REPORT ON GROUND MAGNETOMETER
AND HORIZONTAL LOOP EM SURVEYS
HURTUBISE TOWNSHIP
NORTHERN ONTARIO

BRIAN GROVES

DIVISION GEOPHYSICIST

NORANDA EXPLORATION COMPANY LIMITED

TIMMINS, ONTARIO

FEBRUARY 10, 1987

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List of Maps

1. Introduction

During the period 10/11/86 to 12/12/86, ground magnetometer and horizontal loop E.M. (H.E.M.) surveys were completed over a group of 26 claims in Hurtubise Township by Timmins Geophysics Limited for Noranda Exploration Company, Limited.

2. Location and Access

The 26 claims covered by this report are: L867639, to 867641 inclusive, L878095, 878097 to 878101 inclusive, L878141 to 878145 inclusive and L878147 to 878158 inclusive. The claims are located in northern central Hurtubise Township approximately 100 km northeast of Cochrane, Ontario.

Access to the property is afforded via either La Sarre, Quebec or Cochrane. From the former, vehicular access is via the Selbaie Mines road and beyond Villebois, winter roads lead west from the Selbaie road to the Burntbush River.

From Cochrane, vehicular access is via the Detour Lake road to the Translimit Road, then along the all weather Tomlinson gravel road to a bridge across the Kabika River. From this point, the river provides the best access to the property.

3. Survey Specifications

The magnetometer and H.E.M. surveys were performed along northwesterly oriented grid lines spaced 125 metres apart. Station spacing along the lines was 25 metres.

A Scintrex MP-3 micro-processor controlled proton precession magnetometer system was employed to measure the earth's total magnetic field with an accuracy of 1 nT. A MP-3 base station magnetometer monitored the diurnal variation of the magnetic field during the survey and automatically corrected the field readings for drift.

An Apex Parametrics Maxmin II H.E.M. unit was employed for the E.M. survey. A transmitter to receiver coil spacing of 200 metres was used. The in-phase and quadrature components of the secondary E.M. field at frequencies of 444 Hz and 1777 Hz were measured with an accuracy of 1%.

A total of 27.975 line km of magnetometer surveying and 24.35 line km of H.E.M. surveying were completed over the grid.

4. Data Presentation

The magnetometer data are presented in computer contoured plan form in Map 1. A contour interval of 25 nT has been employed and smoothing filters applied to the contours.

In-phase and quadrature components for the H.E.M. survey are plotted in profile form for the 444 Hz (Map 2) and 1777 Hz (Map 3) data at a scale of 1 cm = 20%. Interpreted conductor axes are shown on Map 3.

5. Discussions of Results

a) Magnetometer Data

The magnetometer data are dominated by two linear, northeast trending magnetic highs which display magnetic reliefs of up to 1000 nT above local background. These highs, in the extreme north and south of the survey grid, flank a broad central area of relatively featureless magnetic relief.

Previous work in the area would suggest that the probable source of the highs are iron formations. The remainder of the property would appear to be underlain by a sequence of metavolcanics. The subtle, apparently discontinuous, magnetic high which straddles the grid baseline, may be the response of a more mafic unit with in the volcanic sequence.

b) H.E.M. Data

Seven conductive features (labelled A to G on Map 3) have been defined by the E.M. survey and most are interpreted to have bedrock causative sources.

Conductor A extends from Line 250W, 1100N to Line 1750W defined by conductor shoulder responses. Interpreted depth to causative source and apparent conductivity-thickness (σt) estimates are in the range of 25 to 30 metres and 30 to 40 Siemens respectively. The conductor lacks a direct magnetic association and hence, a graphitic or possibly non-magnetic sulphide causative source is suggested.

Conductor B extends across the grid and would appear to bifurcate in the vicinity of Line 2500W. Interpreted depths and σt range between 45m and 25 Siemens on Line 2875W to 35m and 45 Siemans on Line 2000W. These estimates are based on the 444 Hz data which have been less affected by overburden conductivities. The contribution of overburden conductivity to the bedrock response is noted on the 1777 Hz data where phase rotation of the quadrature responses is apparent.

No magnetic expression is noted with this conductor and a causative source similar to that for conductor A is suggested here.

