REPORT ON
COMBINED HELICOPTER BORNE MAGNETIC, ELECTROMAGNETIC AND VLF SURVEY
CADMAN LAKE AND KEEZHIK LAKE PROPERTIES
FORT HOPE AREA, ONTARIO

for
NORAMCO EXPLORATIONS INC.
by
AERODAT LIMITED

OCTOBER 28, 1987

J8751B,C

R. J. de Carle
Consulting Geophysicist

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1. INTRODUCTION

This report describes an airborne geophysical survey carried out on behalf of Noramco Explorations Inc. by Aerodat Limited. Equipment operated included a three frequency electromagnetic system, a high sensitivity cesium vapour magnetometer, a two frequency VLF-EM system, a film 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 and recorded on film as well as being marked on the flight path mosaic by the operator while in flight.

The survey, comprised of two separate blocks of ground in the Fort Hope Area, Kenora Mining District of northern Ontario, are located in the general proximity of Keezhik Lake (Block B) and Cadman Lake (Block C). Four flights were required to complete the survey and were flown on September 21 and 22, 1987. Flight lines, for each block, were oriented 000-180 degrees with a nominal line spacing of 100 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 or base metal exploration targets. Of importance, therefore, are poorly mineralized conductors, displaying weak conductivity, which may represent structural features which can sometimes play an essential role in the eventual location of primary minerals. Weak conductors associated with iron formations are also considered primary targets for precious metals. In regard 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.

A total of 615 kilometres of the recorded data were compiled in map form and are presented as part of this report according to specifications outlined by Noramco Explorations Inc.

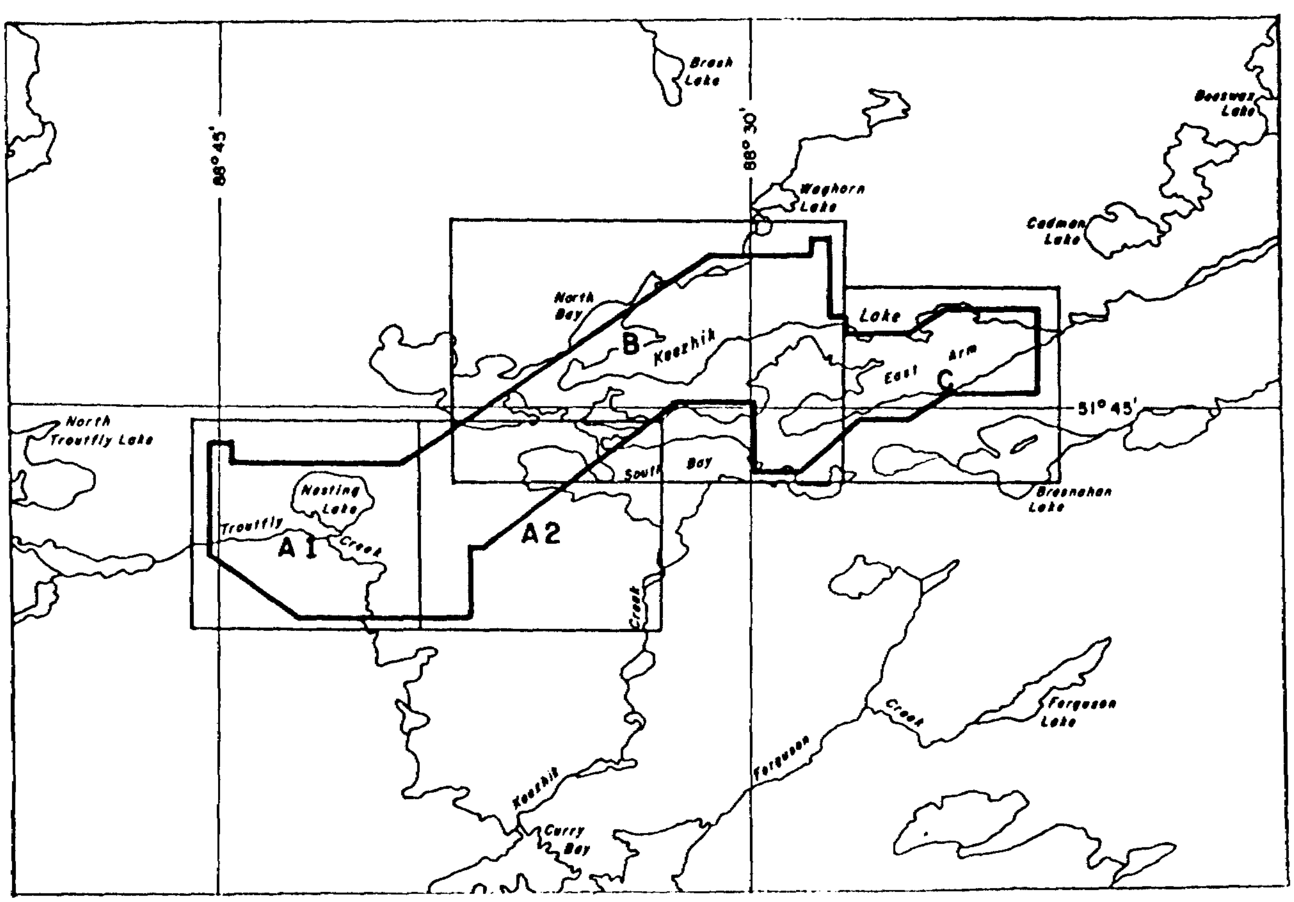
The following is a summary of the total mileage for each of the flown blocks:

Block	Area Name	Mileage (kms)
B	Keezhik Lake	430
C	Cadman Lake	185

2. SURVEY AREA LOCATION

The survey areas are depicted on the index map as shown. All blocks are located to the north of the Albany River, with the two blocks being some 20 kilometres north-northeast of Miminiska Lake. They are also located approximately 40 kilometres northwest of Fort Hope, Ontario. The following is a brief summary for each area location:

Block B	Keezhik Lake	Latitude 51 degrees 47′ north
	NTS 52P9, 15, 16	Longitude 88 degrees 32′ west
Block C	Cadman Lake	Latitude 51 degrees 46′ north
	NTS 52P16	Longitude 88 degrees 23′ west



3. AIRCRAFT AND EQUIPMENT

3.1 Aircraft

An Aerospatiale A-Star 350D helicopter, (C-GJIX), owned and operated by Ranger 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 3-frequency system. Two vertical coaxial coil pairs were operated at 935 Hz and 4600 Hz and a horizontal coplanar coil pair at 4175 Hz. The transmitter-receiver separation was 7 metres. Inphase and quadrature signals were measured simultaneously for the 3 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 Jim Creek, Washington, broadcasting at 24.8 kHz, and Annapolis, Maryland, broadcasting at 21.4 kHz

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-2 proton precession magnetometer was operated at the base of operations to record diurnal variations of the earth's magnetic field. The clock of the base station was synchronized with that of the airborne system to facilitate later correlation.

3.2.5 Radar Altimeter

A King Air 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 Sony video tracking camera was used to record flight path on VHS video tape. The camera was operated in continuous mode. Fiducial numbers and time reference marks, for cross reference to the analog and digital data, were encoded on the 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	Low Frequency Inphase	2.0 ppm/mm
CXQ1	Low Frequency Quadrature	2.0 ppm/mm
CXI2	High Frequency Inphase	2.0 ppm/mm
CXQ2	High Frequency Quadrature	2.0 ppm/mm
CPI1	Mid Frequency Inphase	8.0 ppm/mm
CPQ1	Mid Frequency Quadrature	8.0 ppm/mm
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

Channel	Input	Scale
ALT	Altimeter	10 ft/mm
MAGF	Magnetometer, fine	2.5 nT/mm
MAGC	Magnetometer, coarse	25 nT/mm
MAGN	Magnetometer, noise	0.025 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	0.5 seconds
Magnetometer	0.2 seconds
Altimeter	0.5 seconds
Nav System	1.0 seconds

Positional information was recorded at 1.0 second intervals on a DAC/NAV I.

4. DATA PRESENTATION

4.1 Base Map

A topographic base at a scale of 1:10,000 was prepared from an enlargement of a 1:50,000 topographic map.

4.2 Flight Path Map

The flight path for all blocks 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 map showing all flight lines, are presented on a Cronaflex copy of the topographic base map, with camera frame and navigator's manual fiducials for cross reference to both the analog and digital data.

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 response) and conductor axes. The anomalous responses of the three coil configurations along with the interpreted conductor axes were plotted on a Cronaflex copy of the topographic base map.

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

4.5 Vertical Magnetic Gradient Contours

The vertical magnetic gradient was calculated from the gridded total field magnetic data. Contoured at a 1 nT/m interval, the gradient data were presented on a Cronaflex copy of the topographic 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 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 4600 Hz coaxial frequency pair used. 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 Cronaflex copy of the topographic base map with the flight path.

4.7 VLF-EM Total Field Contours

The VLF-EM signals from NLK, Jim Creek, Washington, broadcasting at 24.8 kHz were compiled. The VLF data were compiled in contour map form and presented on a Cronaflex copy of the topographic base map.

5. INTERPRETATION

5.1 Geology

The map area lies within the Uchi Subprovince, a predominately metavolcanic-metasedimentary east trending belt in the Superior Province of the Canadian Shield. With the exception of a few wide, north trending dikes of Middle Precambrian diabase, all the rocks in the area are Early Precambrian in age. Quaternary deposits of glacial till, and glaciolacustrine and glaciofluvial sand and gravel now cover much of the bedrock.

Towards the northwest portion of the Cadman Lake property, there exists a porphyritic flow complex as well as a quartz-feldspar porphyry package of rocks. Traversing in a northwest-southeast direction, through the middle of the East Arm, is a mafic intrusive body which has been described as being anorthositic gabbro to gabbro. The remainder of the Cadman Lake block, according to those geology maps available to the writer, would appear to be underlain with massive to foliated basalt to andesite (Fort Hope-Lansdowne House Sheet, Map 2237).

However, referring to Map 55-1963, Miminiska Area, Ontario, it will be noted that towards the extreme northwest corner of the Cadman Lake block, there exists an acidic volcanic rock unit, in contact with the aforementioned gabbro complex. As well, it will be seen that a banded iron formation has been mapped towards the extreme northeast corner of the block. In fact, it is located just outside of the survey boundary.

The Keezhik Lake block is underlain with much the same rock as those for the Cadman Lake block. The western half of the block is underlain with pillowed basalt to andesite while towards the east, the rocks are mainly massive to foliated basalt to andesite. Along the northern boundary of the survey block, areas of rhyolite to dacite rocks have been mapped. The same gabbroic rocks that were indicated within the Cadman Lake block, also extend into the eastern portion of the Keezhik Lake block.

Porphyritic flows or quartz-feldspar porphyry have also been mapped towards the eastern section of the block. It is also the same package of rocks which extend into the Cadman Lake block.

5.2 Magnetics

The magnetic data presentation for the Keezhik Lake block has shown an approximate northeast-southwest trending lithology.

Individual magnetic trends are interpreted to be interlayering of basalt to andesitic bedding. Towards the northwest boundary, the higher intensity magnetic trends may be related to banded iron formation. As well, the higher intensity portions towards the northeast corner of the block are probably related to the anorthositic gabbro that has been mentioned previously.

There would appear to be one diabase dyke within the survey block and it is located towards the north-central portion of the block. Its extent to the south may be limited, but upon further examination in the field, the diabase dyke may be found to extend well beyond the southern boundary. In fact, the writer believes this to be the case.

The lower intensity magnetic areas are perhaps related to the felsic volcanics, especially towards the eastern portion of the Keezhik Lake block. It is quite a large area, somewhat circular, just to the west of the assumed gabbroic intrusive rock unit.

Some of the northeast-southwest trending lower intensity magnetic features may be related to metasedimentary rocks as this rock is known to exist within the survey block.

The attitude of the metavolcanic-metasedimentary package of rocks would appear to be, for the most part, towards the south, with some areas being steeply dipping or near vertical.

The high intensity magnetic feature traversing across the northeastern portion of the Cadman Lake block is related to a banded iron formation which has been indicated on geology map 54-1963. Some of the other higher intensity, elongated magnetic features within the East Arm of Keezhik Lake are thought to be related to anorthositic gabbro. Lower intensity areas may be related to massive to foliated basalt and andesite.

5.3 Vertical Magnetic Gradient Contours

The vertical gradient data has clearly defined the northeast-southwest trending lithology within the Keezhik Lake block. It has separated these trends into unique horizons and actually, can be interpreted to correspond with a particular rock unit.

The areas of high intensity magnetics have been clearly "broken up" into unique trends as a result of the computation of the vertical gradient. This interpretation is not as readily obvious when one refers to the magnetic total field map.

It should also be noted that the zero contour interval coincides directly or 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. By using known or accurate geological information and combining this data with the vertical gradient data, one can use the presented maps as a pseudo-geological map. Obviously, the more that is known about an area geologically, the closer this type of presentation is to what the rock types are.

This type of presentation is an invaluable tool in helping to define complex geology, especially in drift covered areas. Not only in areas of complex geology but in areas of closely spaced geologic formations, has the calculated vertical gradient computation been of exceptional value. Since a good portion of the survey blocks are overlain with Quaternary sand and gravel, this particular presentation will be very useful.

The writer has indicated several fault zones on the interpretation map. Because of the nature of the computation of the vertical gradient data, magnetic anomalies produced by near surface features are emphasized with respect to those resulting from more deeply buried rock formations. As a result, much more detail is obtained, providing a better opportunity to recognize fault zones. As mentioned, some fault zones have been interpreted by the writer, however, it will become more apparent to the client as more field geological information is obtained, that other fault zones do exist.

This presentation will also, perhaps, change the clients mind about certain geologic horizons and especially the location of contacts.

5.4 Electromagnetics

The electromagnetic data was first checked by a line-by-line examination of the analog records. Record quality was good with minor noise levels on the low frequency coaxial trace. This was readily removed by an appropriate smoothing filter. Instrument noise was well within specifications. Geologic noise, in the form of surficial conductors, is present, in some areas of the survey, on the higher frequency responses and to a minor extent, on both the low frequency inphase and 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. These selections were then checked with a proprietary computerized selection program which can be adjusted for ambient and instrumental noise. 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 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

As a result of this airborne survey being carried out, there were a number of bedrock conductors intercepted in both the Keezhik Lake and Cadman Lake blocks. Most display good electromagnetic responses with some having magnetic association while others seem to be flanking magnetic trends. Formational trends are quite apparent with most of these showing variable conductivity values along their strike lengths. These areas may be locations for accumulations of massive sulphides, of which, economic sulphides may exist. There are several conductors that are correlating with magnetic lows indicating that pyrite and/or graphite is the probable cause.

There are a number of isolated one, two or three line conductive trends which the writer has outlined on the interpretation map. These are areas that have base metal potential. Also, note how a few of them have been cut off by inferred fault zones.

Referring to the high frequency quadrature trace, it will be seen that lake bottom sediments are quite conductive. As well, there are areas that reflect a thick layer of conductive overburden. However, it is felt that both of these conductive horizons did not act as a masking layer in preventing the detection of any weak bedrock conductors.

It is also interesting to note that the inphase responses for all frequencies 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. Also, as can be seen from the results, there are no electrical conductors associated with this geological horizon, with the exception of ZONES K16 and C-10, suggesting the absence of any sulphides within these assumed highly magnetic banded iron formation.

The writer has outlined on the map, selected targets which have been assigned a number. It is recommended that each zone be given a thorough investigation in regards to geology and previous work carried out. A brief comment is given for each of these zones along with a priority rating, 1-high, 2-medium, 3-low.

ZONE K-1

The conductor displays a reasonable electromagnetic response and one that, for the most part, has magnetic correlation. The trend no doubt extends to the west, beyond the western boundary of the Keezhik Lake block. However, it appears to have been pinched out towards the east near line 11700. A dip to the south is interpreted. The rock types in the area are thought to be pillowed basalt to andesite.

The target may be at depth because it is known that a layer of Quaternary sand and gravel exists in the area, as well, the conductor is located within Keezhik Lake. Priority 2.

ZONE K-2

The short trend would appear to be on the south flank of a magnetic feature, which is located approximately 50 metres north of K-2. A wide, vertical dyke-like conductor is interpreted for K-2, as well as being located at depth. The latter could be due to the thick lake bottom sediments as well as the layer of sand and gravel. Pillowed basalt and andesite are thought to be the rock types. Priority 3.

ZONE K-3

The long conductor, which is dipping to the south, displays reasonably good conductivity and is flanking a magnetic feature which is located approximately 50 metres to the south. It is thought that the conductive trend is associated with a geological contact. It is also felt that K-3 may be related to the same bedrock source as that for K-6, K-9, K-10 and K-11, all being related to the same magnetic flank. Pillowed basalt and andesite are the rock types. Priority 3.

ZONE K-4

This short trend displays a weak electromagnetic response but it is still felt that the cause of this conductive response is related to a bedrock source. Its relationship with a magnetic feature may suggest pyrrhotite as the source. Priority 2.

ZONE K-5

This one line conductor is definitely an isolated, flanking anomaly to K-3. Its EM response is reasonable and it would appear to be correlating with the zero contour interval from the calculated vertical gradient data. The latter suggests a relationship with a geological contact. There may also be a fault zone just to the east of K-5. Pillowed basalt and andesite are thought to be the rock types. Priority 1.

ZONE K-6

This indicated trend displays an extremely weak electromagnetic response, and as suggested previously, may be associated with the same geological environment as that for K-3, K-9, K-10 and K-11. Priority 3.

ZONE K-7

The trend displays a very strong electromagnetic response and a preliminary indication is that K-7 is not related to the same source as that for K-8, primarily because of its relationship with a magnetic feature. The latter zone does not have any magnetic association. It is also felt that K-7 is close to a metasedimentary quartzite and conglomerate horizon. Priority 1.

ZONE K-8

This is an extremely long conductor displaying fair to poor conductivity along most of its strike length. As well, there is no magnetic correlation. Pyrite is the probable cause. Areas in the vicinity of lines 11480, 11400, 11320 and 11280, however, display fair to good conductivity and perhaps, should be areas to be looked at. Any proximity to fault structures are locations to be investigated. Priority 3.

