42C16NW0106 2.5970 LIZAR

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REPORT ON COMBINED HELICOPTER-BORNE MAGNETIC, ELECTROMAGNETIC, AND VLF-EM SURVEY ON LIZAR CLAIM GROUP

for
TUNDRA GOLD MINES LIMITED
by
AERODAT LIMITED
July 1983

TABL...

LIST OF MAPS

(Scale: 1/15,840)

Map 1	Interpreted Conductive Units
Map 2	Airborne Electromagnetic Survey Profile Map (955 Hz. coaxial)
Map 3	Total Field Magnetic Map
Map 4	VLF-EM Total Field Contours

Data provided but not included in report:

1 - master map (2 colour) of coaxial and coplanar profiles with flight path

2 - anomaly list providing estimates of depth and conductivity thickness

3 - analogue records of data obtained in flight

1. INTRODUCTION

This report describes an airborne geophysical survey carried out on behalf of Tundra Gold Mines Limited by Aerodat Limited. Equipment operated included a 3 frequency electromagnetic system, a VLF-EM system, and a magnetometer.

The survey was flown on March 26 to March 29, 1983 from an operations base at Wawa Ontario. A total of 541 line miles were flown, at a nominal line spacing of 660 feet. Of the total flown, this report describes 334.4 line miles.

2. SURVEY AREA/CLAIM NUMBERS AND LOCATIONS

The mining claim numbers and locations covered by this survey are indicated on the map in the following pocket.

3. AIRCRAFT EQUIPMENT

3.1 Aircraft

The helicopter used for the survey was an Aerospatial Astar 350D owned and operated by North Star Helicopters. Installation of the geophysical and ancillary equipment was carried out by Aerodat. The survey aircraft was flown at a nominal altitude at 60 meters.

3.2 Equipment

3.2.1 Electromagnetic System

The electromagnetic system was an Aerodat/ Geonics 3 frequency system. Two vertical coaxial coil pairs were operated at 955 and 4130 Hz and a horizontal coplanar coil pair at 4500 Hz. The transmitter-receiver separation was 7 meters. In-phase and quadrature signals were measured simultaneously for the 3 frequencies with a time-constant of 0.1 seconds. The electromagnetic bird was towed 30 meters below the helicopter.

3.2.2 VLF-EM System

The VLF-EM System was a Herz 2A. This instrument measures the total field and vertical quadrature component of two selected frequencies. The sensor was towed in a bird 15 meters below the helicopter.

The sensor aligned with the flight direction is designated as "LINE", and the sensor perpendicular to the line direction as "ORTHO". The "LINE" station used was NAA, Cutler Maine, 17.8 KHz or NLK, Jim Creek Washington, 24.8 KHz. The "ORTHO" station was NSS, Annapolis Maryland, 21.4 KHz. The NSS transmitter was operating on a very limited schedule and was not available during a large part of the survey.

3.2.3 Magnetometer

The magnetometer was a Geometrics G-803 proton precession type. The sensitivity of the instrument was 1 gamma at a 1.0 second sample rate. The sensor was towed in a bird 15 meters below the helicopter.

3.2.4 Magnetic Base Station

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

3.2.5 Radar Altimeter

A Hoffman HRA-100 radar altimeter was used to record terrain clearance. The output from the instrument is a linear function of altitude for maximum accuracy.

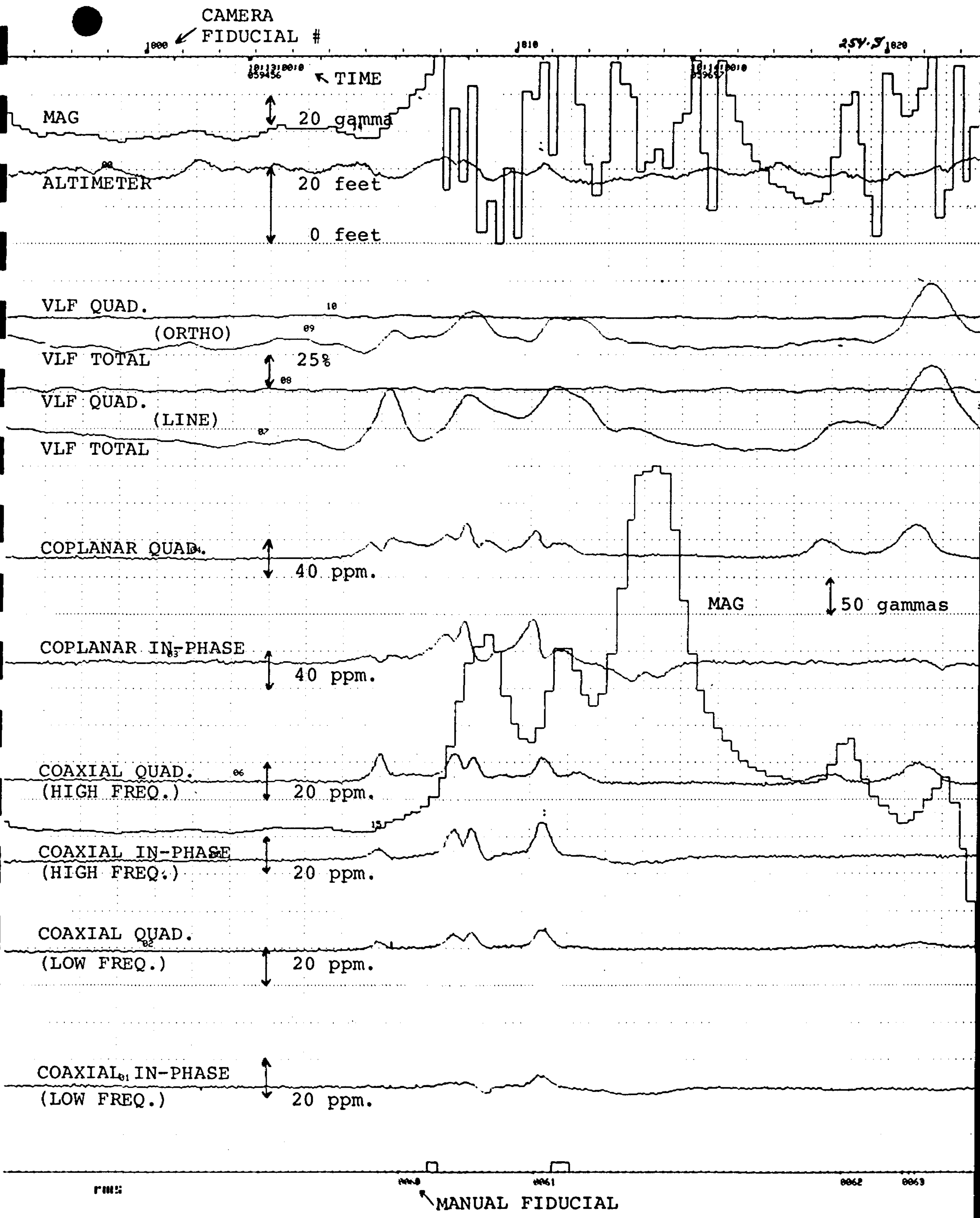
3.2.6 Tracking Camera

A Geocam tracking camera was used to record flight path on 35 mm film. The camera was operated in strip mode and the fiducial numbers for cross reference to the analog and digital data were imprinted on the margin of the film.

3.2.7 Analog Recorder

A RMS dot-matrix recorder was used to display the data during the survey. A sample record with channel identification and scales is presented on the following page.