Conductor C is a generally weak, poorly defined response over mmost of its strike extent. Responsses on Lines 3250W to 3000W suggest a bedrock causative source. However, to the east of Line 3000W, the conductive trend is comprised of only quadrature responses. A very poorly conductive probable bedrock source is suggested. The feature lacks a magnetic expression and a source similar to the previous conductors is suggested.

Conductor D is a poorly conductive response defined on Lines 3500W to 3250W with a possible extension on Lines 2625W and 2500W. The very poor conductivity of this feature is emphasized by the rapid decrease in amphlitude from the 1777 Hz data to the 444 Hz data. No direct magnetic association is noted with the response. This feature is considered a questionable bedrock.

Conductor E extends discontinuously between Lines 3625W and 3000W and displays very poor conductivity. As with conductor D, this response is considered as a possible bedrock conductor and lacks a magnetic association.

Conductor F is a weak two-line response defined on Lines 3625W and 3500W. No magnetic association is noted with the conductor and a possible bedrock causative source is suggested.

Conductor G extends between Lines 3625W and 3000W and the source appears to deepen towards the east. On Line 3500W, interpreted depth to source and σt are of the order of 55m and 15 Siemen respectively. A close flanking magnetic association is noted with the conductor and a graphitic and/or sulphide bedrock causative source is suggested.

6. Conclusions

Four of the seven conductors defined by the survey have definite bedrock sources. The remaining three conductors, while questionable in terms of being of bedrock origin, display strike extents and directions comparable to the stronger responses. The survey area displays similar geological and geophysical attributes to those of the Casa Berardi area of northwestern Quebec. Therefore, drill evaluation of all conductors is highly recommended.

Respectfully submitted,

B J Groves

Ontario and Mines

(Geophysical, Geological, Geochemical and Expenditures)

W8608.00561

Mining

32E05NW0054 2.9824 HURTUBISE

900

Type of Survey	Geo[illegible]sical (Mag & E.M.)
Claim Holder(s)	Glen Auden Resources Limited
Prospector's Licence No.	T-1915
Address	Suite 500-67 Richmond St. West, Toronto, Ontario
Survey Company	Timmins Geophysics, Timmins, Ontario
Date of Survey (from & to)	10 Day, 11 Mo., 86 Yr. – 12 Day, 12 Mo., 86 Yr.
Total Miles of line Cut	35 km.
Name and Address of Author (of Geo-Technical report)	Brian Groves, P. O. Box 1205, Timmins, Ontario P4n 7J5

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	20
	- Magnetometer	40
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 31 1986 9.55 am

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

Expenditures (excludes power stripping)

Type of Work Performed

Performed on Claim(s)

Calculation of Expenditure Days Credits

Total Expenditures $ ÷ 15 = Total Days Credits

Instructions

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

Date	Recorded Holder or Agent (Signature)
Dec. 19/86	R. C. Denommee

Mining Claims Traversed (List in numerical sequence)

Prefix	Number	Expend. Days Cr.	Prefix	Number	Expend. Days Cr.
L-	867639		L-	878147	
	867640			878148	
	867641			878149	
				878150	
	878095			878151	
	878097			878152	
	878098			878153	
	878099			878154	
	878100			878155	
	878101			878156	
				878157	
	878141			878158	
	878142				
	878143				
	878144				
	878145				

RECEIVED

MINING LANDS SECTION

Total number of mining claims covered by this report of work. 26

For Office Use Only

Total Days Cr. Recorded	Date Recorded	Mining Recorder
1560	DEC 31 1986	Acting
	Date Approved as Recorded: 87.3.9	Branch Director

Certification Verifying Report of Work

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

Name and Postal Address of Person Certifying

R. C. Denommee, P. O. Box 1205

Timmins, Ontario P4N 7J5

Date Certified	Certified by (Signature)
Dec. 24/86	R. C. Denommee

1362 (85/9)

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) GROUND MAG & H.E.M.

Township or Area HURTUBISE

Claim Holder(s) GLEN AUDEN RESOURCES LTD.

Survey Company TIMMINS GEOPHYSICS

Author of Report BRIAN GROVES

Address of Author P.O. BOX 1205, TIMMINS, ONT.