ZONE K-9

The outlined target displays a weak EM response and is correlating with the flank of a magnetic trend. As mentioned previously, it may be associated with the same geological horizon as K-3, K-6, K-10 and K-11. Priority 3.

ZONE K-10

This zone is thought to be related to the same source as that for K-11, however this one, has been faulted off. A dip to the south is interpreted. Priority 1.

ZONE K-11

The long conductor displays a very strong electromagnetic response and would seem to have little or no magnetic association, except for the extreme northern and southern ends of the trend. A dip to the south is interpreted. As mentioned previously, the extreme west end of the trend may have been faulted off. It is perhaps, in this area, that further work may be considered. Towards the east end, where the writer has outlined ZONES K-11, K-12 and K-13, it is felt that further work in the field, in the form of a ground EM survey, should be carried out in order to accurately delineate the conductors. It is suggested, by the writer, that K-12 may be the eastern extent of K-11 with the present eastern extent of K-11 being an isolated conductor. Priority 2.

ZONES K-12 and K-13

The writer has combined these two for discussion because of the previously mentioned possible change in the interpretation. It should also be said that K-12 may extend well to the west. K-13 is probably isolated and as such, may turn out to be an interesting target. Referring to geology map 54-1963, it will be noted that acidic volcanic rocks have been mapped in the vicinity of the western extent of ZONE K-12, at the base of the peninsula. Priority 1.

ZONE K-14

This two line conductor is interpreted as a bedrock source which may be at depth. It is also correlating with a magnetic low suggesting an association with either graphite or pyrite. A ground survey is suggested. Priority 2.

ZONE K-15

This two line conductor displays a very weak electromagnetic response that may be related to a bedrock source. It is extremely weak. The trend is correlating with a magnetic low indicating that either pyrite or graphite may be the source. Pillowed basalt or andesite may be the rock type. Priority 3.

ZONE K-16

The zone displays a very good electromagnetic response as well as having good magnetic correlation. In fact, this may be the situation where sulphides is involved with a banded iron formation. It has a short strike length and interestingly enough, the sulphides do not seem to correlate with the magnetics along the remainder of the iron formation. Priority 1.

ZONES K17, K18 and K-19

All are long, linear trends displaying fair to good conductivity. As indicated on the interpretation map, the trends have been faulted off towards the west end and it may be in this area that further work is warranted. The EM responses are somewhat broad, suggesting that the conductors may be at depth. ZONES K-17 and K-18 are correlating with a magnetic trend suggesting pyrrhotite as the source while K-19 is correlating with a magnetic low indicating that either pyrite or graphite is the source. Priority 2.

ZONES K-20 and K-21

Both are extremely poor conductors. The two reasonable responses, which suggests that the responses may be bedrock related, are on line 11260. It is in this area that any further work should be concentrated. There does not seem to be any relationship with magnetics. The possibility exists that the interpreted fault zone, to the east, extends further to the south, to cut off the east end of both conductors K-20 and K-21. Priority 3.

ZONE K-22

The electromagnetic responses for this conductor are very poor and the writer interprets them as being possibly due to conductive lake bottom sediments. In fact, the trend may be related to an edge effect. Priority 3.

ZONE K-23

This lone intercept, in all probability, has a west extention to it, whereas it is probably limited, as to strike extent, to the east. It displays a fair EM response but does not have any magnetic correlation. The profile is somewhat broad, indicating perhaps a deep source. There is an esker nearby and this may have something to do with it. Priority 1.

ZONE K-24

The western extent of this conductor seems to be somewhat better defined than the east end and this could be related to the depth to the top of the conductor. It is also quite apparent from the electromagnetic traces that towards the east, the overburden as well as the lake bottom sediments, are quite conductive. This has certainly had a masking effect on the detection of the bedrock conductor. Any preliminary work on this zone should be carried out in the vicinity of intercept 10860A. There is also good magnetic correlation. Priority 1.

ZONE K-25

This lone intercept displays a fair EM response but one that is definitely due to a bedrock source. It also has good magnetic correlation. Referring to the topographic base map, it will be noted that the intercept would appear to be located within a swamp. Basalt and andesite may be the rock type. Priority 1.

ZONE K-26

The western extent of this trend may be related to conductive lake bottom sediments whereas the eastern portion is definitely due to a bedrock source. A northerly dip is interpreted. There is also magnetic correlation which suggests that pyrrhotite may be the source. Priority 1.

ZONE C-1

This isolated conductor has an extremely short strike length and would appear to be dipping towards the northwest. It displays a reasonably good electromagnetic response but has no magnetic association. Pyrite and/or graphite is the probable source. Basalt and andesite are thought to be the rock types. Priority 1.

ZONE C-2

The anomaly displays a rather broad electromagnetic response, one that is indicative of a deep target. Because of its location at the end of the flight line, it is not known whether or not the isolated response extends to the west. It is felt, however, that its eastern extent is limited. There is fair magnetic association. Priority 1.

ZONE C-3

The trend is definitely due to a bedrock source, which also has good magnetic correlation. It is interesting to note that even though there is a lengthy magnetic trend, the resultant conductivity is rather short. A dip to the north-northwest is interpreted. Priority 1.

ZONE C-4

This trend displays a good EM response but has only a subtle magnetic feature associated with it. A dip to the northeast is interpreted. There is every possibility that the fault zone interpreted to the south, may extend northward to cut off the east end of C-4. There is an esker in close proximity to C-4 so it may be found that the conductor is at depth. Priority 2.

ZONE C-5

The lone anomaly may be correlating with the banded iron formation which has been interpreted by the writer. It is also quite possible that the source for C-5 is the same as that for C-9. Priority 1.

ZONES C-6, C-7 and C-10

All three conductors are correlating with magnetic lows which flank the interpreted banded iron formation. ZONE C-6 is the best of the three conductors with C-10 displaying the weakest electromagnetic response. Priority 2.

ZONE C-8

This is an extremely weak electromagnetic response but one that is related to a poorly mineralized bedrock source. Its association with the flank of a magnetic feature suggests a relationship with a geological contact. Priority 2.

ZONE C-9

As mentioned previously, this conductor is associated with a banded iron formation. Its conductivity is quite good, as, of course, is its magnetic association. A dip to the north is interpreted. Sulphides within the iron formation is the cause. Although there seems to be a limited western extent, the conductor is thought to extend well to the east. Priority 1.

5.5 Apparent Resistivity

There are subtle similarities between the total field magnetics and the apparent resistivity data indicating a possible relationship with the bedrock. It does not appear, for the most part, that the apparent resistivity data is solely outlining conductive lake bottom sediments or conductive overburden. With this in mind, it is perhaps correct in suggesting a probable relationship with the basement rocks.

There is also good correlation between the selected targets and the apparent resistivity data. With the latter presentation, strike extent of the conductors is usually longer.

The background apparent resistivity for both survey blocks is generally in the 501 to 1000 ohm-metre range, with a few areas being somewhat less.

5.6 VLF-EM Total Field

Referring to the Keezhik Lake block, it will be noted that there are no similarities with the aeromagnetic data. The VLF tends to strike east-west to northwest-southeast, whereas the aeromagnetic data tend to strike northeast-southwest. Obviously, the VLF is not related to the basement but rather to possible overlying overburden. In the Cadman Lake block, however, there are similarities and thus, a possible relationship with the basement rocks.

Any structural information that may be forthcoming from the VLF data over the Keezhik Lake block could only be gained after a closer examination of the two sets of data. Much the same synopsis can be made for the Cadman Lake block. There seems, however, to be signs of faulting within the Cadman Lake block.

In comparing the 3-frequency EM data with the VLF data, again it will be seen that there are no similarities between the two sets of data, in regards to the selected EM targets. However, if one refers to the quadrature responses of the 3-frequency EM and compare it to the VLF-EM data, then there does appear to be some correlation. The suggestion here is that the VLF may, in fact, be giving a representation of the conductive overburden.

5.7 Recommendations

On the basis of the results of this airborne survey, ground follow-up work is recommended for the selected targets as outlined by the writer on the interpretation map. Most of these zones would be primarily base metal targets because of their shorter strike lengths.

Because of the unobvious for the much longer conductors, in that conductances are similar, selecting areas for further follow up is difficult. Some of the conductive trends have magnetic association while others do not. As well, the geological picture is not as clear in order to give a geological-geophysical synopsis. It is, therefore, suggested that a geological reconnaissance survey of the areas be carried out, where possible, in order to establish a relationship between each of the intercepted bedrock conductors and the basement rocks. As mentioned previously, there is a thin layer of conductive overburden over most of the survey blocks, but outcrops do exist.

Over the more favourable areas geologically, till or soil sampling for gold is recommended with any correlation of subsequent anomalous areas and intercepted bedrock conductors being prime targets for drilling. Areas which may give promising results are those areas in close proximity to the interpreted fault zones as well as areas which are correlating with the banded iron formation.

In regards to a follow-up geophysical programme, any of the horizontal loop EM systems can be used. It would seem that detectability should be easy for any of the types of conductors intercepted within either of the two survey blocks. It is not recommended, however, that a VLF-EM survey be carried out because of the apparent lack of detectability of the conductors with the airborne system. An induced polarization survey could be carried out if the area is overlain with a layer of highly conductive overburden or if the ground EM methods have not defined the conductors fully or if disseminated sulphides are suspected.

Some of the more interesting targets to investigate in the field include K-5, K-7, K-10, K-12 to K-14, K-16, K-24, K-25, C-1, C-3, C-4 and C-9.

Robert J. de Carle

Robert J. de Carle
Consulting Geophysicist
for
AERODAT LIMITED
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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 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 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 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

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FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM) INPHASE	QUAD.	CONDUCTOR CTP MHOS	DEPTH MTRS	BIRD HEIGHT MTRS
5	10021	A	0	1.7	6.5	0.0	0	80
5	10021	B	1	14.4	14.8	1.1	0	62
5	10030	A	0	20.5	35.9	0.6	0	48
5	10030	B	0	0.2	18.8	0.0	0	46
5	10040	A	0	-0.4	18.6	0.0	0	50
5	10040	B	0	4.0	15.5	0.0	0	62
5	10040	C	0	2.4	8.4	0.0	0	54
5	10050	A	0	1.9	13.2	0.0	0	47
5	10050	B	0	7.3	23.3	0.1	0	54
5	10060	A	0	2.7	6.5	0.1	0	52
5	10060	B	0	-2.7	12.0	0.0	0	59
5	10070	A	0	5.8	13.3	0.2	0	48
5	10080	A	0	2.3	14.7	0.0	0	49
5	10090	A	0	1.3	21.0	0.0	0	46
5	10100	A	0	2.6	18.2	0.0	0	51
5	10150	A	0	-0.5	5.8	0.0	0	54
5	10160	A	0	1.0	5.7	0.0	0	59
5	10170	A	0	4.1	9.5	0.2	0	48
5	10180	A	0	5.5	7.3	0.5	0	59
5	10190	A	1	18.2	20.1	1.1	0	46
5	10200	A	0	8.7	14.8	0.4	0	59
5	10200	B	0	13.9	44.5	0.2	0	49
5	10210	A	0	26.3	62.2	0.4	0	39
5	10210	B	0	3.6	11.8	0.1	0	52
5	10220	A	0	3.3	6.7	0.2	0	71
5	10220	B	0	30.4	50.6	0.7	0	44
5	10230	A	0	13.2	51.3	0.1	0	42

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.

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FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM) INPHASE	QUAD.	CONDUCTOR CTP MHOS	DEPTH MTRS	BIRD HEIGHT MTRS
5	10230	B	0	12.2	19.9	0.5	0	55
5	10240	A	1	20.7	23.0	1.1	0	57
5	10250	A	1	42.0	43.2	1.6	0	48
5	10260	A	0	10.3	25.4	0.2	0	58
5	10280	A	0	4.3	12.0	0.1	0	51
5	10450	A	0	4.7	12.9	0.1	0	52
5	10460	A	0	9.9	15.0	0.5	0	57
5	10470	A	0	3.9	14.6	0.0	0	45
5	10510	A	0	8.2	18.8	0.2	0	57
5	10580	A	0	13.1	17.7	0.7	1	40
6	10740	A	0	18.9	34.9	0.5	0	43
6	10750	A	0	18.7	46.0	0.3	0	39
6	10760	A	0	9.1	28.4	0.2	0	45
6	10790	A	0	9.8	33.3	0.1	0	47
6	10790	B	0	7.4	54.5	0.0	0	37
6	10800	A	0	6.4	33.7	0.0	0	47
6	10800	B	0	8.0	25.2	0.1	0	50
6	10810	A	0	11.6	53.5	0.1	0	40
6	10820	A	0	6.1	32.9	0.0	0	48
6	10830	A	0	21.9	81.7	0.2	0	43
6	10840	A	0	10.3	40.9	0.1	0	49
6	10850	A	0	7.9	16.0	0.3	0	48
6	10860	A	0	7.8	13.4	0.4	0	53
6	10890	A	0	1.0	8.7	0.0	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.

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FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM) INPHASE	QUAD.	CONDUCTOR CTP MHOS	DEPTH MTRS	BIRD HEIGHT MTRS
6	10900	A	0	1.1	16.2	0.0	0	41
6	10910	A	0	10.1	63.9	0.0	0	36
6	10920	A	0	8.8	53.5	0.0	0	41
6	10930	A	0	9.0	14.2	0.5	0	50
7	11071	A	0	9.3	45.4	0.1	0	43
7	11080	A	0	9.9	62.8	0.0	0	35
7	11090	A	0	8.1	30.2	0.1	0	54
7	11100	A	0	7.3	20.3	0.2	0	45
7	11100	B	0	9.6	34.3	0.1	0	51
7	11110	A	0	12.2	36.3	0.2	0	48
7	11110	B	0	19.8	25.1	0.9	0	48
7	11120	A	0	13.4	21.6	0.5	0	40
7	11120	B	0	13.2	35.5	0.2	0	43
7	11130	A	0	10.2	21.0	0.3	0	48
7	11130	B	0	10.0	18.5	0.4	0	53
7	11140	A	0	8.9	17.2	0.3	0	42
7	11140	B	0	11.6	22.2	0.4	0	41
7	11150	A	0	11.0	17.5	0.5	0	49
7	11150	B	0	6.8	16.1	0.2	0	48
7	11160	A	0	5.4	21.7	0.1	0	48
7	11160	B	0	10.7	23.4	0.3	0	46
7	11170	A	0	8.4	16.2	0.3	0	49
7	11170	B	0	3.9	11.5	0.1	0	51
7	11180	A	0	7.3	26.6	0.1	0	44
7	11190	A	0	10.6	24.5	0.3	0	48
7	11200	A	0	3.5	11.0	0.1	0	41
7	11200	B	0	6.7	42.4	0.0	0	37

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.

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FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM) INPHASE	QUAD.	CONDUCTOR CTP MHOS	DEPTH MTRS	BIRD HEIGHT MTRS
7	11210	A	0	25.9	83.7	0.3	0	40
7	11210	B	0	13.5	57.6	0.1	0	41
7	11210	C	0	13.9	23.2	0.5	0	50
7	11220	A	0	7.5	19.4	0.2	0	49
7	11220	B	0	16.5	75.8	0.1	0	37
7	11220	C	0	20.4	81.1	0.2	0	39
7	11230	A	0	19.6	68.5	0.2	0	42
7	11230	B	0	12.4	28.5	0.3	0	45
7	11240	A	0	9.1	42.3	0.1	0	39
7	11240	B	0	5.5	48.8	0.0	0	38
7	11240	C	0	11.9	71.2	0.0	0	37
7	11240	D	0	17.2	65.1	0.2	0	42
7	11250	A	0	21.4	64.0	0.3	0	44
7	11250	B	0	17.8	58.2	0.2	0	44
7	11250	C	0	12.8	56.0	0.1	0	41
7	11250	D	0	-3.6	21.9	0.0	0	48
7	11260	A	0	-10.7	42.7	0.0	0	37
7	11260	B	0	12.2	70.6	0.1	0	38
7	11260	C	0	23.1	89.7	0.2	0	38
7	11260	D	0	25.3	88.4	0.2	0	39
7	11270	A	0	17.5	57.7	0.2	0	45
7	11270	B	0	13.8	55.8	0.1	0	44
7	11270	C	0	12.6	54.3	0.1	0	44
7	11280	A	0	18.0	49.3	0.3	0	41
7	11280	B	0	18.2	63.5	0.2	0	41
7	11290	A	0	16.9	49.2	0.2	0	40
7	11300	A	0	21.6	46.4	0.4	0	42
7	11300	B	0	12.8	40.1	0.2	0	43
7	11310	A	0	12.4	43.5	0.2	0	41
7	11310	B	0	22.3	46.0	0.5	0	42
7	11310	C	1	41.9	55.6	1.1	0	41
7	11310	D	0	7.4	56.4	0.0	0	43
7	11320	A	0	24.2	50.4	0.5	0	42

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.

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FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM) INPHASE	AMPLITUDE (PPM) QUAD.	CONDUCTOR CTP MHOS	CONDUCTOR DEPTH MTRS	BIRD HEIGHT MTRS
7	11320	B	2	53.8	50.1	2.0	0	41
7	11320	C	1	47.7	55.5	1.4	0	38
7	11320	D	0	18.8	56.4	0.3	0	39
7	11331	A	0	14.1	48.2	0.2	0	44
7	11331	B	2	83.6	69.2	2.7	0	42
7	11331	C	2	63.0	57.1	2.2	0	41
7	11331	D	0	6.4	36.3	0.0	0	41
7	11340	A	0	19.0	41.1	0.4	0	43
7	11340	B	1	31.1	39.3	1.1	0	45
7	11340	C	0	14.8	45.9	0.2	0	47
7	11350	A	0	21.1	60.3	0.3	0	47
7	11350	B	0	20.9	34.4	0.6	0	46
7	11350	C	0	15.4	37.0	0.3	0	47
7	11360	A	0	33.7	51.4	0.9	0	38
7	11360	B	0	34.1	99.0	0.4	0	37
7	11370	A	0	27.5	76.1	0.3	0	40
7	11370	B	0	34.0	55.1	0.8	0	39
7	11380	A	1	35.4	38.4	1.4	0	45
7	11380	B	0	14.8	38.9	0.3	0	45
7	11390	A	0	11.2	42.4	0.1	0	42
7	11390	B	2	93.7	72.3	3.0	0	37
7	11400	A	2	75.3	66.6	2.4	0	38
7	11400	B	0	10.6	30.4	0.2	0	42
7	11410	A	0	5.8	9.8	0.3	0	56
7	11410	B	2	25.4	18.8	2.1	0	59
7	11420	A	2	25.2	14.4	2.9	0	48
7	11420	B	0	4.3	7.2	0.3	0	54
7	11430	A	1	13.0	10.7	1.4	0	55
7	11440	A	0	7.3	13.1	0.3	0	47
7	11440	B	0	4.1	7.0	0.3	7	47
7	11450	A	0	5.7	8.6	0.4	0	53
7	11460	A	0	4.8	21.9	0.0	0	46

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.

FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM) INPHASE	QUAD.	CONDUCTOR CTP MHOS	DEPTH MTRS	BIRD HEIGHT MTRS
7	11460	B	0	8.8	16.0	0.4	0	48
7	11470	A	0	10.8	26.2	0.3	0	45
7	11480	A	0	12.6	27.0	0.3	0	44
7	11490	A	0	28.1	39.3	0.9	0	41
7	11490	B	0	3.6	27.8	0.0	0	45
7	11500	A	0	2.1	22.9	0.0	0	44
7	11500	B	2	51.7	31.2	3.5	0	46
7	11510	A	2	36.8	26.4	2.5	0	50
7	11520	A	0	19.4	26.1	0.8	0	50
7	11530	A	0	18.8	30.4	0.6	0	38
7	11530	B	0	10.1	31.8	0.2	0	37
7	11540	A	0	4.2	30.9	0.0	0	43
7	11540	B	1	30.5	33.1	1.3	0	44
7	11550	A	1	16.6	19.1	1.0	0	53
7	11550	B	0	3.5	41.0	0.0	0	40
7	11561	A	0	7.7	12.2	0.4	0	50
7	11561	B	0	7.4	10.4	0.5	3	45
8	11570	A	0	8.3	8.8	0.8	0	54
8	11570	B	0	5.0	10.4	0.2	0	54
8	11580	A	0	11.1	24.7	0.3	0	46
8	11580	B	0	5.7	16.3	0.1	0	49
8	11590	A	0	5.8	18.8	0.1	0	53
8	11600	A	0	9.8	35.2	0.1	0	44
8	11610	A	0	7.8	40.2	0.0	0	44
8	11620	A	0	7.6	33.5	0.1	0	45
8	11630	A	0	13.6	57.2	0.1	0	46
8	11640	A	0	12.1	56.5	0.1	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.

J8751 KEEZHIK AND CADMAN LAKES

				AMPLITUDE (PPM)		CONDUCTOR		BIRD
FLIGHT	LINE	ANOMALY	CATEGORY	INPHASE	QUAD.	CTP MHOS	DEPTH MTRS	HEIGHT MTRS
8	11650	A	0	6.9	46.3	0.0	0	44
8	11700	A	0	4.8	20.3	0.0	0	47
8	11710	A	0	7.1	20.1	0.2	0	52
8	11720	A	0	15.8	28.6	0.5	0	48
8	11730	A	0	20.2	37.9	0.5	0	43
8	11740	A	0	17.7	44.7	0.3	0	42

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, 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 eighteen 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 Noramco Explorations Inc. and from a review of the proprietary airborne geophysical survey flown by Aerodat Limited for Noramco Explorations Inc. 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 Noramco Explorations Inc.

Signed,

Robert J. de Carle

Palgrave, Ontario — Robert J. de Carle

October 28, 1987 — Consulting Geophysicist

Ministry of Northern Development and Mines

Ontario

Report of Work

(Geophysical, Geological, Geochemical and Expenditure)

#559 Land Management Dec. 29

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

52P16SW9489 2.10565 KEEZHIK LAKE (EAST A 900

File 913016 Keezhik Lake Property

Type of Survey(s): Airborne Geophysical Survey

Claim Holder(s): Pure Gold Resources Inc. 1-7689

Address: 1275 Main St. W. North Bay, Ontario

Survey Company: Aerodat Ltd

Date of Survey (from & to): 21 Day 09 Mo. 87 Yr. – 22 Day 09 Mo. 87 Yr.

Total Miles of line Cut: 430 line kms.

Name and Address of Author (of Geo-Technical report): 3883 Nashua Drive, Mississauga, Ontario L4V 1R5.

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	

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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)

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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.
TB	913016		TB	919491	
	913017			919492	
	913018			919493	
	913019			919494	
	913020			919495	
	913021			919502	
	913022			919509	
	913023			919516	
	913024			919523	
	913025			919545	
	913026			919546	
	913027			919547	
	913185			919548	
	913186			919549	
	913187			919550	
	913188			919557	
	913189			919558	
	913190			919581	
	913191			919582	
	919487			919583	
	919488			919584	
	919489			919585	
	919490			919586	

Total number of mining claims covered by this report of work: 208

For Office Use Only		
Total Days Cr. Recorded	Date Recorded	Mining Recorder
16,640	November 9, 1987	Audrey M. Hayes
	Date Approved as Recorded	Branch Director
	16 Dec 87	[signature]

Date	Recorded Holder or Agent (Signature)
Nov 4, 1987	Michelle Dubeau

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: Noramco Explorations Inc. 1275 Main St. W. North Bay Ont P1B 2W7

Date Certified | Certified by (Signature)

Land Management Dec. 29

Ministry of Northern Development and Mines
Ontario

Report of Work

(Geophysical, Geological, Geochemical and Expenditures)

Cadman Lake #560

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.

File 919496

2.10565

Type of Survey(s): Airborne Geophysical Surveys	Township or Area: East Arm Keechik Lake G-288
Claim Holder(s): Pure Gold Resources Inc.	Prospector's Licence No.: T-4689
Address: 1210 Main Str. W. North Bay, Ontario P1B 2W6	
Survey Company: Aerodat Ltd	Date of Survey (from & to): Day — Mo. 09 Yr. 87 / Day — Mo. 09 Yr. 87 · Total Miles of line Cut: 185 kms.
Name and Address of Author (of Geo-Technical report): 3883 Nashua Drive Mississauga, Ontario 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	

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NOV 20 1987
MINING LANDS SECTION

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):

RECEIVED
NOV 09 1987

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)
Nov. 4 1987	Michelle Dubeau

Mining Claims Traversed (List in numerical sequence)

Prefix	Number	Expend. Days Cr.	Prefix	Number	Expend. Days Cr.
TB	919496		TB	919522	
	919497			919524	
	919498			919525	
	919499			919526	
	919500			919527	
	919501			919528	
	919503			919529	
	919504			919530	
	919505			919531	
	919506			919532	
	919507			919533	
	919508			919534	
	919510			919535	
	919511			919536	
	919512			919537	
	919513			919538	
	919514			919539	
	919515			919540	
	919517			919541	
	919518			919542	
	919519			919543	
	919520			919544	
	919521			919551	

Total number of mining claims covered by this report of work: 73.

For Office Use Only

Total Days Cr. Recorded	Date Recorded	Mining Recorder
5840	November 9 1987	[signature]
	Date Approved as Recorded	Branch Director: See revised work statement

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: Noramco Explorations Inc. 1210 Main St. W. North Bay Ont. P1B 2W6

Date Certified	Certified by (Signature)
Nov. 4 1987	Michelle Dubeau

Ontario

Ministry of Northern Development and Mines

Geophysical-Geological-Geochemical Technical Data Statement

File ____________

Cadman Lake Prop.

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

Type of Survey(s) Airborne Geophysical Surveys

Township or Area East Arm - Keezhik Lake

Claim Holder(s) Pure Gold Resources Inc.

1210 Main St. W. North Bay, Ontario

Survey Company Aerodat Ltd.

Author of Report Robert J. de Carle

Address of Author 3883 Nashua Dr. Mississauga, Ont.

Covering Dates of Survey Sept 21 - 30 1987 (linecutting to office)

Total Miles of Line Cut 185 kms

SPECIAL PROVISIONS CREDITS REQUESTED

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

ENTER 20 days for each additional survey using same grid.

	DAYS per claim
Geophysical	
—Electromagnetic	
—Magnetometer	
—Radiometric	
—Other	
Geological	
Geochemical	

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

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

DATE: Nov 4, 1987 SIGNATURE: Michelle Dubreau
Author of Report or Agent

OFFICE USE ONLY

Res. Geol. ____________ Qualifications ____________

Previous Surveys

File No.	Type	Date	Claim Holder

MINING CLAIMS TRAVERSED
List numerically

(prefix) (number)

See list attached

If space insufficient, attach list

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NOV 24 1987
MINING LANDS SECTION

TOTAL CLAIMS 73.

837 (85/12)

GEOPHYSICAL TECHNICAL DATA

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

Number of Stations ____________ Number of Readings ____________

Station interval ____________ Line spacing ____________

Profile scale ____________

Contour interval ____________

MAGNETIC

Instrument ____________

Accuracy – Scale constant ____________

Diurnal correction method ____________

Base Station check-in interval (hours) ____________

Base Station location and value ____________

ELECTROMAGNETIC

Instrument ____________

Coil configuration ____________

Coil separation ____________

Accuracy ____________

Method: ☐ Fixed transmitter ☐ Shoot back ☐ In line ☐ Parallel line

Frequency ____________
(specify V.L.F. station)

Parameters measured ____________

GRAVITY

Instrument ____________

Scale constant ____________

Corrections made ____________

Base station value and location ____________

Elevation accuracy ____________

INDUCED POLARIZATION RESISTIVITY

Instrument ____________

Method ☐ Time Domain ☐ Frequency Domain

Parameters – On time ____________ Frequency ____________

– Off time ____________ Range ____________

– Delay time ____________

– Integration time ____________

Power ____________

Electrode array ____________

Electrode spacing ____________

Type of electrode ____________

SELF POTENTIAL

Instrument ______________________ Range ______________

Survey Method ______________________

Corrections made ______________________

RADIOMETRIC

Instrument ______________________

Values measured ______________________

Energy windows (levels) ______________________

Height of instrument ______________________ Background Count ______________

Size of detector ______________________

Overburden ______________________
(type, depth – include outcrop map)

OTHERS (SEISMIC, DRILL WELL LOGGING ETC.)

Type of survey ______________________

Instrument ______________________

Accuracy ______________________

Parameters measured ______________________

Additional information (for understanding results) ______________________

AIRBORNE SURVEYS

Type of survey(s) Airborne Magnetic & EM, VLF

Instrument(s) EM: Aerodat 3 frequency system VLF: Herz Totem 2A. Mag: Scintrex VIW-2321 H8 cesium
(specify for each type of survey)

Accuracy Mag = 0.1 nanoTeslas.
(specify for each type of survey)

Aircraft used Aerospatiale A-Star 350 d helicopter.

Sensor altitude EM = 30 m. VLF = 48 m. Mag = 48 m.

Navigation and flight path recovery method Mini Ranger radar positioning system.

Aircraft altitude 60 m. Line Spacing 100 m.

Miles flown over total area 615 kms. Over claims only ______________

GEOCHEMICAL SURVEY – PROCEDURE RECORD

Numbers of claims from which samples taken __________

Total Number of Samples __________

Type of Sample __________ (Nature of Material)

Average Sample Weight __________

Method of Collection __________

Soil Horizon Sampled __________

Horizon Development __________

Sample Depth __________

Terrain __________

Drainage Development __________

Estimated Range of Overburden Thickness __________

SAMPLE PREPARATION

(Includes drying, screening, crushing, ashing)

Mesh size of fraction used for analysis __________

General __________

ANALYTICAL METHODS

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

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

Others __________

Field Analysis (__________ tests)

Extraction Method __________

Analytical Method __________

Reagents Used __________

Field Laboratory Analysis

No. (__________ tests)

Extraction Method __________

Analytical Method __________

Reagents Used __________

Commercial Laboratory (__________ tests)

Name of Laboratory __________

Extraction Method __________

Analytical Method __________

Reagents Used __________

General __________

Mining Claim Prefix	Mining Claim Number	Expend. Days Cr.
TB	919496	
	919497	
	9[illegible]98	
	919499	
	919500	
	919501	
	919503	
	919504	
	919505	
	919506	
	919507	
	919508	
	919510	
	919511	
	919512	
	919513	
	919514	
	919515	
	919517	
	919518	
	919519	
	919520	
	919521	

Mining Claim Prefix	Mining Claim Number	Expend. Days Cr.
TB	919522	
	919524	
	919525	
	919526	
	919527	
	919528	
	919529	
	919530	
	919531	
	919532	
	919533	
	919534	
	919535	
	919536	
	919537	
	919538	
	919539	
	919540	
	919541	
	919542	
	919543	
	919544	
	919551	

DMAN PROPERTY CLAIMS

B	919552
B	919553
B	919554
B	919555
B	919556
B	919559
B	919560
	919561
	919562
	919563
	919564
	919565
	919566
	919567
	919568
	919569
	919570
	919571
	919572
	919573
	919574
	919575
	919576
	919577
	919578
TB	919579
TB	919580

Ministry of Northern Development and Mines

Ontario

Geophysical-Geological-Geochemical Technical Data Statement

File ____________

Keezhik

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

Type of Survey(s) Airborne Geophysical Surveys

Township or Area East Arm - Keezhik Lake

Claim Holder(s) Pure Gold Resources Inc

1210 Main St. W. North Bay, Ont

Survey Company GeoNat Ltd.

Author of Report Robert J. de Carle

Address of Author 3883 Nashua Dr. Mississauga, Ont.

Covering Dates of Survey Sept 21 - 22, 1987 (linecutting to office)

Total Miles of Line Cut ____________

SPECIAL PROVISIONS CREDITS REQUESTED

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

ENTER 20 days for each additional survey using same grid.

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

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

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

DATE: Nov. 4, 1987 SIGNATURE: [signature] Author of Report or Agent

MINING CLAIMS TRAVERSED
List numerically

(prefix) (number)

See list attached

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NOV 2 ? 1987

MINING LANDS SECTION

If space insufficient, attach list

TOTAL CLAIMS 208.

OFFICE USE ONLY

Res. Geol. ____________ Qualifications ____________

Previous Surveys

File No.	Type	Date	Claim Holder

837 (85/12)

GEOPHYSICAL TECHNICAL DATA

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

Number of Stations ____________________ Number of Readings ____________________

Station interval ____________________ Line spacing ____________________

Profile scale ____________________

Contour interval ____________________

MAGNETIC

Instrument ____________________

Accuracy – Scale constant ____________________

Diurnal correction method ____________________

Base Station check-in interval (hours) ____________________

Base Station location and value ____________________

____

ELECTROMAGNETIC

Instrument ____________________

Coil configuration ____________________

Coil separation ____________________

Accuracy ____________________

Method: ☐ Fixed transmitter ☐ Shoot back ☐ In line ☐ Parallel line

Frequency ____________________ (specify V.L.F. station)

Parameters measured ____________________

GRAVITY

Instrument ____________________

Scale constant ____________________

Corrections made ____________________

____

Base station value and location ____________________

____

Elevation accuracy ____________________

INDUCED POLARIZATION / RESISTIVITY

Instrument ____________________

Method ☐ Time Domain ☐ Frequency Domain

Parameters -- On time ____________________ Frequency ____________________

-- Off time ____________________ Range ____________________

-- Delay time ____________________

-- Integration time ____________________

Power ____________________

Electrode array ____________________

Electrode spacing ____________________

Type of electrode ____________________

SELF POTENTIAL

Instrument ______ Range ______

Survey Method ______

______

Corrections made ______

______

RADIOMETRIC

Instrument ______

Values measured ______

Energy windows (levels) ______

Height of instrument ______ Background Count ______

Size of detector ______

Overburden ______
(type, depth – include outcrop map)

OTHERS (SEISMIC, DRILL WELL LOGGING ETC.)

Type of survey ______

Instrument ______

Accuracy ______

Parameters measured ______

______

Additional information (for understanding results) ______

______

______

AIRBORNE SURVEYS

Type of survey(s) Magnetic, EM & VLF.

Instrument(s) EM = Aerodat 3 Frequency System, VLF = Herz Totem 2A, Mag = Scintrex VIW 2321 H8 cessium
(specify for each type of survey)

Accuracy Mag = 0.1 nanoteslas
(specify for each type of survey)

Aircraft used Aerospatiale A-Star 350d helicopter

Sensor altitude EM = 30 m, VLF = 48 m, Mag 48 m

Navigation and flight path recovery method Mini Ranger radar positioning system

______

Aircraft altitude 60 m Line Spacing 100 m.

