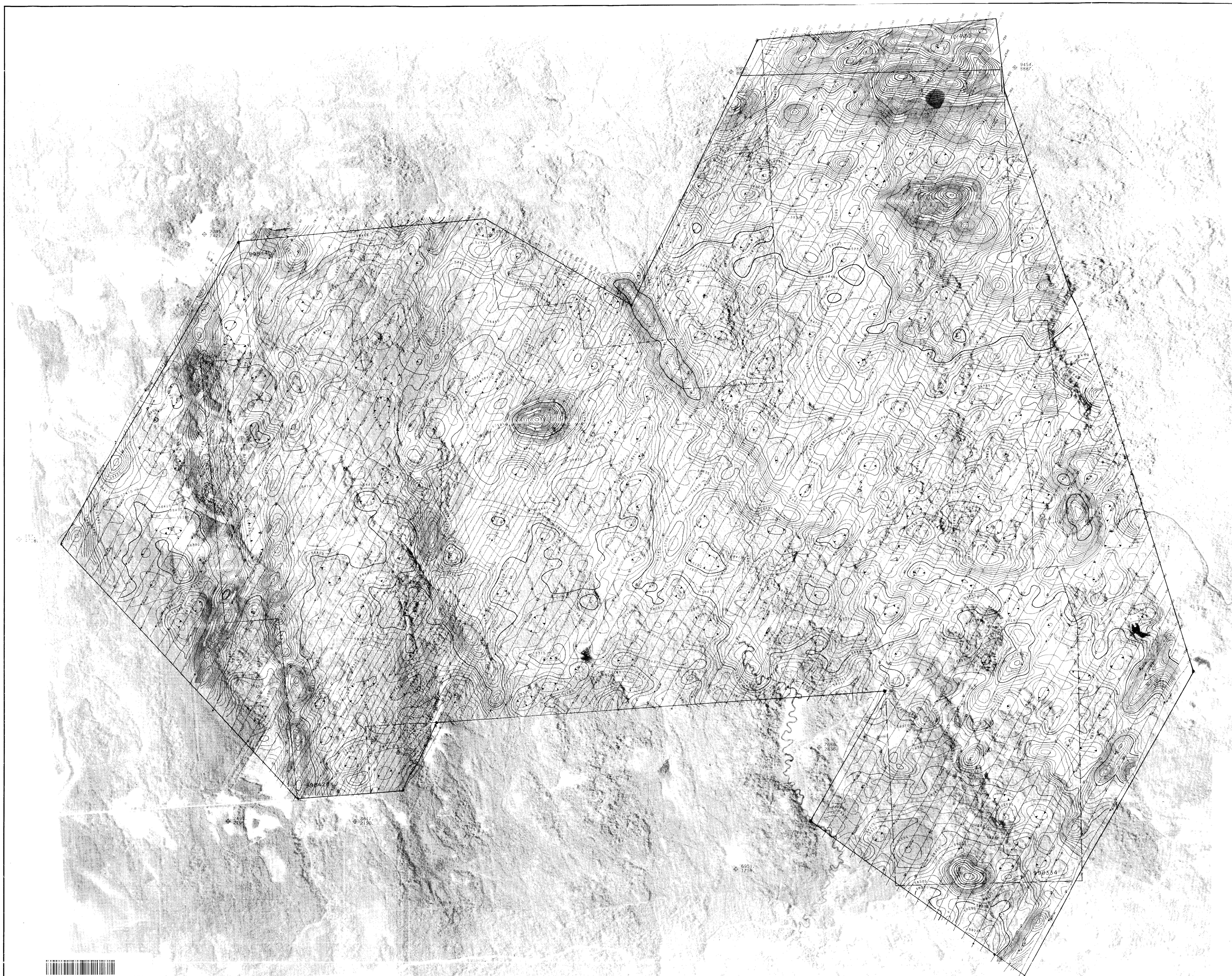
AERODAT LIMITED

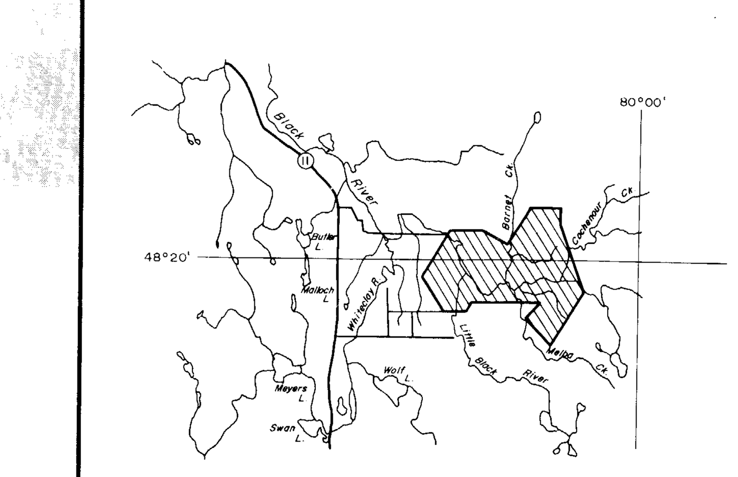
DATE: NOV 1987

NTS No: 42 A

MAP No: 3 J8782

240





Magnetics

Cesium high sensitivity magnetometer
Sensor elevation 50m

Total Field Magnetic Intensity
Contours in nT

Flight Path

Navigation and recovery using
Motorola Mini-Ranger (MRS III)
radar navigation system