Covering Dates of Survey 10/11/86 - 12/12/86 (linecutting to office)

Total Miles of Line Cut 35 km

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	20
--Magnetometer	40
--Radiometric	
--Other	
Geological	
Geochemical	

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

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

DATE: [illegible] SIGNATURE: [illegible]
Author of Report or Agent

Res. Geol. ____________ Qualifications 2.3655

Previous Surveys

File No.	Type	Date	Claim Holder

MINING CLAIMS TRAVERSED
List numerically

(prefix)	(number)	
L	867639	
	867640	
	867641	
	878095	
	878097	
	878098	
	878099	
	878100	
	878101	
	878141	
	878142	
	878143	
	878144	
	878145	
	878147	
	878148	
	878149	
	878150	878155
	878151	878156
	878152	878157
	878153	878158
	878154	

If space insufficient, attach list

TOTAL CLAIMS 26

OFFICE USE ONLY

837 (85/12)

GEOPHYSICAL TECHNICAL DATA

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

Number of Stations MAG: 942 HEM: 938 Number of Readings MAG: 942 MHE: 1876

Station interval 25 METRES Line spacing 125 METRES

Profile scale EM: 1cm = 20%

Contour interval MAG: 25 nT

MAGNETIC

Instrument SCINTREX MP-3

Accuracy – Scale constant 1 nT

Diurnal correction method MICRO-PROCESSOR CONTROLLED MAGS CORRECT AUTOMATICALLY

Base Station check-in interval (hours) NOT APPLICABLE

Base Station location and value L-1750W, ON, 58,888 nT

ELECTROMAGNETIC

Instrument APEX MAXMIN II

Coil configuration HORIZONTAL CO-PLANAR

Coil separation 200 METRES

Accuracy 1%

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

Frequency 444 Hz & 1777 Hz
(specify V.L.F. station)

Parameters measured IN-PHASE & QUAD COMPONENTS OF SECONDARY E.M. FIELD

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) ______________________

Instrument(s) ______________________

(specify for each type of survey)

Accuracy ______________________

(specify for each type of survey)

Aircraft used ______________________

Sensor altitude ______________________

Navigation and flight path recovery method ______________________

____

Aircraft altitude ______________________ **Line Spacing** __________

Miles flown over total area ______________________ **Over claims only** __________

GEOCHEMICAL SURVEY – PROCEDURE RECORD

Numbers of claims from which samples taken ______________________

____

____

Total Number of Samples ______________________

Type of Sample ______________________
(Nature of Material)