Miles flown over total area 615 km Over claims only ______

GEOCHEMICAL SURVEY – PROCEDURE RECORD

Numbers of claims from which samples taken ____________________

____

____

Total Number of Samples ____________________

Type of Sample ____________________
(Nature of Material)

Average Sample Weight ____________________

Method of Collection ____________________

____

Soil Horizon Sampled ____________________

Horizon Development ____________________

Sample Depth ____________________

Terrain ____________________

____

Drainage Development ____________________

Estimated Range of Overburden Thickness ____________________

____

____

SAMPLE PREPARATION
(Includes drying, screening, crushing, ashing)

Mesh size of fraction used for analysis ____________________

____

____

____

General ____________________

____

____

____

____

____

____

____

____

____

ANALYTICAL METHODS

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

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

Others ____________________

Field Analysis (____________________ tests)

Extraction Method ____________________

Analytical Method ____________________

Reagents Used ____________________

Field Laboratory Analysis

No. (____________________ tests)

Extraction Method ____________________

Analytical Method ____________________

Reagents Used ____________________

Commercial Laboratory (____________________ tests)

Name of Laboratory ____________________

Extraction Method ____________________

Analytical Method ____________________

Reagents Used ____________________

General ____________________

____

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____

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____

____

____

Mining Claim Prefix	Mining Claim Number	Expend. Days Cr.
TB	913016	
	913017	
	913018	
	913019	
	913020	
	913021	
	913022	
	913023	
	913024	
	913025	
	913026	
	913027	
	913185	
	913186	
	913187	
	913188	
	913189	
	913190	
	913191	
	919487	
	919488	
	919489	
	919490	

Mining Claim Prefix	Mining Claim Number	Expend. Days Cr.
TB	919491	
	919492	
	919493	
	919494	
	919495	
	919502	
	919509	
	919516	
	919523	
	919545	
	919546	
	919547	
	919548	
	919549	
	919550	
	919557	
	919558	
	919581	
	919582	
	919583	
	919584	
	919585	
	919586	

KEEZHIK LAKE CLAIMS CONTINUED

CLAIM #	CLAIM #	CLAIM #	CLAIM #
919587	934905	934947	968321
919588	934906	934948	968322
919589	934907	934949	968323
919590	934908	934950	968324
919591	934909	934951	968325
919592	934910	934952	968326
919593	934911	934953	968327
919594	934912	934954	968328
919595	934913	934955	968329
919596	934914	934956	968330
919597	934915	934957	968331
919598	934916	934958	968332
919600	934917	934959	968333
920181	934918	934960	968334
920182	934919	968238	968335
920183	934920	968239	968336
920184	934921	968240	968337
920185	934922	968241	968338
920186	934923	968242	968339
920187	934924	968243	968340
920188	934925	968244	968341
920189	934926	968245	968342
920190	934927	968246	968343
920191	934928	968247	968344
920192	934929	968303	968345
920193	934930	968304	968346
920194	934931	968305	968347
920195	934932	968306	968348
920196	934933	968307	968349
920197	934934	968308	968350
920198	934935	968309	968351
920199	934936	968310	968352
934901	934937	968311	968353
934902	934938	968312	968354
934903	934939	968313	968355
934904	934940	968314	968356
	934941	968315	968357
	934942	968316	968358
	934943	968317	968359
	934944	968318	968360
	934945	968319	968361
	934946	968320	968362

December 15, 1987

Your File: 560
Our File: 2.10565

Mining Recorder
Ministry of Northern Development and Mines
435 James Street South
P.O. Box 5000
Thunder Bay, Ontario
P7C 5G6

Dear Madam:

RE: Notice of Intent dated November 26, 1987
Geophysical (Electromagnetic and Magnetometer) Survey
on Mining Claims TB 919496 et al in the Areas of
Keezhik Lake (East Arm) and Ferguson Lake

The assessment work credits, as listed with the above-mentioned Notice of Intent, have been approved as of the above date.

Please inform the recorded holder of these mining claims and so indicate on your records.

Yours sincerely,

W.R. Cowan, Manager
Mining Lands Section
Mines and Minerals Division

Whitney Block, Room 6610
Queen's Park
Toronto, Ontario
M7A 1W3

Telephone: (416) 965-4888

DK:pl
Enclosure: Technical Assessment Work Credits

cc: Mr. G.H. Ferguson
Mining & Lands Commissioner
Toronto, Ontario

Resident Geologist
Thunder Bay, Ontario

Pure Gold Resources Inc.
1210 Main Street W.
North Bay, Ontario
P1B 2W6

Ministry of Northern Development and Mines
Ontario

Technical Assessment Work Credits

File
2.10565

Date	Mining Recorder's Report of Work No.
November 26,1987	560

Recorded Holder
Pure Gold Resources Inc.

XXXXXXX Area
Keezhik Lake (East Arm) and Ferguson Lake

Type of survey and number of Assessment days credit per claim	Mining Claims Assessed
Geophysical	
Electromagnetic 40 days	TB-919496 to 501 inclusive
Magnetometer 40 days	919503 to 08 inclusive
Radiometric ______ days	919510 to 15 inclusive
Induced polarization ______ days	919517 to 22 inclusive
Other ______ days	919524 to 44 inclusive
Section 77 (19) See "Mining Claims Assessed" column	919551 to 56 inclusive
Geological ______ days	919559 to 75 inclusive
Geochemical ______ days	
Man days ☐ Airborne ☒	
Special provision ☐ Ground ☐	
☐ Credits have been reduced because of partial coverage of claims.	
☐ Credits have been reduced because of corrections to work dates and figures of applicant.	

Special credits under section 77 (16) for the following mining claims

No credits have been allowed for the following mining claims

☒ not sufficiently covered by the survey ☐ insufficient technical data filed

TB-919576 to 80 inclusive

The Mining Recorder may reduce the above credits if necessary in order that the total number of approved assessment days recorded on each claim does not exceed the maximum allowed as follows: Geophysical - 80; Geologocal - 40; Geochemical - 40; Section 77(19) - 60.

828 (85/12)

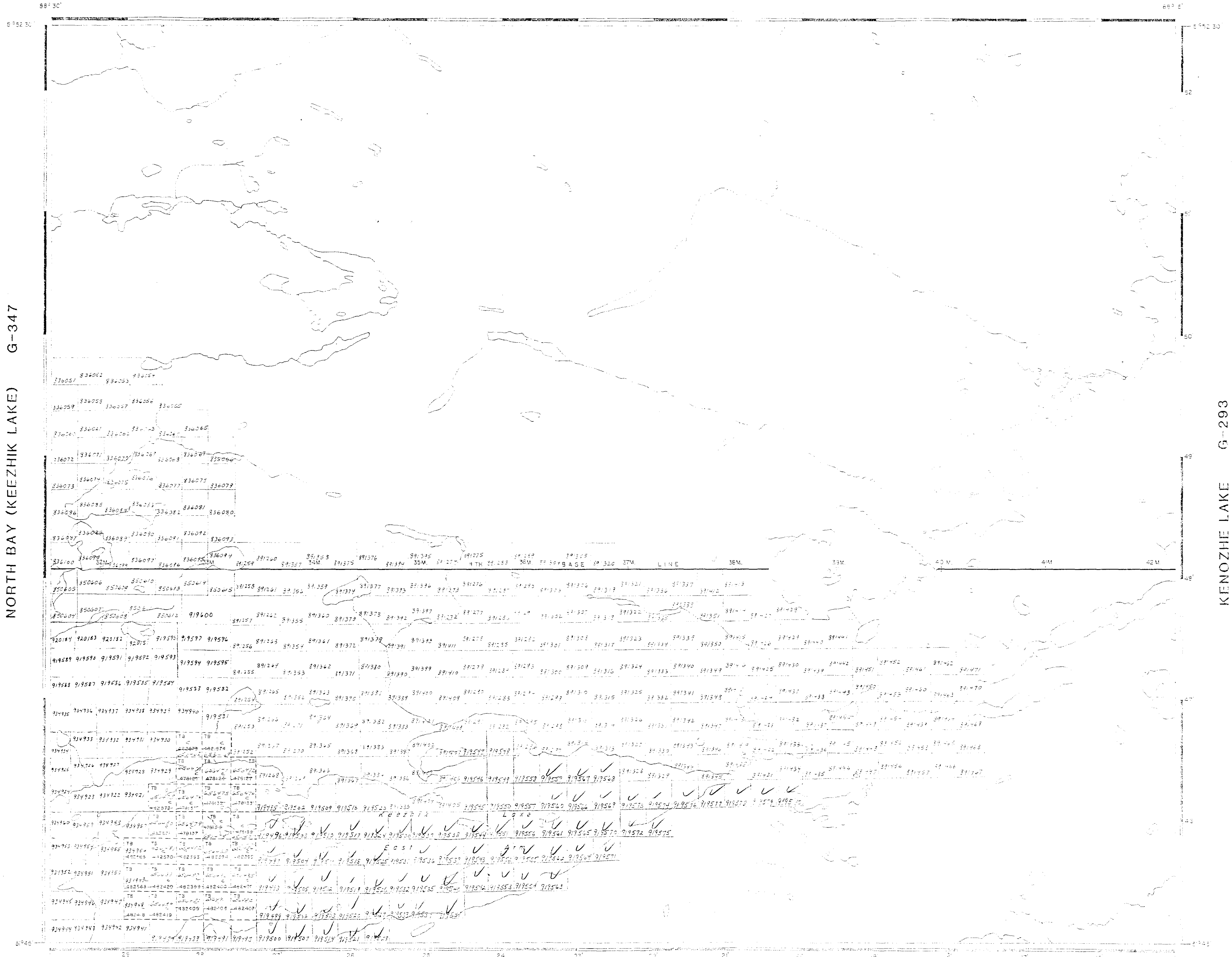
KEEZHIK LAKE CLAIMS CONTINUED

CLAIM #	CLAIM #	CLAIM #	CLAIM #
919587	934905	934947	968321
919588	934906	934948	968322
919589	934907	934949	968323
919590	934908	934950	968324
919591	934909	934951	968325
919592	934910	934952	968326
919593	934911	934953	968327
919594	934912	934954	968328
919595	934913	934955	968329
919596	934914	934956	968330
919597	934915	934957	968331
919598	934916	934958	968332
919600	934917	934959	968333
920181	934918	934960	968334
920182	934919	968238	968335
920183	934920	968239	968336
920184	934921	968240	968337
920185	934922	968241	968338
920186	934923	968242	968339
920187	934924	968243	968340
920188	934925	968244	968341
920189	934926	968245	968342
920190	934927	968246	968343
920191	934928	968247	968344
920192	934929	968303	968345
920193	934930	968304	968346
920194	934931	968305	968347
920195	934932	968306	968348
920196	934933	968307	968349
920197	934934	968308	968350
920198	934935	968309	968351
920199	934936	968310	968352
934901	934937	968311	968353
934902	934938	968312	968354
934903	934939	968313	968355
934904	934940	968314	968356
36	934941	968315	968357
	934942	968316	968358
	934943	968317	968359
	934944	968318	968360
	934945	968319	968361
	934946	968320	968362
	42	42	42

CADMAN PROPERTY CLAIMS

TB	919552
TB	919553
TB	919554
TB	919555
TB	919556
TB	919559
TB	919560
TB	919561
TB	919562
TB	919563
TB	919564
TB	919565
TB	919566
TB	919567
TB	919568
TB	919569
TB	919570
TB	919571
TB	919572
TB	919573
TB	919574
TB	919575
TB	919576
TB	919577
TB	919578
TB	919579
TB	919580

HAIL LAKE G-264



FERGUSON LAKE G-249

52P16SW9489 2.10565 KEEZHIK LAKE (EAST A

200

REFERENCES

THUNDER BAY MINING DIVISION RECEIVED FEB 10 1987 AM 7|8|9|10|11|12|1|2|3|4|5|6 PM

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)

AREA

KEEZHIK LAKE (EAST ARM)

M.N.R. ADMINISTRATIVE DISTRICT

GERALDTON

MINING DIVISION

THUNDER BAY

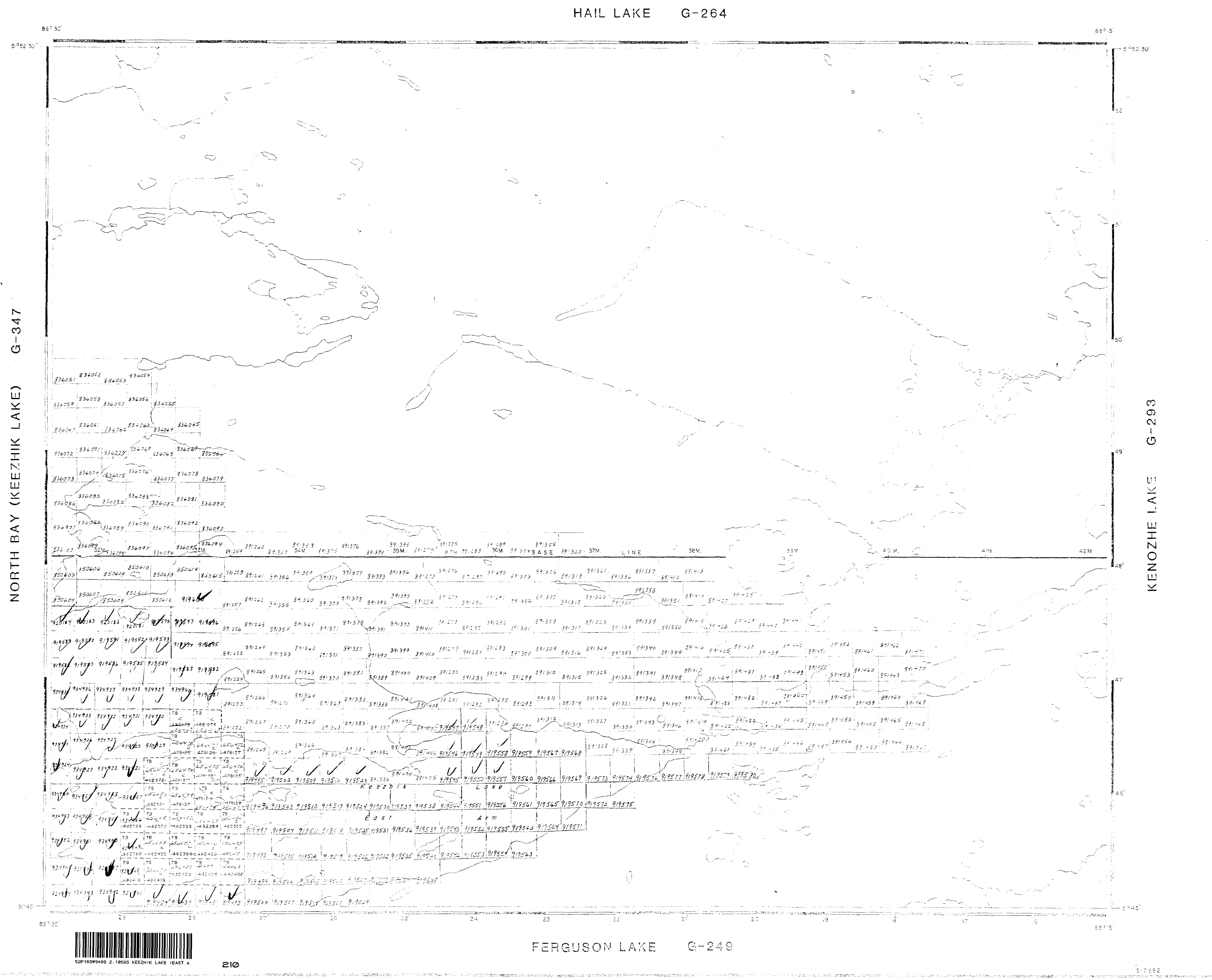
LAND TITLES / REGISTRY DIVISION

KENORA/PATRICIA

Ontario Ministry of Natural Resources — Land Management Branch

Date JUNE, 1981

G-288



REFERENCES

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	⑥

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)

AREA
KEEZHIK LAKE (EAST ARM)

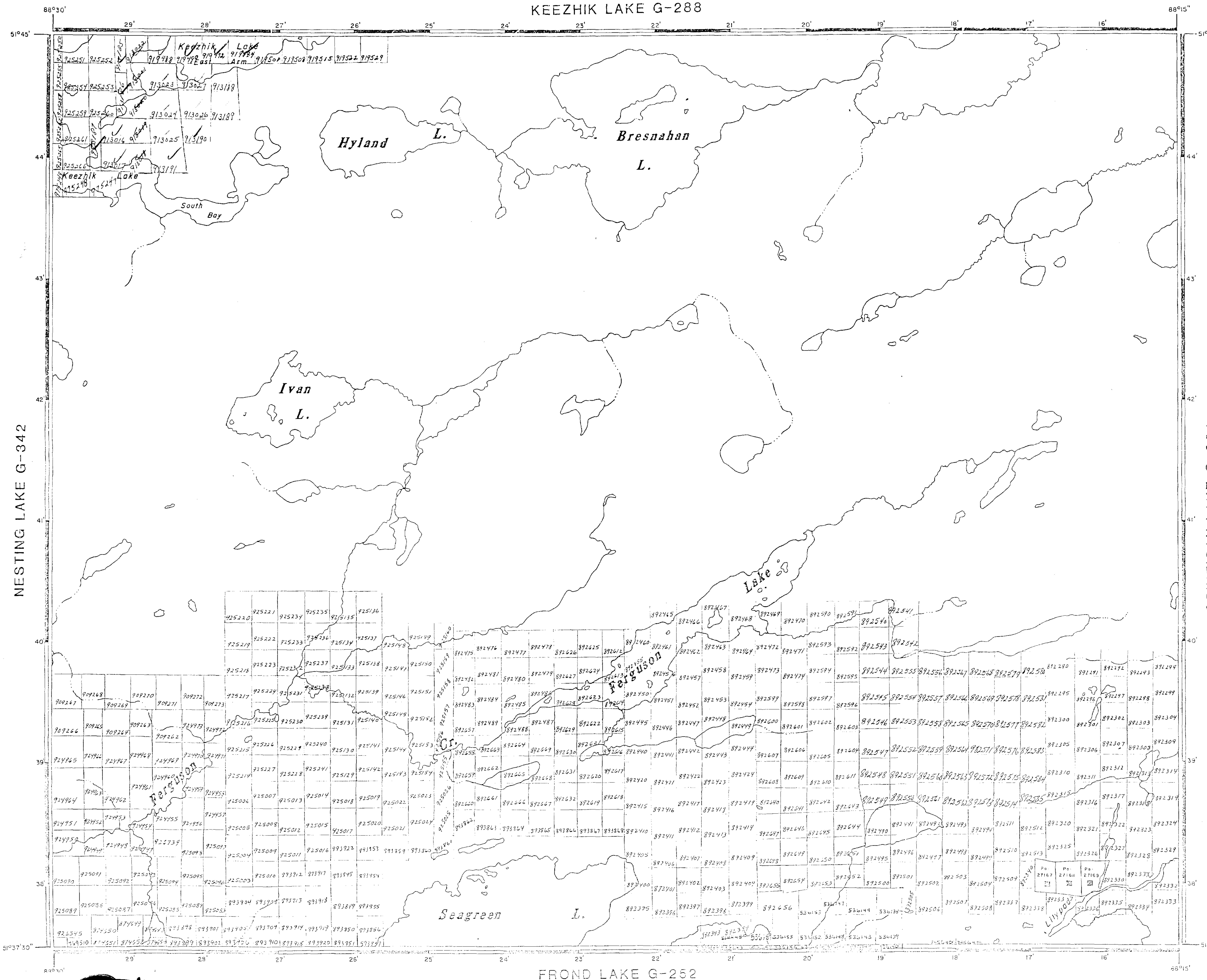
M.N.R. ADMINISTRATIVE DISTRICT
GERALDTON

