A-835

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REPORT ON AN

AIRBORNE MAGNETIC & VLF-EM SURVEY NAPANEE LAKE PROPERTY KENORA MINING DIVISION ONTARIO

for

CANHORN MINING CORPORATION

by

TERRAQUEST LTD.
Toronto, Canada

October 27, 1989

2.12874

240 Adelaide Street West, Toronto, Canada M5H 1W7, Telephone (416) 971-5400, Fax (416) 971-6449

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF MAPS IN JACKET

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1. INTRODUCTION

This report describes the specifications and results of a geophysical survey carried out for Canhorn Mining Corporation of Suite 400, 67 Yonge Street, Toronto, Ontario, M5E 1J8, Attn: Mr. D. Hall by Terraquest Ltd., 240 Adelaide Street West, Toronto, Canada. The field work was carried out between September 17th and 19th, 1989 and the data processing, interpretation and reporting from September 20th to October 27th.

The purpose of a survey of this type is two-fold. First to prospect directly for anomalously conductive and magnetic areas in the earth's crust which may be caused by, or at least related to, mineral deposits. A second is to use the magnetic and conductivity patterns derived from the survey results to assist in mapping geology, and to indicate the presence of faults, shear zones, folding, alteration zones and other structures potentially favorable to the presence of gold and base-metal concentration. To achieve this purpose the survey area was systematically traversed by an aircraft carrying geophysical instruments along parallel flight lines spaced at even intervals, 100 metres above the terrain surface, and aligned so as to intersect the regional geology in a way to provide the optimum contour patterns of geophysical data.

2. THE PROPERTY

The property is located approximately 70 kilometres southwest of the town of Dryden in the Kenora Mining Division of Ontario. It lies approximately 5 kilometres southwest of Lower Manitou Lake and 15 kilometres west of Highway 812. The survey block encompasses Napanee and Nelson Lakes.

The latitude and longitude are 49 degrees 11 minutes, and 93 degrees 09 minutes respectively, and the N.T.S. reference is 52F/3.

The property outline is shown in figure 2.

3. GEOLOGY

Map References

1. Map 43A: Straw-Manitou Lakes Area. 1:63,360, ODM 1934
2. Map 2443: Kenora-Fort Francis Geological Compilation Series. Scale 1:253,440, OGS 1981.

The survey area is located in a northeast trending, wide belt of mafic to intermediate metavolcanics. The dominant rocks are agglomerate and tuff with associated massive andesite, basalt and pillow lava, plus minor quartz porphyry. Gold mineralization has been mapped at the south end of Nelson Lake.

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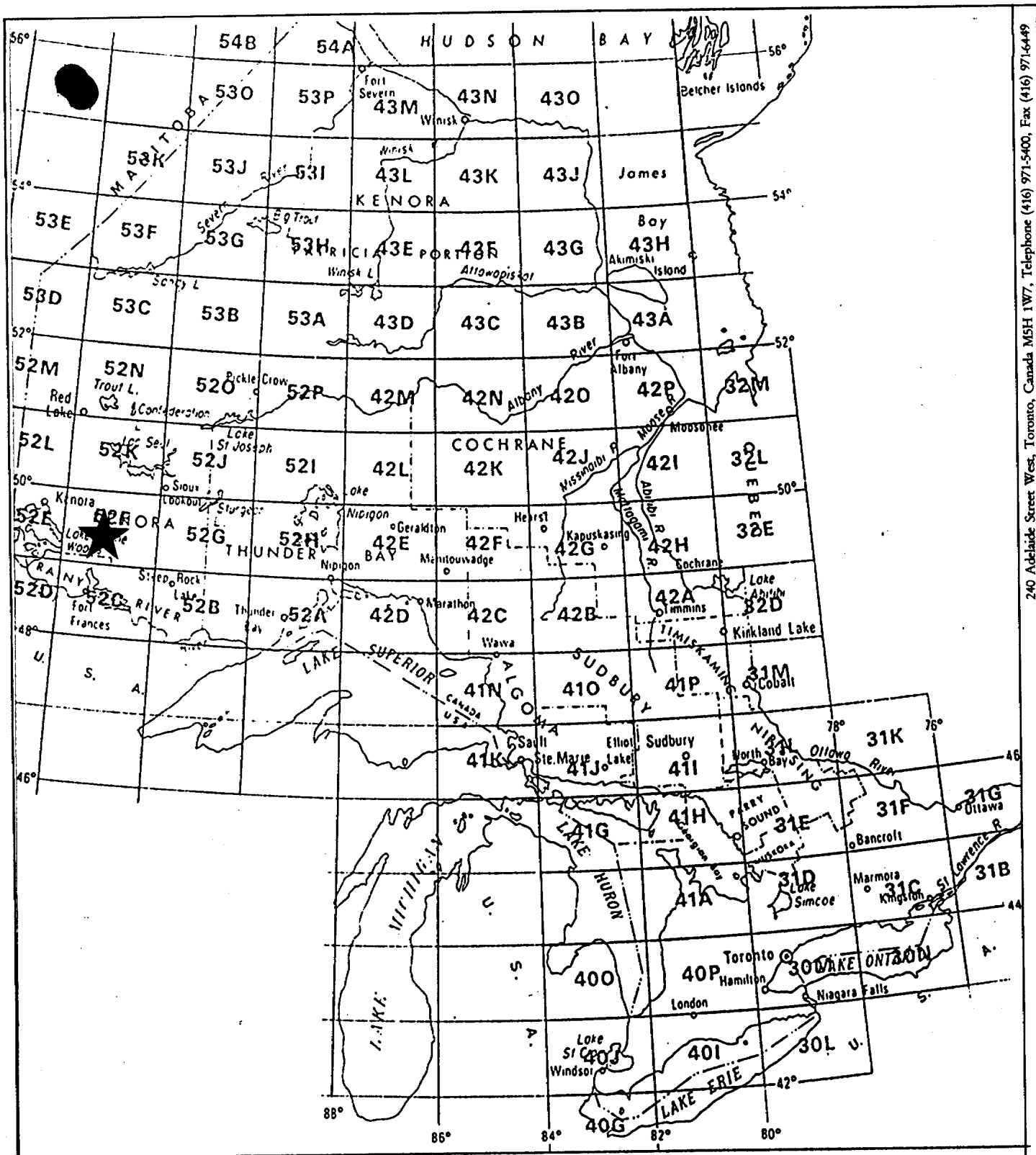