Average Sample Weight ______________________

Method of Collection ______________________

____

Soil Horizon Sampled ______________________

Horizon Development ______________________

Sample Depth ______________________

Terrain ______________________

____

Drainage Development ______________________

Estimated Range of Overburden Thickness ______________________

____

____

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

Mesh size of fraction used for analysis ______________________

____

____

____

General ______________________

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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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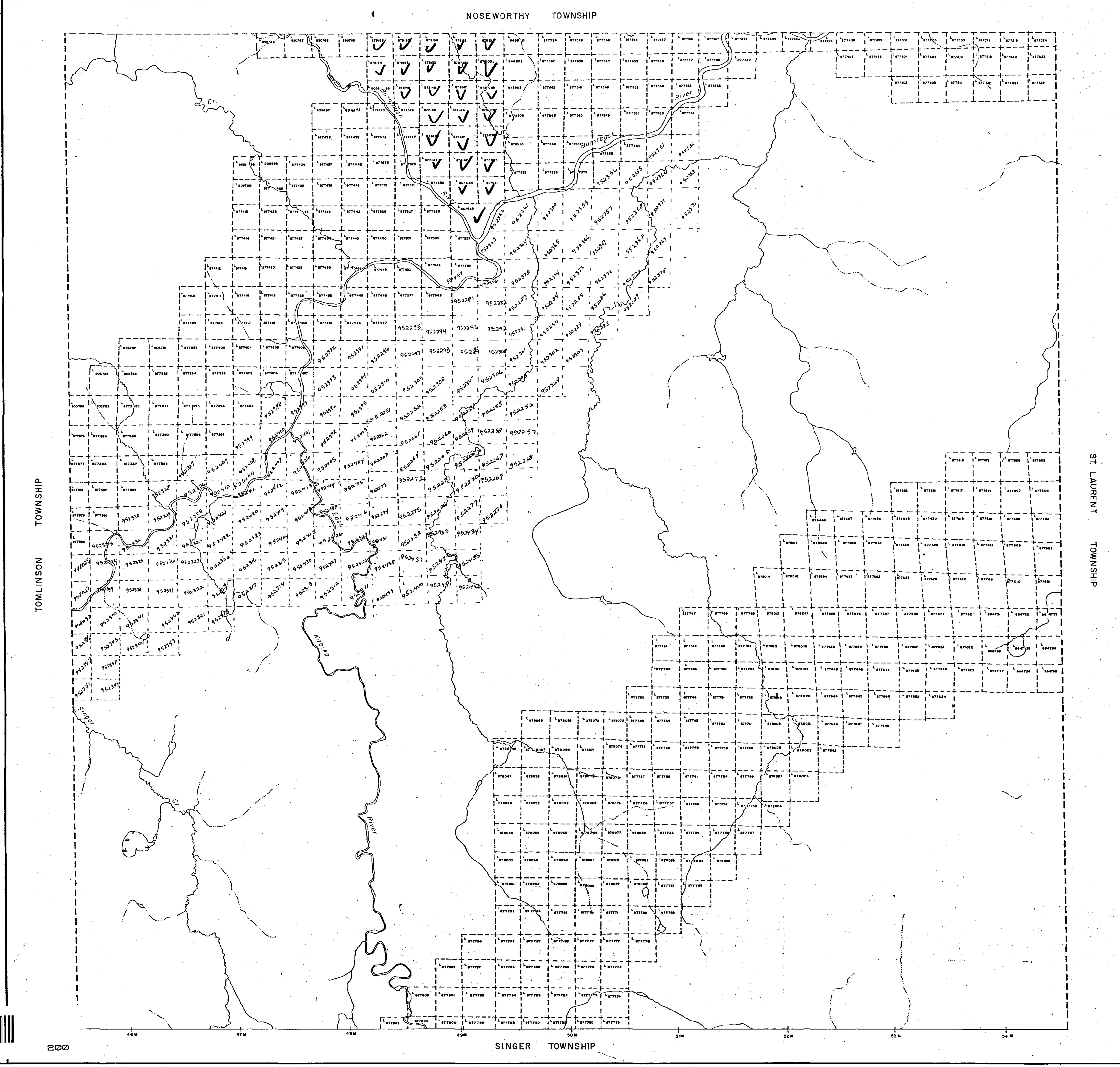
	Fm	Mag		29824	
861639	✓	✓		Fm	Mag
40	✓	✓	878149	✓	✓
41	✓	✓	50	✓	✓
			51	✓	✓
878095	✓	✓	52	✓	✓
97	✓	✓	53	✓	✓
98	✓	✓	54	✓	✓
99	✓	✓	55	✓	✓
100	✓	✓	56	✓	✓
101	✓	✓	57	✓	✓
			58	✓	✓
878141	✓	✓			
42	✓	✓			
43	✓	✓			
44	✓	✓			
45	✓	✓			
47	✓	✓			
48	✓	✓			

