MUSKASENDA PROJECT

P-172
EXPLORATION REPORT 1988

PART II

AERODAT GEOPHYSICAL REPORT

Beemer and English Townships
District of Sudbury, Ontario

NTS 42A3

REPORT ON A
COMBINED HELICOPTER-BORNE
MAGNETIC, ELECTROMAGNETIC AND VLF
SURVEY
MUSKASENDA, ONTARIO

FOR
AMERICAN BARRICK RESOURCES CORPORATION
BY
AERODAT LIMITED
August 3, 1988

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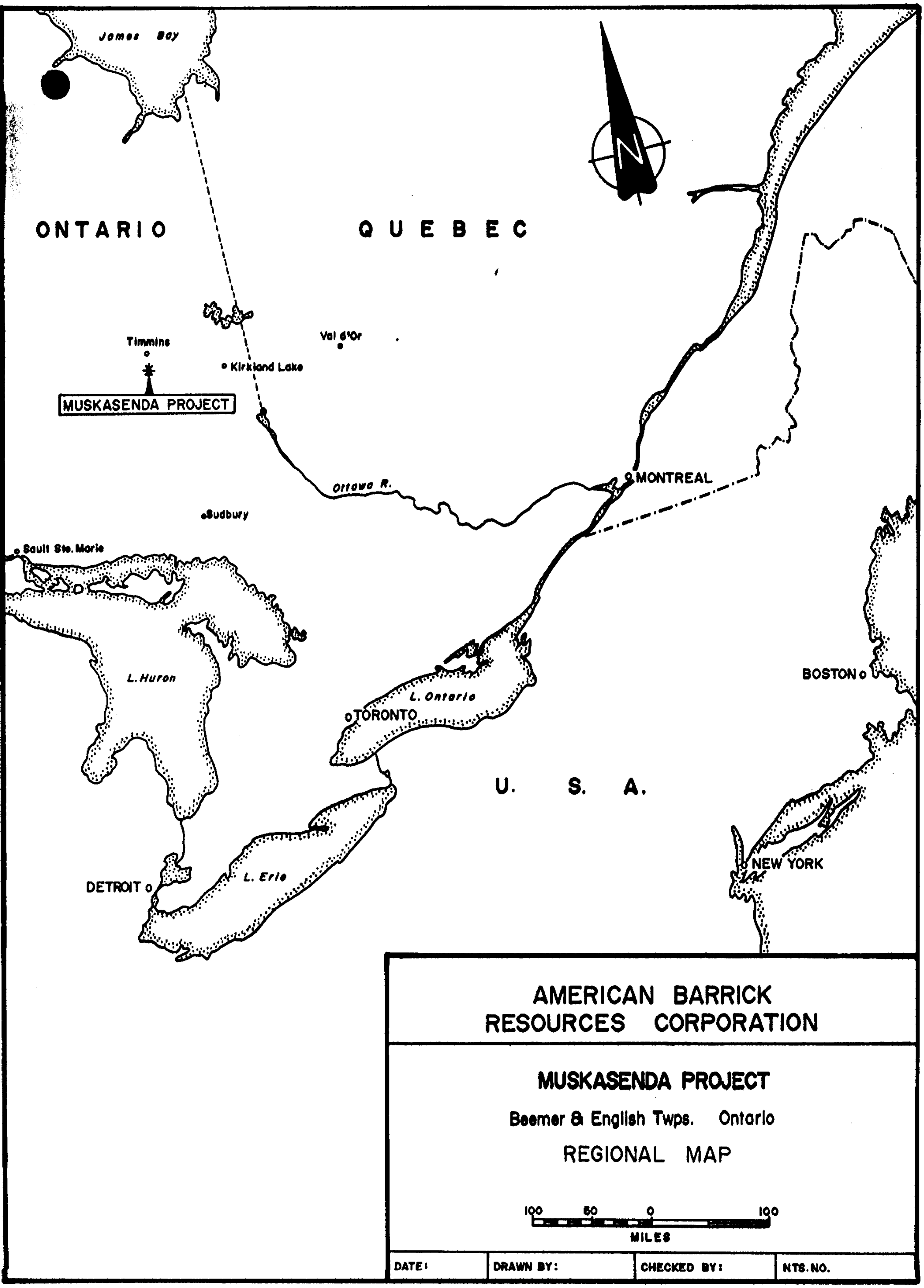
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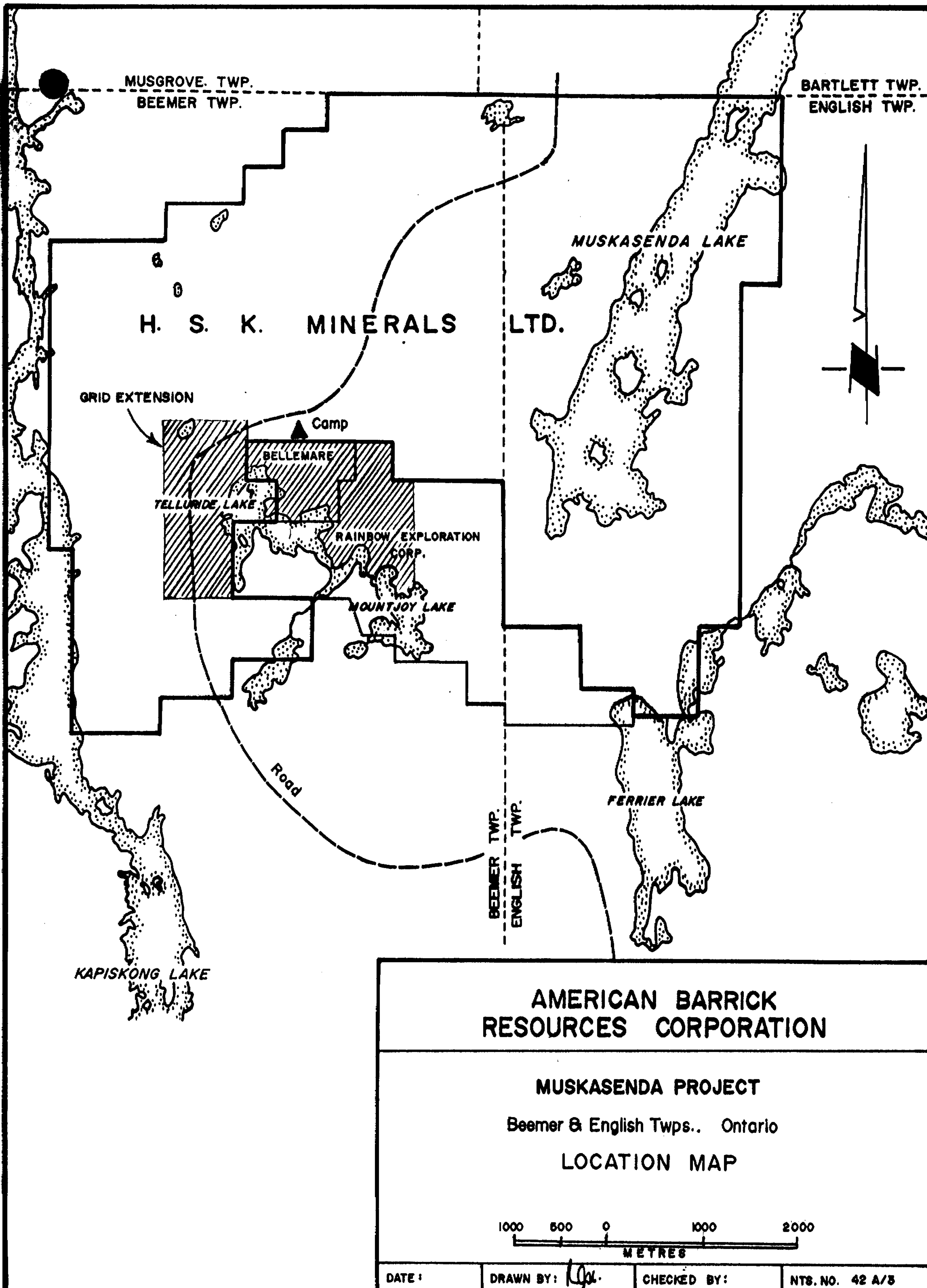

AMERICAN BARRICK RESOURCES CORPORATION

MUSKASENDA PROJECT

Beemer & English Twps., Ontario

LOCATION MAP

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LIST of MAPS
(Scale 1: 5,000)

Basic Maps : (As described under Appendix "A" of Contract)

1. TOPOGRAPHIC BASE MAP;
Showing registration crosses corresponding to NTS co-ordinates on survey maps, on stable cronaflex film.

2. FLIGHT LINES;
Photocombination of flight lines, anomalies and fiducials with base map.

3. AIRBORNE ELECTROMAGNETIC SURVEY INTERPRETATION MAP;
showing conductor axes and anomaly peaks along with InPhase and Quadrature amplitudes and conductivity thickness values; on a cronaflex base; Interpretation Report

4. TOTAL FIELD MAGNETIC CONTOURS;
showing magnetic values contoured at 5 nanoTesla intervals; on a cronaflex base map.

5. COMPUTED VERTICAL MAGNETIC GRADIENT CONTOURS;
showing vertical gradient values contoured at 0.5 nano-Tesla per metre intervals showing flight lines and fiducials; on a cronaflex base map.

6. RESISTIVITY CALCULATED FROM 4175 Hz COPLANAR COILS;
contoured data at logarithmic resistivity intervals (in ohm.m.), on a base map.

