

DIGHEM SUR



RADISSON PROJE

42A07NW0115 2.962 SHERATON

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FOR

JUL 27 1972

COMINCO LTD.

PROJECTS SECTION

BY

DIGHEM LTD.

May 20, 1971  
Toronto, Ontario

D.C. Fraser  
Manager

The equipment provided five channels of EM data at 918 hz, two of magnetics, and radioaltitude. The channels and usual noise levels were:

<u>Channel</u>		<u>Time Constant</u>	<u>Scale units/mm</u>	<u>Noise</u>
1	horizontal null coil quadrature	0.7 sec	5 ppm	4 ppm
2	vertical null coil quadrature	0.7 sec	5 ppm	4 ppm
3	maximum-coupled coil inphase	0.7 sec	5 ppm	3 ppm
4	maximum-coupled coil inphase	5.0 sec	1 ppm	1 ppm
5	maximum-coupled coil quadrature	5.0 sec	1 ppm	1 ppm
6	magnetometer: 1 gamma/step	1.0 sec	2.5 gamma	2 gamma
7	magnetometer: 10 gamma/step	1.0 sec	25.0 gamma	20 gamma
8	radioaltitude			

The quoted noise levels are generally valid for wind speeds up to 20 mph. Higher winds may cause the system to be grounded because excessive bird swinging produces control difficulties in piloting the helicopter. The swinging results from the 50 square feet of area which is presented by the bird to broadside gusts. The DIGHEM system nevertheless can be flown under wind conditions that seriously degrade other continuous wave AEM systems.

The survey was flown at line spacing of 1/8 mile using the FH-1100 helicopter CF-DAL. Ancillary equipment consisted of a Barringer Research Limited AM-104 magnetometer, a Bonzer radioaltimeter, Triad sequence camera, MFE 8-channel hot pen recorder, and a 60 hz monitor.

### DATA PRESENTATION

#### Electromagnetics

The anomalies were interpreted by computer according to the conductivity-thickness product in mhos of an oblique-striking vertical dike model. The multiple EM channels generally provide a distinction between vertical and horizontal current flow paths. Anomalies which were obviously produced by horizontal current flow patterns are not shown on the photomosaic anomaly maps. Anomalies which probably arose from such flow patterns are plotted but are indicated by the letter S in accordance with the map legend. All other anomalies generally can be considered to represent bedrock conductors and, as such, could reflect ore regardless of their conductivity-thickness products. However, conductors may be placed into three categories for sake of comparison from area to area, i.e.,

<u>conductivity-thickness (mhos)</u>	<u>conductor quality</u>
$\leq 9$	weak *
10-29	moderate
$\geq 30$	strong

The mho values generally are independent of flying height or depth of burial apart from the averaging of the response of a conductor over a greater portion of the body as height increases. Weak responses from deeply buried strong conductors are not confused with weak responses from shallow poor conductors because the former will have larger mho values.

A limited amount of interpretation is presented on the photomosaics. This consists of the line-to-line correlation of those anomalies which appear to be caused by a single conductive band, to provide an interpretation of conductor patterns.

The attached data sheets provide a tabulation of all anomalies in ppm and mhos. The anomalies are listed from top to bottom or from left to right of the map for each line.

Magnetic correlation is indicated directly on the EM anomaly photomosaics.

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\* Clients have reported that conductors of less than 4 mhos may not respond to ground EM equipment using frequencies less than 2000 Hz.

COMMENTS

Parts of the Radisson project area appear to be covered by conductive overburden. Occasionally, this overburden yielded in excess of 20 ppm of quadrature (i.e., half-scale excursions on the high sensitivity channel 5 of the flight tapes). However, the inphase response generally was less than 2 ppm, illustrating the almost total rejection of overburden by this channel. The phase shifts caused by conductive overburden produces uncertainty in the interpreted conductivity-thickness values. The net effect of the signals being phase-shifted through overburden is to yield conductivity-thickness values which are somewhat too low,

and to cause conductors to appear erroneously deep.