ANALOG CHART



3.2.8 Digital Recorder

A Perle DAC/NAV data system recorded the survey data on cassette magnetic tape. Information recorded was as follows:

Equipment	Interval
EM	0.1 second
VLF-EM	0.5 second
magnetometer	0.5 second
altimeter	1.0 second
fiducial (time)	1.0 second
fiducial (manual)	0.2 second

4. DATA PRESENTATION

4.1 Base Map and Flight Path Recovery

The base map photomosaic at a scale of 1/15,840 was constructed from available aerial photography. The flight path was plotted manually on this base and digitized for use in the computer compilation of the maps. The flight path is presented with fiducials for cross reference to both the analog and digital data.

4.2 Electromagnetic Profile Maps

The electromagnetic data was recorded digitally at a high sample rate of 10/second with a small time constant of 0.1 second. A two stage digital filtering process was carried out to reject major sferic events, and reduce system noise.

Local atmospheric 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 a geological phenomenon. To avoid this possibility, a computer algorithm searches out and rejects the major "sferic" events.

The signal to noise was further enhanced by the application of a low pass filter. The filter was applied digitally. It has zero phase shift which prevents any lag or peak displacement from occurring and it suppresses only variation with a wavelength less than about 0.25 seconds. This low effective time constant permits maximum profile shape resolution.

Following the filtering processes, a base level correction was made. The correction applied is a linear function of time that ensures that the corrected amplitude of the various inphase and quadrature components is zero when no conductive or permeable source is present. This filtered and levelled data was then presented in profile map form.

The in-phase and quadrature responses of the coaxial 955 Hz configuration are plotted with the flight path and presented on the photomosaic base.

The in-phase and quadrature responses of the coaxial 4500 Hz and the coplanar 4130 Hz configuration are plotted with flight path and are available as a two colour overlay.

4.3 Magnetic Contour Maps

The aeromagnetic data was corrected for diurnal variations by subtraction of the digitally recorded base station magnetic profile. No correction for regional variation is applied.

The corrected profile data was interpolated onto a regular grid at a 2.5 mm interval using a cubic spline technique. The grid provided the basis for threading the presented contours at a 10 gamma interval.

4.4 VLF-EM Contour and Profile Maps

The VLF-EM "LINE" signal, was compiled in map form. The mean response level of the total field signal was removed and the data was gridded and contoured at an interval of 2%. When the "ORTHO" signal was available it was compiled in a similar fashion.

4.5 Electromagnetic Conductor Symbolization

The electromagnetic profile maps were used to identify those anomalies with characteristics typical of bedrock conductors. The in-phase and quadrature response amplitudes at 4130 Hz were digitally applied to a phasor diagram for the vertical half-plane model and estimates of conductance (conductivity thickness) were made. The conductance levels were divided into categories as indicated in the map legend; the higher the number, the higher the estimated conductivity thickness product.

As discussed in Appendix I the conductance should be used as a relative rather than absolute guide to conductor quality. A conductance value of less than 2 mhos is typical for conductive overburden material and electrolytic conductors in faults and shears. Values greater than 4 mhos generally indicate some electronic conduction by certain metallic sulphides and/or graphite. Gold, although highly conductive, is not expected to occur in sufficient concentration to directly produce an electromagnetic anomaly; however, accessory mineralization such as pyrite or graphite can produce a measurable response.

With the aid of the profile maps, responses of similar characteristics may be followed from line to line and conductor axes identified.

The distinction between conductive bedrock and overburden anomalies is not always clear and some of the symbolized anomalies may not be of bedrock origin. It is also possible that a response may have been mistakenly attributed to overburden and therefore not included in the symbolization process. For this reason, as geological and other geophysical information becomes available, reassessment of the significance of the various conductors is recommended.

4.6 INTERPRETATION MAPS

The conductive trends are shown and discriminated for descriptive purposes.

These conductors are described below.

1	Questionable, probably overburden, next to diabase dyke.
2	Moderate, deep conductor on flank of magnetic trend.
3	Poor conductivity on flank of magnetic response.
4	Conductive lake sediments probably cause this response.
5	Possible bedrock response below lake sediments.
6	Questionable, probably overburden
7	Low amplitude response on flank of magnetic high.
8	Possible multiple below lake sediments on flank of magnetic high.

9	Questionable response next to diabase dyke.
10	Weak conductor coinciding with magnetic high. On trend from gold prospect.
11	Possible conductor below lake sediments
12	Possible conductor below lake sediments
13	Possible conductor on south flank of magnetic high.
14	Possible conductivity below lake sediments with coincident magnetic high.
15	Probable weak conductor coincides with crest of long magnetic feature.
16	Possible multiple conductors bracketting magnetic high.
17	Possible bedrock conductor under conductive sediments.

Respectfully submitted,

August 8, 1983.

Fenton Scott, P.Eng.

APPENDIX I

GENERAL INTERPRETIVE CONSIDERATIONS

Electromagnetic

The Aerodat 3 frequency system utilizes 2 different transmitter-receiver coil geometries. The traditional coaxial coil configuration is operated at 2 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 conductivity and its size and shape; the "geometrical" property of the response is largely a function of the conductors 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 in-phase to quadrature ratio and a large phase shift a low ratio. This relationship is shown quantitatively for a 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 ppm 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 I and the conductance and in-phase 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, 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 the depth estimate but both should be considered a relative rather than absolute guide to the anomalies 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 sphalerite, cinnabar and stibnite are good conductors; however, they may occur in a disseminated manner that inhibits electrical conduction through the rock mass. In this case the apparent conductance can seriously under rate 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 concentration in association with minor conductive sulphides, and the electromagnetic response only relate to the minor associate 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 decreases 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 coil 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 infered 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 follow 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 measurable VLF signals. For the same reason, poor conductors such as sheared contacts, breccia zones, narrow faults, alteration zones and porous flow tops normally produce VLF anomalies. The method can therefore be used effectively for geological mapping. The only relative disadvantage of the method lies in its sensitivity to conductive overburden. In conductive ground 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.

Ministry of Natural Resources
Ontario

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

#64/84

42C16NW0106 2.5970 LIZAR

900

Mining Act — Do not use shaded areas below.

Type of Survey(s)	AIRBORNE ELECTROMAGNETIC, MAGNETIC, VLF-EM
Township or Area	LIZAR
Claim Holder(s)	TUNDRA GOLD MINES LIMITED
Prospector's Licence No.	T1533
Address	4001 INDIAN SCHOOL ROAD N.E. · ALBUQUERQUE NEW MEXICO
Survey Company	AERODAT LIMITED
Date of Survey (from & to)	26 3 83 – 29 3 83 (Day, Mo., Yr.)
Total Miles of line Cut	334.4 (0.8 on claim)
Name and Address of Author (of Geo-Technical report)	FENTON SCOTT 17 MALABAR PL. DON MILLS ONTARIO

Credits Requested per Each Claim in Columns at right

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

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

Airborne Credits		Days per Claim
Note: Special provisions credits do not apply to Airborne Surveys.	Electromagnetic	21.8
	Magnetometer	21.8
	Radiometric VLF	21.8

Mining Claims Traversed (List in numerical sequence)

Prefix	Number	Expend. Days Cr.
P	695064	

Expenditures (excludes power stripping)

Type of Work Performed

Performed on Claim(s)

Calculation of Expenditure Days Credits

Total Expenditures $ ÷ 15 = Total Days Credits

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

Total number of mining claims covered by this report of work. 1

RECEIVED APR 9 1984 MINING LANDS SECTION

RECEIVED PORCUPINE MINING DIVISION MAR 07 1984 A.M. P.M. 7,8,9,10,11,12,1,2,3,4,5,6

RECORDED MAR 7 1984 Receipt No. C1

For Office Use Only

Total Days Cr. Recorded	Date Recorded	Mining Recorder
65.4	Mar 7/84	[signature]
	Date Approved as Recorded: 84.4.27	Branch Director: [signature]

Date	Recorded Holder or Agent (Signature)
Feb 27/84	[signature] for Tundra Gold Mines Ltd.