FIGURE 1. Location Map

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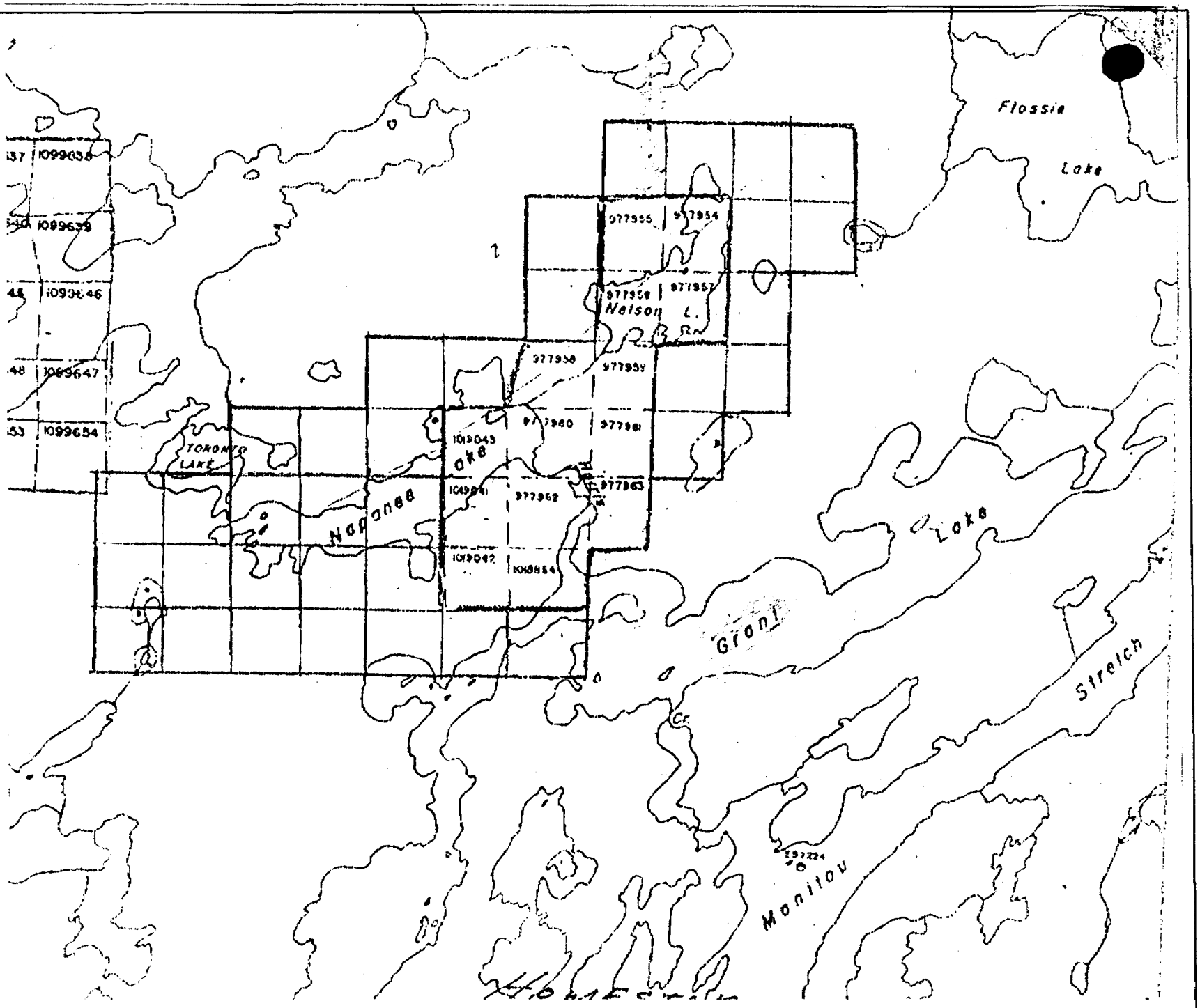
FIGURE 2. SURVEY AREA



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The dominant structures in the region trend to the northeast and several to the northwest. The extension of the Pipestone-Cameron Fault trends eastwest approximately 5 kilometres south of the property.

4. SURVEY SPECIFICATIONS

4.1 Aircraft and Instruments

The survey was carried out using a Cessna 206 aircraft, registration C-GGLS, which carries a magnetometer and a VLF electromagnetic detector.

The magnetometer is a high sensitivity, optically pumped cesium vapour magnetometer mounted in an extension boom attached to the tail of the with a aircraft. It's specifications are as follows:

Working range:	20,000-100,000 gammas
Sensitivity:	0.001 gammas
Sampling rate:	0.2 seconds
Model:	BIW 2321H8
Manufacturer:	Scintrex, Concord Ontario.

The magnetometer processor is a PMAG 3000 and the data acquisition system is a PDAS 1000, both manufactured by Picodas Group Inc.

The signal to noise ratio of the magnetic response can be improved by a real time compensation technique provided by Picodas Group Inc. The sources of noise are permanent, induced and eddy current effects of the airframe, and the heading effects. The system uses three orthogonal fluxgate magnetometers to measure the aircraft attitude with respect to the earth's magnetic field vector. A mathematical model is used to solve this interference effect.

The VLF-EM unit uses three orthogonal detector coils to measure (a) the total field strength of the time-varying EM field and (b) the phase between the vertical coil and both the "along line" coil (LINE) and the "cross-line" coil (ORTHO). The LINE coil is tuned to a transmitter station that is ideally positioned at right angles to the flight lines, while the ORTHO coil transmitter should be in line with the flight lines. It's specifications are:

Accuracy:	1%
Reading Interval:	0.2 second
Model:	TOTEM 2A
Manufacturer:	Herz Industries, Toronto, Canada

The VLF sensor is mounted in the left wing tip.

Other instruments are:

* King KRA-10A radar altimeter
* PDAS-1000 data processor with 40 mByte cassette tape and 3 1/2" disk recorder manufactured by Picodas Group Inc.
* GPS satellite and Loran-C navigation where possible

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* Video tape flight path confirmation, 1/10th second fiducial intervals and with electronic attitude compensation

4.2 Lines and Data

Line spacing:	100 metres
Line direction:	360 degrees
Terrain clearance:	100 m
Average ground speed:	193 km/hr
Data point interval:	
Magnetic:	11 metres
VLF-EM:	11 metres
Tie Line interval:	2 km
Channel 1 (LINE):	NAA Cutler, 24.0 kHz
Channel 2 (ORTHO):	NSS Annapolis, 21.4 kHz
Line km over total survey area:	143 line km
Line km over claim groups:	96

4.3 Tolerances

Line spacing: Any gaps wider than twice the line spacing and longer than 10 times the line spacing were filled in by a new line.
Terrain clearance: Portions of line which were flown above 125 metres for more than one km were reflown if safety considerations were acceptable.
Diurnal magnetic variation: Less than ten gammas deviation from a smooth background over a period of two minutes or less as seen on the base station analogue record.
Manoeuvre noise: nil

4.4 Photomosaics

For navigating the aircraft and recovering the flight path, semi-controlled mosaics of aerial photographs were made from existing air photos. Each photograph forming the mosaic was adjusted to conform to the NTS map system before the mosaic was assembled.