MINING DIVISION
THUNDER BAY

LAND TITLES / REGISTRY DIVISION
KENORA/PATRICIA

Ministry of Natural Resources Ontario
Land Management Branch

Date JUNE, 1981
Number G-288



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)

AREA

FERGUSON LAKE

M.N.R. ADMINISTRATIVE DISTRICT

GERALDTON

MINING DIVISION

THUNDER BAY

LAND TITLES / REGISTRY DIVISION

KENORA/PATRICIA

Ministry of Natural Resources — Land Management Branch

Ontario

Date: JULY 1981 — Number: G-249

August 15, 1985

[redacted] FERGUSON LA

52P16SW9480 2.10565 KEEZHIK LAKE (EAST A

220

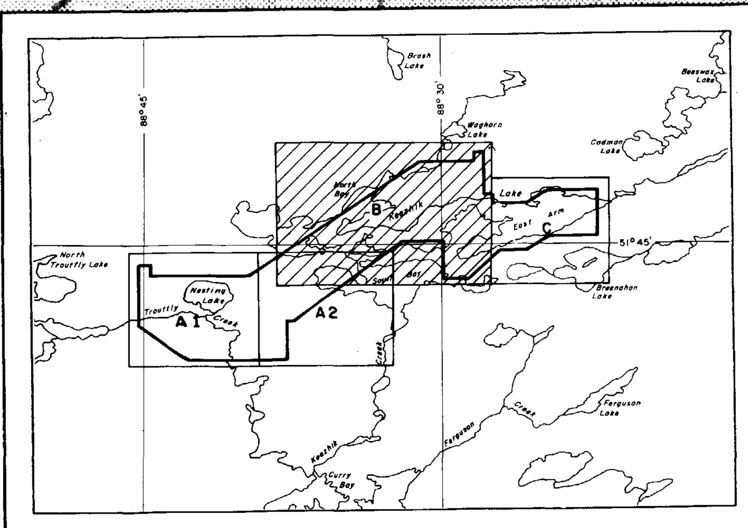
Talbot Lake Area G-426
Keezhik Lake Area (East Arm) G-288
Nesting Lake Area G-342
LEGEND
TYPE OF DOCUMENT
SYMBOL
SCALE: 1 INCH = 40 CHAINS
AREA
NORTH BAY
(KEEZHIK LAKE)
M.N.R. ADMINISTRATIVE DISTRICT
GERALDTON
MINING DIVISION
THUNDER BAY
LAND TITLES / REGISTRY DIVISION
KENORA/PATRICIA
Ministry of Natural Resources
Land Management Branch
Ontario
JUNE 30 1981
G-347
52P16SW9489 2.10565 KEEZHIK LAKE (EAST A
230


SURVEYED LINE
348
310
319
F
303±
NORTH BAY
KEEZHIK LAKE
.312
303±
LAKE
I, K
KEEZHIK
318
LAKE
KEEZHIK LAKE
EAST ARM
303±
(KEEZHIK LAKE)
310
303±
NORAMCO EXPLORATIONS INC.
BASE MAP
KEEZHIK LAKE
ONTARIO
SCALE 1 : 10,000
AERODAT LIMITED
DATE: SEPTEMBER, 1987
NTS No: 52 P/15,16
MAP No: 1
J87518

Flight Path

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

Average terrain clearance 60m
Line spacing = 100m



NORAMCO EXPLORATIONS INC.

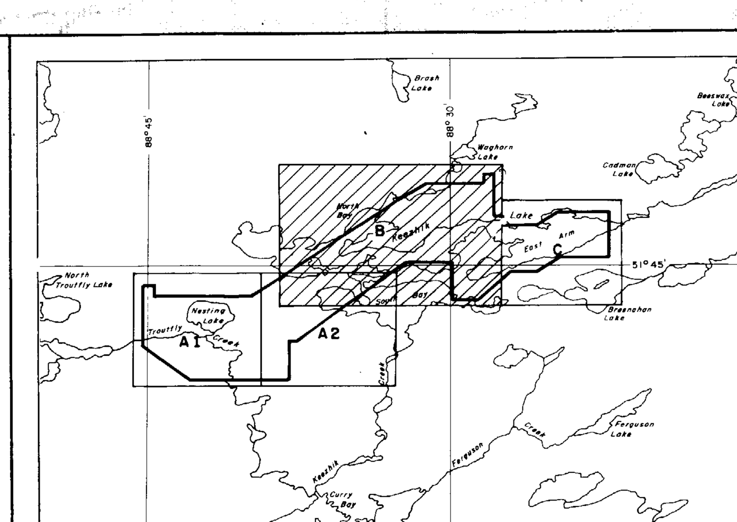
FLIGHT PATH

KEEZHIK LAKE
ONTARIO

SCALE 1:10,000

AERODAT LIMITED

DATE:	SEPTEMBER, 1987
NTS No:	52 P/15,16
MAP No:	2 J8751B



Flight Path

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

Average terrain clearance 60m
Line spacing = 100m

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).

52P16SW9489 2.10565 KEEZHIK LAKE (EAST A

260

INTERPRETATION LEGEND

- EM Anomaly A, in-phase amplitude 7 ppm. Conductivity thickness range 2 (see code)
- Interpreted bedrock conductor axis
- Possible bedrock conductor axis
- Fault
- Direction of dip
- Vertical dip

NORAMCO EXPLORATIONS INC.

INTERPRETATION

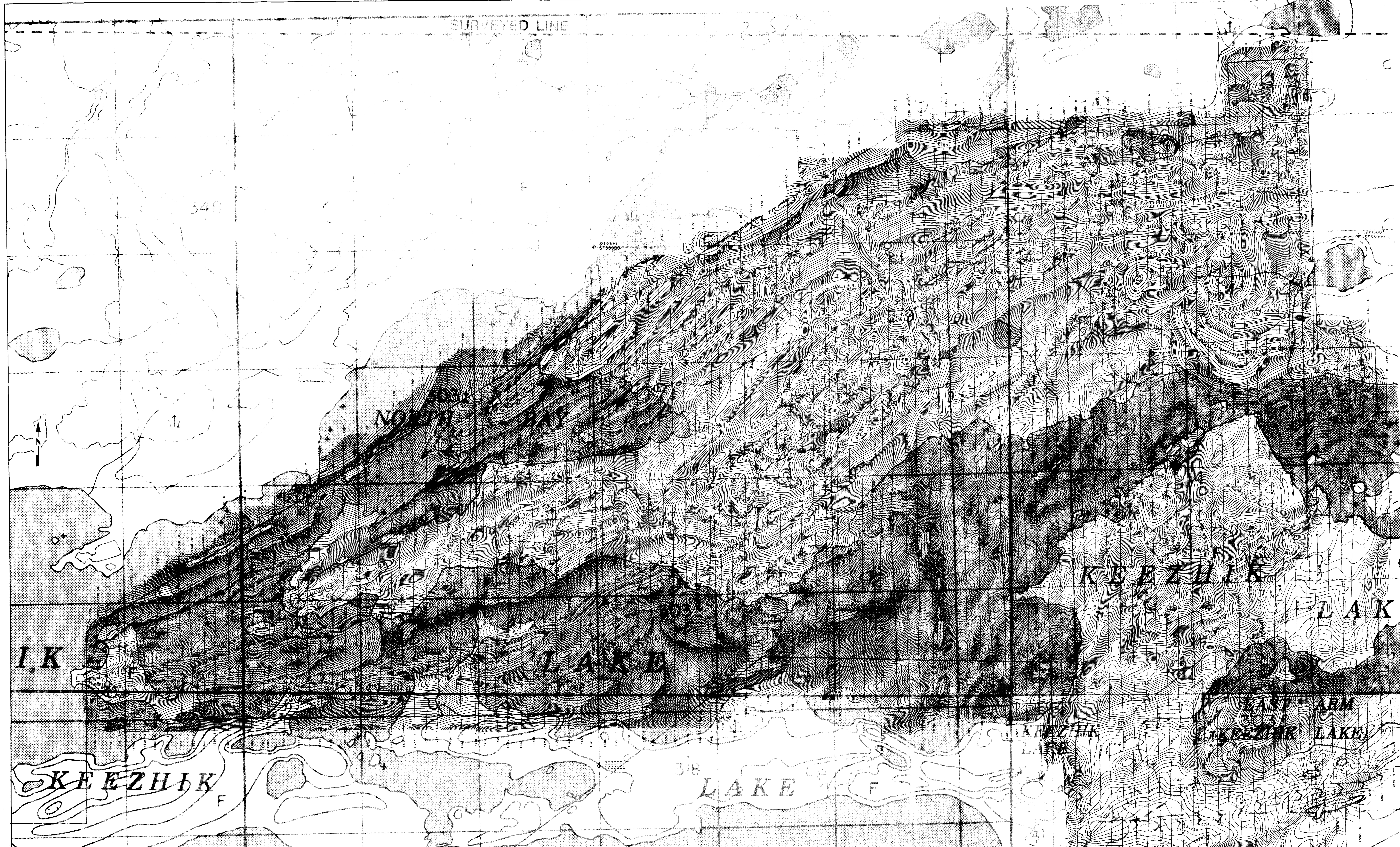
KEEZHIK LAKE

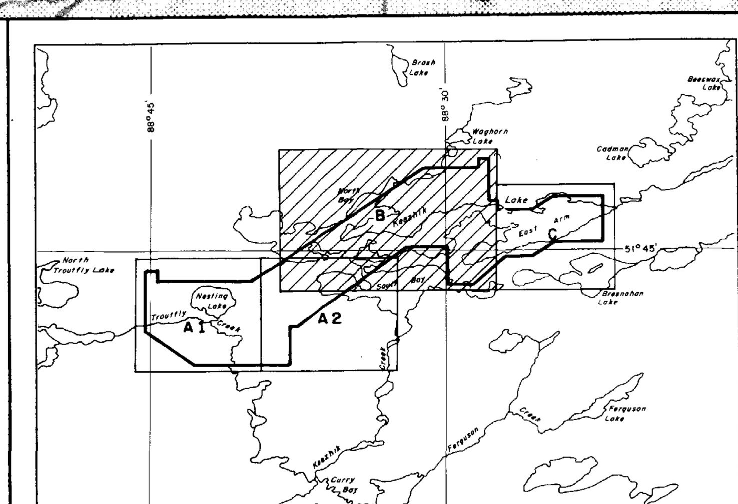
ONTARIO

SCALE 1:10,000

AERODAT LIMITED

DATE: SEPTEMBER, 1987
NTS No: 52 P/15,16
MAP No: 3 J8751B





Flight Path

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

Average terrain clearance 60m
Line spacing = 100m

Magnetics

Cesium high sensitivity magnetometer
Sensor elevation 45m

Total Field Magnetic Intensity Contours in nT

CONTOUR INTERVAL:

500 nT
100 nT
25 nT
5 nT

52P16SW9489 2.10565 KEEZHIK LAKE (EAST A

/270

NORAMCO EXPLORATIONS INC.

TOTAL FIELD MAGNETIC CONTOURS

KEEZHIK LAKE

ONTARIO

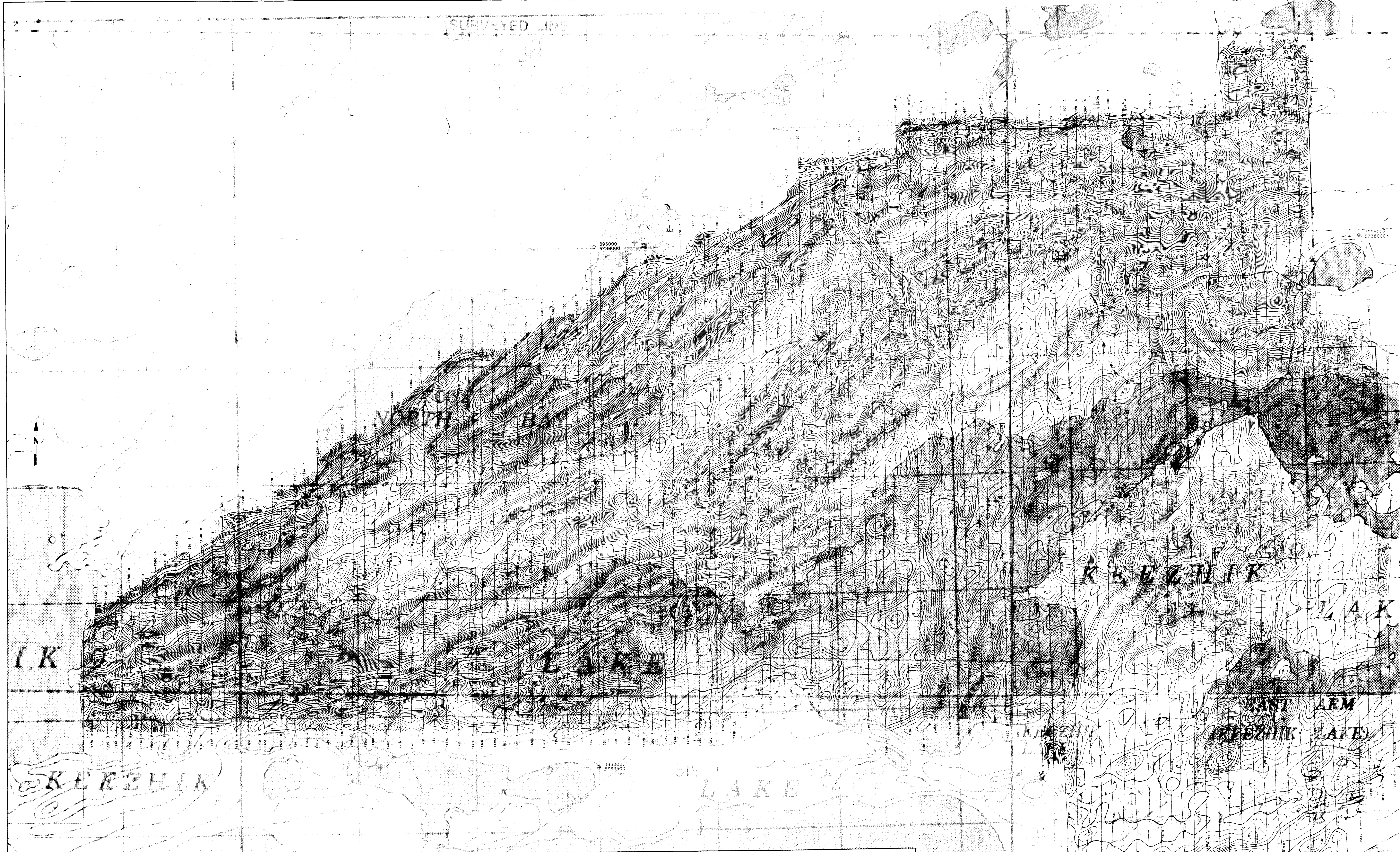
SCALE 1:10,000

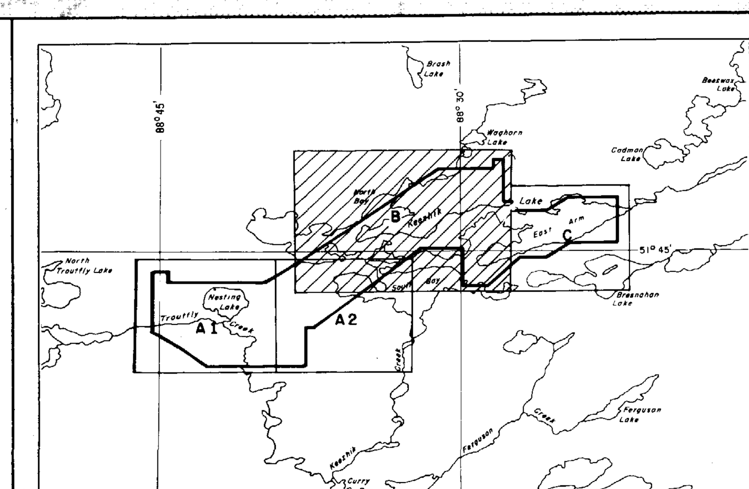
0 330 660 1320 1/2 MILE
0 100 200 500 1 KILOMETRE

AERODAT LIMITED

DATE:	SEPTEMBER, 1987
NTS No:	52 P/15,16
MAP No:	4 J8751B

5





NORAMCO EXPLORATIONS INC.