The signal levels from various conductors at a depth of 200 feet subsurface are given in Table 1, for the maximum-coupled coil. This table illustrates that high sensitivity and low noise is required to detect conductors of poor to moderate conductivity-thickness. Recognition of this problem resulted in the display of two deep exploration channels for the survey, having sensitivities of 1 ppm/mm. This sensitivity is responsible for the

TABLE 1. Anomalies from Vertical Dike Conductors

<u>Subsurface depth *</u>	<u>Conductivity-thickness</u>	<u>Inphase</u>	<u>Quadrature</u>
200 feet	4 mhos	2 ppm	4 ppm
	7 mhos	3 ppm	5 ppm
	10 mhos	5 ppm	4 ppm
	20 mhos	8 ppm	3 ppm

\* for a bird height of 100 feet above surface.

mapping of some conductors in the project areas, inasmuch as several anomalies were identified having amplitudes of less than 2 ppm. The survey mapped two paired-conductor systems in the Radisson area

RADIAL	DEPTH	MAXIMALLY COUPLED COIL		NULL-COUPLED COILS		CONDUCTIVITY THICKNESS MHOS
		REAL PPM	QUAD PPM	VERT QUAD PPM	HORIZ QUAD PPM	
RADIAL	7	-1	1	-1	0	12
	7	-1	0	1	0	26
6	6	1	1	-1	1	6
	6	1	1	-1	1	6
21	21	2	1	-1	0	14
	21	2	1	-1	1	16
22	22	6	1	-1	3	35
23	23	0	1	-1	1	2
	23	1	1	-4	0	5

Respectfully submitted,



May 20, 1971  
Toronto, Ontario

D. C. Fraser  
Manager

Endorsed by,



E.O. Andersen, P. Eng.





Show instrument technical data in each space for  
type of survey submitted or indicate "not applicable"

## GEOPHYSICAL TECHNICAL DATA

### GROUND SURVEYS

Number of Stations \_\_\_\_\_ Number of Readings \_\_\_\_\_

Station interval \_\_\_\_\_

Line spacing \_\_\_\_\_

Profile scale or Contour intervals \_\_\_\_\_  
(specify for each type of survey)

### MAGNETIC

Instrument \_\_\_\_\_

Accuracy - Scale constant \_\_\_\_\_

Diurnal correction method \_\_\_\_\_

Base station location \_\_\_\_\_

### 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 \_\_\_\_\_

Time domain \_\_\_\_\_ Frequency domain \_\_\_\_\_

Frequency \_\_\_\_\_ Range \_\_\_\_\_

Power \_\_\_\_\_

Electrode array \_\_\_\_\_

Electrode spacing \_\_\_\_\_

Type of electrode \_\_\_\_\_



**SELF POTENTIAL**

Instrument \_\_\_\_\_ Range \_\_\_\_\_

Survey Method \_\_\_\_\_

Corrections made \_\_\_\_\_

**RADIOMETRIC**

Instrument \_\_\_\_\_

Values measured \_\_\_\_\_

Energy windows (levels) \_\_\_\_\_

Height of instrument \_\_\_\_\_ Background Count \_\_\_\_\_

Size of detector \_\_\_\_\_

Overburden \_\_\_\_\_

(type, depth - include outcrop map)

**OTHERS (SEISMIC, DRILL WELL LOGGING ETC.)**

Type of survey \_\_\_\_\_

Instrument \_\_\_\_\_

Accuracy \_\_\_\_\_

Parameters measured \_\_\_\_\_

Additional information (for understanding results) \_\_\_\_\_

**AIRBORNE SURVEYS**

Type of survey(s) Airborne EM

Instrument(s) Dighem 5-channel Helicopter EM, Barringer AM-104 Magnetometer.

(specify for each type of survey)

Accuracy See Report - Page 1.

(specify for each type of survey)

Aircraft used Helicopter FH-1100 CF-DAL

Sensor altitude 140 ft.

Navigation and flight path recovery method Continuous strip film and visual

Aircraft altitude 200 ft. Line Spacing 1/8 mile

Miles flown over total area 108 Over claims only 25.7

$25.7 \times 40 = 1028 \div 51 = \underline{20.2 \text{ days per claim}}$

*J*

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 \_\_\_\_\_

2.762

<u>Claim #</u>	<u>Days</u>	<u>Claim #</u>	<u>Days</u>
φ 255282	20	256263	20
255283	"	256264	"
255286	"	256265	"
255287	"	256272	"
255292	"	256273	"
255293	"	256274	"
255296	"	256275	"
255297	"	256279	"
255302	"	256280	"
255303	"	256281	"
255304	"	256282	"
255305	"	256283	"
255306	"	256284	"
256242	"	256285	"
256243	"	256286	"
256244	"	256287	"
256245	"	256299	"
256249	"	256300	"
256250	"	256306	"
256251	"	256307	"
256252	"	256308	"
256253	"	256309	"
256254	"	256310	"
256255	"	256311	"
256256	"	<u>TOTAL</u> - 51	1020 days
256257	"		
256262	"		