Average terrain clearance 60m
Line spacing = 100m

CANREOS MINERALS LTD.

TOTAL FIELD MAGNETIC CONTOURS

BENOIT/MELBA TOWNSHIPS

2.10775

ONTARIO

SCALE 1:10,000

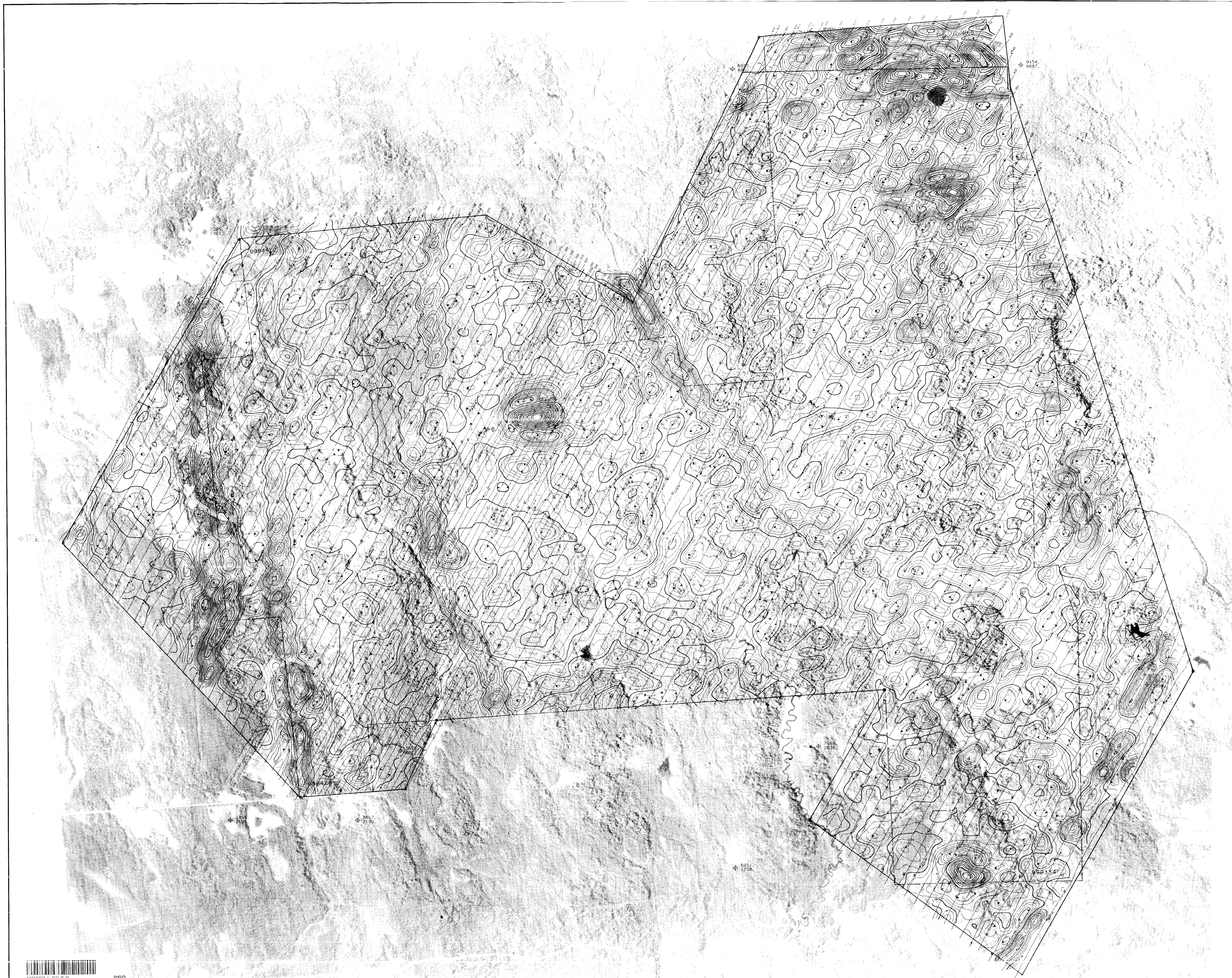
0 330 660 1320 1/2 MILE

0 100 200 500 1 KILOMETRE

AERODAT LIMITED

DATE:	NOV 1987
NTS No:	42 A
MAP No:	4 J8782

250



N

Vertical Gradient

Vertical magnetic gradient calculated from the total field magnetic intensity

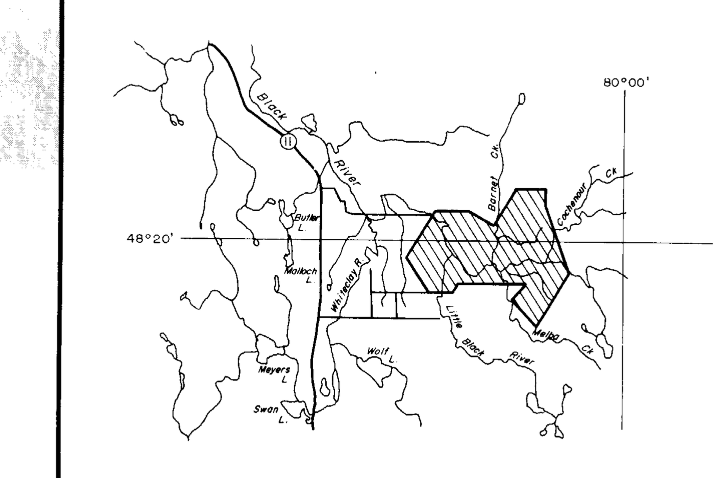
Contours in nT/m

Cesium high sensitivity magnetometer
Sensor elevation 45m

Flight Path

Navigation and recovery using Motorola Mini-Ranger (MRS III) radar navigation system