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
FENTON SCOTT 17 MALABAR PL. DON MILLS ONTARIO M3B-1A4

Date Certified	Certified by (Signature)
Feb 27/84	[signature]

1362 (81/9)

Claim P. 695064 was
omitted from W.R. #
324/83 submitted to our
Office Nov. 3/83.
your file # 2.5970
This report was approved.
On Feb 2, 1984.
Mr Sexton Scott has
re-submitted now - WR # 64/84
from same survey.

Colombe.
Timmins. Mining.

Ministry of Natural Resources
Ontario

2.5970 File 2.5970

#324/83.

#324/83

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

The Mining Act

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

Type of Survey(s): AIRBORNE ELECTROMAGNETIC, MAGNETIC, VLF

Township or Area: LIZAR, ERMINE, DERRY

Claim Holder(s): TUNDRA GOLD MINES LTD.

Prospector's Licence No.: T 1533

Address: 4001 INDIAN SCHOOL ROAD, N.E.

2.5970

Survey Company: AERODAT LIMITED

Date of Survey (from & to): 26 3 83 – 29 3 83 (Day, Mo., Yr.)

Total Miles of line Cut: 334.4

Name and Address of Author (of Geo-Technical report): FENTON SCOTT, 17 MALABAR PLACE, DON MILLS, ONTARIO

Credits Requested per Each Claim in Columns at right

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

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

Airborne Credits		Days per Claim
Note: Special provisions credits do not apply to Airborne Surveys.	Electromagnetic	21.8
	Magnetometer	21.8
	VLF	21.8

Mining Claims Traversed (List in numerical sequence)

Prefix	Number	Expend. Days Cr.	Prefix	Number	Expend. Days Cr.
P	690292 ET. AL.				
	LIST ATTACHED				

Expenditures (excludes power stripping)

Type of Work Performed:

Performed on Claim(s):

Calculation of Expenditure Days Credits

Total Expenditures $ ÷ 15 = Total Days Credits

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

Total number of mining claims covered by this report of work: 614

For Office Use Only
Total Days Cr. Recorded: 40156
Date Recorded: Nov 3/83
Mining Recorder: [signature]
Date Approved as Recorded: 84.2.2
Branch Director: [signature]

Date: OCT. 31/83
Recorded Holder or Agent (Signature): [signature]

PORCUPINE MINING DIVISION RECEIVED NOV 03 1983 A.M. 7,8,9,10,11,12,1,2,3,4,5,6 P.M.

RECORDED NOV 3 1983

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: FENTON SCOTT 17 MALABAR PLACE DON MILLS. M3B 1A4

Date Certified: OCT 31/83
Certified by (Signature): [signature]

TUNDRA GOLD MINES — LIZAR CLAIM LIST

P 690898 ✓	P 690946 ✓	P 690998 ✓	P691046 ✓	P691098 ✓
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44 ✓				

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73 ✓	26 ✓	72 ✓	26 ✓	81 ✓	28 ✓
74 ✓	27 ✓	73 ✓	27 ✓	82 ✓	29 ✓
75 ✓	28 ✓	74 ✓	28 ✓	83 ✓	30 ✓
76 ✓	29 ✓	75 ✓	29 ✓	84 ✓	31 ✓
77 ✓	30 ✓	76 ✓	30 ✓	85 ✓	32 ✓
78 ✓	31 ✓		31 ✓	86 ✓	33 ✓
79 ✓	32 ✓	78 ✓	32 ✓	87 ✓	34
80 ✓	33 ✓	79 ✓	33 ✓	88 ✓	35 ✓
81 ✓	34 ✓	80 ✓	34 ✓	89 ✓	36 ✓
82 ✓	35 ✓	81 ✓	35 ✓	90 ✓	37 ✓
83 ✓	36 ✓			91 ✓	38 ✓
84 ✓	37 ✓			92 ✓	39 ✓
85 ✓	38 ✓			93 ✓	40 ✓
86 ✓	39 ✓			94 ✓	41 ✓
87 ✓	40 ✓			95 ✓	42 ✓
	41 ✓			96 ✓	43 ✓
	42 ✓			97 ✓	44 ✓
	43 ✓			98 ✓	45 ✓
				99 ✓	

P695146 ✓	P695192 ✓	P695338 ✓	P695333 ✓
47 ✓	93 ✓	39 ✓	34 ✓
48 ✓	94 ✓	40 ✓	35 ✓
49 ✓	95 ✓	41 ✓	36 ✓
50 ✓	96 ✓	42 ✓	
51 ✓	97 ✓	43 ✓	695345 ✓
52 ✓	98 ✓	44 ✓	46 ✓
53 ✓	99 ✓	45 ✓	47 ✓
54 ✓	200 ✓	46 ✓	48 ✓
55 ✓	01 ✓	47 ✓	
56 ✓	02 ✓	48 ✓	695353 ✓
57 ✓	03 ✓	49 ✓	54 ✓
58 ✓	04 ✓	50 ✓	
59 ✓	05 ✓	51 ✓	695363 ✓
60 ✓	06 ✓	52 ✓	64 ✓
61 ✓	07 ✓	53 ✓	65 ✓
62 ✓	08 ✓	54 ✓	66 ✓
63 ✓	09 ✓	55 ✓	
64 ✓	10 ✓	56 ✓	695373 ✓
65 ✓	11 ✓	57 ✓	74 ✓
66 ✓	12 ✓		75 ✓
67 ✓	13 ✓		76 ✓
68 ✓	14 ✓	695288 ✓	
69 ✓	15 ✓	89 ✓	695380 ✓
70 ✓	16 ✓	90 ✓	81 ✓
71 ✓	17 ✓	91 ✓	
72 ✓	18 ✓		
73 ✓	19 ✓	695302 ✓	
74 ✓	20 ✓	03 ✓	
75 ✓	21 ✓		
76 ✓	22 ✓	695310 ✓	
77 ✓	23 ✓	11 ✓	
78 ✓	24 ✓	12 ✓	
79 ✓	25 ✓	13 ✓	
80 ✓	26 ✓		
81 ✓	27 ✓	695320 ✓	
82 ✓	28 ✓	21 ✓	
83 ✓	29 ✓	22 ✓	
84 ✓	30 ✓	23 ✓	
85 ✓	31 ✓		
86 ✓	32 ✓	695327 ✓	
87 ✓	33 ✓	28 ✓	
88 ✓	34 ✓	29 ✓	
89 ✓	35 ✓	30 ✓	
90 ✓	36 ✓		
91 ✓	37 ✓		

TOTAL — 614 CLAIMS

Ontario | Ministry of Natural Resources

Geotechnical Report Approval

File 25970

Mining Lands Comments

☐ To: Geophysics Mr R. Barlow

Comments

☒ Approved ☐ Wish to see again with corrections | Date Jan 3/83 | Signature R R

☐ To: Geology - Expenditures

Comments

☐ Approved ☐ Wish to see again with corrections | Date | Signature

☐ To: Geochemistry

Comments

L.D.

☐ Approved ☐ Wish to see again with corrections | Date | Signature

☐ To: Mining Lands Section, Room 6462, Whitney Block. (Tel: 5-1380)

1593 (81/10)

1983 11 08 2.5970

Mining Recorder
Ministry of Natural Resources
60 Wilson Avenue
Timmins, Ontario
P4N 2S7

Dear Sir:

We have received reports and maps for an Airborne Geophysical (Electromagnetic and Magnetometer and VLF) survey submitted on mining claims P 690898 et al in the Townships of Lizar, Ermine and Derry.