7. VLF EM TOTAL FIELD CONTOURS;
of the VLF Total field from the Annapolis, Md. transmitter; as a cronaflex base map.

1. INTRODUCTION

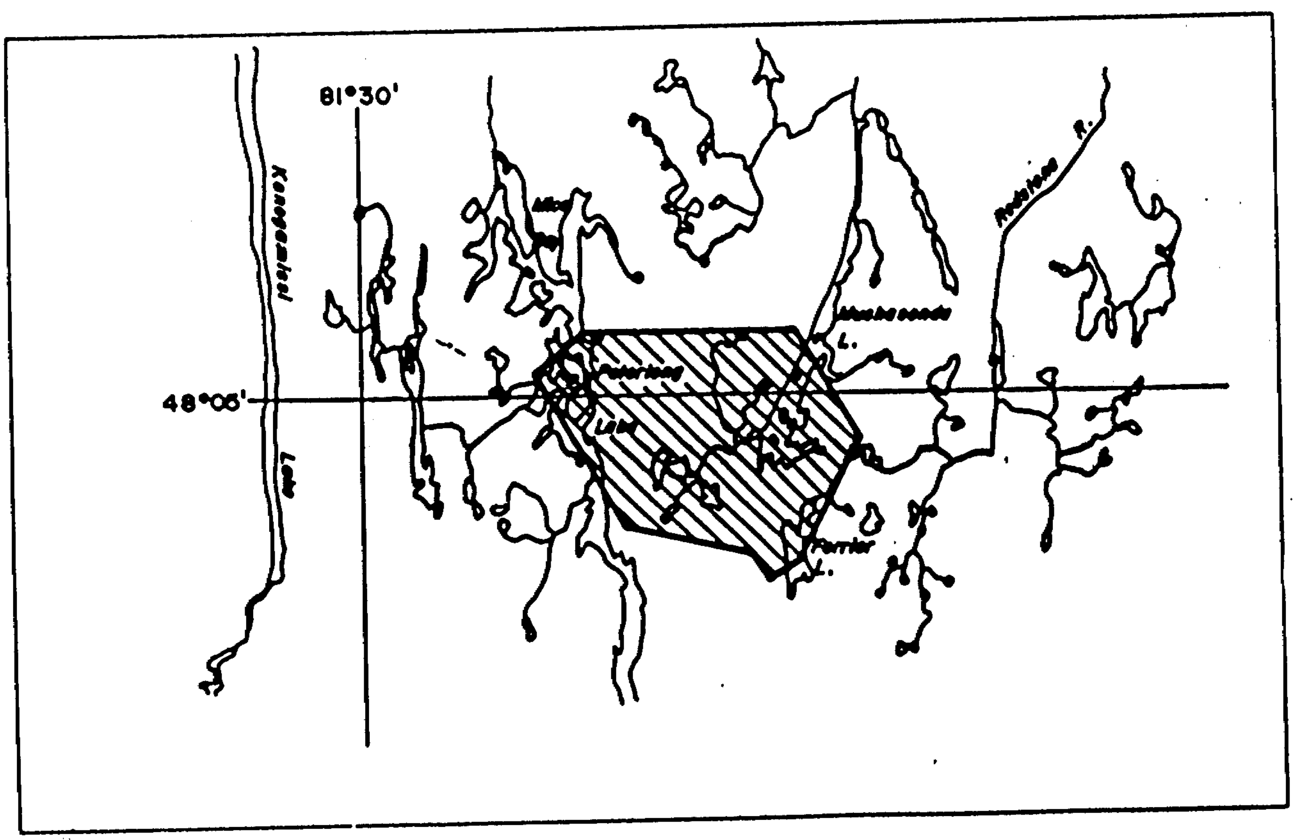
This report describes an airborne geophysical survey carried out on behalf of American Barrick Resources Corporation by Aerodat Limited. Equipment operated included a 3 frequency electromagnetic system, a high sensitivity cesium vapour magnetometer, a dual frequency VLF-EM system, a video tracking camera, and an altimeter. Electromagnetic, magnetic and altimeter data were recorded both in digital and analogue form. Positioning data was recorded on VHS video film, as well as being marked on a topographic base map by the operator while in flight.

The survey area, is comprised of 1 contiguous block in the Sudbury Mining Division and is situated about 45 kilometres south of Timmins, Ontario. The survey was flown between July 9 and 10, 1988. Five flights were required to complete the survey with flight lines orientated at an azimuth of 150 -330 ' and flown at a nominal spacing of 200 m., although a detail area has 100 metre line spacing. Coverage and data quality were considered to be within the specifications described in the contract.

The purpose of the survey was to record airborne geophysical data over and around properties of American Barrick Resources Corporation. A total of 484 kilometres of the recorded data were compiled on 1 map sheet and are presented as part of this report according to specifications outlined by American Barrick Resources Corporation.

2. SURVEY AREA LOCATION

The survey area is outlined on the index map shown below. It is centred between latitudes 48 01′ - 48 07′ and longitudes 81 17′ - 81 25′. The area is located within 45 kilometres of Timmins, Ontario, within NTS sector 42 A 3. The property is located in parts of Beemer and English Tp. Access to the area is by gravel roads south from Timmins, connecting with Hwy 566 extending eastward from Matchewan. Lumber, exploration roads and trails provide access to the other points in the survey area.



3. AIRCRAFT AND EQUIPMENT

3.1 Aircraft

An Aerospatiale A-Star 350 D helicopter, (CG-ATX), piloted by G. Charbonneau, 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 equipment operator and navigator was J. Mercier. The survey equipment 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 are operated at 935 Hz and 4600 Hz and one horizontal coplanar coil pair at 4175 Hz. The transmitter-receiver separation was 7 metres. Inphase and quadrature signals were measured simultaneously for the 4 frequencies with a time constant of 0.1 seconds. the electromagnetic bird was towed 30 metres below the transmitter.

3.2.2 VLF-EM System

The VLF-EM System was a Herz Totem 2 A. This instrument measures the total field and quadrature component of the selected frequency. The sensor was towed in a bird 12 metres below the helicopter. The transmitting station used was NAA, Cutler, Maine broadcasting at 24.0 kHz. This station is maximum coupled with E-W striking conductors and provides usable results for strikes + 45 degrees.

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

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

3.2.6 Tracking Camera

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

3.2.7 Analog Recorder

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

Channel	Input	Scale
CXI1	Low Frequency Inphase	25 ppm/cm
CXQ1	Low Frequency Quadrature	25 ppm/cm
CXI2	High Frequency Inphase	25 ppm/cm

Channel	Input	Scale
CXQ2	High Frequency Quadrature	25 ppm/cm
CPI1	Mid Frequency Inphase	100ppm/cm
CPQ1	Mid Frequency Quadrature	100 ppm/cm
CPI2	High Frequency Inphase	200 ppm/cm
CPQ2	High Frequency Quadrature	200 ppm/cm
VLT	VLF EM Total Field, Line NAA	25 %/cm
VLQ	VLF EM Quadrature, Line NAA	25 %/cm
VOT	VLF EM Total Field,Ortho NSS	25 %/cm
VOQ	VLF EM Quadrature, Ortho NSS	25 %/cm
RALT	Radar Altimeter, (150 m. at top of chart)	100ft/cm
MAGF	Magnetometer, fine	25nT/cm
MAGC	Magnetometer, coarse	250nT/cm

3.2.8 Digital Recorder

A DGR 33:16 data system recorded the survey on magnetic tape. Information recorded was as follows:

Equipment	Recording Interval
EM System	0.1 seconds

Equipment	Recording Interval
VLF-EM	0.20 seconds
Magnetometer	0.20 seconds
Altimeter	0.25 seconds
Nav System	1.0 seconds
Power Line Monitor	0.25 seconds

3.2.9 Radar Positioning System

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

4. DATA PRESENTATION

4.1 Base Map and Flight Path

A topographic base at a scale of 1:10,000 was prepared from 1:50,000 base maps supplied by Aerodat on a screened cronaflex base.

4.2 Electromagnetic Anomaly Map

4.2.1 Flight Path

The flight path was derived from the Mini Ranger VHF 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 on the base map.

The flight lines have the flight number as an additional reference and the camera frame, time, and the navigator's manual fiducials for cross reference to both analog and digital data.

4.2.2 Electromagnetic Data Compilation

The electromagnetic data was 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 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 phenomenon. 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 amplitude of the various Inphase and quadrature components is zero when no conductive or permeable source is present. The filtered and leveled data was used in the interpretation of the EM data.

4.2.3 Airborne EM Interpretation

An interpretation of the electromagnetic data was prepared showing peak locations of anomalies and conductivity thickness ranges along with the Inphase amplitudes (computed from the 4600 Hz coaxial response). The peak response symbols may be referenced by a sequential letter, progressing in the original flight direction. The EM response profiles are presented on a separate map with an expanded vertical scale.

4.3 Total Field Magnetic Contours

The aeromagnetic data was corrected for diurnal variations by adjustment with the digitally recorded base station magnetic values. No correction for regional variation (IGRF) was applied. The corrected profile data was interpolated onto a regular grid at a 25 metre true scale interval using a cubic spline technique. The grid provided the basis for threading the presented contours at a 5 nanoTesla interval. The aeromagnetic data have been presented with flight path and electromagnetic information on a Cronaflex copy of the topographic base map.

4.4 VLF-EM Total Field

The VLF-EM signals from NAA, Cutler, Maine, broadcasting at 24.0 kHz, were compiled as contours in map form and presented on a Cronaflex overlay of the topographic base map along with flight lines and anomaly information. The orthogonal VLF data was not utilized in the compilation due to lower field strengths and higher noise levels. The data was recorded on the analog records and on digital tape.

4.5 EM Resistivity Contours

The apparent resistivity was calculated from the 4175 Hz coplanar coil pair and 4600 Hz coaxial coil pair. The calculations are based on a half space model. This is equivalent to a geological unit with more than 200 metres width and strike length. In practice, conductors, conductive lithologies and surficial conductors often have lesser dimensions, at least in one of the three dimensions. Apparent resistivities are usually underestimated for these sources.

5. INTERPRETATION

5.1 Geological Perspective

The Beemer - English Township property is a part of the southwestern Abitibi greenstone belt, consisting of regionally metamorphosed metavolcanics and metasediments of early Precambrian age. Intrusives comprised of granodiorite, trondjemite, gabbro and diabase cut various formations. Within the survey area, host rocks are composed of massive and pill-owed mafic flows west of Muskasenda Lake while intermediate to felsic flows and tuffs occupy the area east of the Lake. Mu-skasenda Lake lies within a gabbroic intrusive which extends as far north as McArthur Tp. Diabase dykes have a predominant N-S through NNW strike in the survey area.

Faults indicated on OGS Map 2350 are part of a regional N-S system of fractures which cut all lithologies in the Timmins region.

Gold prospects have been identified within the survey area in the past. Notes on the above reference indicate that the gold is associated with quartz veins and porphyry dykes in shear zones within metavolcanics and intrusives.

5.2 Magnetic Interpretation

The magnetic data from the high sensitivity cesium vapour magnetometer provided virtually a continuous magnetic reading when recorded at two - tenth second intervals. The system is also noise free for all practical purposes. The sensitivity of 0.1 nT allows for the mapping of very small inflections in the total field, resulting in a contour map that is comparable in quality to ground data. Both the fine and coarse magnetic traces were recorded on the survey analog records.

The total field magnetic contours are a reasonable approximation of the regional geology. Diabase dykes in the western part of the area form N-S linears, while a previously unknown narrow magnetic linear is parallel and 700 m. south of the northern area boundary. This pervasive E-W magnetic direction is also present east of the Muskasenda Lake. There is no indication of any E-W structure or intrusions on the geological reference, with the exception of the Telluride Lake area.

The gabbroic intrusive on which Muskasenda Lake is centred, has a distinct linear magnetic expression coincident with outcrop exposure, but the geology under the lake is essentially nonmagnetic. Several inliers of volcanics may be evidence that there are more volcanics or more felsic differentiates of the gabbro than indicated on the geology map. Total field expressions of the mafic volcanics west of Muskasenda Lake are not unusual, showing irregular and short low contrast magnetic zones. Primary bedding linears are rare, but a contact gradient is present 1.5 Km. west of Muskasenda Lake. West of Ferrier Lake, a high amplitude magnetic linear may be a strike extension of iron formations mapped at the Semple - English Tp line. Felsic intrusives south of Mountjoy Lake have low and featureless magnetic expressions, but several inhomogeneities, including structures, cut the granodiorite. Magnetic expressions of the felsic - intermediate composition volcanics are much higher in susceptibility contrast than the mafic volcanics, an unusual situation.

5.3 Vertical Magnetic Gradient Contours

The high magnetic susceptibilities detected as total magnetic field strengths, make the recognition and exact positioning of subtle anomalies difficult. The vertical gradient data clearly removes the regional background levels and sharpens the residual anomalies. Closely spaced anomalies can be more easily separated, interpreted and modelled.

Breaks and offsets are more clearly defined and some faults and shears are recognizable as definite marker horizon displacements. These have been drafted on the interpretation maps but only in rare situations do they have a physiographic linear expression. Strike slip faults are not easily defined. Sometimes, they occur at the contact of a major lithological units, such as volcanics and sediments. A linear magnetic (and gradient) low can mark these zones.

The "zero" contour level is a close approximation of the width of the susceptibility sources. If required, vertical gradient contour trends can be compiled into a pseudo geological map.