Average terrain clearance 60m
Line spacing = 100m



CANREOS MINERALS LTD.

CALCULATED VERTICAL MAGNETIC GRADIENT

BENOIT/MELBA TOWNSHIPS 2.10775

ONTARIO

SCALE 1:10,000

AERODAT LIMITED

DATE:	NOV 1987
NTS No:	42 A
MAP No:	5

J8782

260

N

Apparent Resistivity

Contours - in ohm-m

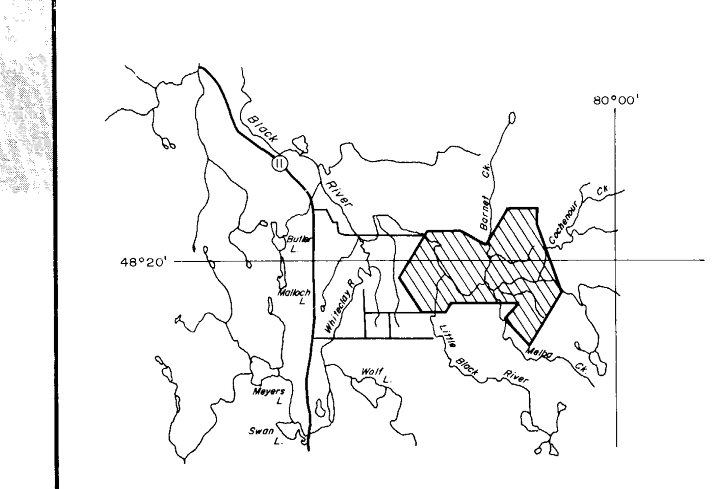
Calculated from 4600 Hz coplanar response using a 200 m model

Sensor elevation 30m

Flight Path

Navigation and recovery using Motorola Mini-Ranger (MRS III) radar navigation system

Average terrain clearance 60m
Line spacing = 100m



CANREOS MINERALS LTD.