# SHERATON TOWNSHIP

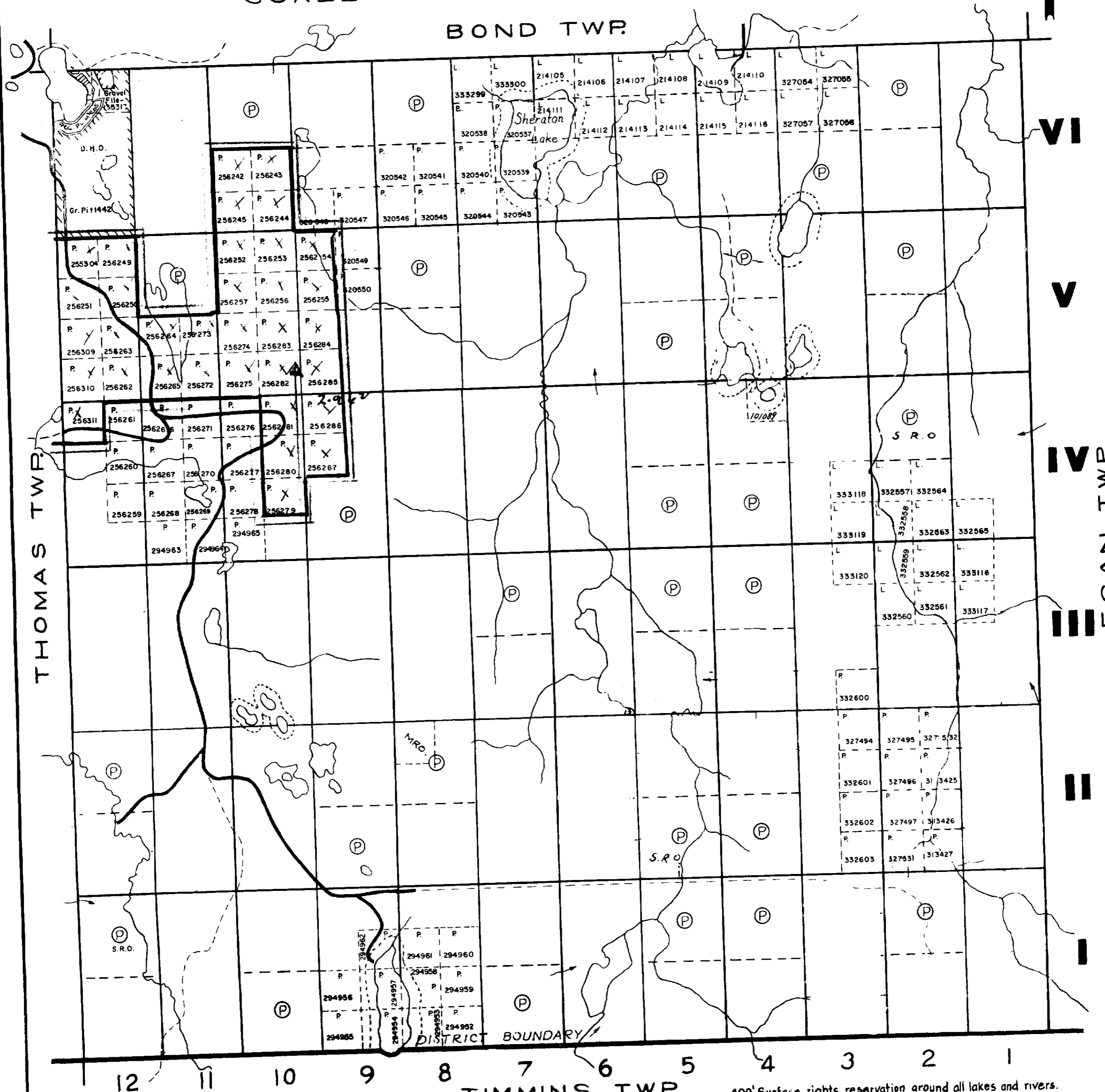
PORCUPINE MINING DIVISION

DISTRICT OF COCHRANE

M.386

DATE OF ISSUE  
 APR 1 1972  
 CHIEF DEPT. OF MINES  
 AND NORTHERN AFFAIRS

SCALE 40 CHAINS TO ONE INCH  
BOND TWP.