CALCULATED VERTICAL MAGNETIC GRADIENT

KEEZHIK LAKE

ONTARIO

SCALE 1:10,000

0 330 660 1320 1/2 MILE

0 100 200 500 1 KILOMETRE

AERODAT LIMITED

DATE: SEPTEMBER, 1987

NTS No: 52 P/15,16

MAP No: 5 J8751B

Flight Path

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

Average terrain clearance 60m
Line spacing = 100m

Vertical Gradient

Vertical magnetic gradient calculated from the total field magnetic intensity

Contours in nT/m

Cesium high sensitivity magnetometer
Sensor elevation 45m

CONTOUR INTERVAL:

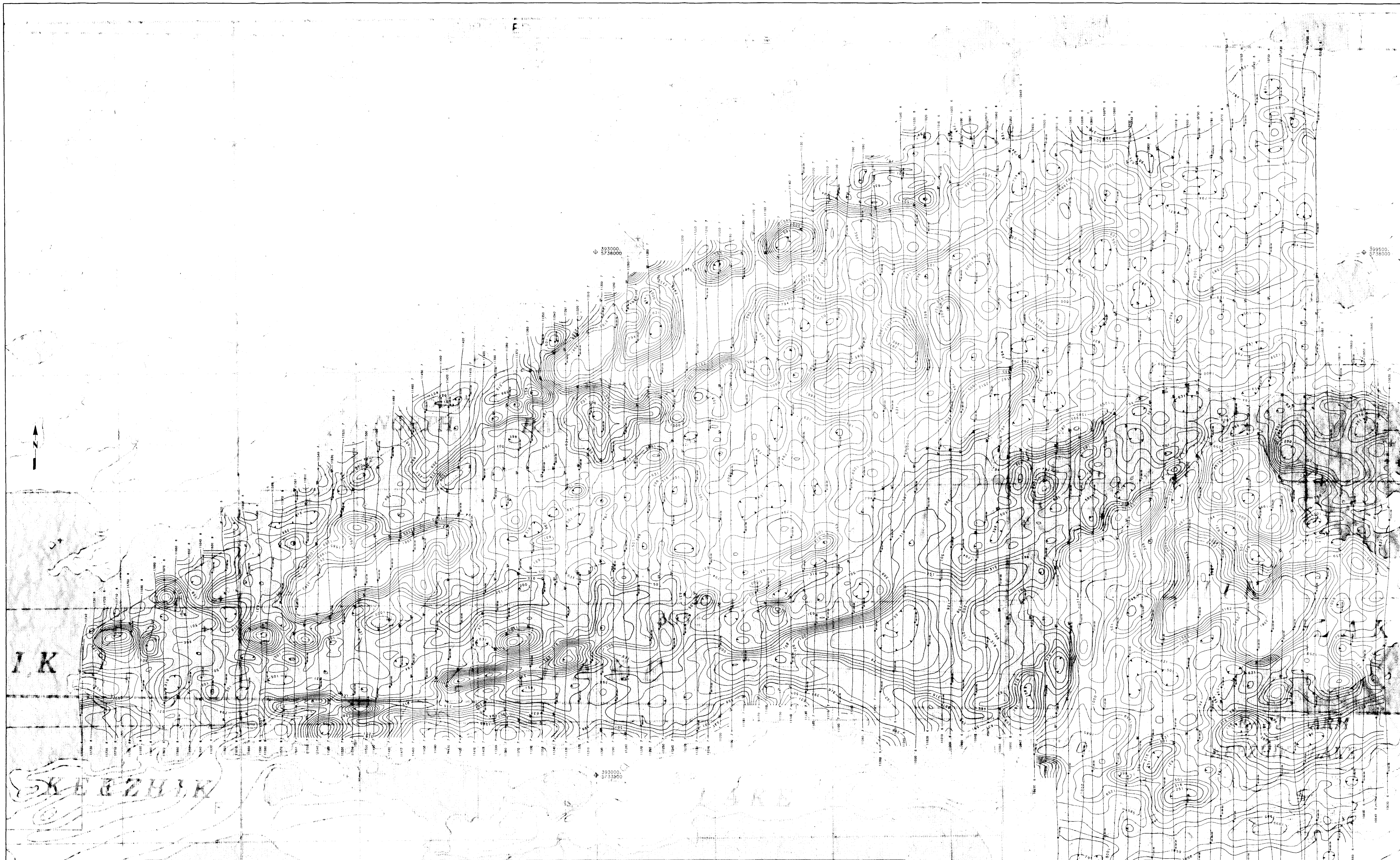
nT/m ....

nT/m ....

nT/m ....

52P16SW9469 2.10565 KEEZHIK LAKE (EAST A

280



Flight Path

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

Average terrain clearance 60m
Line spacing = 100m

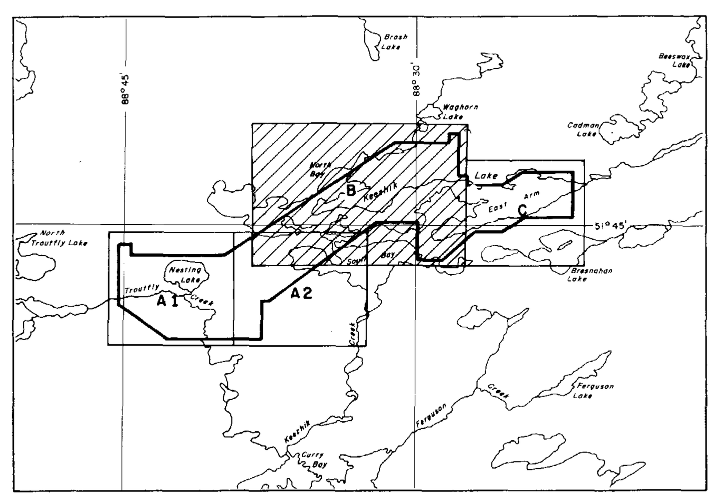
Apparent Resistivity

Contouring in ohm-m at logarithmic intervals.

Calculated from 4600 Hz coaxial EM response assuming a 200 m conductive layer.
Sensor elevation 30m

52P15SW9489 2.10565 KEEZHIK LAKE (EAST A

290



NORAMCO EXPLORATIONS INC.

APPARENT RESISTIVITY CONTOURS

KEEZHIK LAKE

ONTARIO

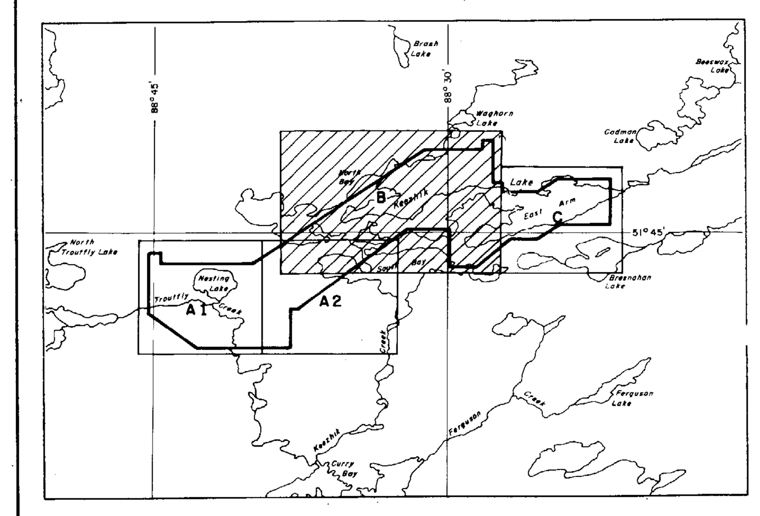
SCALE 1:10,000

0 330 660 1320 1/2 MILE

0 100 200 500 1 KILOMETRE

AERODAT LIMITED

DATE:	SEPTEMBER, 1987
NTS No:	52 P/15,16
MAP No:	6 J8751B



NORAMCO EXPLORATIONS INC.

VLF-EM TOTAL FIELD CONTOURS

KEEZHIK LAKE

ONTARIO

SCALE 1:10,000

AERODAT LIMITED

DATE: SEPTEMBER, 1987

NTS No: 52 P/15,16

MAP No: 7 J87518

Flight Path

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

Average terrain clearance 60m
Line spacing = 100m

VLF-EM

VLF-EM Total Field Intensity in percent

Station: NLK (Jim Creek, Wash.) 24.8 kHz

Sensor elevation 45m

CONTOUR INTERVAL:

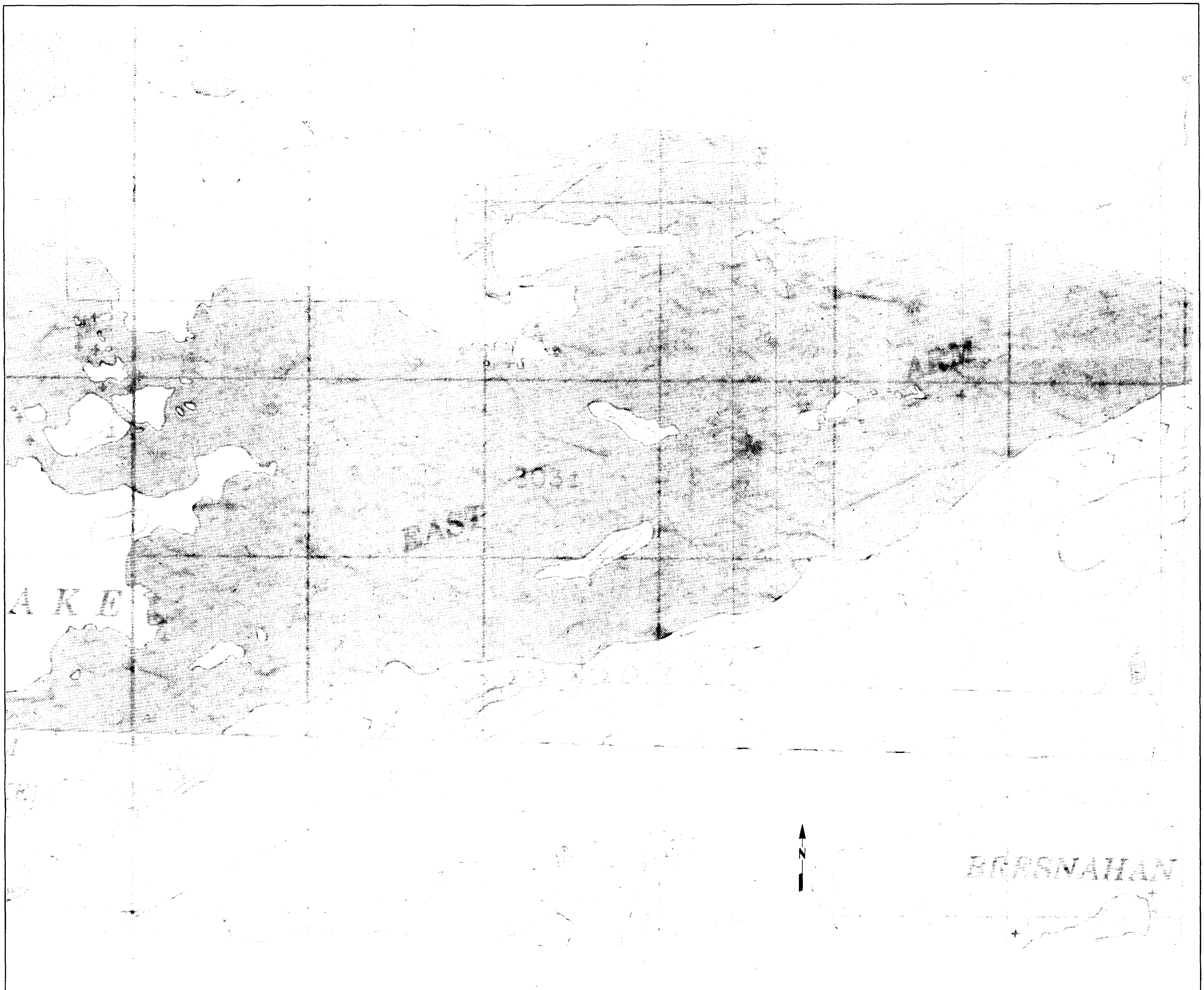
25 %

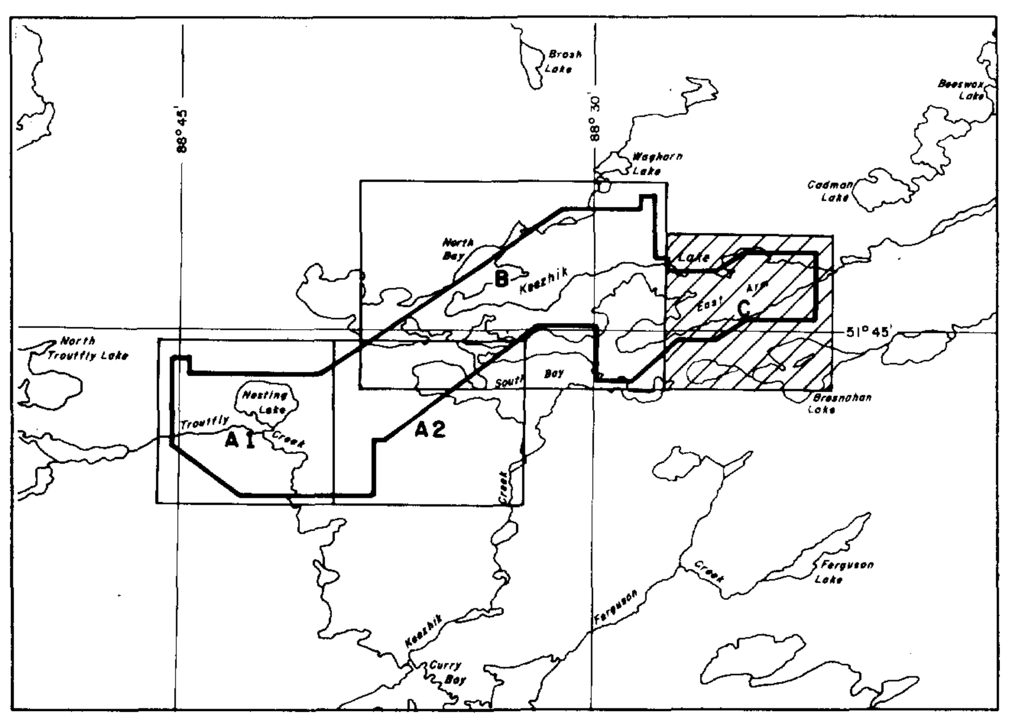
5%

1%

52P16SW9489 2.10565 KEEZHIK LAKE (EAST A

300





NORAMCO EXPLORATIONS INC.

BASE MAP

CADMAN LAKE

ONTARIO

SCALE 1:10,000

0 330 660 1320 1/2 MILE

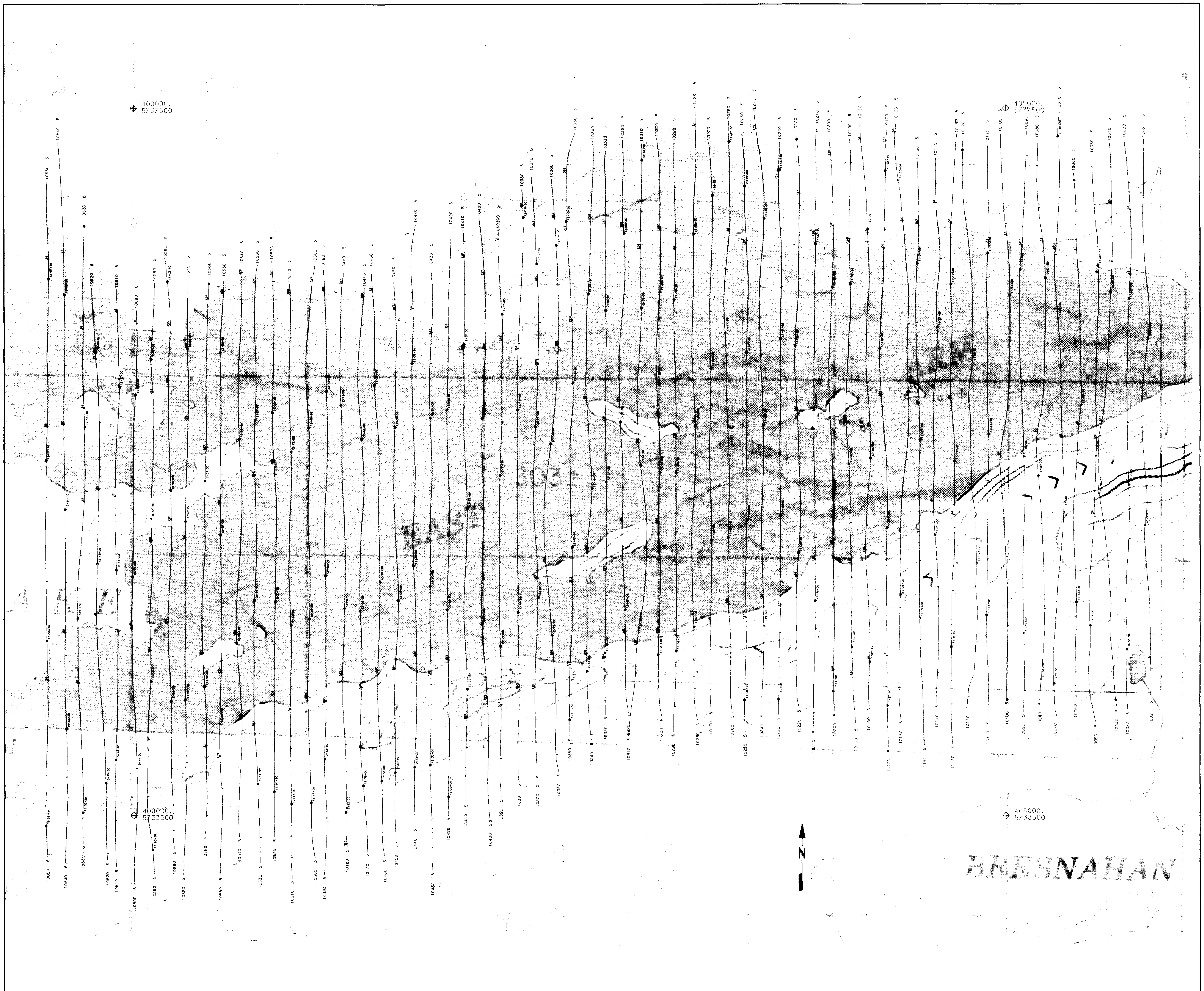
0 100 200 500 1 KILOMETRE

AERODAT LIMITED

DATE: SEPTEMBER, 1987

NTS No: 52 P/16

MAP No: 1 J8751C

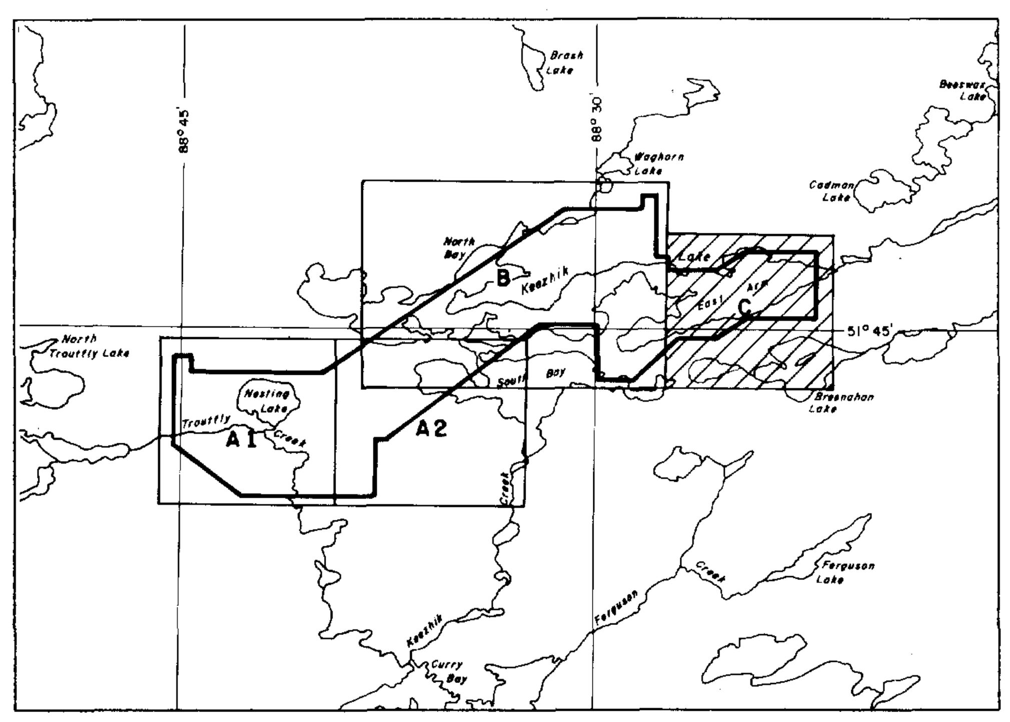


Flight Path

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

Average terrain clearance 60m
Line spacing = 100m

320



NORAMCO EXPLORATIONS INC.