Results

The computed gradient map shows the gabbroic intrusive and the E-W diabase clearly. The gradient also delineates an E-W "dyke swarm" possibly accompanied by shearing. Although obvious on the gradient contours, these are not easily recognisable as total field contours. These are especially common in the area of Telluride and Mountjoy Lakes. With the exception of a synformal axis north of Telluride Lake, there is no other mapped structure to confirm the geophysical results. Widely separated outcrops of gabbro have been given N-S continuity, stratiform with assumed bedrock lithologies. The could also explain the magnetic observations if they have E-W directions.

5.4 VLF-EM Total Field Interpretation

The VLF system results responded mainly to conductive overburden edges. These often have a similar appearance to bedrock conductors, but their orientation may be oblique to bedrock magnetic lithologies. This lineation direction is radial to the transmitter location, in this case approximately east south east, somewhat oblique to the regional trends. The faults and shears which have a reliable magnetic characterization have no VLF EM conductivity in this area. Parts of the selected bedrock conductors have coincident linear VLF-EM responses. This implies that the lithologies hosting the conductors are relatively homogeneous, except where cross faulting is present.

On the interpretation maps, only those VLF zones which are interpreted as possible or definite bedrock conductors or structural zones have been plotted on the interpretation map.

The selected VLF-EM conductors are short strike length zones, which on rare occasions are coincident with EM resistivity lows. VLF-EM conductors should be verified for coincidence with wet, lowlying topography - a typical explanation.

5.5 Electromagnetics

The electromagnetic data was first checked by a line to line examination of the analog records. The record quality was very good, with only local noise spikes affecting the coaxial channels. The system noise during survey was typically within a 1 ppm envelope. This were removed by an appropriate filter. Instrument noise was well within specifications. Geological noise, in the form of surficial conductors, is present on the 3 high frequency coil pair profiles and to a minor extent on the 935 Hz. quadrature.

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 digitized, edited and replotted 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 and inclusion if warranted - of less obvious bedrock conductors. Each conductor or group of conductors was evaluated on the basis of magnetic and lithologic correlations as well as man made or surficial features not obvious on the analog charts.

Results

The survey results are composed mainly of surficial responses and resistivity low zones. There were no cultural conductors with or without a 60 Hz component on the records. Only assumed bedrock resistivity low response symbols were plotted on the map, based on the coaxial coil data channel peaks where possible, but otherwise from the 34 Khz coplanar peak.

Surficial conductivity was detected over almost every swamp, bog, stream and lake. These responses are best illustrated on the resistivity contour map. In the vicinity of lakes, the responses are most pronounced. There are no responses near the gold prospects near Telluride and Muskasenda Lakes.

None of the selected responses could be attributed to narrow discrete bedrock targets. The resistivity lows selected as potential bedrock sources may be overburden sourced, and verification against air photos is suggested. If no obvious source is recognized, then IP/resistivity surveys are recommended where geology is favourable or obscured by overburden.

All resistivity low zones have been selected for followup surveys. The location of the selected responses is reasonably well distributed over lithologies in the northern two thirds of the survey block. Most resistivity low zones have magnetic low correlations and have orientations stratiform with assumed bedding directions.

Targets have not been prioritized as all zones have similar sources - and response characteristics. Resistivity contrasts with an interpreted bedrock source have presented on the interpretation map as linear, usually elongated zones. These are aligned and coincident or adjacent to magnetic low zones. This interpretation matches the model for alteration zones associated with brecciation along significant faults and splays. The resistivity lows often are caused by sericite and pyrite. Local argillaceous zones may produce similar results.

5.6 Resistivity Contours

The resistivity contours approximate the profile amplitude trends only in particular situations. Resistivities vary over a relatively narrow range, with the thickness of the conductive layer modulating the response amplitudes over a substantial part of the survey area. There are no distinguishing characteristics for weak surficial and bedrock zones, except obvious correlations with lakes and low lying topography.

6. CONCLUSIONS

The survey area has a generally resistive character broken by local minor overburden problems and weak resistivity contrasts possibly attributed to bedrock sources. In favour of this interpretation is the alignment of these zones with regional stratigraphic bedding strikes and coincidences with magnetic lows. VLF-EM conductors are seldom directly coincident with The EM resistivity lows, and then the strike directions seldom match. This is a typical characteristic of surficial conductivities or wide bedrock resistivity lows. The magnetic results provide detail which is not reflected in the regional geological mapping. An E-W dyke cuts the northern end of the survey block, and a swarm of narrow, low amplitude magnetic linears cut across the lower half of survey area. These are not explained by regional mapping, but they do cut lithologies hosting gold prospects.

7. RECOMMENDATIONS

Detailed geological mapping and sampling is recommended for every VLF-EM and resistivity low zone. With additional information, the explorationist may be able to explain some conductors and reject unfavourable geological environments. Geophysical surveys are warranted on zones which can not be adequately tested by surface sampling.

Resistivity zones should be detailed with Induced Polarization to pinpoint chargeability anomalies which may be associated eith mineralized resistivity lows. Horizontal loop EM surveys are not recommended due to their inherent poor discrimination between surficial and bedrock resistivity zones. A combined magnetic/gradiometer/VLF-EM survey may help to resolve local structures and magnetite depletion zones, to locate magnetic strata and to extrapolate mapping under areas obscured by surficial sediments.

The selected conductors should serve as a starting point in ground explorations. There are many types of gold deposits which have no detectable airborne EM or VLF-EM response, but may have a ground VLF-EM or IP response.

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for
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August 3, 1988

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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

ANOMALIES J8827B MUSKASENDA

FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM) INPHASE	QUAD.	CONDUCTOR CTP MHOS	DEPTH MTRS	BIRD HEIGHT MTRS
3	170	A	0	-0.5	3.1	0.0	0	43
3	180	A	0	-0.5	4.0	0.0	0	39
3	190	A	0	-0.2	3.1	0.0	0	46
3	230	A	0	1.2	3.3	0.0	22	40
3	240	A	0	0.9	3.5	0.0	13	41
3	250	A	0	0.6	3.8	0.0	7	39
3	260	A	0	0.0	2.5	0.0	0	47
3	281	A	0	0.3	3.4	0.0	0	48
3	301	A	0	0.1	2.9	0.0	0	45
3	311	A	0	-0.1	4.8	0.0	0	41
4	322	A	0	0.7	4.5	0.0	8	35
4	322	B	0	0.7	1.8	0.0	26	52
4	322	C	0	0.4	2.0	0.0	18	43
4	322	D	0	1.5	6.3	0.0	3	40
4	331	A	0	1.3	4.2	0.0	11	44
4	331	B	0	0.9	4.6	0.0	8	37
4	331	C	0	1.2	6.0	0.0	4	38
4	331	D	0	0.7	3.2	0.0	13	41
4	341	A	0	-0.1	2.2	0.0	0	31
4	341	B	0	0.5	3.1	0.0	0	51
4	341	C	0	0.1	5.1	0.0	0	33
4	341	D	0	1.0	5.3	0.0	1	41
4	351	A	0	0.7	5.9	0.0	3	33
4	351	B	0	0.0	2.8	0.0	0	36
4	371	A	0	1.1	6.4	0.0	4	35
4	381	A	0	0.9	4.8	0.0	3	41
4	391	A	0	0.8	4.7	0.0	6	38
4	401	A	0	1.9	3.6	0.1	29	38

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.

ANOMALIES J8827B MUSKASENDA

FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM) INPHASE	QUAD.	CONDUCTOR CTP MHOS	DEPTH MTRS	BIRD HEIGHT MTRS
4	450	A	0	0.4	4.2	0.0	0	45
4	460	A	0	-0.4	5.9	0.0	0	37
4	470	A	0	0.1	3.2	0.0	0	46
4	480	A	0	0.0	3.9	0.0	0	44
4	490	A	0	0.0	2.5	0.0	0	56
4	500	A	0	0.0	3.4	0.0	0	42
4	530	A	0	0.9	5.5	0.0	1	40
4	540	A	0	0.9	7.3	0.0	0	33
4	540	B	0	0.7	5.8	0.0	0	43
4	550	A	0	0.5	3.0	0.0	7	43
5	560	A	0	-0.5	4.5	0.0	0	37
5	570	A	0	0.2	8.9	0.0	0	37
5	570	B	0	0.6	2.9	0.0	16	39
5	580	A	0	2.2	9.9	0.0	0	43
5	580	B	0	1.7	4.9	0.0	12	41
5	590	A	0	1.8	9.7	0.0	0	36
5	590	B	0	3.9	14.9	0.0	0	40
5	600	A	0	4.3	11.0	0.1	3	39
5	600	B	0	1.2	5.5	0.0	4	40
5	600	C	0	2.9	8.5	0.1	5	39
5	610	A	0	1.7	8.6	0.0	8	28
5	610	B	0	2.4	8.1	0.0	8	34
5	610	C	0	2.1	9.1	0.0	0	44
5	620	A	0	1.0	6.3	0.0	0	44
5	630	A	0	0.5	5.9	0.0	0	37
5	630	B	0	0.1	4.3	0.0	0	38

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, Marcel H. Konings Certify that :

1) I reside at R.R. # 1, (Part E 1/2-L9-C6 Adjala Twp), Colgan, Ontario, L0G 1G0.

2) I am a qualified Geological Engineer, having received my academic training at the University of Toronto, specializing in Exploration Geophysics and having graduated in 1974.

3) I am a registered Professional Engineer of the Province of Ontario, in good standing.

4) I have been professionally engaged in my profession, the application of Mining Geophysical Methods to mineral exploration, continuously for 14 years in Canada and internationally.

5) I have been an active member of the Society of Exploration Geophysicists since 1977 and hold memberships in other professional societies involved in the mineral exploration industry.

6) The accompanying report was prepared from data supplied by Aerodat and public geological data forwarded by American Barrick Resources Corporation.

7) I have no interest, direct or indirect, in the property described nor do I hold securities in American Barrick Resources Corporation.

8) I hereby consent to the use of this report in a Statement of Material Facts of the Company and for the preparation of a prospectus for submission to the Ontario Securities Commission and/or other regulatory authorities.

Signed

Marcel H. Konings, P.Eng
Colgan, Ontario
(416) 936-4853

August 3, 1988

Qual. 2.1666

APPENDIX IV

PERSONNEL

FIELD

Flown - July 1988

Pilot - G. Charbonneau

Operator - Joe Mercier

OFFICE

Processing - Keith Fisk, B.Sc.

Report - Marcel H. Konings

Ministry of Northern Development and Mines
Ontario

Report of Work

(Geophysical, Geological, Geochemical and Expenditures)

W8806.50168 2.11642

2 Mining

Instructions: – Please type or print.
– If number of mining claims traversed

42A03SE0208 2.11642 BEEMER 900

Type of Survey(s)
Airborne Magnetic, Electromagnetic and VLF

Claim Holder(s)
American Barrick Resources Corporation, ~~N.J. BELLEMARE MINING INC~~ JOHN HUSSEY

Prospector's Licence No.
T 834, ~~T-5193~~ M-19606

Address
953 Government Road West, P.O. Box 1203, Kirkland Lake, Ontario P2N 3M7

Survey Company
Aerodat Limited

Date of Survey (from & to)
09 07 88 | 10 07 88 (Day Mo. Yr. | Day Mo. Yr.)