This material will be examined and assessed and a statement of assessment work credits will be issued.

We do not have a copy of the report of work which is normally filed with you prior to the submission of this technical data. Please forward a copy as soon as possible.

Yours very truly,

E.F. Anderson
Director
Land Management Branch

Whitney Block, Room 6643
Queen's Park
Toronto, Ontario
M7A 1W3
Phone: (416)965-1380

A. Barr:mc

cc: Tundra Gold Mines Limited
c/o H.I. Miller
Suite 1205
45 Richmond Street West
Toronto, Ontario
M5H 1Z2

cc: Fenton Scott
17 Malabar Place
Don Mills, Ontario
M3B 1A4

File ____________

Ontario

Ministry of Natural Resources

GEOPHYSICAL – GEOLOGICAL – GEOCHEMICAL TECHNICAL DATA STATEMENT

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 Electromagnetic, Magnetic, VLF_EM

Township or Area Lizar, Ermine, Derry

Claim Holder(s) Tundra Gold Mines Limited

Survey Company Aerodat Limited

Author of Report Fenton Scott

Address of Author 17 Malabar Place, Don Mills, Ont.

Covering Dates of Survey March 26 to 29, 1983
(linecutting to office)

Total Miles of Line Cut 334.4

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 21.8 Electromagnetic 21.8 ~~Radiometric~~ VLF 21.8
(enter days per claim)

DATE: October 31/83 SIGNATURE: Fenton Scott
Author of Report or Agent

MINING CLAIMS TRAVERSED
List numerically

P 690898 et al
(prefix) (number)
see list attached

RECEIVED
NOV 1 1983
MINING LANDS

If space insufficient, attach list

TOTAL CLAIMS 614

OFFICE USE ONLY

Res. Geol. ____________ Qualifications 63.1263

Previous Surveys

File No.	Type	Date	Claim Holder

837 (5/79)

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 Electromagnetic VLF

Instrument(s) Geometrics G803 Aerodat 3 freq. Totem 2A

(specify for each type of survey)

Accuracy 0.5 gammas 1 ppm 1%

(specify for each type of survey)

Aircraft used Astar Helicopter

Sensor altitude 150' 100' 150'

Navigation and flight path recovery method Visual navigation, manual and autimatic fiducials, on board camera

Aircraft altitude 200' Line Spacing 660' okay MEA

Miles flown over total area 541 Over claims only 334.4

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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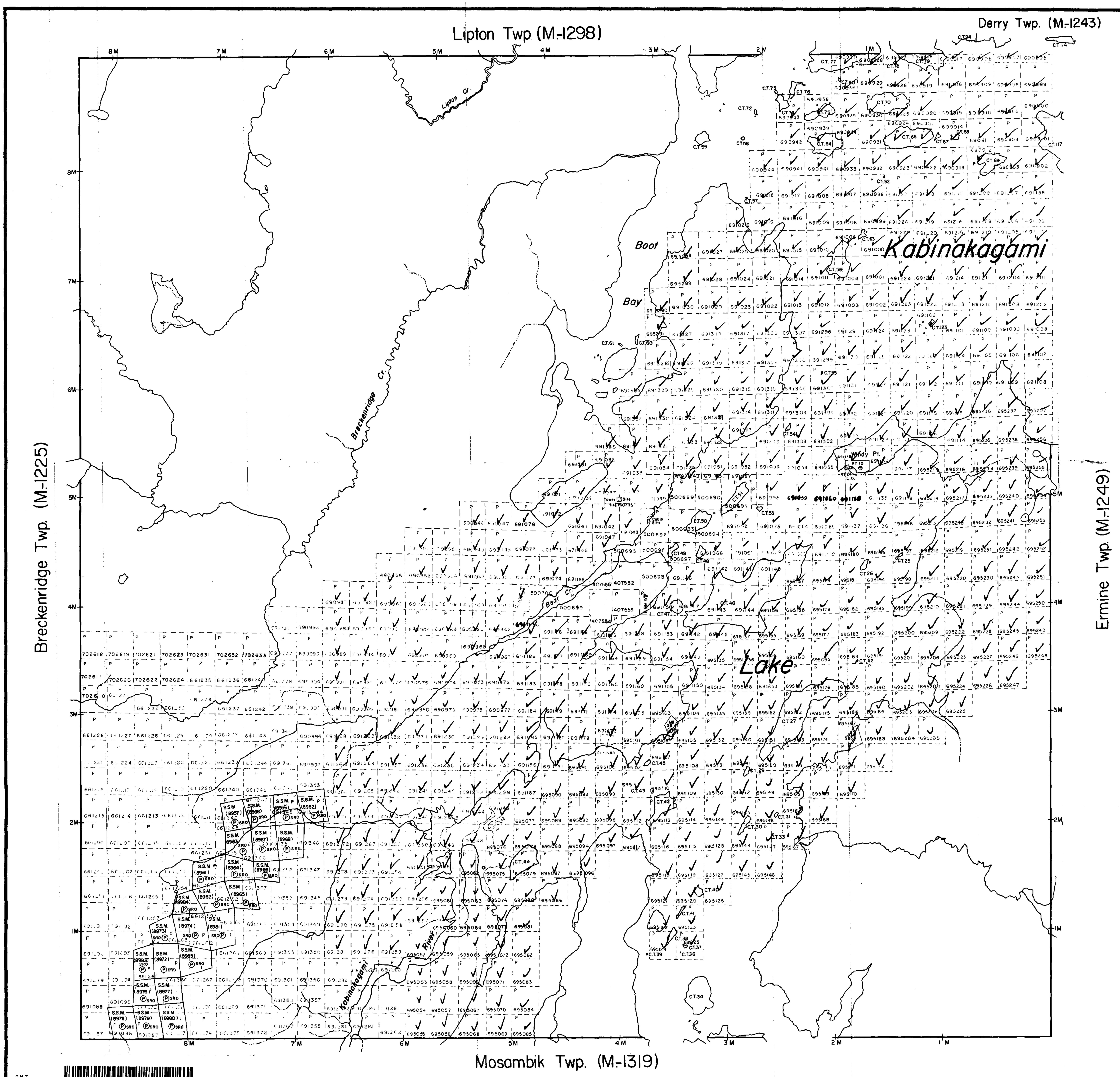


THE TOWNSHIP OF

LIZAR

DISTRICT OF **ALGOMA**

PORCUPINE MINING DIVISION

SCALE: 1-INCH = 40 CHAINS

LEGEND

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

NOTES

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

DATE OF ISSUE
JAN 31 1984
Ministry of Natural Resources
TORONTO

PLAN NO.-M.1299

ONTARIO
MINISTRY OF NATURAL RESOURCES
SURVEYS AND MAPPING BRANCH

C.M.T.