FLIGHT PATH

CADMAN LAKE

ONTARIO

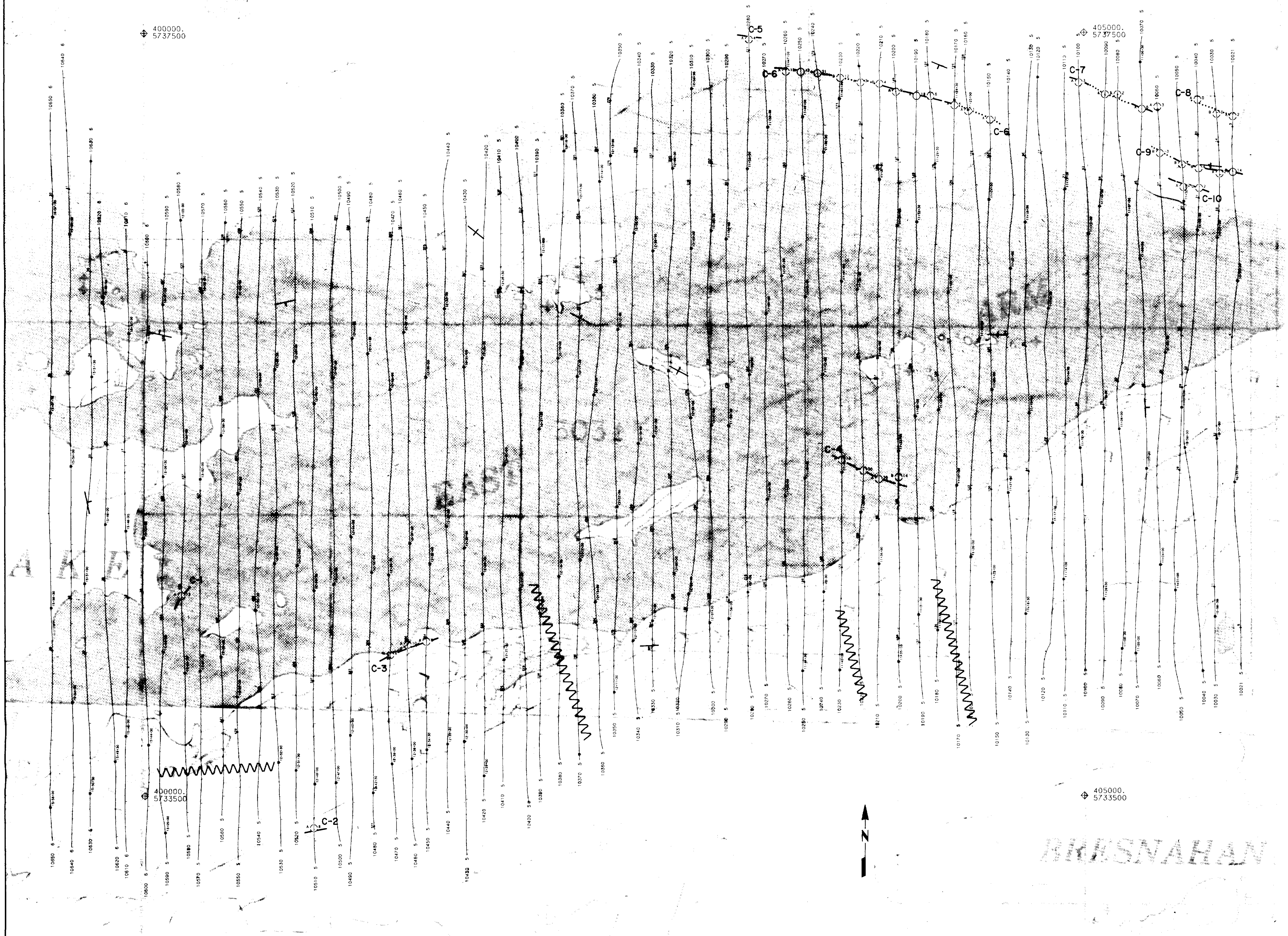
SCALE 1:10,000

0 330 660 1320 1/2 MILE

0 100 200 500 1 KILOMETRE

AERODAT LIMITED

DATE:	SEPTEMBER, 1987
NTS No:	52 P/16
MAP No:	2 J8751C



Flight Path

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

Average terrain clearance 60m
Line spacing = 100m

EM Anomalies

Conductivity Thickness (mhos)
0 - 1
1 - 2
2 - 4
4 - 8
8 - 15
15 - 30
> 30

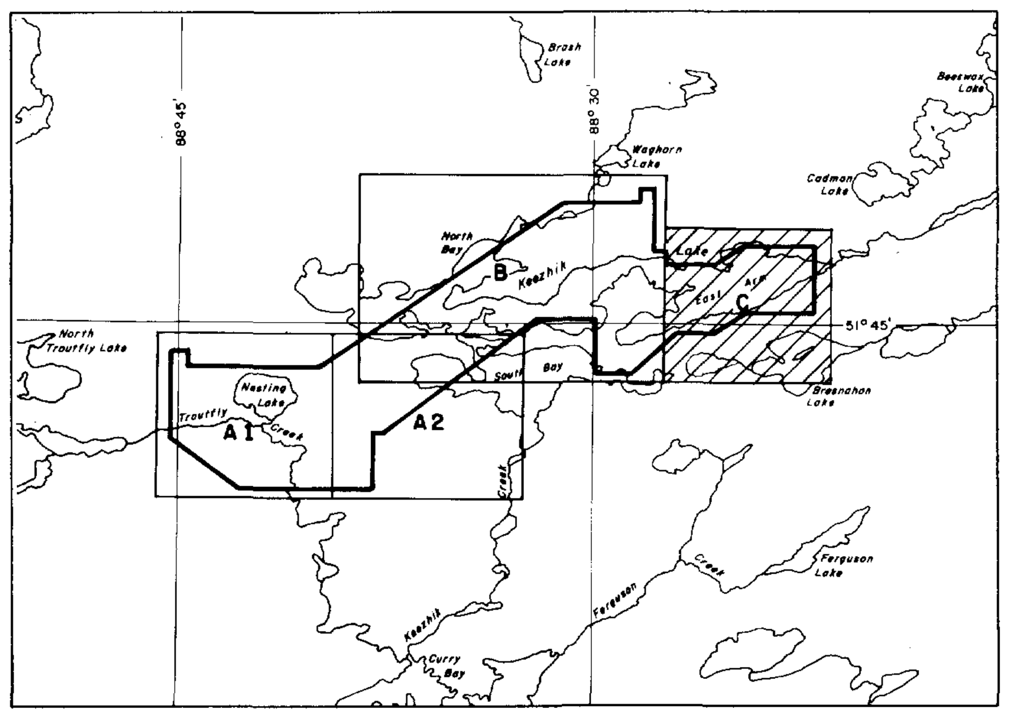
EM Anomaly A, 4600 Hz inphase amplitude 7 ppm. Conductivity thickness 1-2 mhos (see code).

INTERPRETATION LEGEND

- EM Anomaly A, in-phase amplitude 7 ppm. Conductivity thickness range 2 (see code)
- Interpreted bedrock conductor axis
- Possible bedrock conductor axis
- Fault
- Direction of dip
- Vertical dip

52P16SW0489 2.10565 KEEZHIK LAKE (EAST A

330



NORAMCO EXPLORATIONS INC.

INTERPRETATION

CADMAN LAKE

ONTARIO

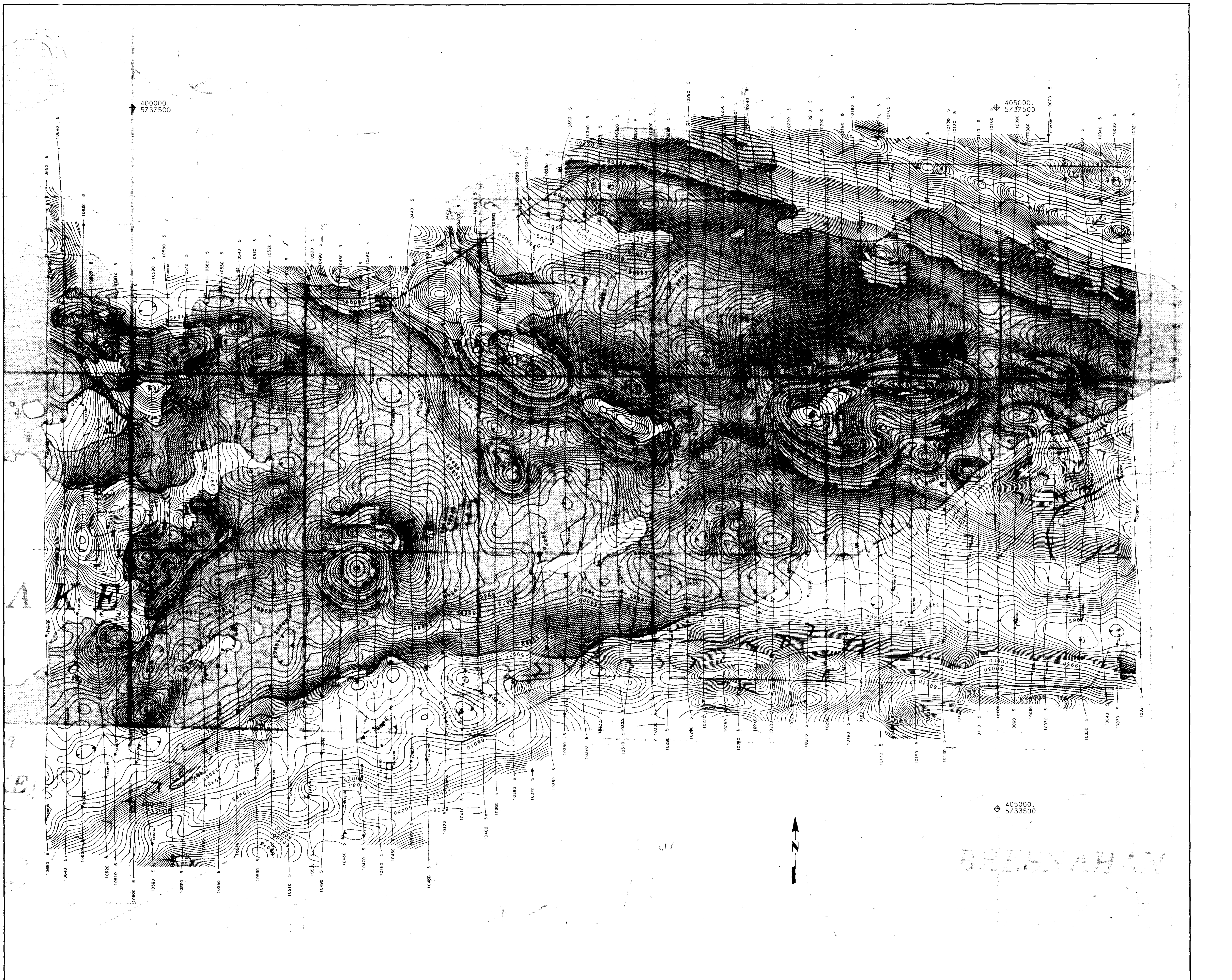
SCALE 1:10,000

0 330 660 1320 1/2 MILE

0 100 200 500 1 KILOMETRE

AERODAT LIMITED

DATE:	SEPTEMBER, 1987
NTS No:	52 P/16
MAP No:	3 J8751C



Flight Path

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

Average terrain clearance 60m
Line spacing = 100m

Magnetics

Cesium high sensitivity magnetometer
Sensor elevation 45m

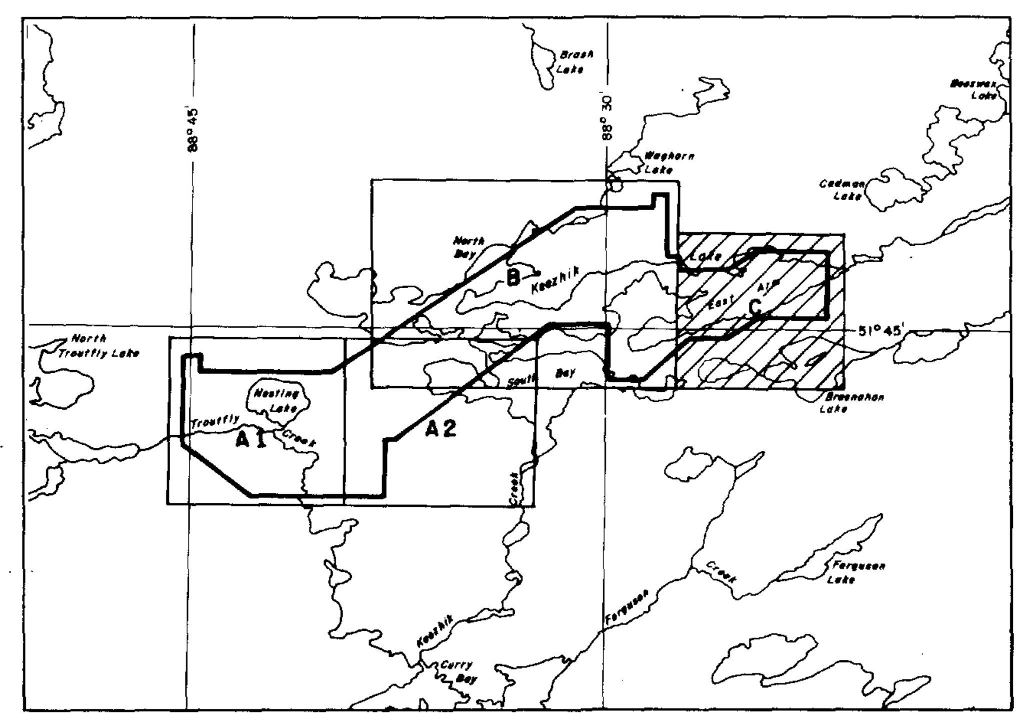
Total Field Magnetic Intensity
Contours in nT

CONTOUR INTERVAL:

500 nT ....
100 nT ....
25 nT ....
5 nT ....

52P16SW9489 2.10565 KEEZHIK LAKE (EAST A

340



NORAMCO EXPLORATIONS INC.