Total Miles of line Cut

Name and Address of Author (of Geo-Technical report)
Marcel Konings, P.Eng., RR#1 (Part E 1/2 - L9 - C6 Adjala Twp.) Colgan, Ontario L0G 1G0

Credits Requested per Each Claim in Columns at right

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

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

RECEIVED
DEC 28 1988
MINING LANDS SECTION

Airborne Credits		Days per Claim
Note: Special provisions credits do not apply to Airborne Surveys.	Electromagnetic	24
	Magnetometer	20
	Radiometric	

RECORDED
SEP 21 1988

Expenditures (excludes power stripping)
Type of Work Performed

Performed on Claim(s)
SEP 21 1988

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.
P	987532	24 20	P	969344	
	969247	15 14 *		969345	
	969248	*		969346	15 14 *
	969249	*		969347	*
	969250	*		969928	*
	969251	*		969929	*
	969252	*		969930	
	969253	*		1027618	
	969254	*		1027619	
	969255	*		1027620	
	969256	*		1027621	
	969257	*		1027622	
	969258	*		1027623	
	969259	*		1027624	
	969260	*		1027625	
	969261			1027626	
	969262			1027627	
	969263	15 14 *		1027628	
	969264	*		1027629	
	969265	*		983120	
	969266	*		983121	
	969342			983122	
	969343			983123	

*MAXIMUM OF 29 DAYS ALLOWED UNDER SECTION 77(9)

Total number of mining claims covered by this report of work. 273

For Office Use Only		
Total Days Cr. Recorded: 11,547	Date Recorded: Sept 21/88	Mining Recorder: Mining Recorder
	Date Approved as Recorded: See revised statement	Branch Director

Date: Sept. 19, 1988. Recorded Holder or Agent (Signature)

Certification Verifying Report of Work

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

Name and Postal Address of Person Certifying

46

American Barrick Resources Corp. English - Beemer Twps.

Prefix	Claim No.	Prefix	Claim No.	Prefix	Claim No.
P	983124	P	1003187	P	969348 51 *
	983125		1003188		969349 51 *
	983126		1027630		969350 51 *
	983128		998488		969351 51 *
	983129		998489		987138
	1025327		998490		987139
	1025328		998491		987140
	1025329		998492		987141
	1025330		998493		987142
	1027934		998494		987143
	1003168		1026756		987144
	1003169		1026757		987145
	1003170		1026758		1026843
	1003171		1026759		1026844
	1003173		1026760		1026845
	1037311		1026761		1026846
	1037312		1026762		1026847
	1037313		1026763		1026848
	1037314		1026764		1026849
	1037315		1026765		1026850
	1037316		1026766		1026851
	1037317		1026767		1026852
	1037318		998064		1026853
	1037319		998065		1026854
	1037320		969903 51 *		1026855
	1037321		969904 51 *		1026856
	1037322		969905 51 *		1026857
	1003185		969906 51 *		1026858
	1003186		969907 51 *		1026859

American Barrick Resources Corp. English-Beemer Twp

Prefix	Claim No.	Prefix	Claim No.	Prefix	Claim No.
P	1026860	P	1026869	P	1012821
	1026898		1026870		1012822
	1026899		1026871		1012823
	1026900		1026872		1012824
	1026901		1026873		1012825
	1026902		1026874		1012826
	1026903		1026875		1012827
	1026904		1026876		1012828
	1026905		1026877		1012829
	1026906		1010777		1012830
	1026907		1010778		1012831
	1026908		1010779		1012832
	1026909		996965		1012834
	1026910		996966		1012835
	1026911		998074		1012836
	1026912		998075		1012837
	1026913		998076		1012838
	1026914		1026782		1012839
	1026915		1026783		1012840
	1026916		1026784		1026878
	1026917		1026785		1026879
	1026861		1026786		1026880
	1026862		1026787		1026881
	1026863		1026788		1026882
	1026864		1026789		1026883
	1026865		1026790		1026884
	1026866		1012818		1026885
	1026867		1012819		1026886
	1026868		1012820		1026887

American Barrick Resources Corp. English-Beemer Twp.

Prefix	Claim No.	Prefix	Claim No.	Prefix	Claim No.
P	1026888	P	987297		
	1026889		987298		
	1026890		987299		
	1026891		987582		
	1026892		987578		
	1026893		988368		
	1026894		988369		
	1026895		997194		
	1026896		1014038		
	1026897		1026330		
	1027935		1026331		
	1027936		1026332		
	997184		1026333		
	997185		1026334		
	997187		1026817		
	997192		1026818		
	997193		1026819		
	997196		1026821		
	997197		1026822		
	997188		873378 ✓		
	997189		960991		
	997190		960992		
	997191		960993		
	997195		960994		
	997198				
	997199				
	997200				
	987260				
	987261				

Ministry of Northern Development and Mines

Ontario

Geophysical-Geological-Geochemical Technical Data Statement

File ____________

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

Type of Survey(s) Airborne Geophysical

Township or Area English-Beemer Twp.

Claim Holder(s) American Barrick Resources Corp.

Survey Company Aerodat Limited

Author of Report Marcel Konings

Address of Author RR#1 (Part E ½-L9-C6 Adjala Twp.) Colgan, Ont. L0G 1C0

Covering Dates of Survey July 9 - 10, 1988 (linecutting to office)

Total Miles of Line Cut ——

SPECIAL PROVISIONS CREDITS REQUESTED

RECEIVED SEP 22 1988 MINING LANDS SECTION

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 20 Electromagnetic 24 Radiometric ____ (enter days per claim)

DATE: Sept. 20, 1988 SIGNATURE: [signature] Author of Report or Agent

MINING CLAIMS TRAVERSED
List numerically

(prefix)	(number)
P -	873378
	960991 - 960994
	969247 - 969266
	969342 - 969351
	969903 - 969907
	969928 - 969930
	983120 - 983126
	983128 - 983129
	987138 - 987145
	987260 - 987261
	987297 - 987299
	987532
	987578
	987582
	988368 - 988369
	996965 - 996966
	997184 - 997185
	997187 - 997200
	998064 - 998065
	998074 - 998076
	998488 - 998494
	Continued:

If space insufficient, attach list

TOTAL CLAIMS 273

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 ______

Sept. 20, 1988.

American Barrick Resources Corp.
English - Beemer Twps.
Mining Claims Traversed continued;

P - 1003168 - 1003171
1003173
1003185 - 1003188
1010777 - 1010779
1012818 - 1012832
1012834 - 1012840
1014038
1025327 - 1025330
1026330 - 1026334
1026756 - 1026767
1026782 - 1026790
1026817 - 1026819
1026821 - 1026822
1026843 - 1026917
1027618 - 1027629
1027630
1027934
1027935 - 1027936
1037311 - 1037322

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 and Electromagnetic & VLF-EM

Instrument(s) Magnetometer: Scintrex Model VIW 2321 H8 cesium / VLF-EM: Herz Totem 2 A / EM: Aerodat 3 Frequency System.
(specify for each type of survey)

Accuracy Mag: 0.1 nanoTeslas at 0.2 second sampling rate. E.M.: ± 1%.
(specify for each type of survey)

Aircraft used Aerospatiale A-Star 350 D helicopter (CG-ATX)

Sensor altitude 60 m

Navigation and flight path recovery method Motorola Mini Ranger III, VHF radar navigation system.

Aircraft altitude 72 m Line Spacing 200m and locally 100m

Miles flown over total area 300.75 miles Over claims only 215 miles

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 ____________________

____

____

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____

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____

____

____

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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Ministry of Northern Development and Mines
Ontario

Technical Assessment Work Credits

File	
	2.11642

Date	Mining Recorder's Report of Work No.
January 24, 1989	W8806-50168

Recorded Holder
American Barrick Resources Corporation

Township or Area
English and Beemer Townships

Type of survey and number of Assessment days credit per claim	Mining Claims Assessed	
Geophysical	P 987532	P 1012836 to 40 inclusive
Electromagnetic 24 days	969247 to 66 inclusive	1026878 to 97 inclusive
Magnetometer 20 days	969342 to 47 inclusive	1027935-36
Radiometric ____ days	969928-29-30	997184-85
Induced polarization ____ days	1027618 to 29 inclusive	997187
Other ____ days	983120 to 26 inclusive	997192-93
Section 77 (19) See "Mining Claims Assessed" column	983128-29	997196-97
Geological ____ days	1025327 to 30 inclusive	997188 to 91 inclusive
Geochemical ____ days	1027934	997195
Man days ☐ Airborne ☒	1003168 to 71 inclusive	997198 to 200 inclusive
Special provision ☐ Ground ☐	1037311 to 22 inclusive	987260-61
☐ Credits have been reduced because of partial coverage of claims.	1003185 to 88 inclusive	987297-98-99
☐ Credits have been reduced because of corrections to work dates and figures of applicant.	1027630	987582
	998488 to 94 inclusive	987578
	1026756 to 67 inclusive	988368-69
	998064-65	997194
	969903 to 07 inclusive	1014038
	969348 to 51 inclusive	1026330 to 34 inclusive
	987138 to 45 inclusive	1026817-18-19
	1026843 to 60 inclusive	1026821-22
	1026898 to 917 inclusive	873378
	1026861 to 77 inclusive	960991 to 94 inclusive
	1010777-78-79	
	996965-66	
	998074-75-76	
	1026782 to 90 inclusive	
	1012818 to 32 inclusive	

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

P 1003173
1012834-35

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.

826 (85/12)

Ontario

Ministry of
Northern Development
and Mines

Ministère du
Développement du Nord
et des Mines

Mining Lands Section
3rd floor, 880 Bay Street
Toronto, Ontario
M5S 1Z8

Telephone: (416) 965-4888

February 9, 1989

Your file: W8806-50168
Our file: 2.11642

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

Dear Sir:

Re: Notice of Intent dated January 24, 1989
Geophysical (Magnetometer & Electromagnetic) Survey submitted on
Mining Claims P 987532 et al in English & Beemer Townships

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
Provincial Manager, Mining Lands
Mines & Minerals Division

AB:pl
Enclosure

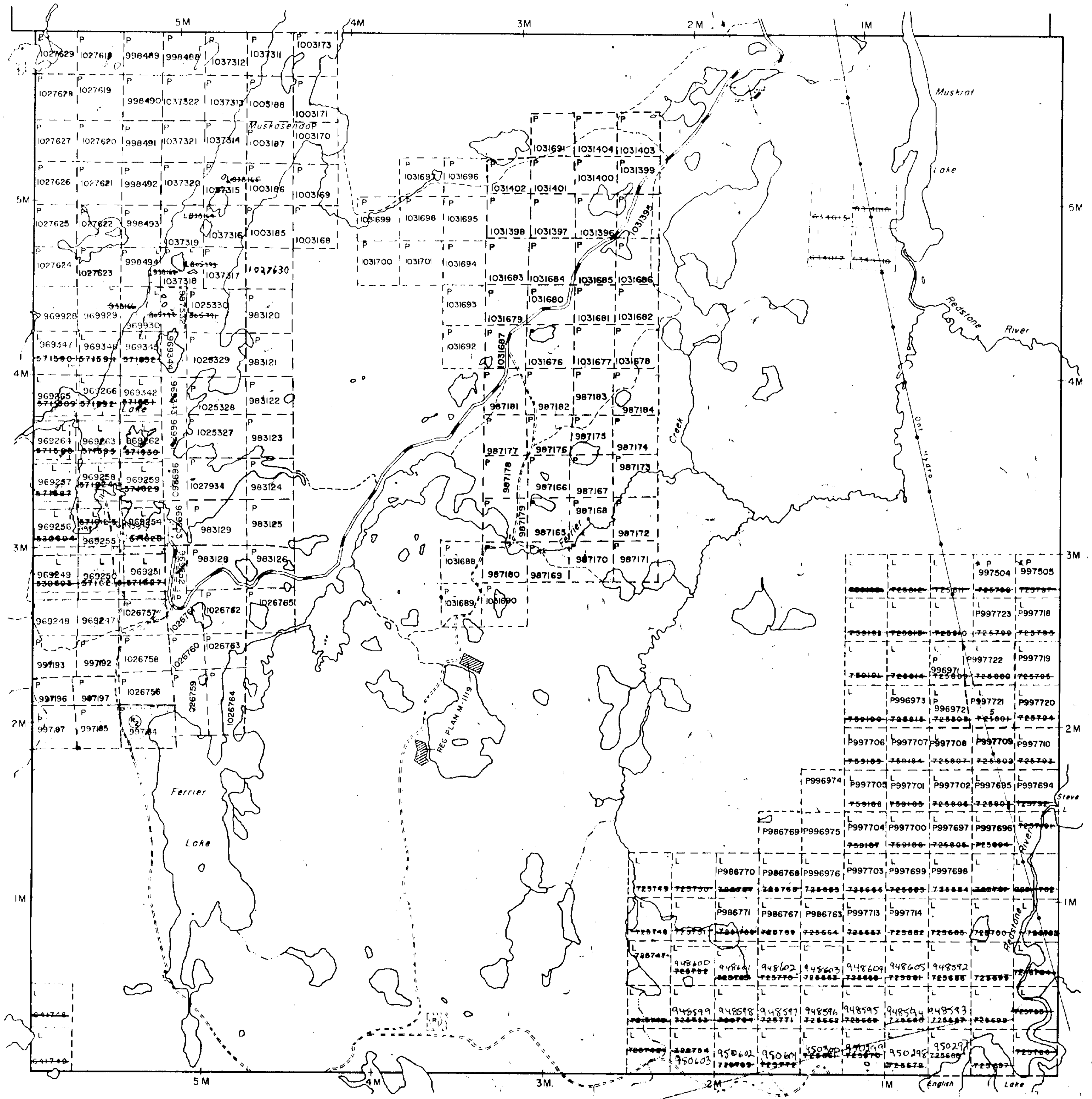
cc: Mr. G.H. Ferguson
Mining and Lands Commissioner
Toronto, Ontario