5. DATA PROCESSING

Flight path recovery was carried out in the field using a video tape viewer to observe the flight path as recorded by the Geocam video camera system. The flight path recovery was completed daily to enable reflights to be selected where needed for the following day.

The magnetic data was levelled in the standard manner by tying survey lines to the tie lines. The IGRF has not been removed. The total field was contoured by computer using a program provided by Dataplotting Services Inc. To do this the final levelled data set is gridded at a grid cell spacing of 1/10th of an inch at map scale.

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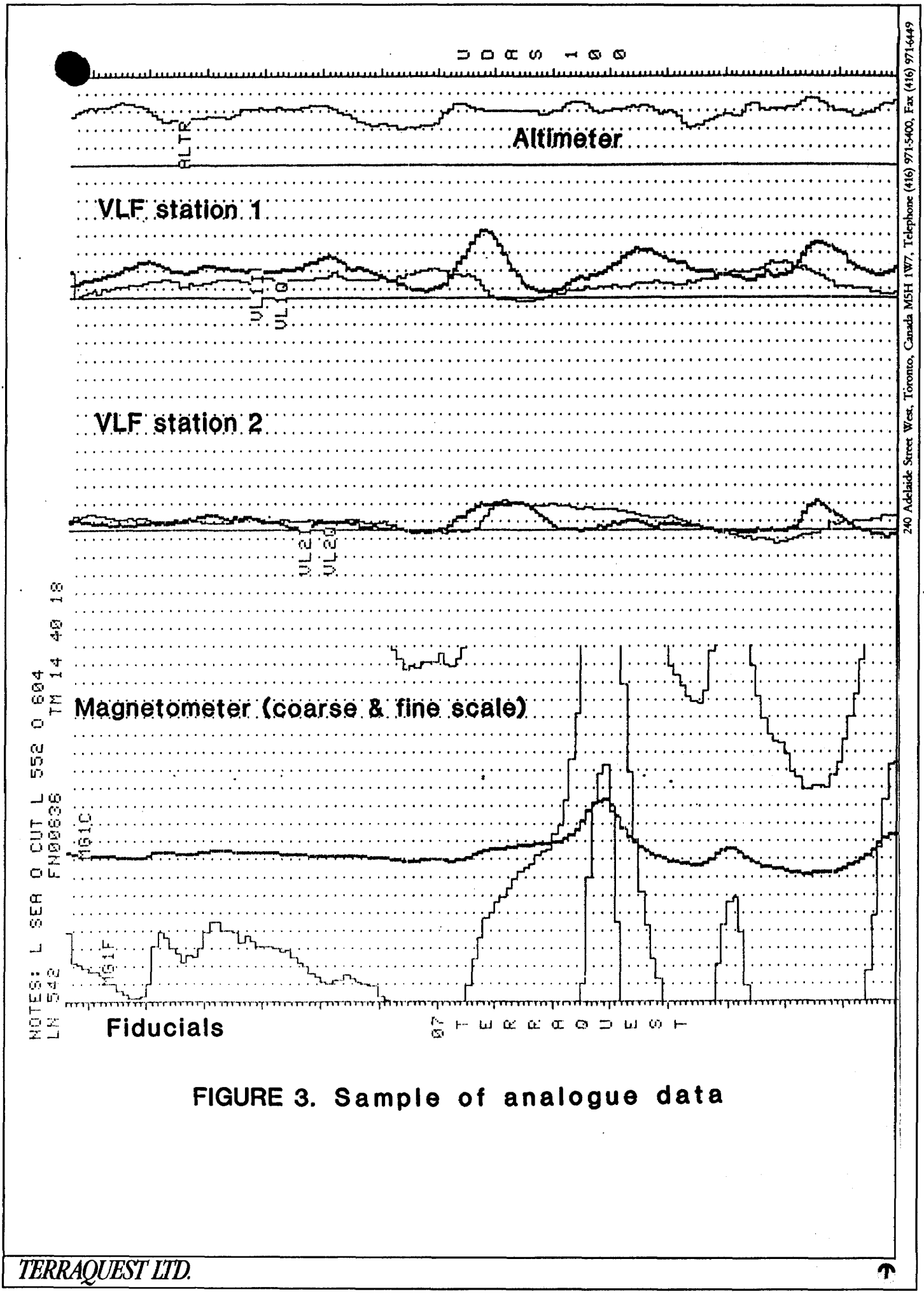

FIGURE 3. Sample of analogue data

The vertical magnetic gradient is computed from the gridded and contoured total field data using a method of transforming the data set into the frequency domain, applying a transfer function to calculate the gradient, and then transforming back into the spatial domain. The method is described by a number of authors including Grant, 1972 and Spector, 1968. The computer program for this purpose is provided by Paterson, Grant and Watson Ltd. of Toronto.

The VLF data was treated automatically so as to normalize the non conductive background areas to 100 (total field strength) and zero (quadrature). The algorithms to do this were developed by Terraquest and will be provided to anyone interested by application to the company.

All of these dataprocessing calculations and map contouring were carried out by Dataplotting Services Inc. of Toronto.

Grant, F.S. and Spector A., 1970: Statistical Models for Interpreting Aeromagnetic Data; Geophysics, Vol 35

Grant, F.S., 1972: Review of Data Processing and Interpretation Methods in Gravity and Magnetics; Geophysics Vol 37-4

Spector, A., 1968: Spectral Analysis of Aeromagnetic maps; unpublished thesis; University of Toronto.

6. INTERPRETATION

6.1 General Approach

To satisfy the purpose of the survey as stated in the introduction, the interpretation procedure was carried out on both the magnetic and VLF data. On a local scale the magnetic gradient contour patterns were used to outline geological units which have different magnetic intensity and patterns or "signatures". Where possible these are related to existing geology to provide a geological identity to the units. On a regional scale the total field contour patterns were used in the same way.

Faults and shear zones are interpreted mainly from lateral displacements of otherwise linear magnetic anomalies but also from long narrow "lows". The direction of regional faulting in the general area is taken into account when selecting faults. Folding is usually seen as curved regional patterns. Alteration zones can show up as anomalously quiet areas, often adjacent to strong, circular anomalies that represent intrusives. Magnetic anomalies that are caused by iron deposits of ore quality are usually obvious owing to their high amplitude, often in tens of thousands of gammas.

VLF anomalies are categorized according to whether the phase response is normal, reverse, or no phase at all. The significance of the differing phase responses is not completely understood although in general reverse phase indicates either overburden as the source or a conductor with considerable depth extent, or both. Normal phase response is theoretically caused by surface conductors with limited depth extent. In some cases, a change in

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the orientation of the conductor appears to affect the sense of the phase response.

Areas showing a smooth VLF-EM response somewhat above background (ie. 110 or so) are likely caused by overburden which is thick enough and conductive enough to saturate at these frequencies. In this case no response from bedrock is seen.