THOMAS TWP

VI

V

IV

III

II

I

EGAN TWP.

TIMMINS TWP.

40' Surface rights reservation around all lakes and rivers.

### LEGEND

IMPROVED ROADS ...  
TRAILS

PATENTED LANDS .....  
CROWN LAND SALES .....



# SHERATON TOWNSHIP

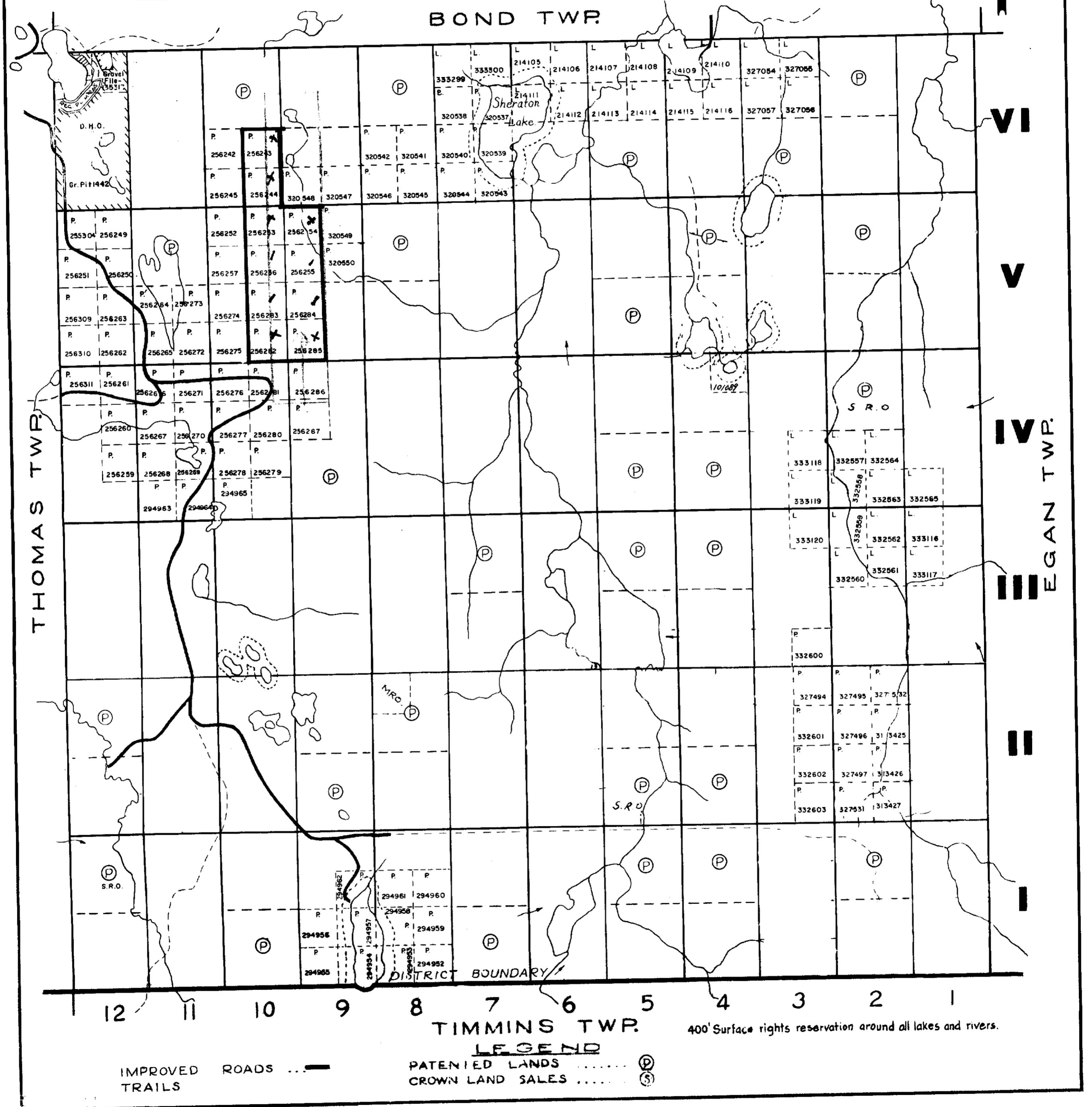
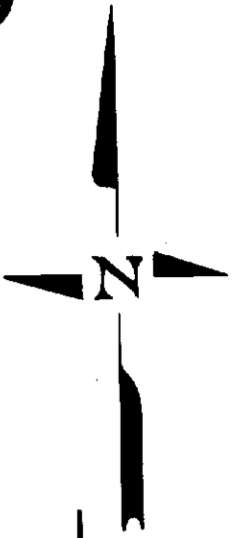
PORCUPINE MINING DIVISION