42C15NW0108 2.5970 LIZAR

200

REFERENCE

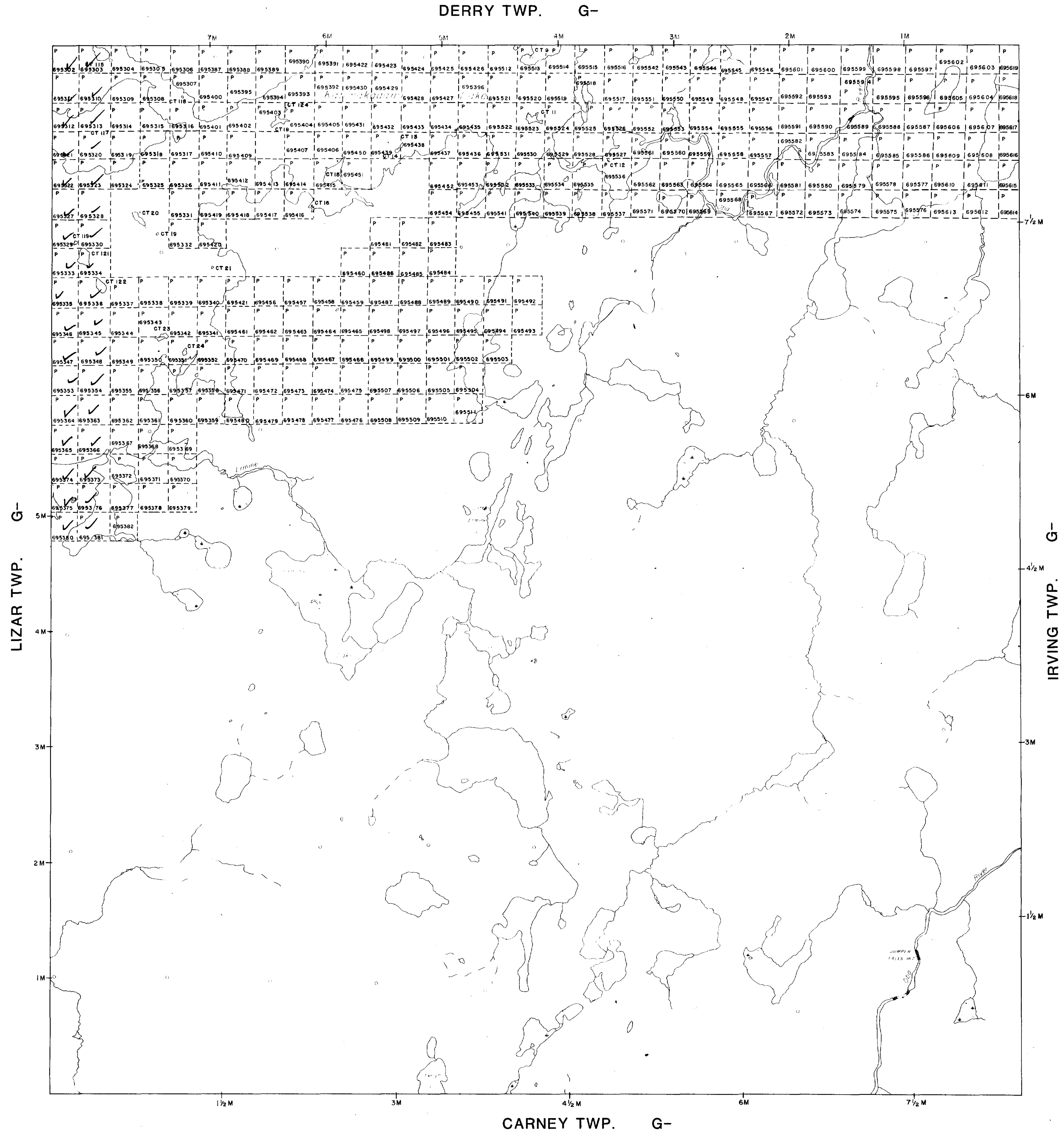
AREAS WITHDRAWN FROM DISPOSITION

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

Description	Order No.	Date	Disposition	File

42C15NW0106 2.5970 LIZAR

210



REFERENCE

DATE OF ISSUE
JAN 31 1984
Ministry of Natural Resources
TORONTO

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)