The VLF-EM conductor axes have been identified and evaluated according to the Terraquest classification system (Figure 4). This system correlates the nature and orientation of the conductor axes with stratigraphic, structural and topographic features to obtain an association from which one or more origins may be selected. Alternate associations are indicated in parentheses.

6.2 Interpretation

The magnetic and VLF-EM data are shown in contoured format on maps at a scale of 1:10,000 in the back pocket. An interpretation map is also provided. The following notes are intended to supplement these maps.

The total magnetic field has a relief of approximately 400 gammas and shows several prominent, northeast trending magnetic units along the south eastern edge of the survey area, and a regional magnetic gradient that decreases to the northwest. The calculated vertical magnetic gradient format improves the resolution and delineation of the magnetic units and removes the regional magnetic gradient. The interpretation is based on both of these formats. Due to the fact that the magnetic pattern is relatively complicated and that an outcrop map was not available for correlation it is cautioned that this interpretation does not represent a unique solution.

The magnetic responses have been categorized into three types. The bulk of the mafic to intermediate metavolcanics (Unit 1) are interpreted to be associated with the weak to moderate responses that make up the magnetic background. This group probably includes most of the massive andesites, basalts, pillow lavas, agglomerates and tuffs. Any responses from the quartz porphyry intrusives probably fall within this group. It is suspected that these rocks are characterized by low magnetic character and occupy an insignificant total mass or volume at this scale.

The magnetically active horizons have classified into weakly magnetic anomalies (Unit 1w) across most of the survey area and strongly magnetic anomalies (Unit 1m) along the south eastern edge of the survey area. It is suspected that both of these types belong to the mafic to intermediate metavolcanics and may be related to either increased concentrations of magnetic minerals such as magnetite or pyrrohotite, or to a change in composition generally towards more mafic compositions and may include hypabyssal metavolcanics.

Two areas within the 1m Unit are characterised by decreased magnetic responses. These are interpreted as possible alterations zones such as

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FIGURE 4

TERRAQUEST CLASSIFICATION OF VLF-EM CONDUCTOR AXES

SYMBOL	CORRELATION	ASSOCIATION: Possible Origins
a , A	Coincident with magnetic stratigraphy	Bedrock magnetic horizons: stratabound mineralogic origin or shear zone
b , B	Parallel to magnetic stratigraphy	Bedrock non-magnetic horizons: stratabound mineralogic origin or shear zone
c , C	No correlation with magnetic stratigraphy	Association not known: possible small scale stratabound mineralogic origin, fault or shear zone, overburden
d , D	Coincident with magnetic dyke	Dyke or possible fault: mineralogic or electrolytic
f , F	Coincident with topographic lineament or parallel to fault system	Fault zone: mineralogic or electrolytic
ob , OB	Contours of total field response conform to topographic depression	Most likely overburden: clayey sediments, swampy mud
cul , CUL	Coincident with cultural sources	Electrical, pipe or railway lines

NOTES

1 - Upper case symbols denote a relatively strong total field strength

2 - Underlined symbols denote a relatively strong quadrature response

3 - Mineralogic origins include sulphides, graphite, and in fault zones, gouge

4 - Electrolytic origins imply conductivity related to porosity or high moisture content

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silicification, sericitization, hematization or carbonatization.

Numerous faults or shear zones have been interpreted from the magnetic data, many of which coincide with topographic lineaments. Most of these trend to the west-northwest and northwest and a few to the northeast. It is suspected that more northeast trending structures exist but are difficult to identify because they would be parallel to the dominant magnetic fabric.

Most of the conductivity identified by the VLF-EM survey is associated with lakes and swampy areas and therefore is probably related to conductive overburden. This suggests that most of the conductive overburden is confined to topographic depressions.

Three conductor axes coincide with magnetically interpreted structures. This type of conductivity may be related to a) minerals such as sulphides, graphite or gouge along the structure, or b) an ionic effect created by porosity or water within the structure or along the upper weathered and leached edge. Structures identified by either VLF-EM or magnetic methods may posses potential for epithermal type mineralization.

Three conductor axes are either parallel to or coincident with magnetic stratigraphy and therefore possess potential for stratabound bedrock origins. These may be caused by disseminated to massive sulphides, graphite or porosity within the rocks such as porus flowtops. Those that possess good correlation with the stratigraphy and ground mapping should be followed up using EM or IP methods.

7. SUMMARY

An airborne combined magnetic and VLF-EM survey has been carried out at 100 metre line intervals with data reading stations at 11 metres along the flight lines. All data is produced on maps at a scale of 1:10,000.

The magnetic data has been used to identify and delineate numerous weakly to strongly magnetic horizons trending to the northeast within the mafic to intermediate metavolcanic suite. These are interpreted to have been faulted or sheared by numerous northwest trending faults and several northeast trending structures. The strongest VLF-EM conductors are associated with overburden which appears to be confined to topographic depressions. Several conductor axes of moderate intensity are interpreted to be associated variously with structure or stratigraphic sources. A few have been recommended for additional investigation.

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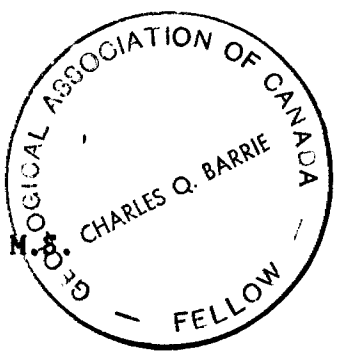

Charles Q. Barrie, M.Sc.
Geologist

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Ministry of Northern Development and Mines

Ontario

m.L.

DOCUMENT No. W8901-245

Instructions
- Please type or print
- Refer to Section 77 the Mining Act for

DECEMBER 15

Mining Act

Report of Work
(Geophysical, Geological and Geochemical

52F03NE0002 2.12874 NAPANEE LAKE

900

Type of Survey(s)
AIRBORNE GEOPHYSICAL

Min

Recorded Holder(s)
CANHORN MINING CORPORATION

2.12874

Prospector's Licence No.
T-1733

Address
Suite 400, 67 Yonge Street, Toronto, Ontario, M5E 1J8

Telephone No.
(416) 366-2702

Survey Company
TERRAQUEST LTD., 240 Adelaide Street, West, 2nd flr., Toronto, Ontario, M5H 1W7

Name and Address of Author (of Geo-Technical Report)
TERRAQUEST LTD. - See Above

Date of Survey (from & to)

	Day	Mo.	Yr.
From	19	09	89
To	19	09	89

Credits Requested per Each Claim in Columns at right

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

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

Airborne Credits		Days per Claim
Note: Special provision credits do not apply to Airborne Surveys	Electromagnetic	40
	Magnetometer	40
	Other	

Total miles flown over claim(s) 84 km.