DISTRICT OF COCHRANE

M.386

DATE OF ISSUE  
MAY 1 1972  
ONT. DEPT. OF MINES  
AND NORTHERN AFFAIRS

SCALE 40 CHAINS TO ONE INCH  
BOND TWP.



*Airborne E M*

W 315

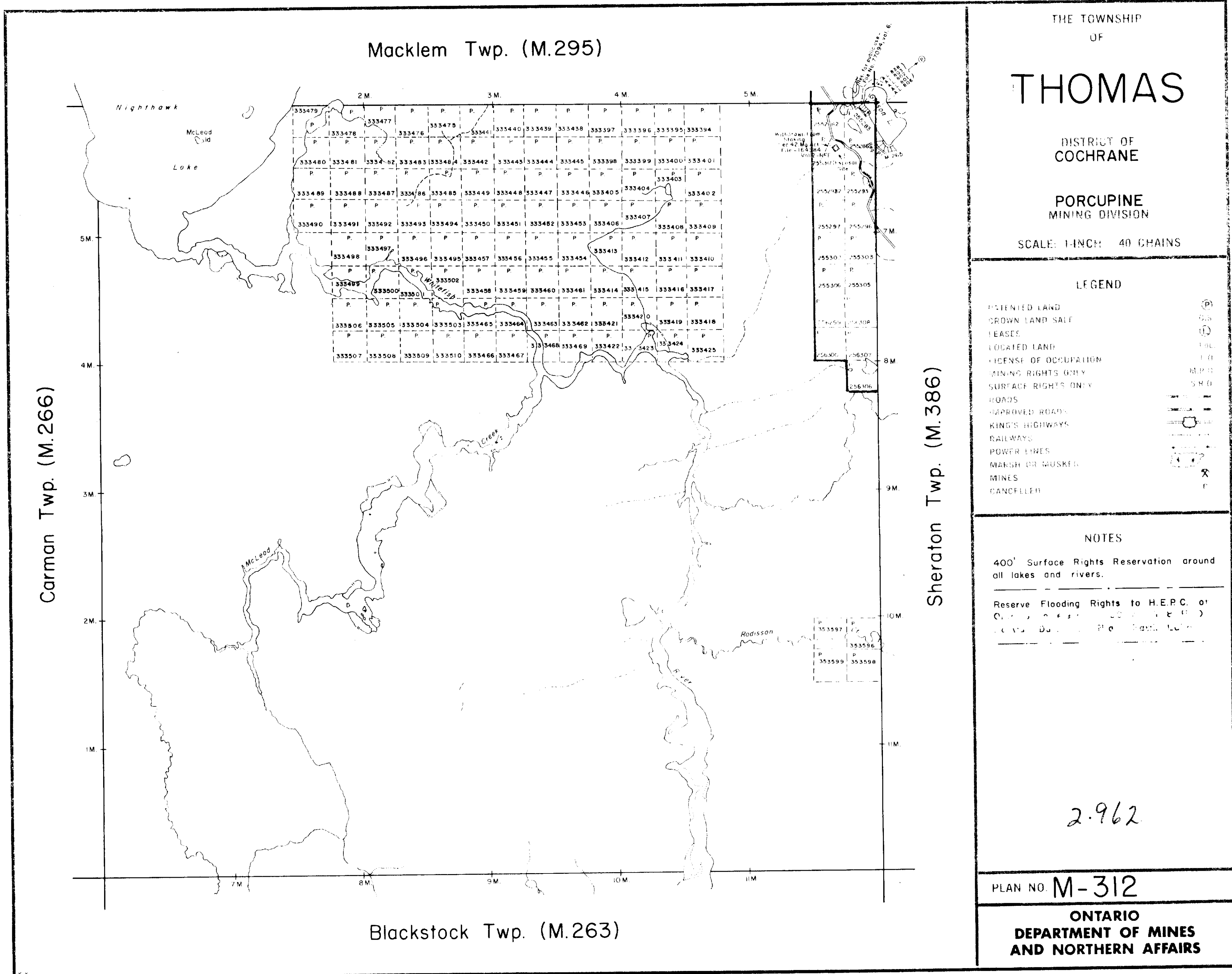
QWT 2AMOHT

W 315

W 315

QWT 2AMOHT

W 315



THE TOWNSHIP OF

# THOMAS

DISTRICT OF COCHRANE

PORCUPINE MINING DIVISION

SCALE: 1-INCH = 40 CHAINS

### LEGEND

- Ⓟ PATENTED LAND
- Ⓞ CROWN LAND SALE
- Ⓢ LEASES
- Ⓛ LOCATED LAND
- Ⓜ LICENSE OF OCCUPATION
- Ⓜ MINING RIGHTS ONLY
- Ⓜ SURFACE RIGHTS ONLY
- ROADS
- IMPROVED ROADS
- KING'S HIGHWAYS
- RAILWAYS
- POWER LINES
- Ⓜ MARSH OR MUSKOGEE
- Ⓜ MINES
- Ⓜ CANCELLED

### NOTES

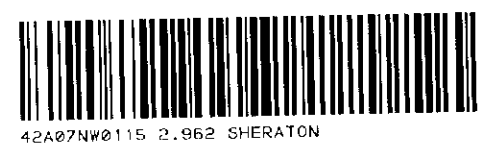
400' Surface Rights Reservation around all lakes and rivers.

Reserve Flooding Rights to H.E.P.C. of Ontario near the town of Thomas, District of Cochrane, Porcupine Mining Division.