TOWNSHIP

ERMINE

M.N.R. ADMINISTRATIVE DISTRICT
HEARST

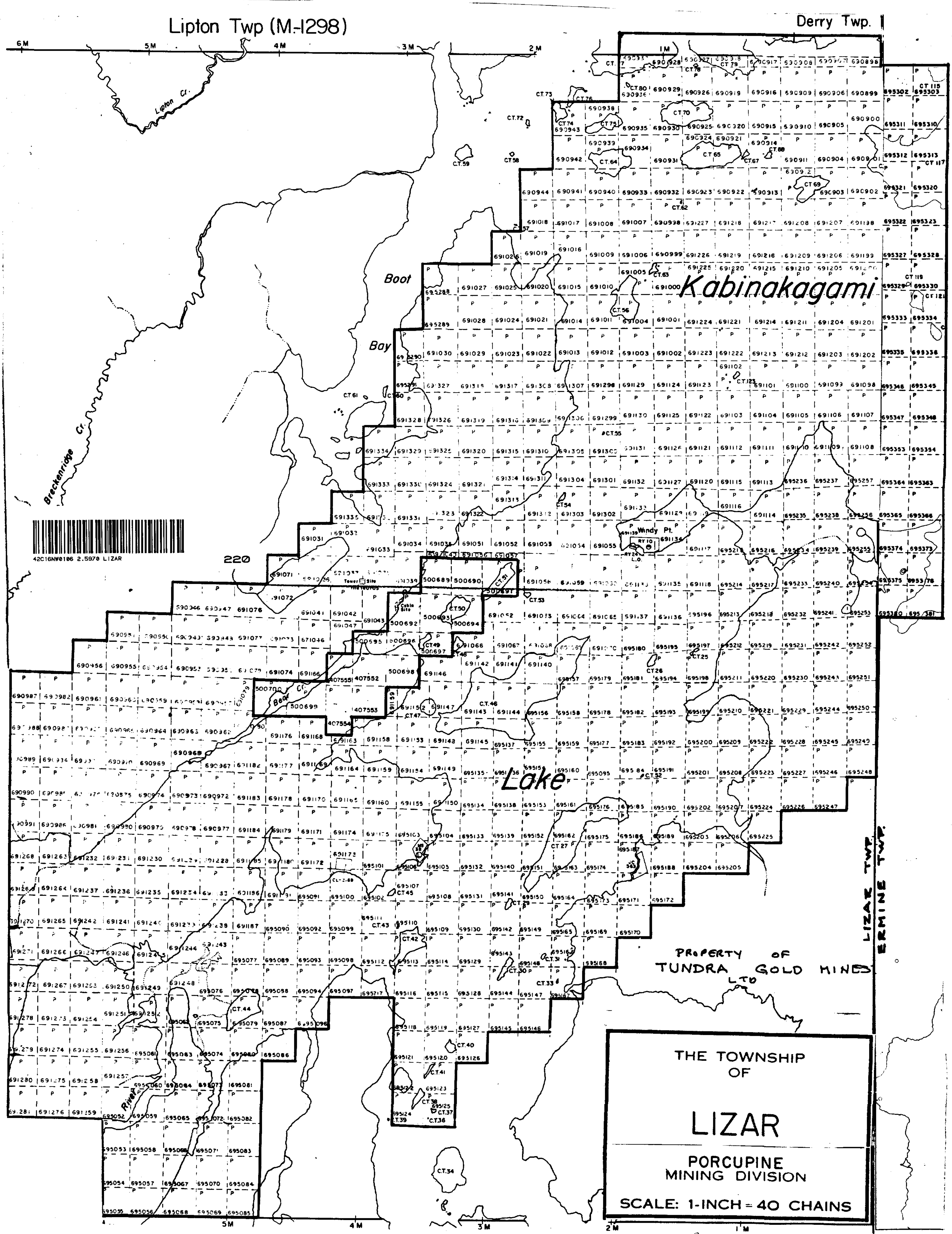
MINING DIVISION
PORCUPINE

LAND TITLES / REGISTRY DIVISION
ALGOMA

Ontario
Ministry of Natural Resources
Land Management Branch

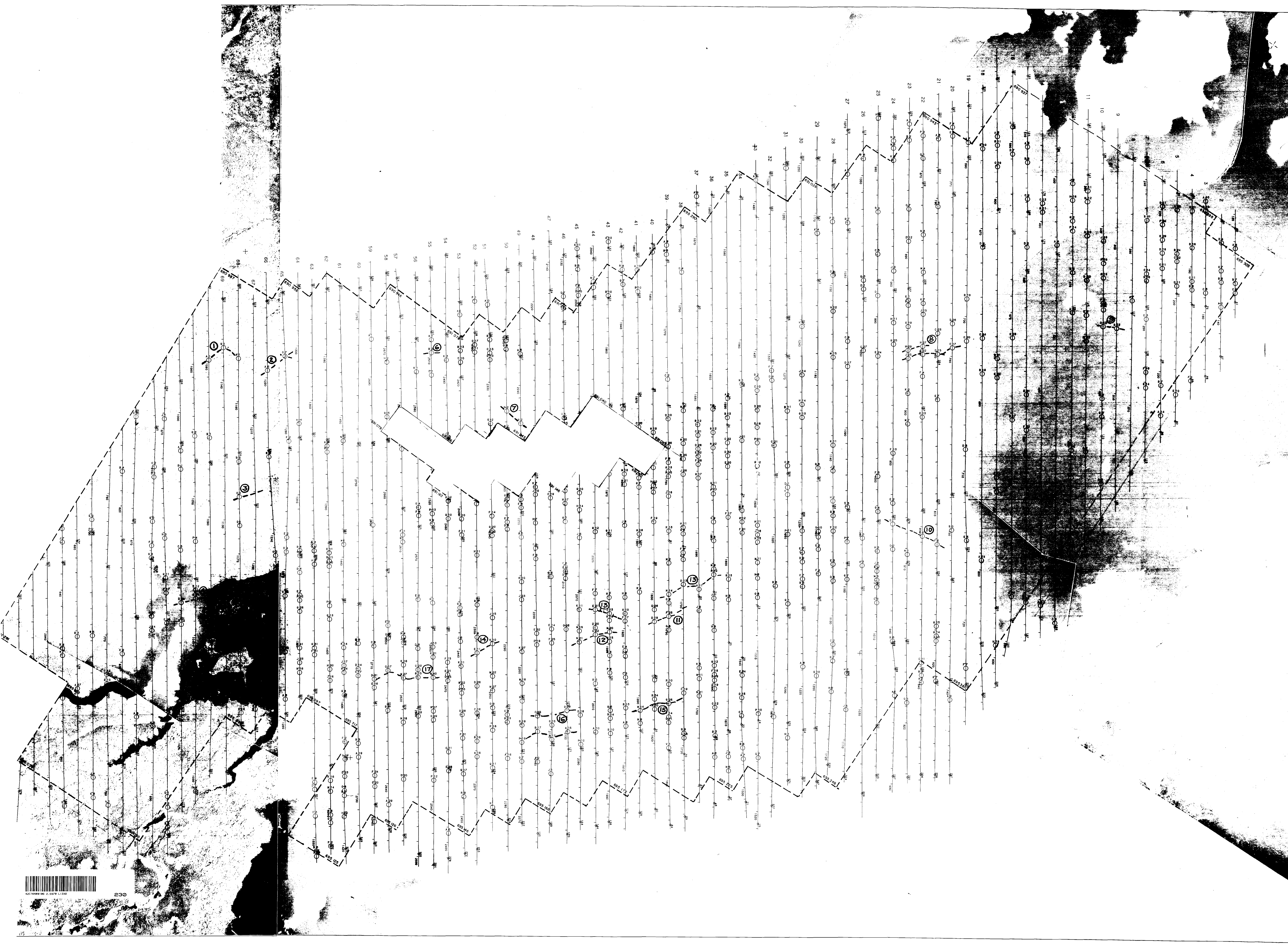
Date DECEMBER, 1982

Number **G-2292**



Lipton Twp (M-1298)
Derry Twp.
Lipton Cr.
Breckenridge Cr.
Boot
Bay
Kabinakagami
Lake
Windy Pt.
Bear Cr.
River
220
42C16NW0106 2.5970 LIZAR
PROPERTY OF
TUNDRA GOLD MINES LTD
LIZAR TWP.
ERMINE TWP.
THE TOWNSHIP
OF
LIZAR
PORCUPINE
MINING DIVISION
SCALE: 1-INCH = 40 CHAINS

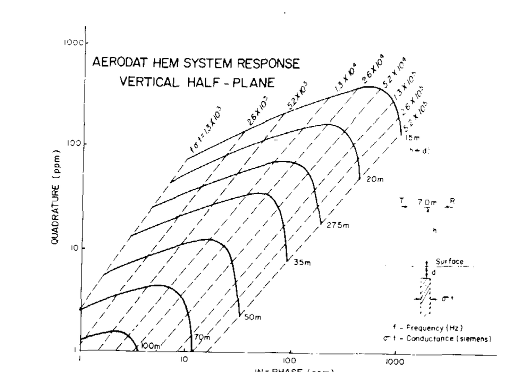
2 5970



Horizontal control .... based on photo laydown

Average bird height .... 30 metres

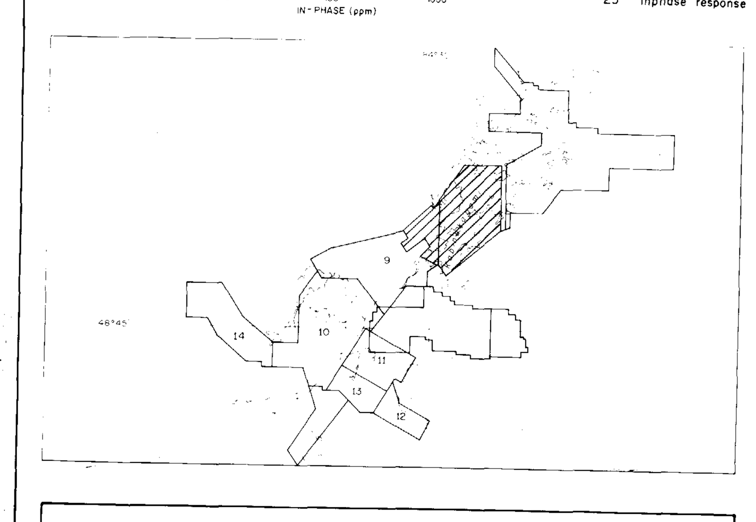
Line spacing .... 660 feet



EM RESPONSE

Conductivity thickness in mhos

⑨	> 500
⑧	250 – 500
⑦	125 – 250
⑥	60 – 125
⑤	30 – 60
④	15 – 30
③	8 – 15
②	4 – 8
①	2 – 4
○	< 2
25	Inphase response



PROSPECTING GEOPHYSICS LTD.

AIRBORNE ELECTROMAGNETIC SURVEY

TUNDRA GOLD MINES LTD.