Date: October 23/89

Recorded Holder or Agent (Signature)

Mining Claims Traversed (List in numerical sequence)

Mining Claim Prefix	Mining Claim Number	Mining Claim Prefix	Mining Claim Number	Mining Claim Prefix	Mining Claim Number
K	977954	K	1115539	K	1115568
	977955		1115540		1115569
	977956		1115541		1115570
	977957		1115542		1115571
	977958		1115543		1115572
	977959		1115544		1115573
	977960		1115545		1115574
	977961		1115546		1115575
	977962		1115547		1115576
	977963		1115548		1115577
K	1019041		1115549		1115578
	1019042	K	1115564		1115579
	1019043		1115565		1115580
	1018864		1115566		1115581
K	1115535		1115567		1115582
	1115536				
	1115537				
	1115538				

Total number of mining claims covered by this report of work: 48

ONTARIO GEOLOGICAL SURVEY
ASSESSMENT FILES OFFICE
FEB 7 1990
RECEIVED

Certification Verifying Report of Work

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

Name and Address of Person Certifying

Paul Sukman, c/o Canhorn Mining Corporation, Suite 400, 67 Yonge Street, Toronto, Ontario, M5E 1J8

Telephone No. (416) 366-2702

Date: October 23, 1989

Certified By (Signature)

RECEIVED
OCT 1 1989
MINING LANDS SECTION

For Office Use Only

Total Days Cr. Recorded: 3840

Date Recorded: Oct. 26/89

Mining Recorder: Scott Rivett

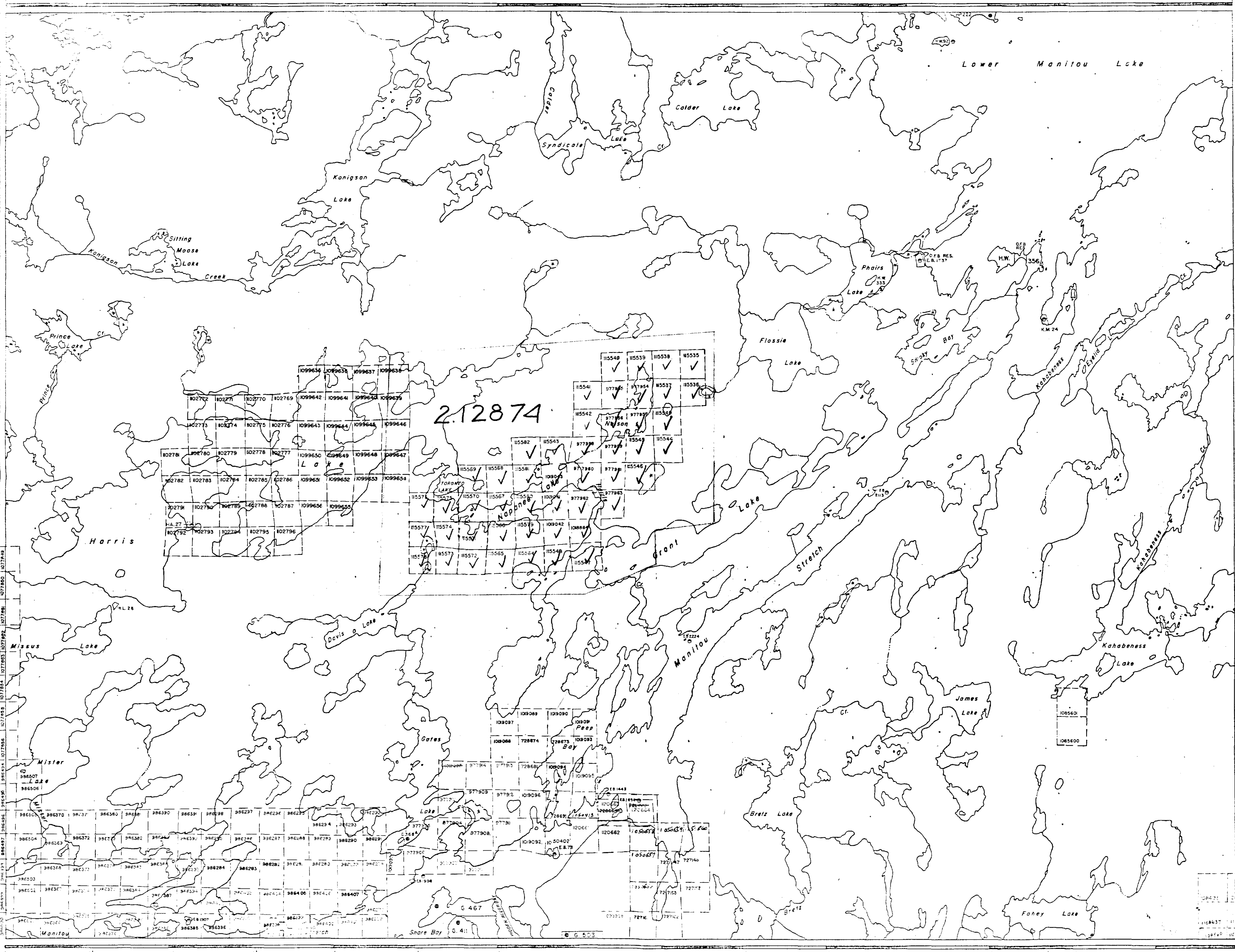
Date Approved as Recorded: Febs/90

Provincial Manager, Mining Lands:

Received Stamp:

KENORA MINING DIV.
RECEIVED
OCT 26 1989
AM 7 8 9 10 11 12 1 2 3 4 5 6 PM

977911



LEGEND

HIGHWAY AND ROUTE No.
OTHER ROADS
TRAILS
SURVEYED LINES
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.