American Barrick Resources Corporation
953 Government Road West
P.O. Box 1203
Kirkland Lake, Ontario
P2N 3M7

Resident Geologist
Timmins, Ontario

Mr. Marcel Konings
R.R. #1
Colgan, Ontario
LOG 1G0

Bartlett Twp. - M.262



Beemer Twp. - M.656

Zavitz Twp. - M.1189

Semple Twp. - M.1100

42A03SE0208 2.11642 BEEMER

200

THE TOWNSHIP OF

ENGLISH

DISTRICT OF SUDBURY

PORCUPINE MINING DIVISION

SCALE: 1-INCH=40 CHAINS

LEGEND

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

NOTES

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

Areas withdrawn from staking under Section of the Mining Act (R.S.O. 1970).

	No.	File	Date	Disposition
R1	W 18/77	83582	28/2/77	S.R.O.
R2	W.19/78	188543	10/4/78	S.R.O.
R3	W 30/78	192219	2/6/78	S.R.O.

RECEIVED APR 5 1988

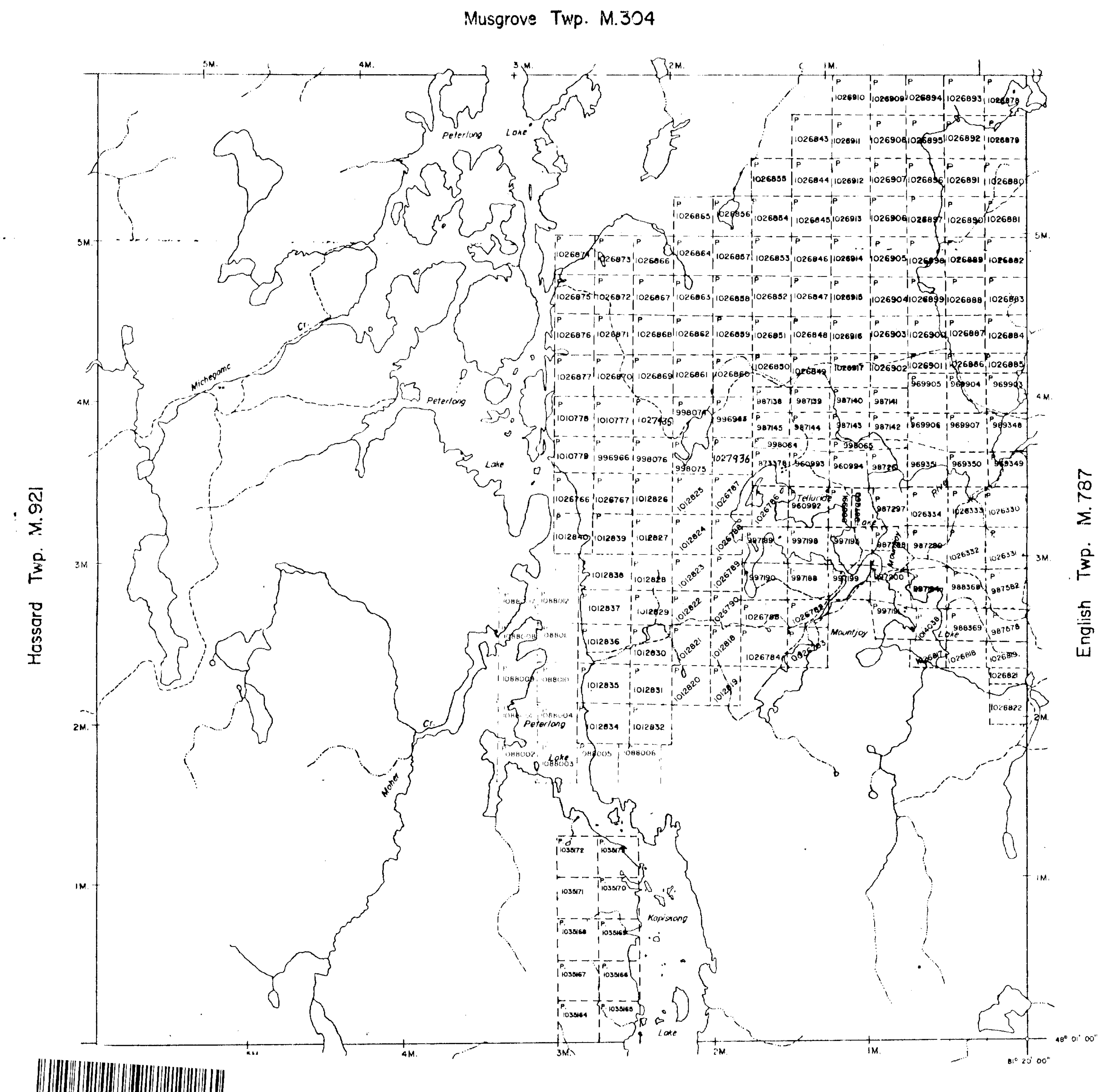
#5

PLAN NO.- M.787

ONTARIO

MINISTRY OF NATURAL RESOURCES

SURVEYS AND MAPPING BRANCH



210

THE TOWNSHIP OF

BEEMER

NOV 18 1988

DISTRICT OF SUDBURY

PORCUPINE MINING DIVISION

SCALE: 1-INCH = 40 CHAINS

LEGEND

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

NOTES

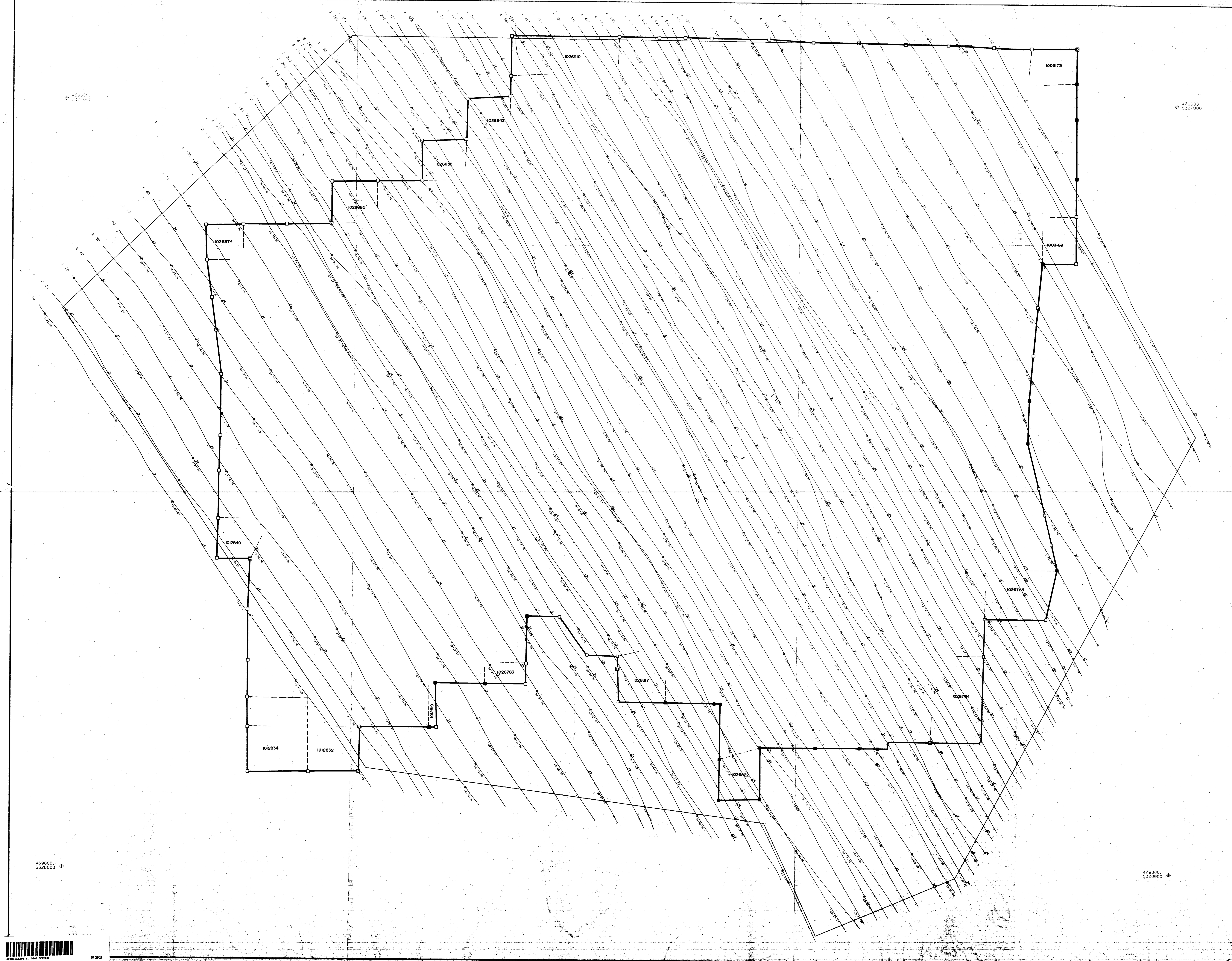
400' Surface Rights Reservation around all lakes and rivers.