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

32E05NW0054 2.9824 HURTUBISE



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

500 0 1000 Metres

SCALE 1:20 000

DATE OF ISSUE
FEB 10 1987
LARDER LAKE
MINING RECORDER'S OFFICE

TOWNSHIP

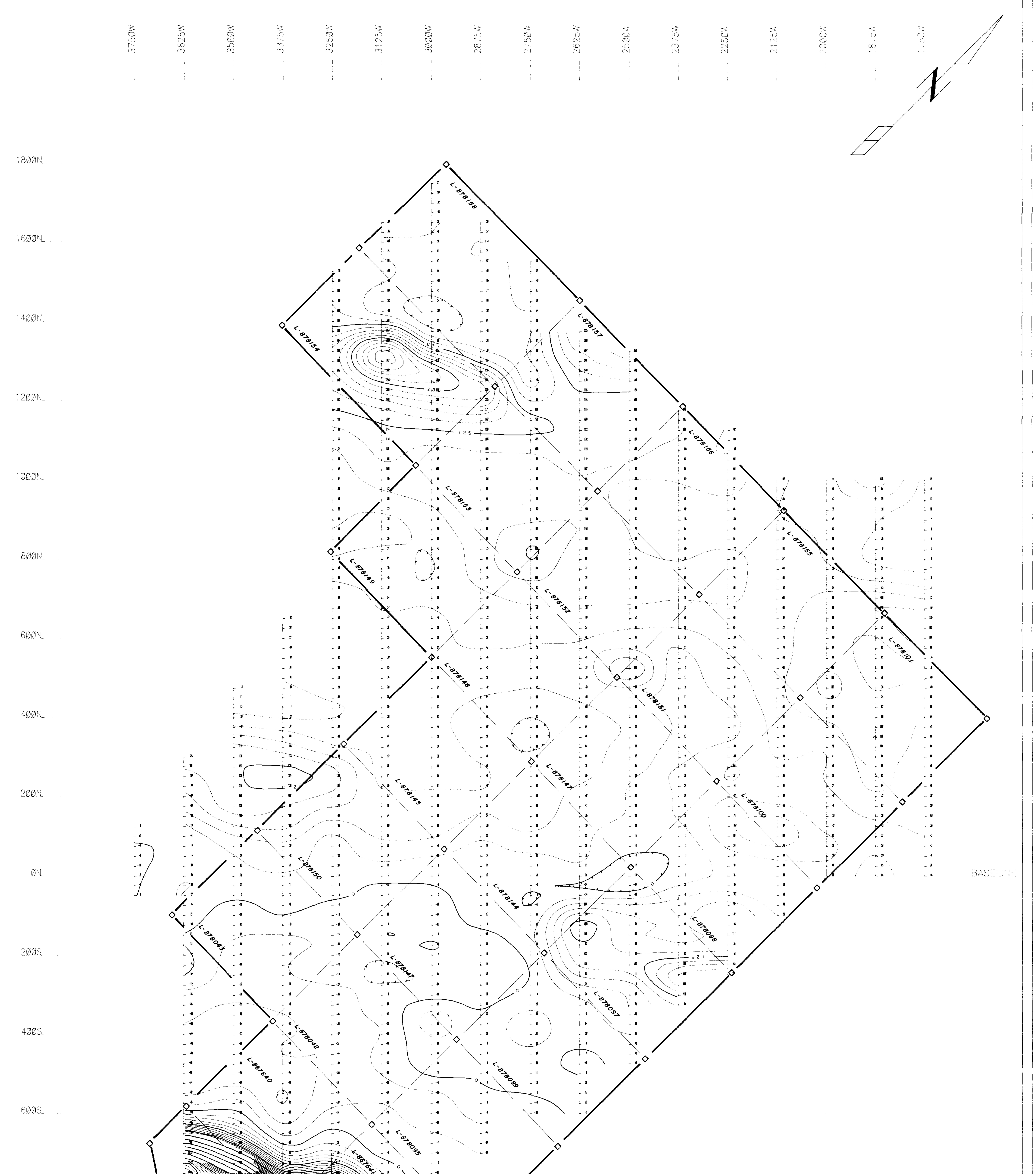
HURTUBISE

M.N.R. ADMINISTRATIVE DISTRICT
COCHRANE
MINING DIVISION
LARDER LAKE
LAND TITLES / REGISTRY DIVISION
COCHRANE

Ontario — Ministry of Natural Resources — Ministry of Northern Development and Mines

Date OCTOBER 1986

Number G-3518



MAP 1

Instrument : MP-3
Field : TOTAL
Datum : 58840.0 nT

Contour interval : 25 nT
(2 passes through a 9 pt. Hanning Filter.)
(2 passes through a 3 pt. Hanning Filter.)

Conductor Axis :

100m 50m 0m 100m 200m

BURNTBUSH RIVER

MAGNETOMETER SURVEY

(FILTERED CONTOUR PRESENTATION)

PROJECT: GLEN AUDEN PROJECT # : 274
BASELINE AZIMUTH : 225 Deg.