TOTAL FIELD MAGNETIC CONTOURS

CADMAN LAKE

ONTARIO

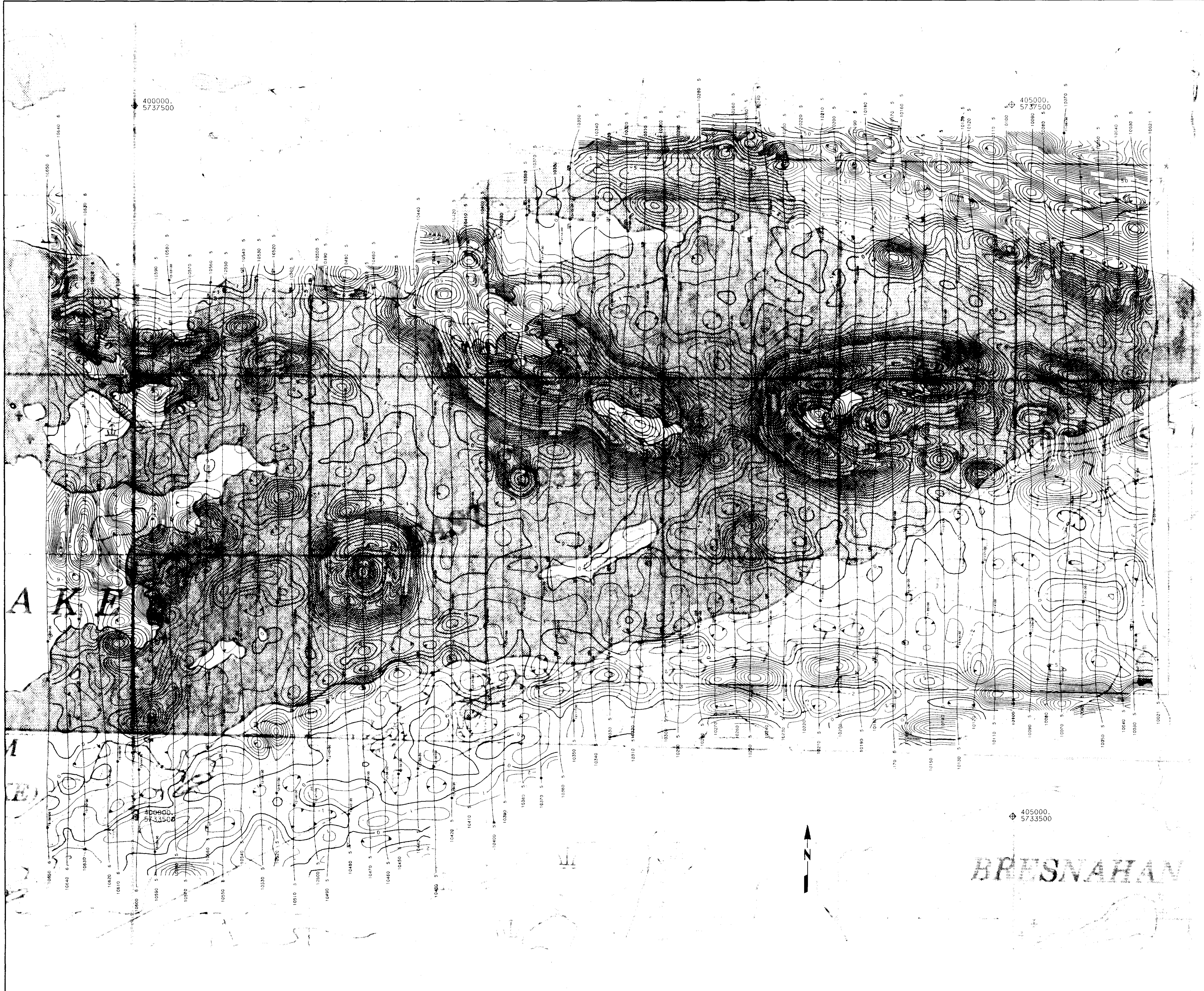
SCALE 1:10,000

0 330 660 1320 1/2 MILE

0 100 200 500 1 KILOMETRE

AERODAT LIMITED

DATE: SEPTEMBER, 1987
NTS No: 52 P/16
MAP No: 4 J8751C



Flight Path

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

Average terrain clearance 60m
Line spacing = 100m

Vertical Gradient

Vertical magnetic gradient calculated from the total field magnetic intensity

Contours in nT/m

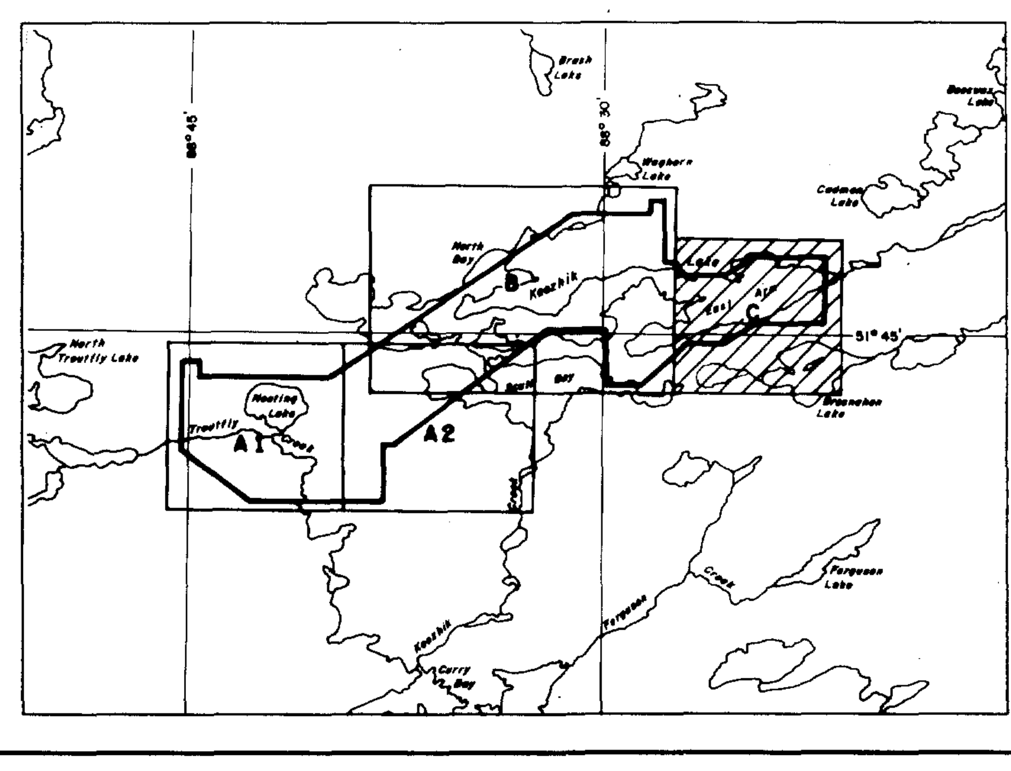
Cesium high sensitivity magnetometer
Sensor elevation 45m

CONTOUR INTERVAL:

25 nT/m ....
5 nT/m ....
1 nT/m ....

52P16SW9489 2.10565 KEEZHIK LAKE (EAST A

350



NORAMCO EXPLORATIONS INC.

CALCULATED VERTICAL MAGNETIC GRADIENT

CADMAN LAKE

ONTARIO

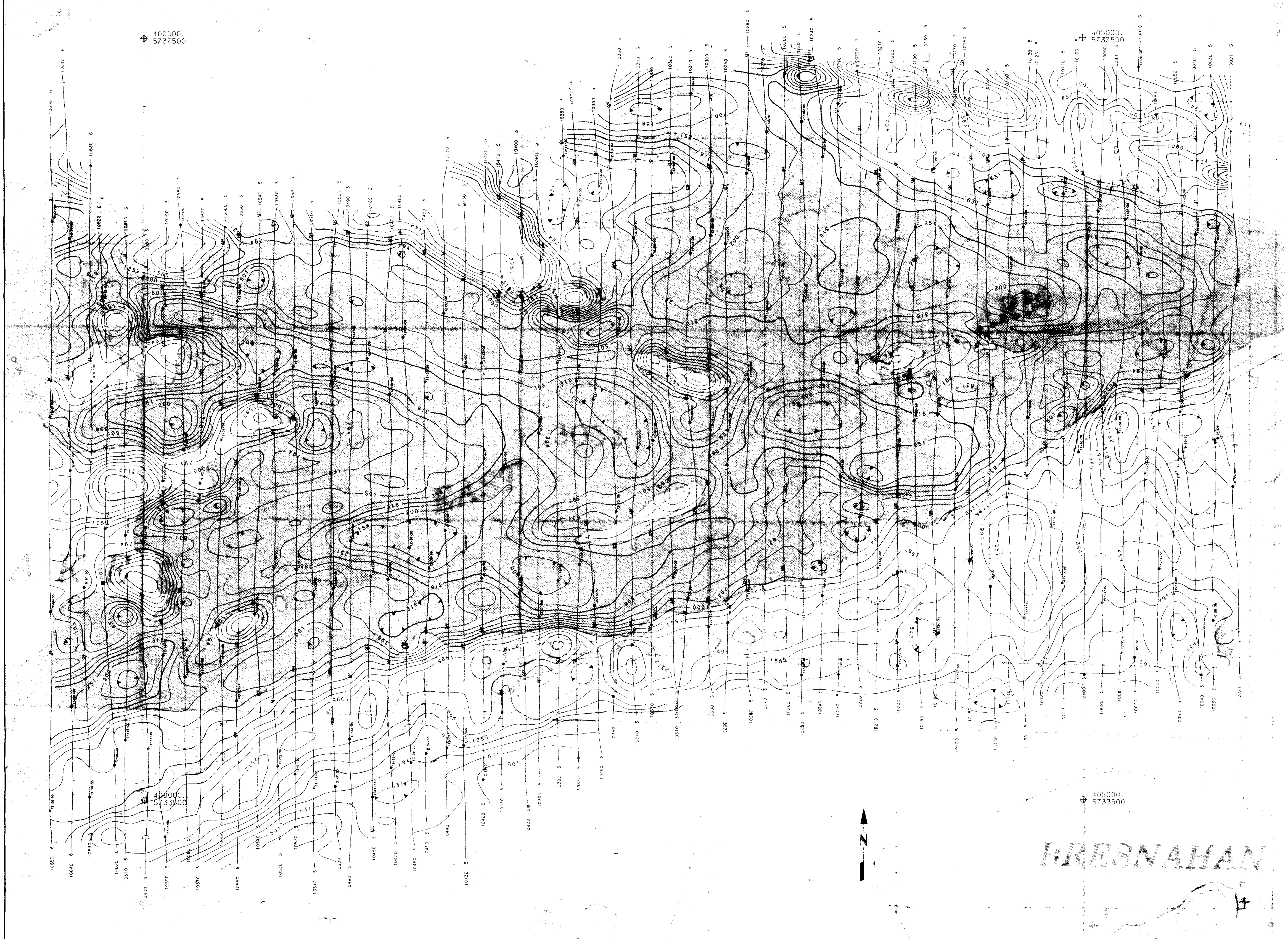
SCALE 1:10,000

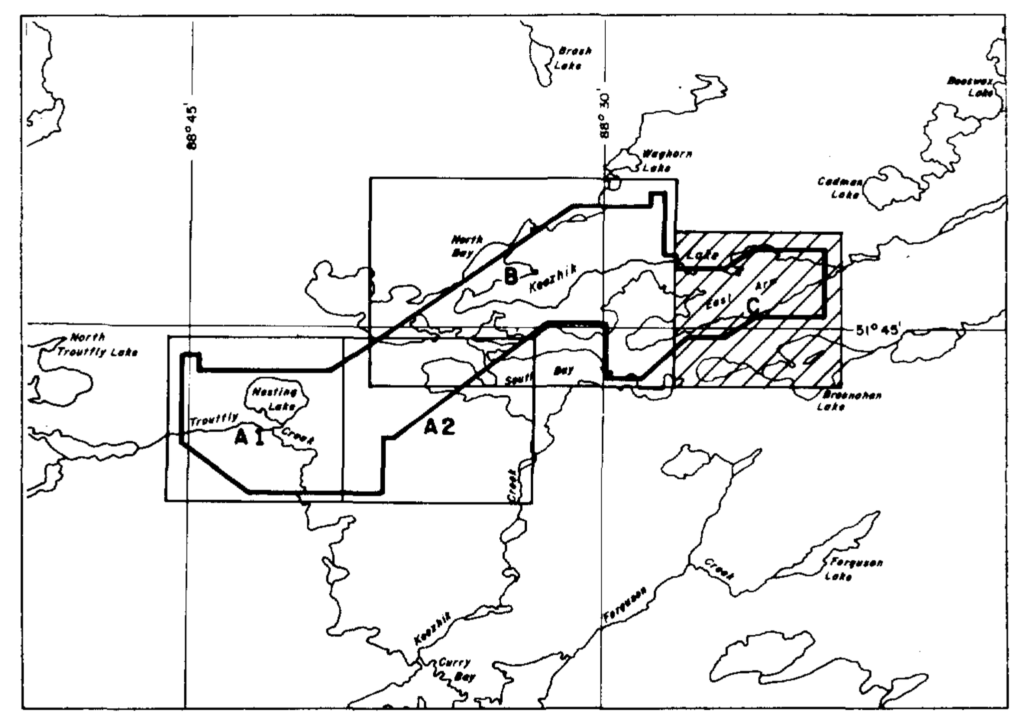
0 330 660 1320 1/2 MILE

0 100 200 500 1 KILOMETRE

AERODAT LIMITED

DATE:	SEPTEMBER, 1987
NTS No:	52 P/16
MAP No:	5 J8751C





Flight Path

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

Average terrain clearance 60m
Line spacing = 100m

Apparent Resistivity

Contouring in ohm-m at logarithmic intervals.

Calculated from 4600 Hz coaxial EM response assuming a 200 m conductive layer.
Sensor elevation 30m

52P16SW9489 2.10565 KEEZHIK LAKE (EAST A

360

NORAMCO EXPLORATIONS INC.

APPARENT RESISTIVITY CONTOURS

CADMAN LAKE

ONTARIO

SCALE 1:10,000

0 330 660 1320 1/2 MILE

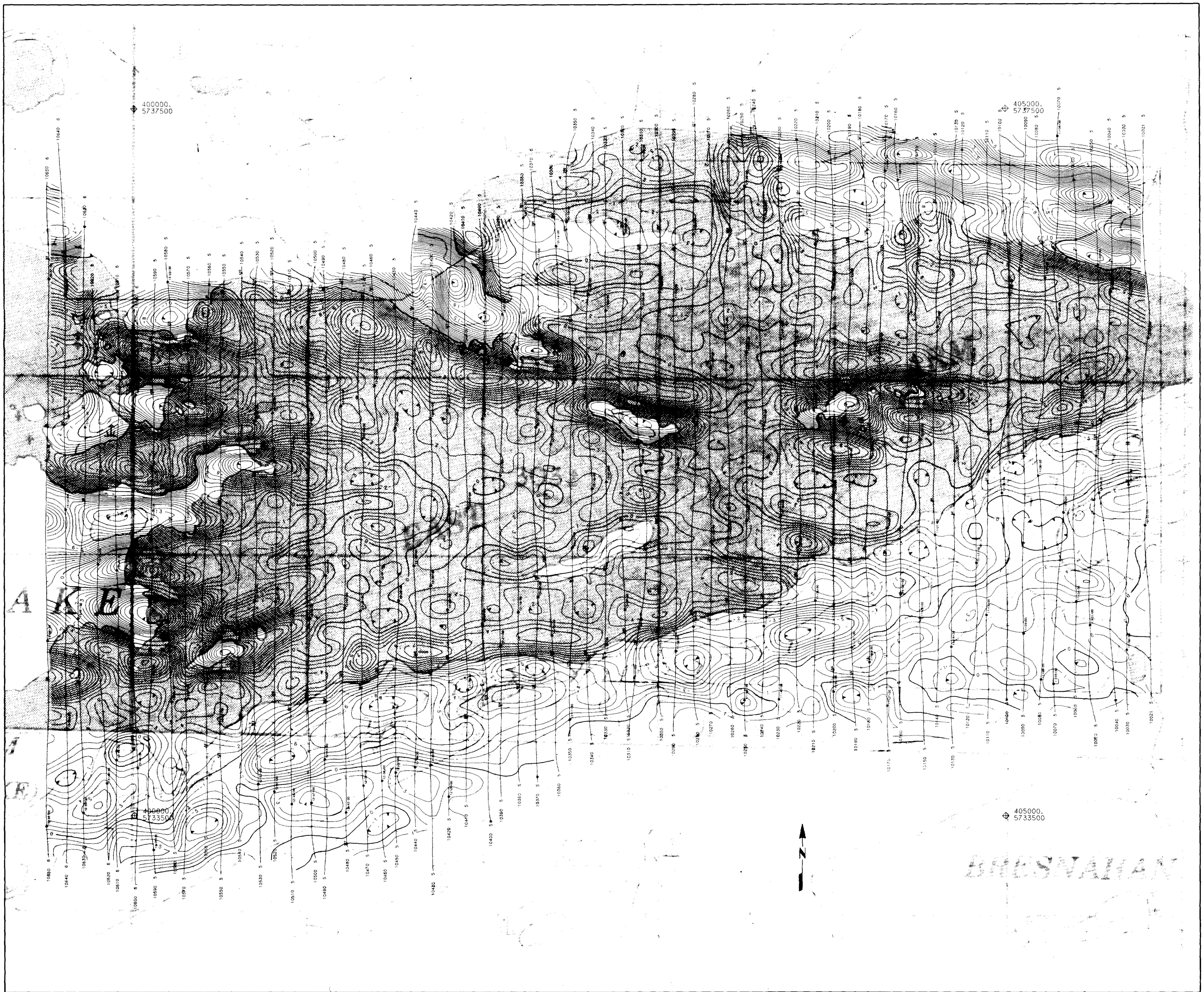
0 100 200 500 1 KILOMETRE

AERODAT LIMITED

DATE: SEPTEMBER, 1987

NTS No: 52 P/16

MAP No: 6 J8751C



Flight Path

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

Average terrain clearance 60m
Line spacing = 100m

VLF-EM

VLF-EM Total Field Intensity in percent

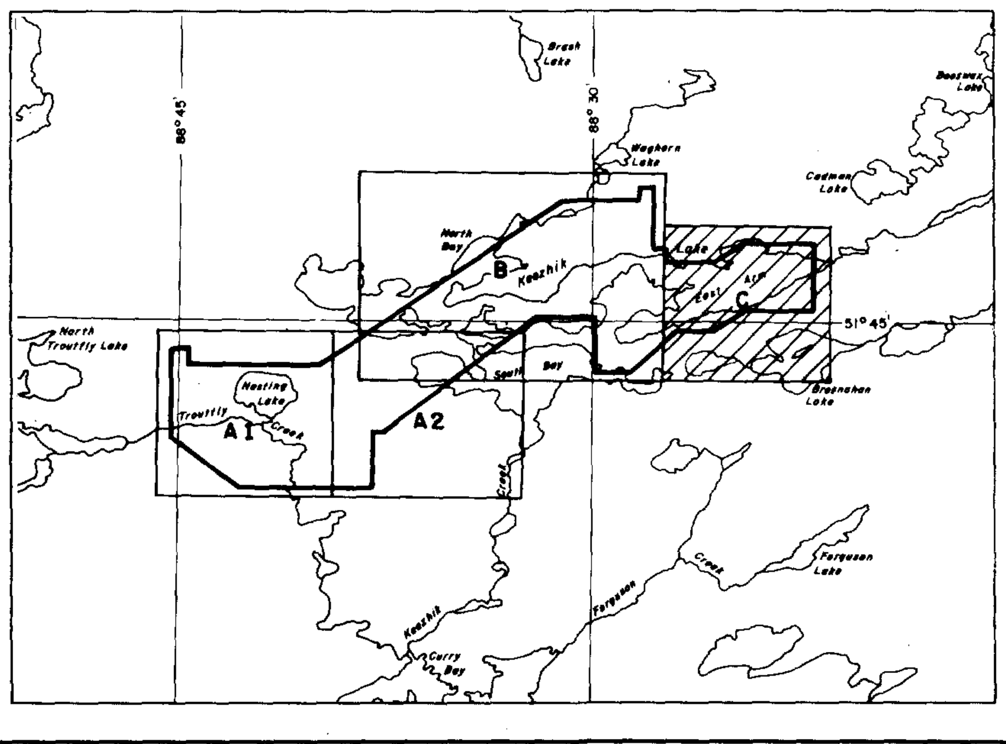
Station: NLK (Jim Creek, Wash.)
24.8 kHz

Sensor elevation 45m

CONTOUR INTERVAL:

25 %
5 %
1 %

370



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VLF-EM TOTAL FIELD CONTOURS

CADMAN LAKE

ONTARIO

SCALE 1:10,000

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