Flooding Rights in Peterong and Kapiskong lakes assigned to H.E.P.C. L.O. 7191
File No. 1162 Vol. 4

PLAN NO. M.656

DEPARTMENT OF MINES
— ONTARIO —

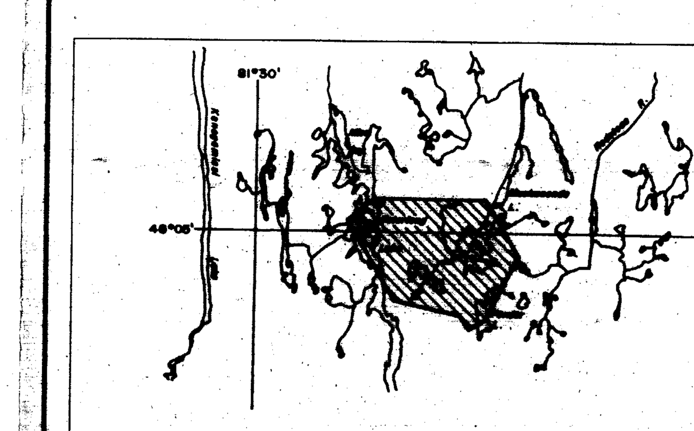

TIMISKAMING DISTRICT
SUDBURY DISTRICT
1150
1200
1300
N
AMERICAN BARRICK RESOURCES CORP.
BASE MAP
2.11642
MUSKASENDA
ONTARIO
SCALE 1:10,000
1/2 MILE
1 KILOMETRE
AERODAT LIMITED
DATE: JULY 1988
NTS No: 42A
MAP No: 1
J8627B
220



Flight Path

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

Average terrain clearance 60m
Average line spacing 100m



AMERICAN BARRICK RESOURCES CORP.

FLIGHT PATH

2.11642

MUSKASENDA

ONTARIO

SCALE 1:10,000

0 330 660 1320 1/2 MILE

0 100 200 500 1 KILOMETRE

AERODAT LIMITED

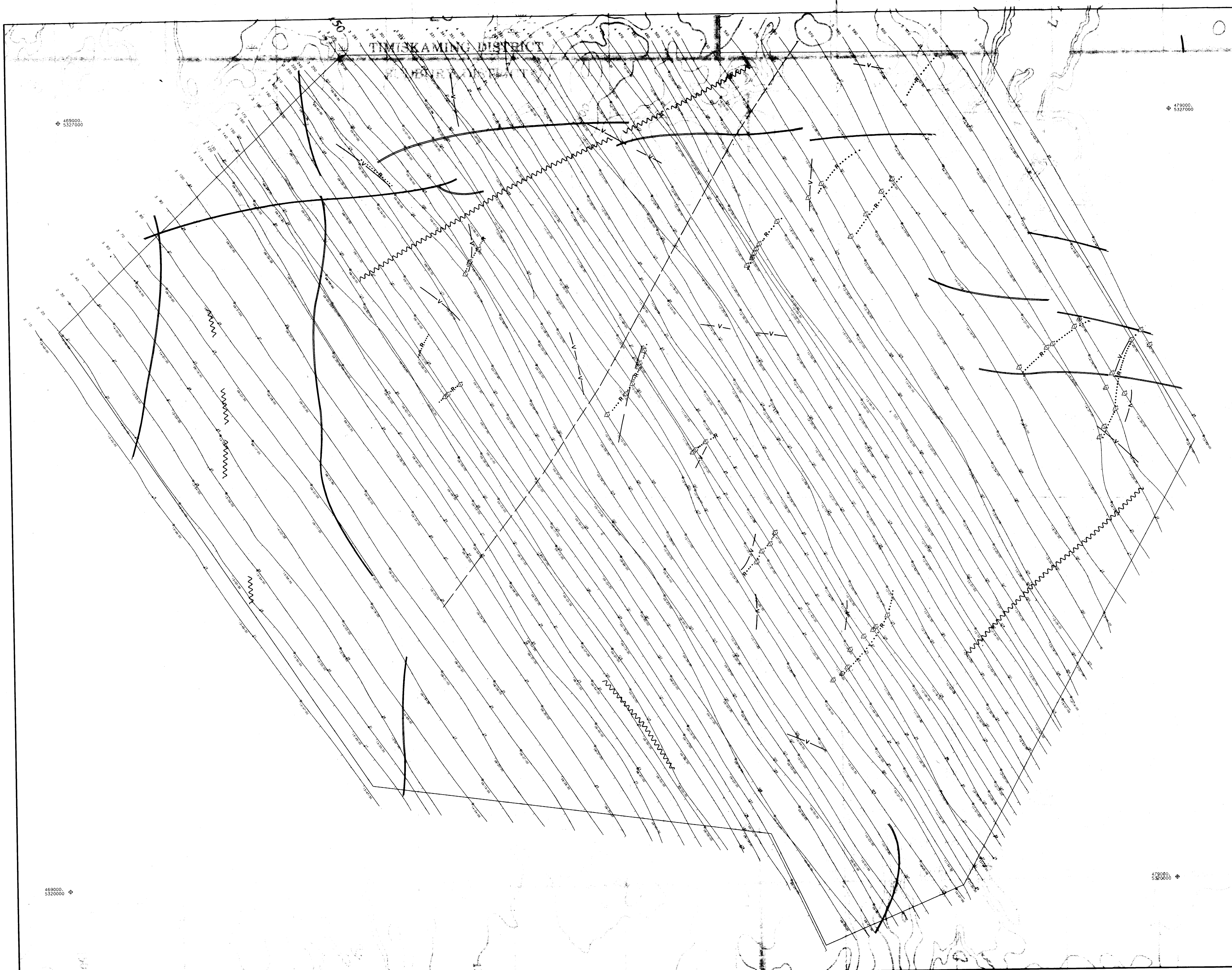
DATE: JULY 1988

NTS No: 42A

MAP No: 2

J8827B

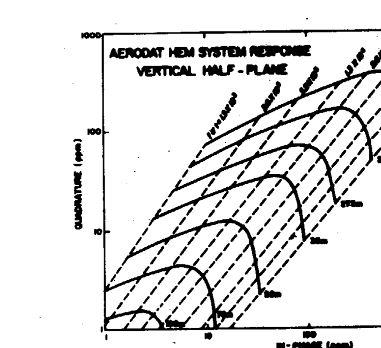
230



Flight Path

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

Average terrain clearance 60m
Average line spacing 100m



EM Anomalies

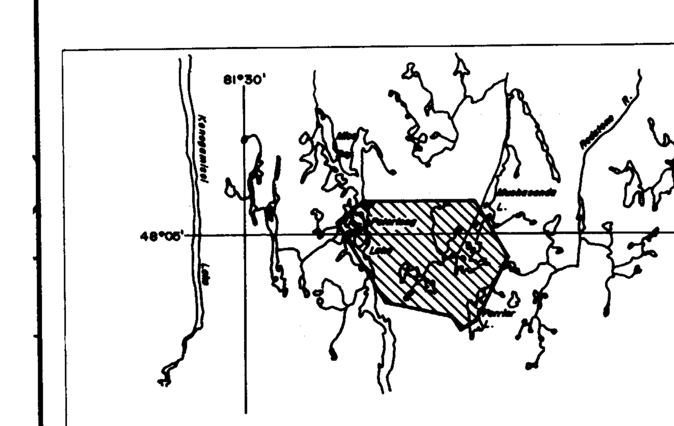
Conductivity Thickness (mhos)

- 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

- —V— VLF conductor
- ····R···· Possible bedrock resistivity low
- — — Contact
- Diabase dike
- Fault



AMERICAN BARRICK RESOURCES CORP.

INTERPRETATION

MUSKASENDA 2.11642

ONTARIO

SCALE 1:10,000

1/2 MILE

1 KILOMETRE

AERODAT LIMITED

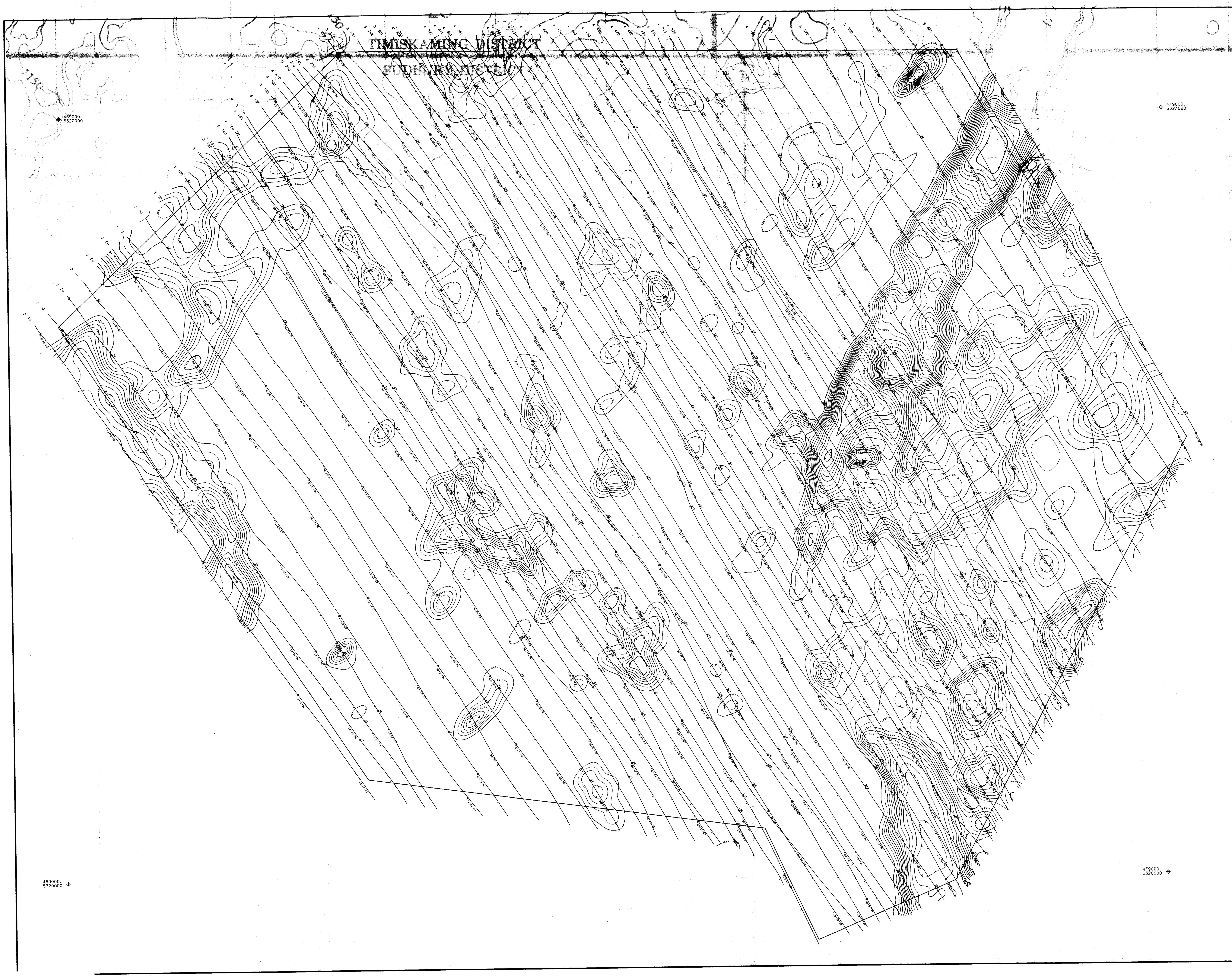
DATE: JULY 1988

NTS No: 42A

MAP No: 3

J8827B

240



N

Flight Path

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

Average terrain clearance 60m
Average line spacing 100m

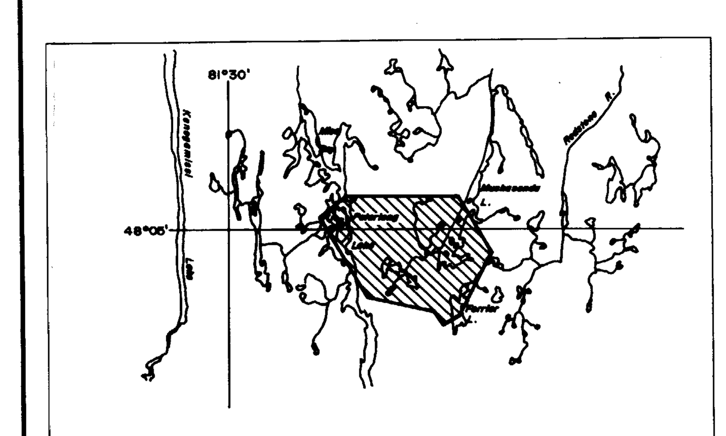
Apparent Resistivity

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

Contouring in ohm•m at logarithmic intervals.