SCALE = 1: 5000 DATE : 12/ 3/86
SURVEY BY : JP,SO NTS : 32-E-5

FILE: M2BUR

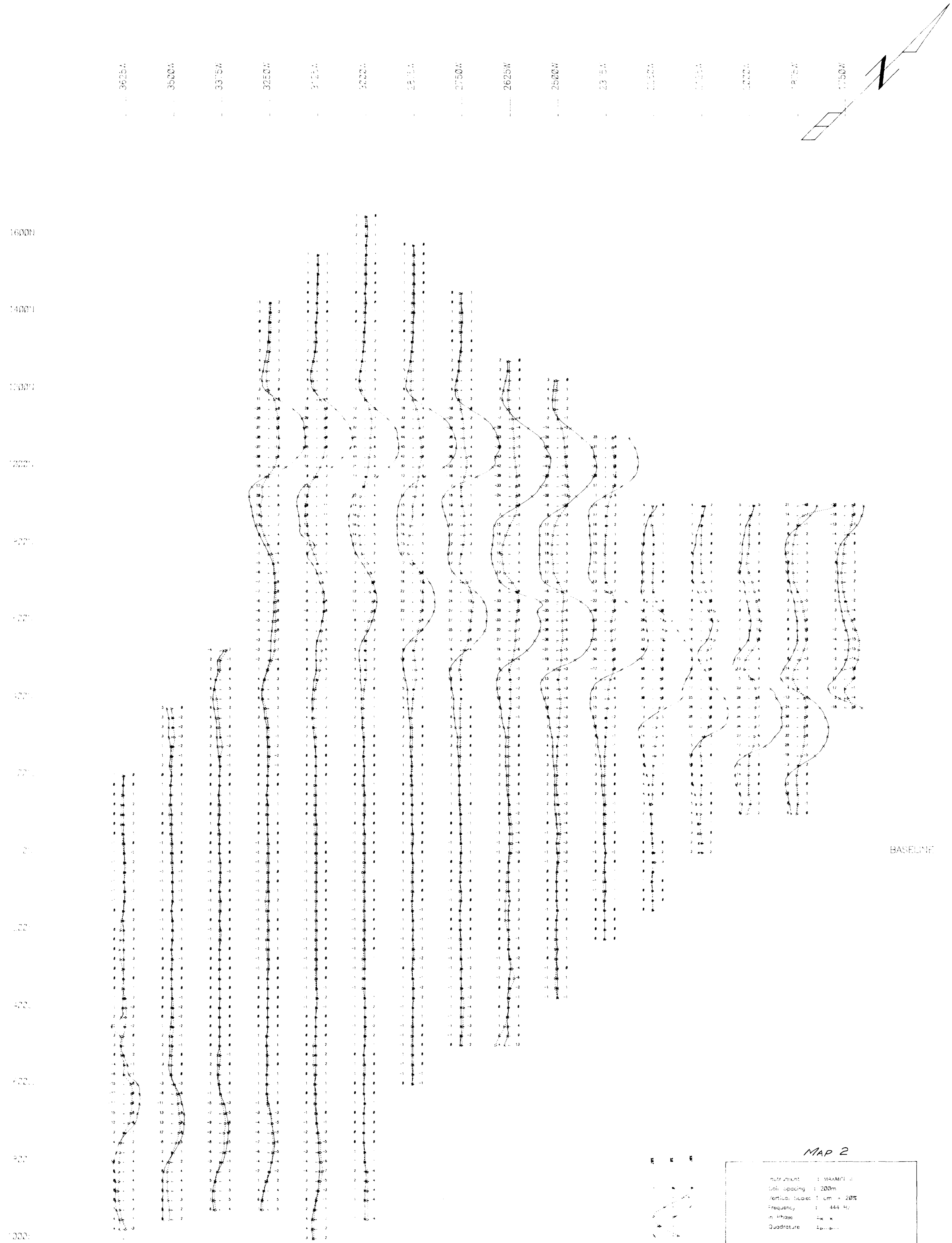
NORANDA EXPLORATION B. J. Groves

For Hole GA-87-4 on 32E/5/11

2.9824

32E05NW0054 2.9824 HURTUBISE

210



MAP 2

Instrument : MAXMIN II
Coil Spacing : 200m
Vertical Scale: 1 cm = 20%
Frequency : 444 Hz
In Phase
Quadrature

100m 50m 0m 100m 200m

BURNTBUSH RIVER

HLEM SURVEY

FREQ. 444 HERTZ

PROJECT: GLEN AUDEN PROJECT # : 274

BASELINE AZIMUTH : 225 Deg.