LIZAR CLAIMS

ONTARIO

SCALE 1/15,840

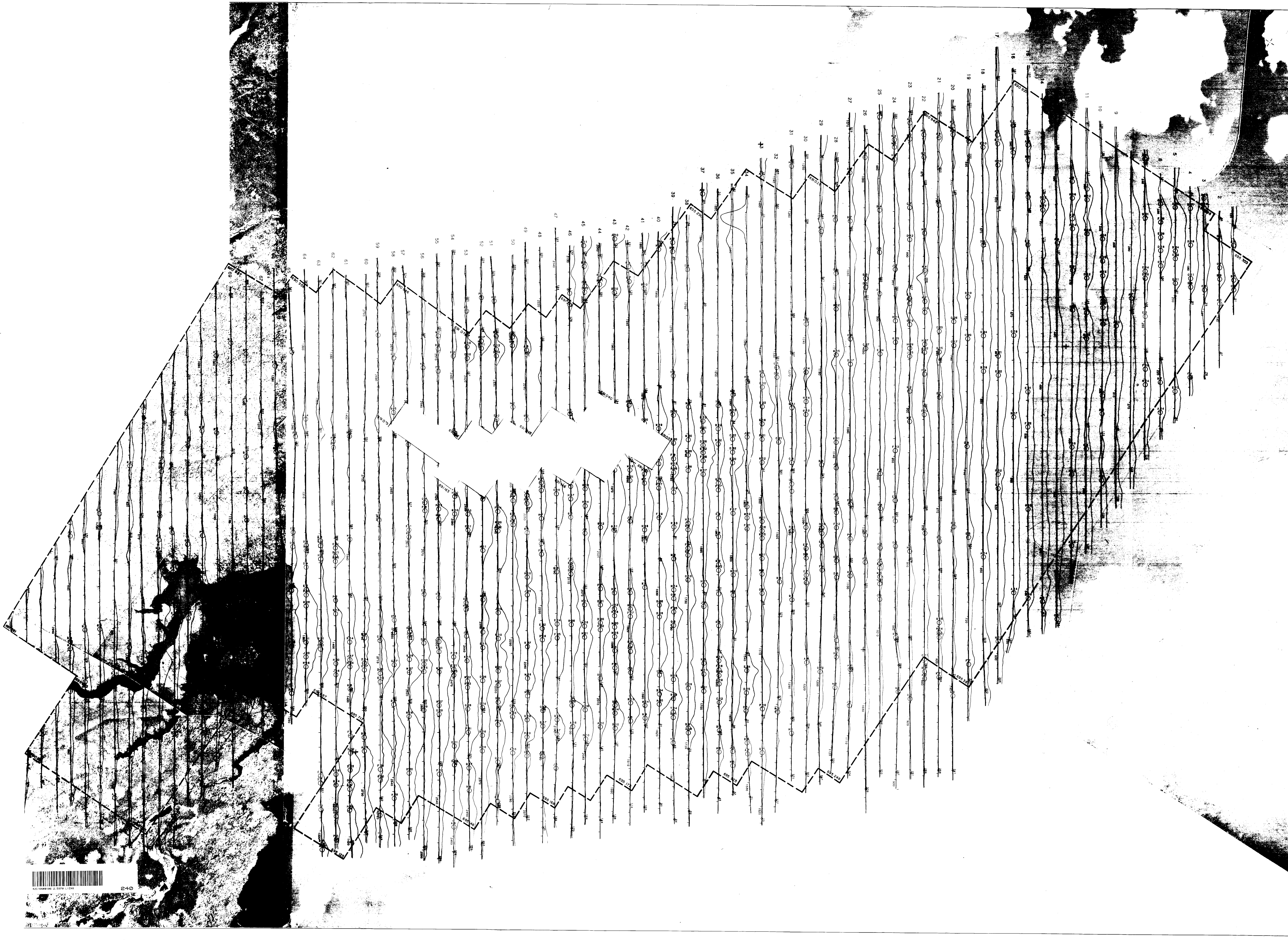
1/2 Mile

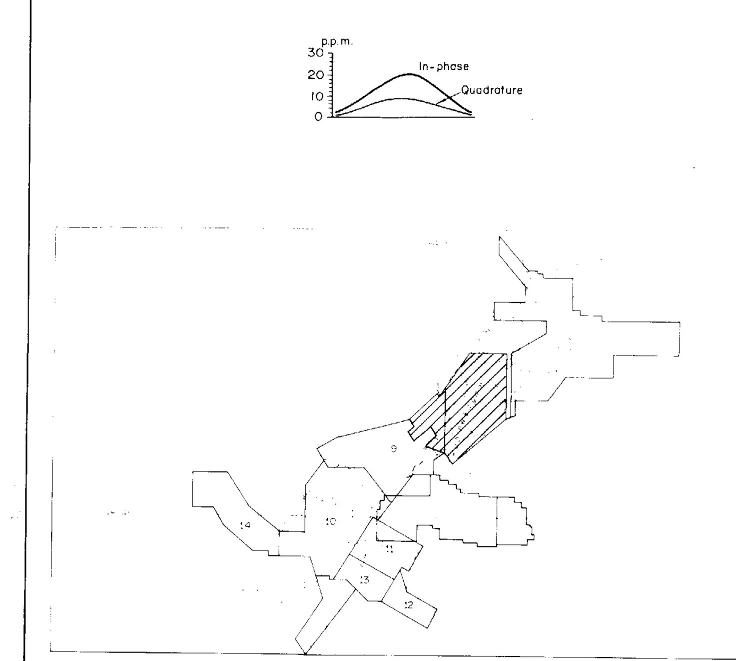
Kilometre

AERODAT LIMITED

DATE	March 1983
N.T.S. No.	42C, 42F
MAP No.	1

230





PROSPECTING GEOPHYSICS LTD.

AIRBORNE ELECTROMAGNETIC SURVEY

PROFILES - 955 Hz (coaxial)

TUNDRA GOLD MINES LTD.