Sensor elevation 30m

(heavy line)	$10^{N.0}$ OHM-M	N = 1,2,3, ... 9
(light line)	$10^{N.M}$ OHM-M	M = 1,2,3, ... 9



AMERICAN BARRICK RESOURCES CORP.

APPARENT RESISTIVITY CONTOURS

MUSKASENDA **2.11642**

ONTARIO

SCALE 1:10,000

1/2 MILE

1 KILOMETRE

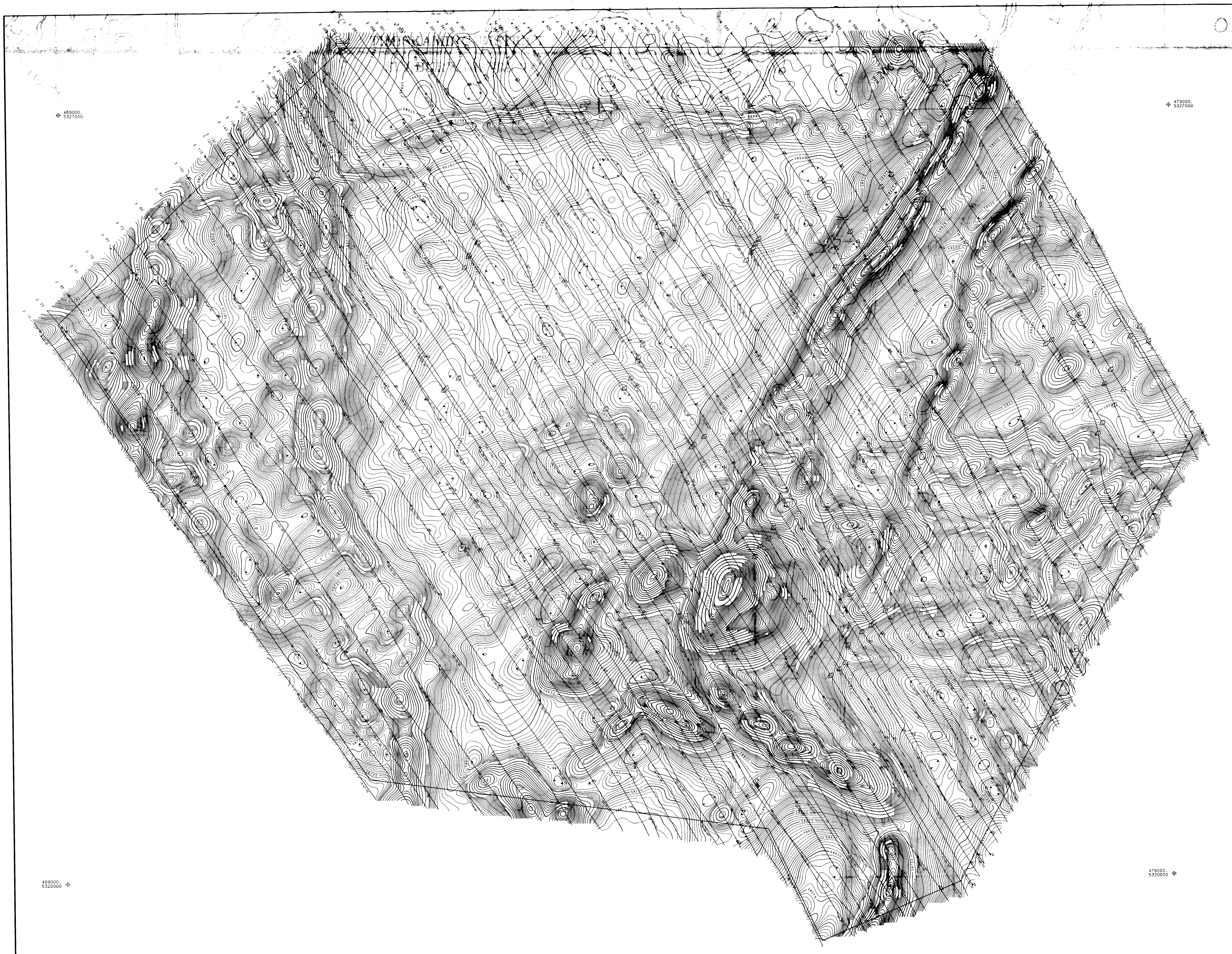
AERODAT LIMITED

DATE: JULY 1988

NTS No: 42A

MAP No: 4

J8827B



Flight Path

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

Average terrain clearance 60m
Average line spacing 100m

Magnetics

Total Field Magnetic Intensity Contours in nT.

Cesium high sensitivity magnetometer.

Sensor elevation 45m

CONTOUR INTERVAL:

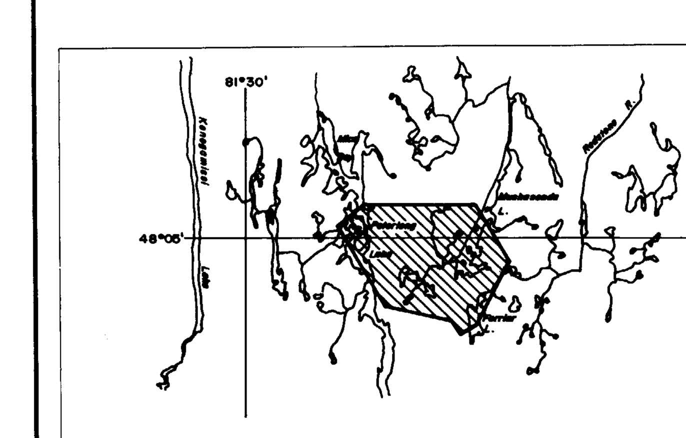
500	nT
100	nT
25	nT
5	nT

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).



AMERICAN BARRICK RESOURCES CORP.

TOTAL FIELD MAGNETIC CONTOURS

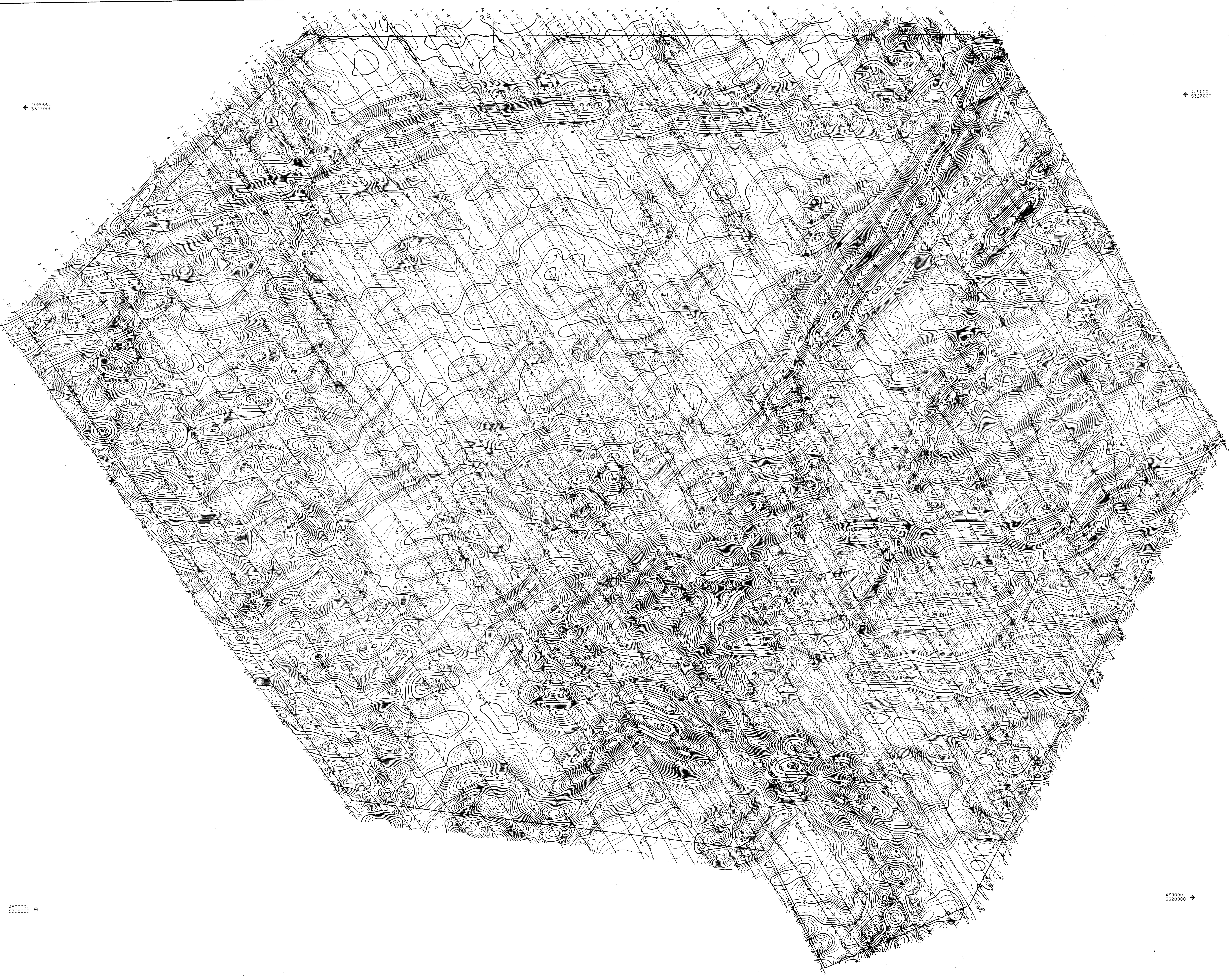
MUSKASENDA **2.11642**
ONTARIO

SCALE 1:10,000

AERODAT LIMITED

DATE:	JULY 1988
NTS No:	42A
MAP No:	4 J8827B

260



Flight Path

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

Average terrain clearance 60m
Average line spacing 100m

Vertical Gradient

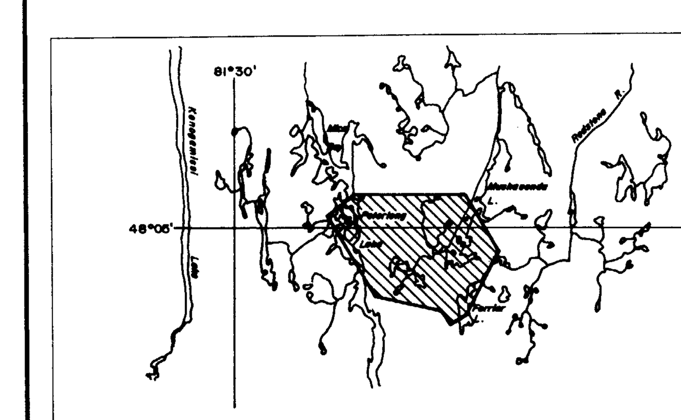
Vertical Magnetic Gradient calculated from the total field magnetic intensity in nT/m.