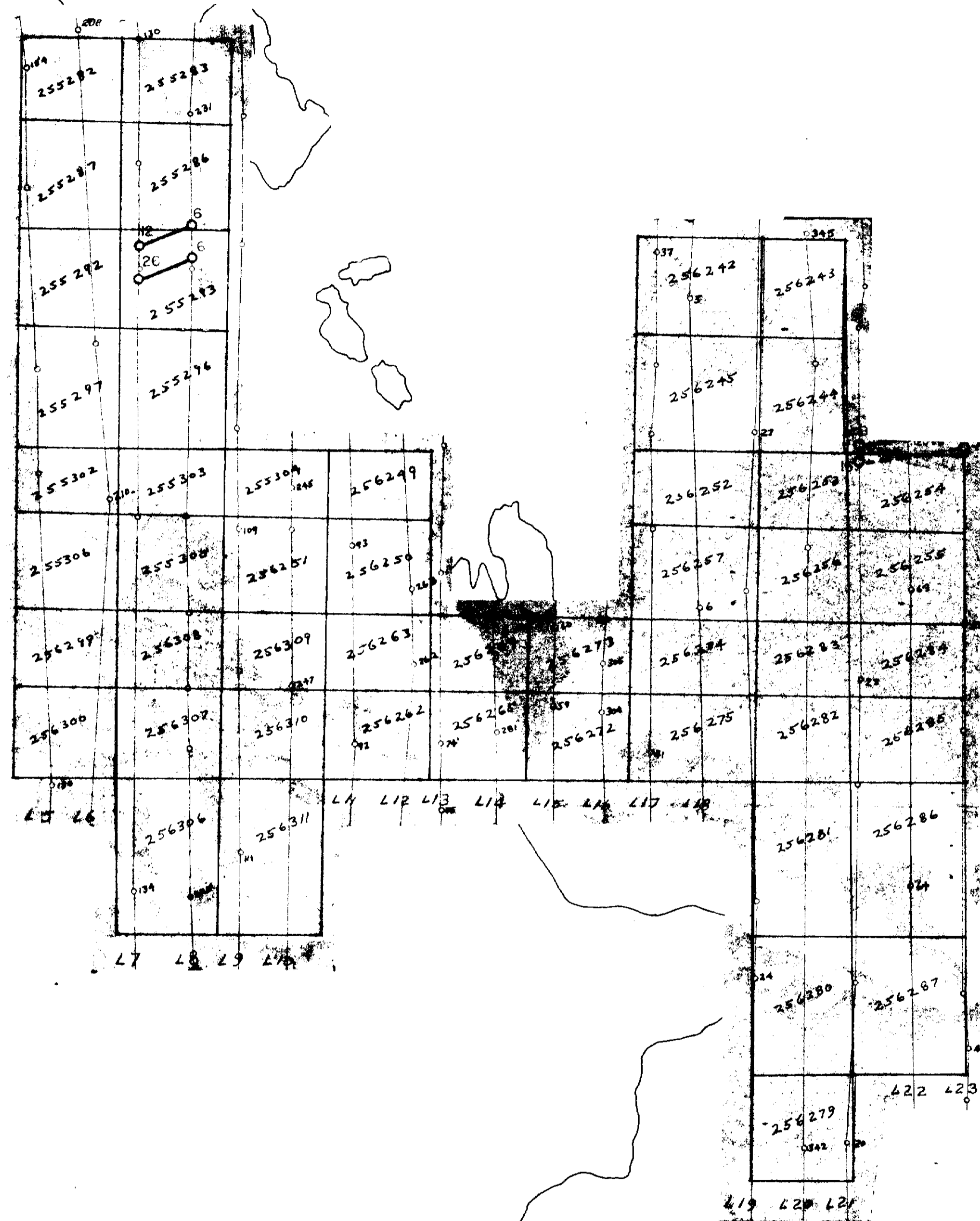
2.962

PLAN NO. M-312

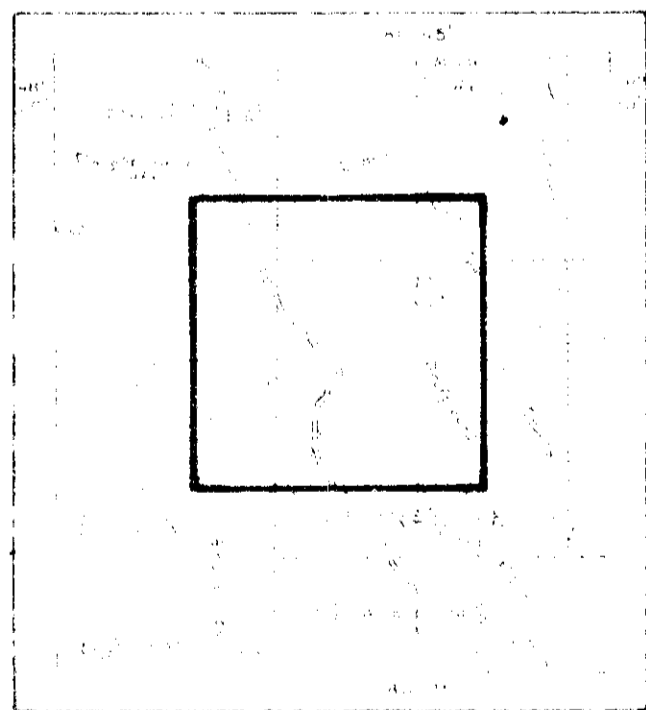
**ONTARIO  
DEPARTMENT OF MINES  
AND NORTHERN AFFAIRS**



42A87N0115 2.962 SHERATON



LOCATION MAP



SCALE: 1:250,000

**EM response**

- 20 ppm (largest value of response)
- 10 ppm (in quadrature of maximum coupled coil)
- 5 ppm

**Magnetic correlation**

100% direct magnetic correlation of EM points  
 100% N. component is on the flank of a 10% magnetic anomaly located to the N. of the

**Interpretation**

- 1. Conductivity (the cross-hatched area)
- 2. Magnetic axis
- 3. Probable surface response
- 4. Magnetic axis response



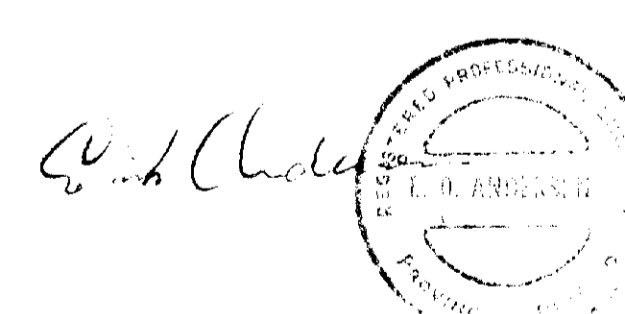
4242/NW115-2-982-SHENATON

230

2000 01 12 11:42 A.M. May 1971 DWG. 5010

# DIGHEM SURVEY ELECTROMAGNETICS

COMINCO LIMITED  
RADISSON PROJECT, ONTARIO



Drawn by	Traced by	COMINCO LTD	
Checked by	Reviewed by	Scale	Date
		1 inch = 1/4 mile	May 1971
			Plate 1