REFERENCES

AREAS WITHDRAWN FROM DISPOSITION

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

Description	Order No.	Date	Disposition	File

KENORA MINING DIV. RECEIVED NOV 24 1989

Effective as
SCALE: 1 INCH = 40 CHAINS

AREA

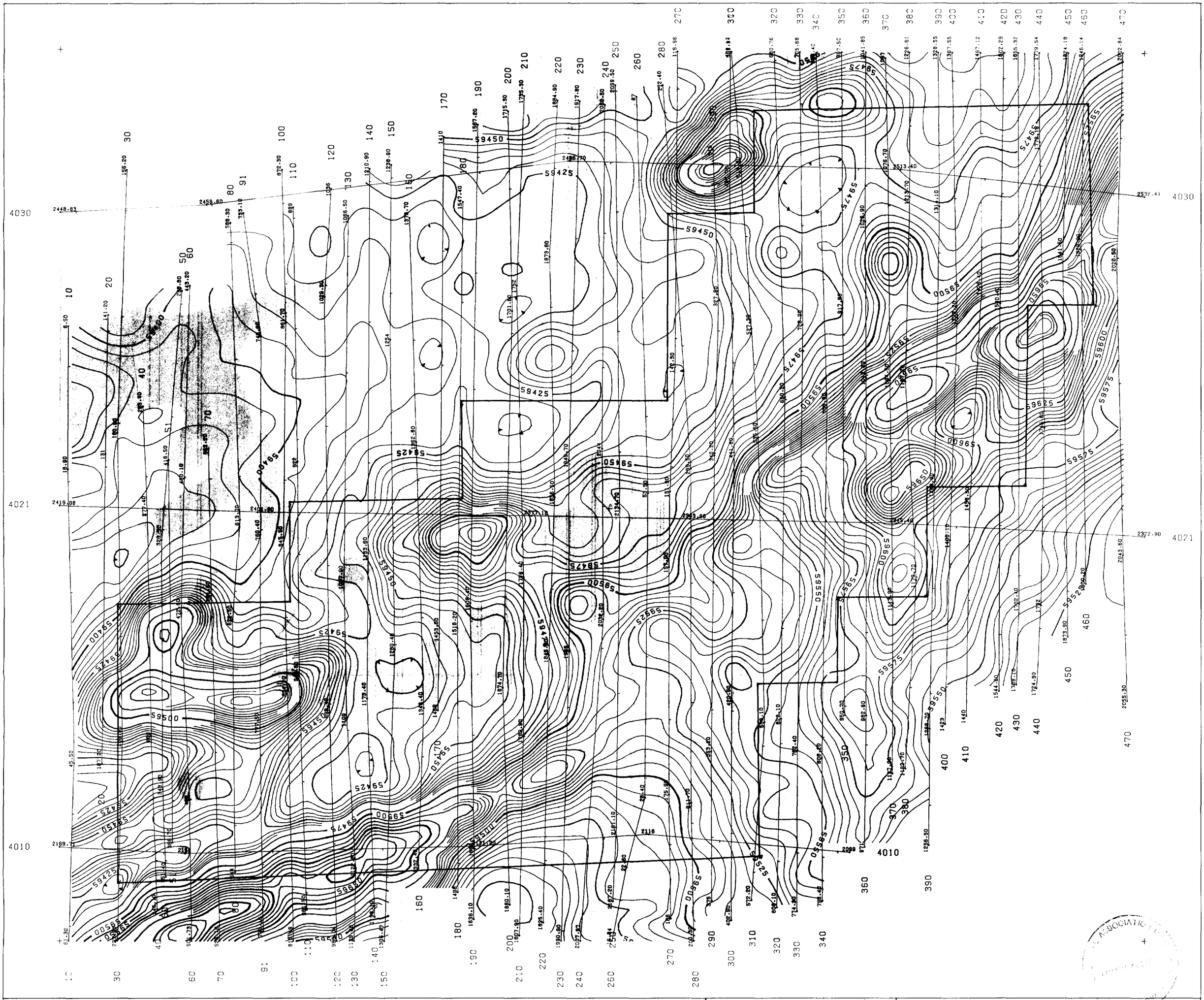
NAPANEE LAKE

M.N.R. ADMINISTRATIVE DISTRICT
FORT FRANCES
MINING DIVISION
KENORA
LAND TITLES / REGISTRY DIVISION
KENORA

Ministry of Natural Resources — Land Management Branch
Ontario

Date: FEBRUARY, 1984.
Number G-2690

52F03NE0002 2.12874 NAPANEE LAKE
200

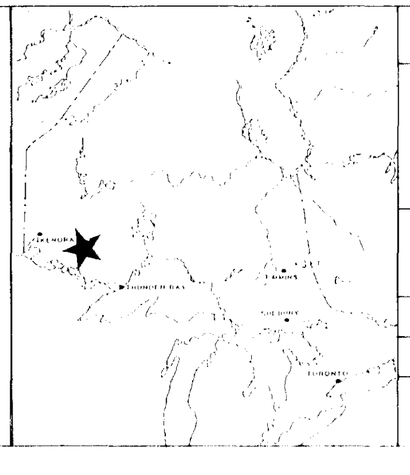


LEGEND

Survey Altitude	100 metres MTC
Line Spacing	100 metres
Survey Boundary	

TOTAL MAGNETIC FIELD

500 gammas	
100 gammas	
25 gammas	
5 gammas	



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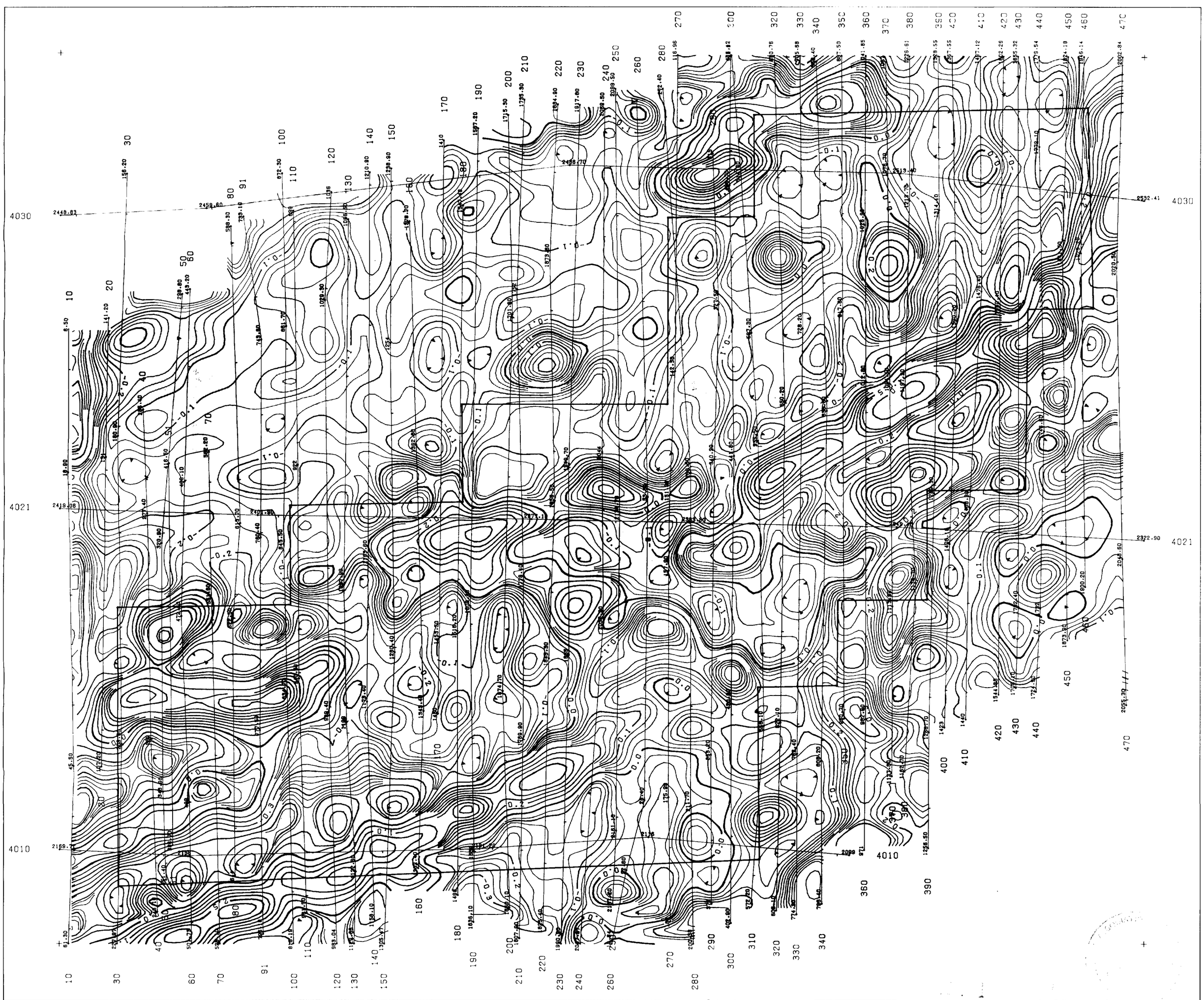
AIRBORNE MAGNETIC SURVEY
TOTAL MAGNETIC FIELD