Cesium high sensitivity magnetometer.

Sensor elevation 45m

CONTOUR INTERVAL

10.0 nT/m
2.5 nT/m
0.5 nT/m



AMERICAN BARRICK RESOURCES CORP.

CALCULATED VERTICAL MAGNETIC GRADIENT

MUSKASENDA 2.11642
ONTARIO

SCALE 1:10,000

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

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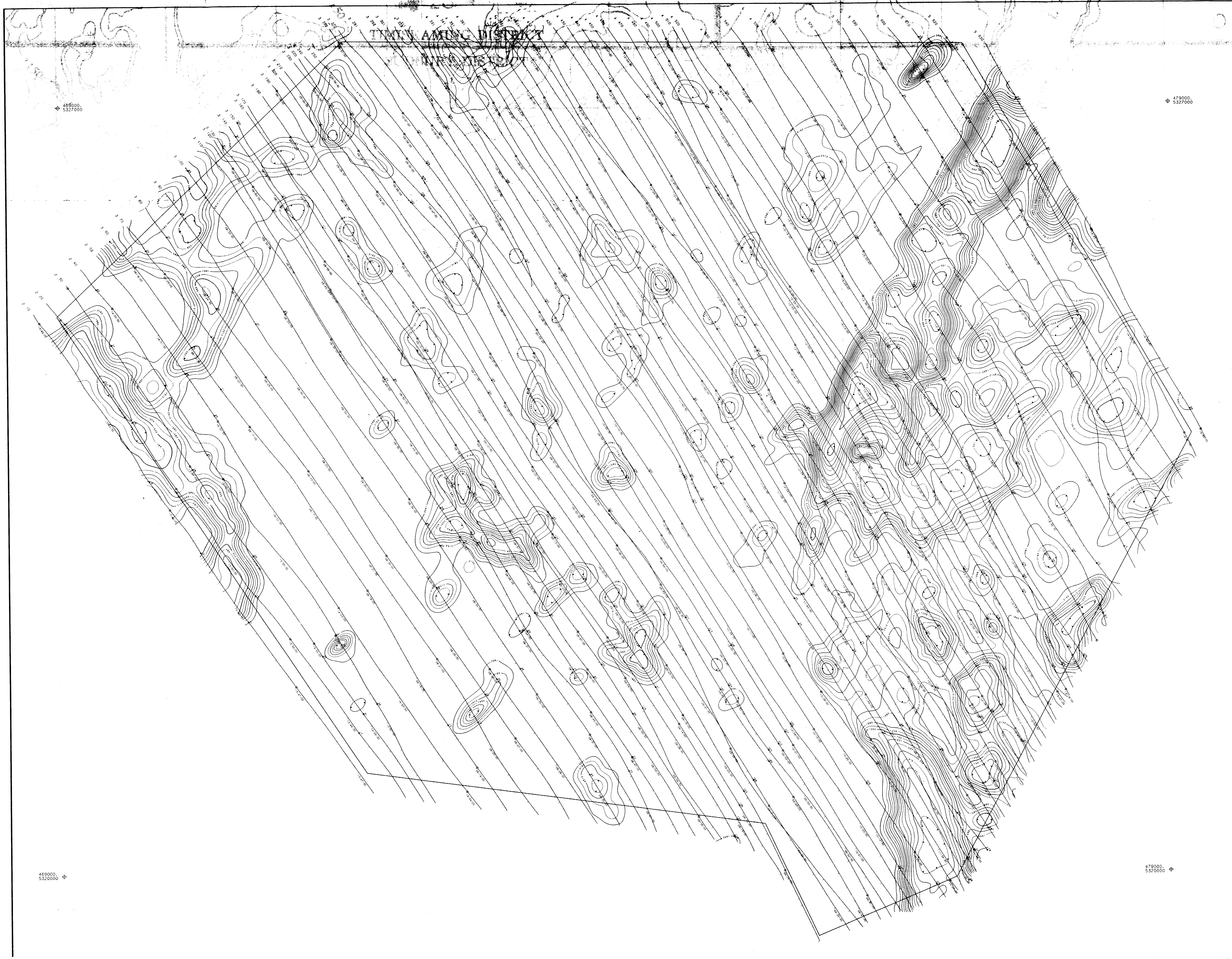
DATE:	JULY 1988
NTS No:	42A
MAP No:	5 J8827B

270



Flight Path

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

Average terrain clearance 60m
Average line spacing 100m

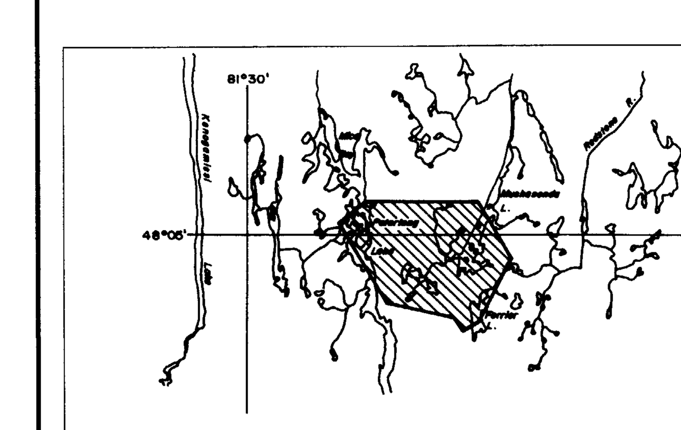
Apparent Resistivity

Calculated from 4175 Hz coplanar EM response assuming a 200 m conductive layer.

Contouring in ohm*m at logarithmic intervals.

Sensor elevation 30m

10 ^{NO} OHM-M N : 1 2 3 ... 9
10 ^{NM} OHM-M M : 1 2 3 ... 9



AMERICAN BARRICK RESOURCES CORP.

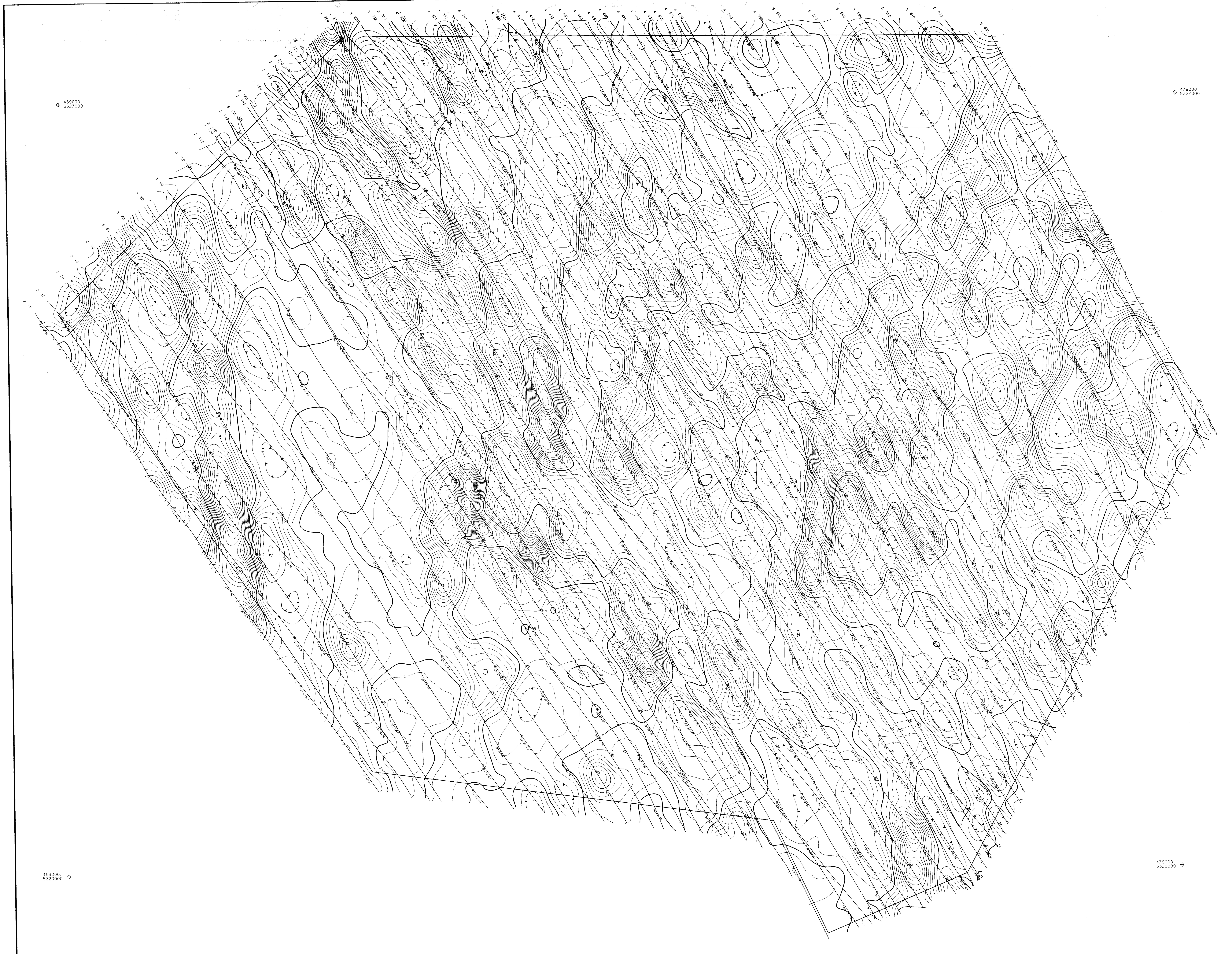
APPARENT RESISTIVITY CONTOURS

MUSKASENDA **2.11642**
ONTARIO

SCALE 1:10,000
0 330 660 1320 1/2 MILE
0 100 200 500 1 KILOMETRE

AERODAT LIMITED	DATE: JULY 1988
	NTS No: 42A
	MAP No: 6 J8827B

280



Flight Path

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

Average terrain clearance 60m
Average line spacing 100m

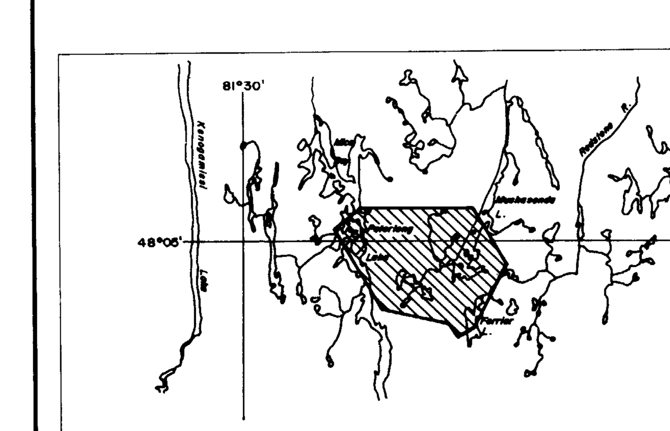
VLF-EM

VLF-EM Total Field Intensity in percent.

Station: NAA
Cutler, Maine
24.0 kHz

Sensor elevation 45m

CONTOUR INTERVAL
50%
10%
2%



AMERICAN BARRICK RESOURCES CORP.

VLF-EM TOTAL FIELD CONTOURS

MUSKASENDA **2.11642**
ONTARIO

SCALE 1:10,000
0 330 660 1320 1/2 MILE
0 100 200 500 1 KILOMETRE

AERODAT LIMITED

DATE:	JULY 1988
NTS No:	42A
MAP No:	7 J8827B

290