SCALE = 1: 5000 DATE : 12/ 3/86

SURVEY BY : JP,SO NTS : 32-E-5

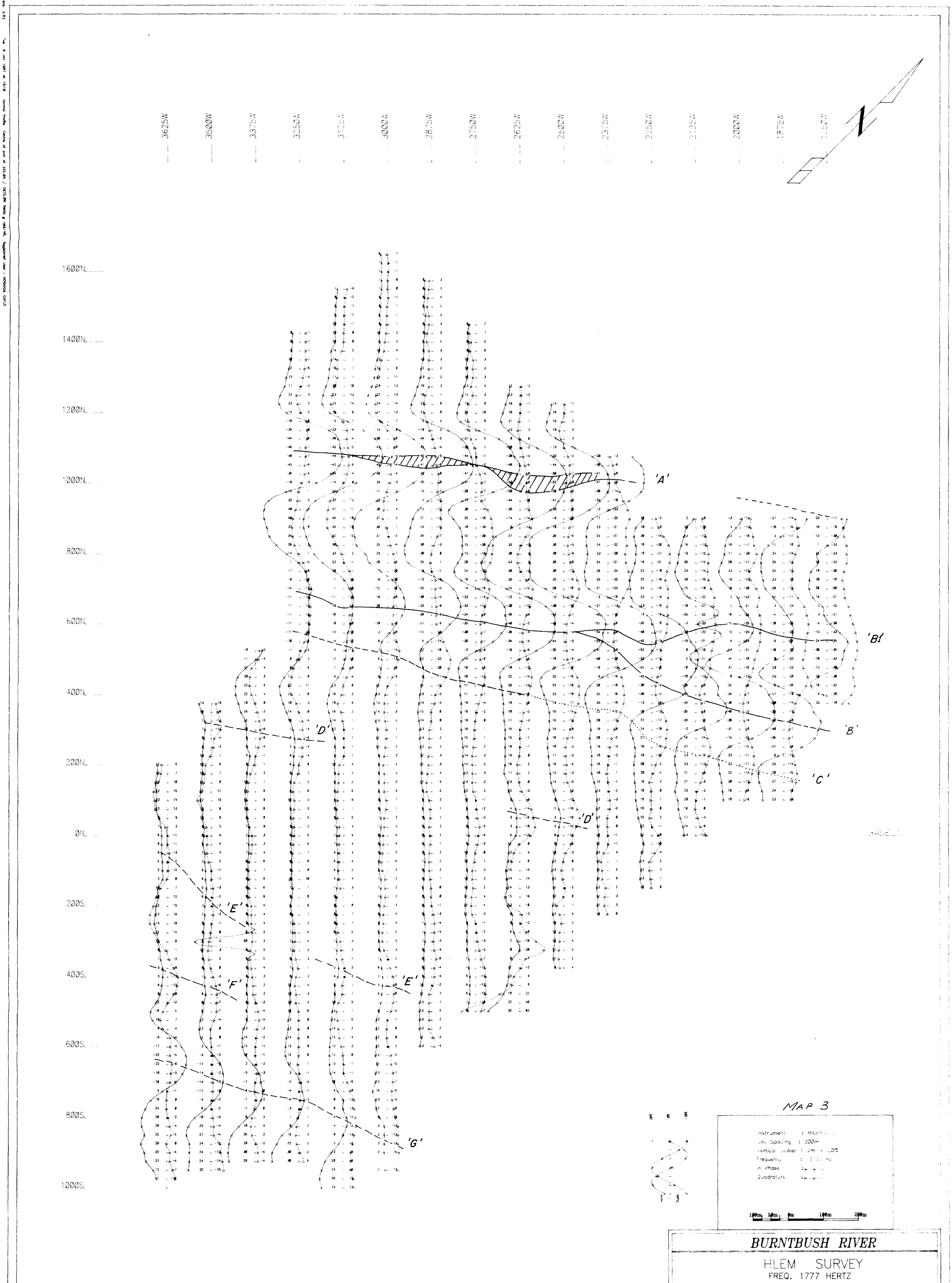
FILE: H2HUR

NORANDA EXPLORATION B.J. Groves

2.9824

32E05NW0054 2.9824 HURTUBISE

220



BURNTBUSH RIVER

HLEM SURVEY

FREQ. 1777 HERTZ

PROJECT: GLEN AUDEN PROJECT # : 274

BASELINE AZIMUTH : 225 Deg.

SCALE = 1: 5000 DATE : 12/ 3/86

SURVEY BY : JP,SO NTS : 32-E-5

FILE: H2HUR

NORANDA EXPLORATION

B J Groves

2.9824

32E05NW0054 2.9824 HURTUBISE

230