NAPANEE LAKE PROPERTY
ONTARIO

N.T.S. NO.	52F/3	DRAWING NO.	A-835-1
SCALE:	1 : 10,000	DATE:	September 1989

TERRAQUEST LTD.
TORONTO, CANADA

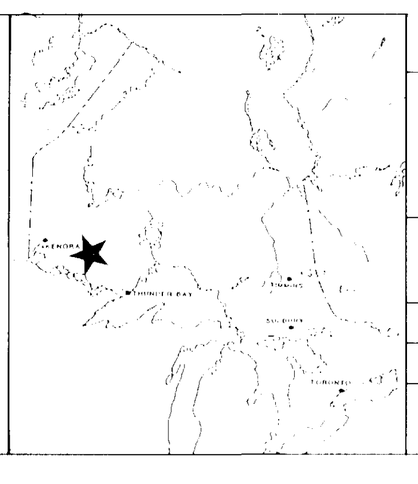


LEGEND

Survey Altitude	100 metres MTC
Line Spacing	100 metres
Survey Boundary	

VERTICAL MAGNETIC GRADIENT

2.500 gammas/metre	
0.500 gammas/metre	
0.100 gammas/metre	
0.025 gammas/metre	



CANHORN MINING CORPORATION

AIRBORNE MAGNETIC SURVEY

VERTICAL MAGNETIC GRADIENT
Calculated From Total Field

NAPANEE LAKE PROPERTY
ONTARIO

N.T.S. NO.	52F/3	DRAWING NO.	A-835-2
SCALE:	1 : 10,000	DATE:	September 1989

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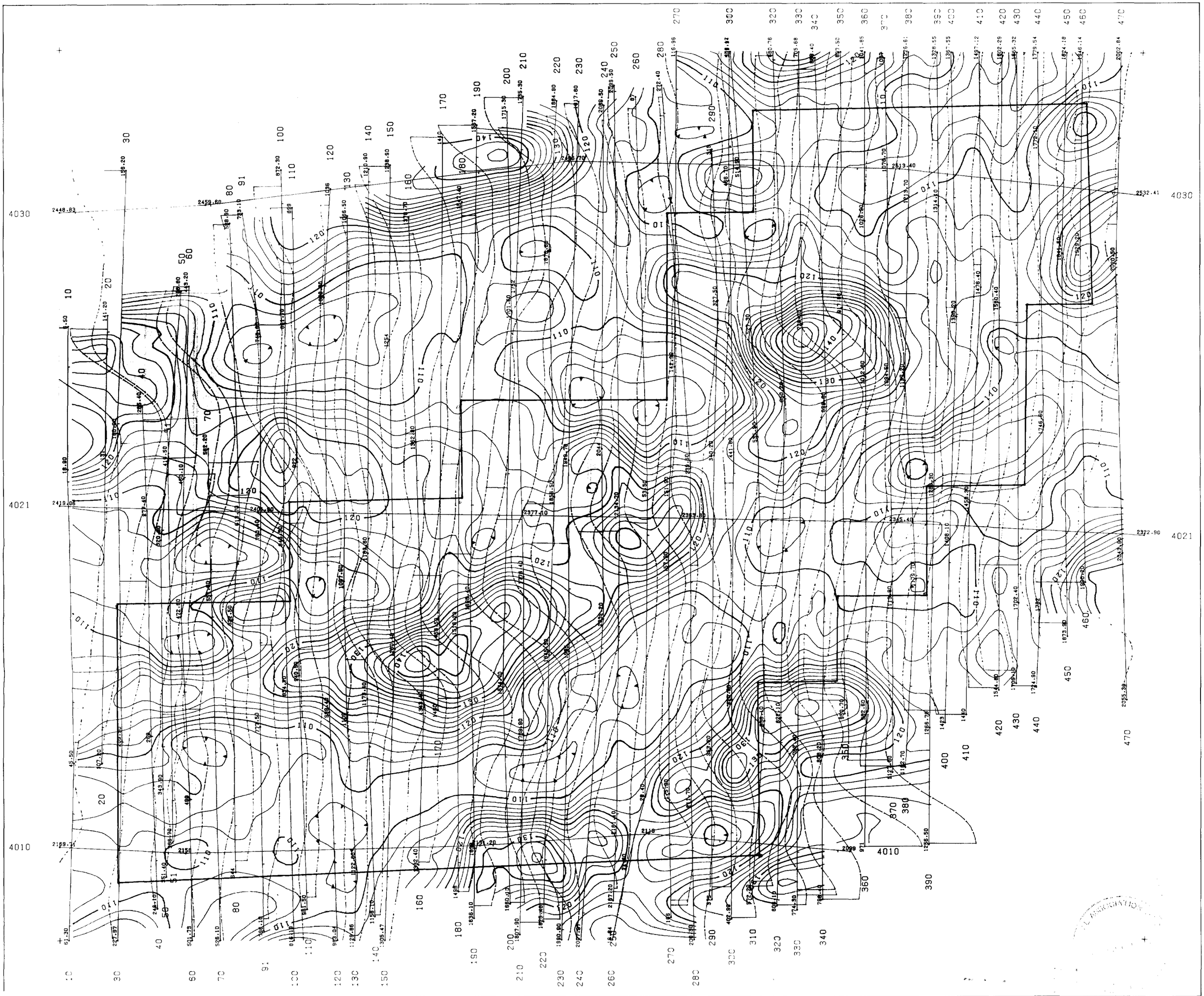


230

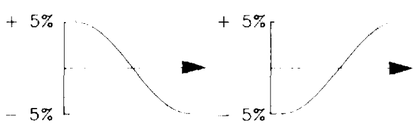
VLF Transmitter
NAA Cutler, 24.0 kHz
Azimuth 095