APPARENT RESISTIVITY CONTOURS

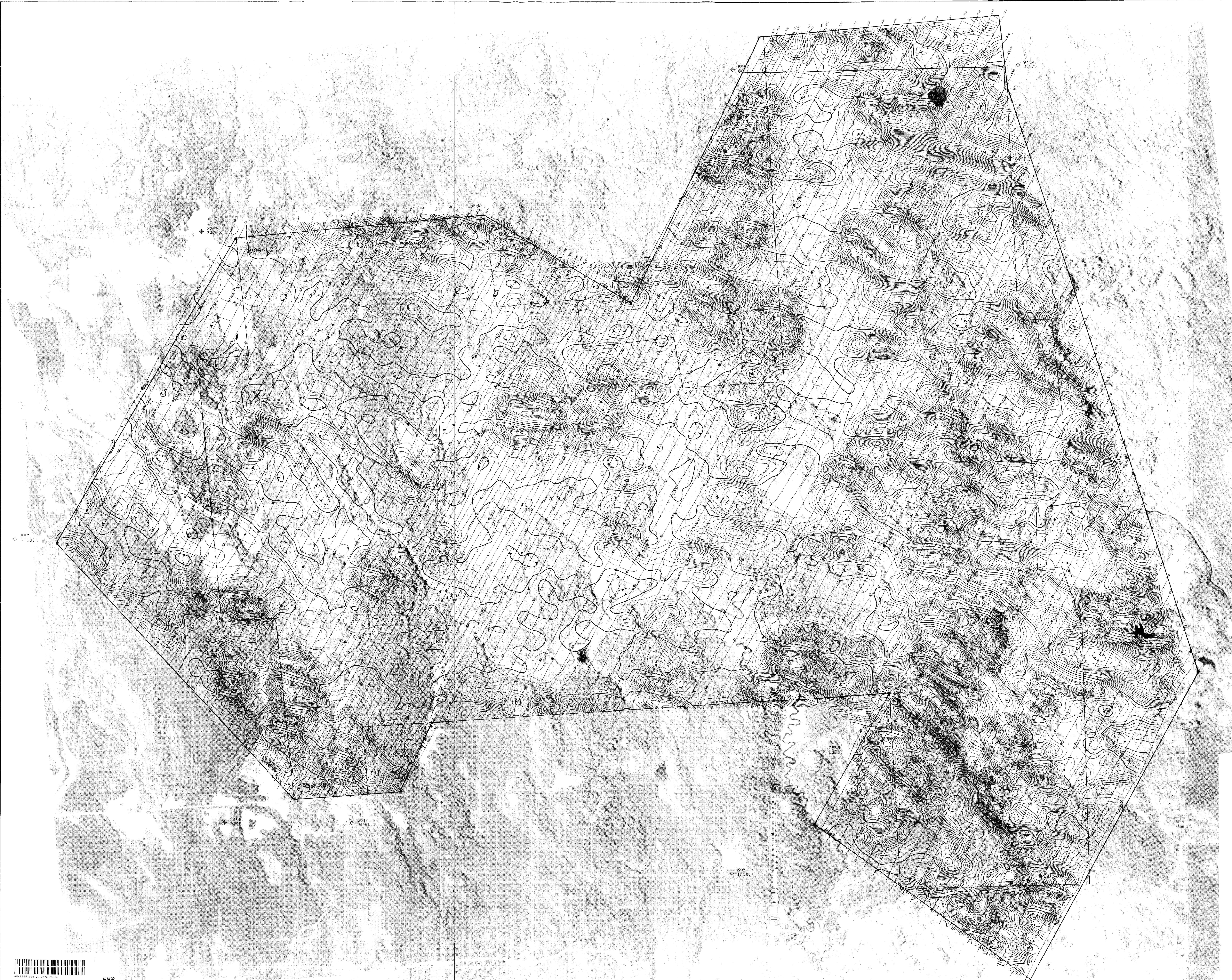
BENOIT/MELBA TOWNSHIPS

ONTARIO

SCALE 1:10,000

AERODAT LIMITED	DATE: NOV 1987
	NTS No: 42 A
	MAP No: 6 J8782

270



VLF-EM

VLF-EM Total Field Intensity in percent

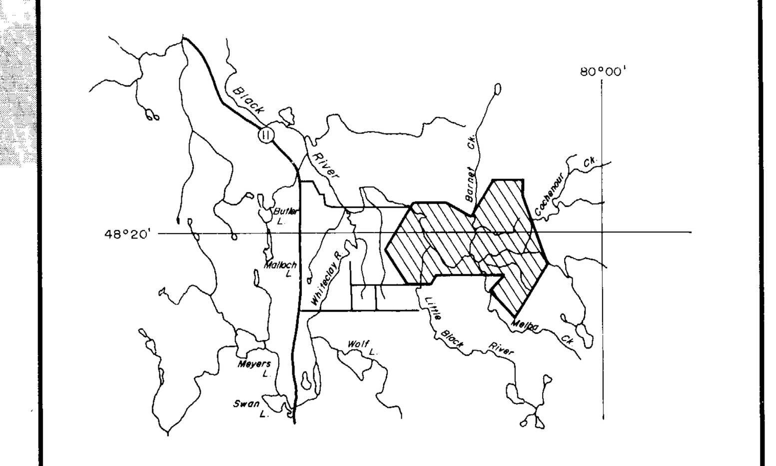
Station: NAA (Cutler, Maine)
24.0 kHz

Sensor elevation 45m

Flight Path

Navigation and recovery using Motorola Mini-Ranger (MRS III) radar navigation system

Average terrain clearance 60m
Line spacing = 100m



CANREOS MINERALS LTD.

VLF-EM TOTAL FIELD CONTOURS

BENOIT/MELBA TOWNSHIPS 2.10775

ONTARIO

SCALE 1:10,000

0 330 660 1320 1/2 MILE

0 100 200 500 1 KILOMETRE

AERODAT LIMITED	DATE:	NOV 1987
	NTS No:	42 A
	MAP No:	7 J8782

280