LIZAR CLAIMS

ONTARIO

SCALE 1/15,840

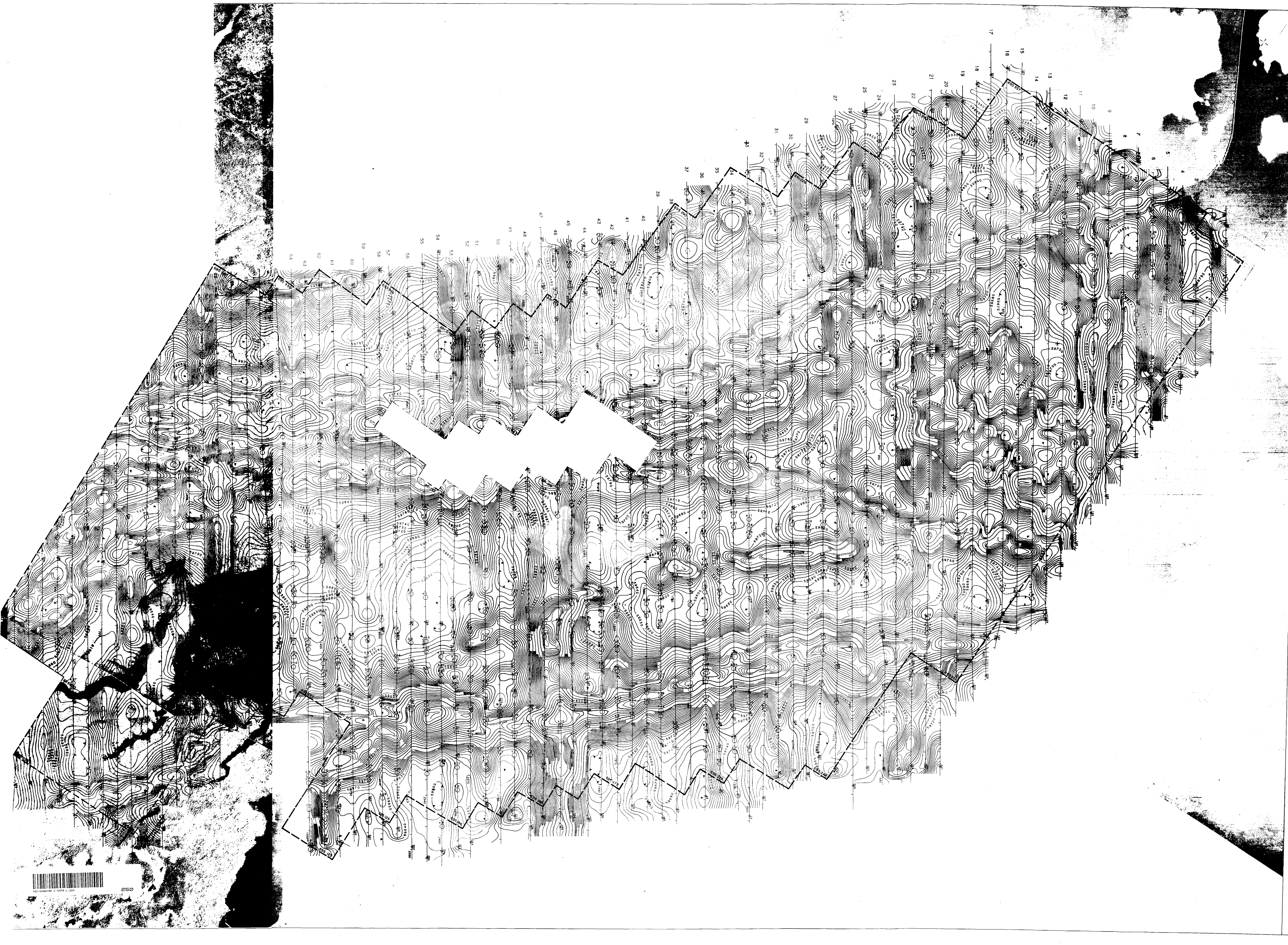
1/2 Mile

1 Kilometre

AERODAT LIMITED

DATE:	March 1983
N.T.S. No:	42C, 42F
MAP No:	2

240



PROSPECTING GEOPHYSICS LTD.

TOTAL FIELD MAGNETIC MAP

TUNDRA GOLD MINES LTD.

LIZAR CLAIMS

ONTARIO

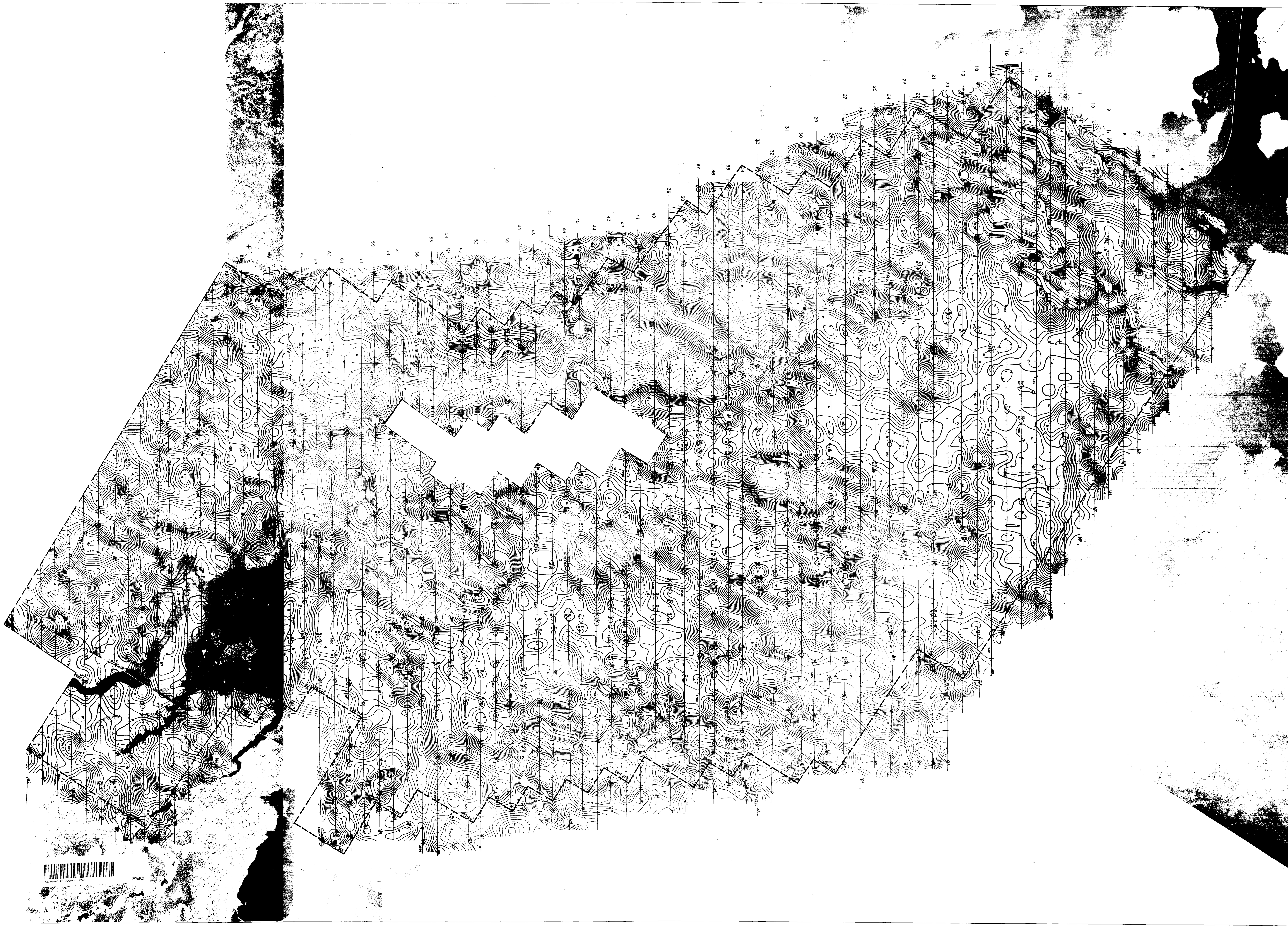
SCALE 1/15,840

1/2 Mile

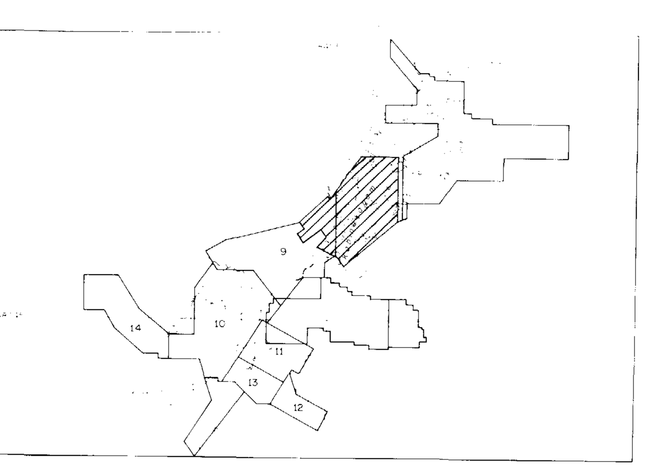
1 Kilometre

▼ AERODAT LIMITED

DATE	March 1983
N.T.S. No.	42C, 42F
MAP No.	3



LEGEND
50 %
10 %
2 %



PROSPECTING GEOPHYSICS LTD.

VLF-EM
NAA (MAINE) 17.8 KHz.
TUNDRA GOLD MINES LTD.
LIZAR CLAIMS
ONTARIO

SCALE 1/15,840
1/2 0 1/2 Mile
0 1 Kilometre

AERODAT LIMITED

DATE	March 1983
N.T.S. No.	42C, 42F
MAP No.	4