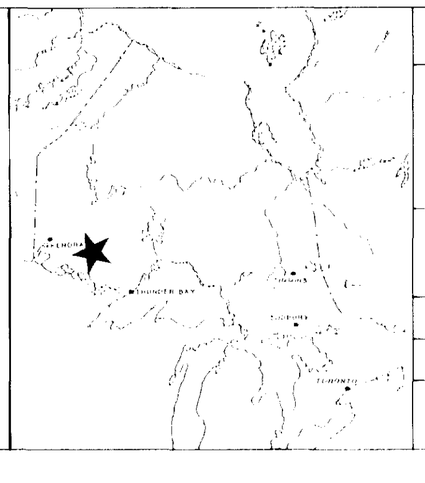
LEGEND

Survey Altitude 100 metres MTC
Line Spacing 100 metres
Survey Boundary

TOTAL FIELD STRENGTH (Contours)
50%
10%
2%

QUADRATURE (Profiles along Flight Lines)
Normal Slope Reverse Slope





CANHORN MINING CORPORATION

AIRBORNE VLF-EM SURVEY

CONTOURS OF TOTAL FIELD STRENGTH
PROFILES OF QUADRATURE

NAPANEE LAKE PROPERTY
ONTARIO

N.T.S. NO.	52F/3	DRAWING NO.	A-835-3
SCALE:	1 : 10,000	DATE:	September 1989

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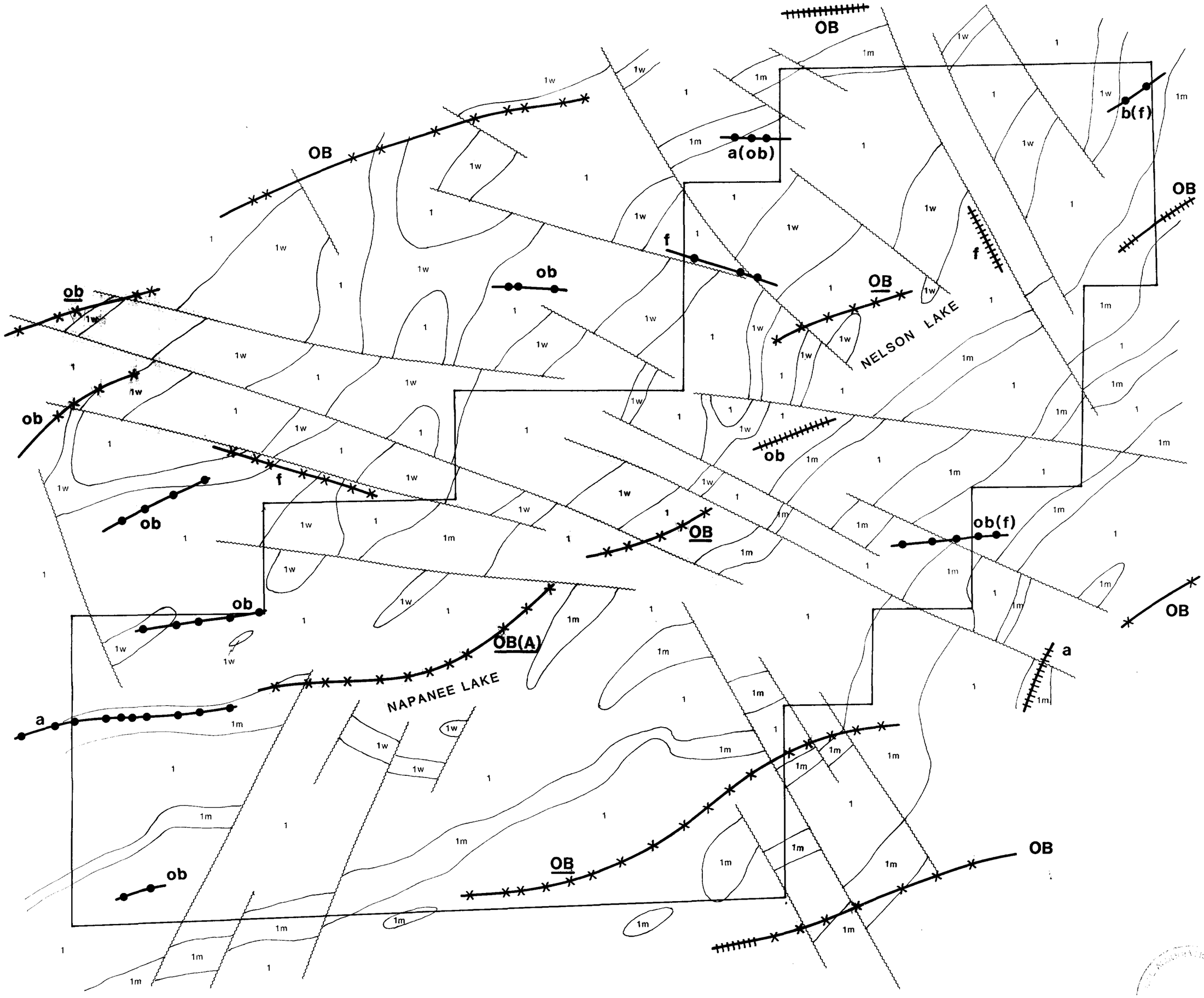
TORONTO, CANADA



240

LEGEND

Survey Altitude 100 metres MTC
Line Spacing 100 metres
Survey Boundary

INTERPRETATION

Contact
Fault

VLF-EM Conductor Axes

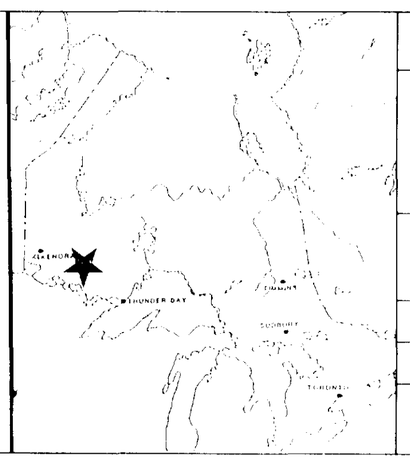
Normal Quadrature
Reverse Quadrature
Total Field Only

See text for classification of VLF-EM conductor axes

LITHOLOGY

- 1w — Weakly Magnetic Anomaly within 1
- 1m — Strongly Magnetic Anomaly within 1
- 1 — Mafic to Intermediate Metavolcanics

VLF Transmitter
NAA Cutler, 24.0 kHz
Azimuth 095



CANHORN MINING CORPORATION

INTERPRETATION

NAPANEE LAKE PROPERTY
ONTARIO

N.T.S. NO.	52F/3	DRAWING NO.	A-835-4
SCALE:	1 : 10,000	DATE:	September 1989

TERRAQUEST LTD.
TORONTO, CANADA