REPORT ON

INDUCED POLARIZATION SURVEY

MISTINIKON LAKE AREA

POWELL TOWNSHIP,

LARDER LAKE MINING DIVISION,
ONTARIO

FOR

British Matachewan Mines Limited

BY

PATERSON, GRANT & WATSON LIMITED
Toronto, Ont. February 1973.

1. INTRODUCTION

This report describes the results of an induced polarization survey conducted on parts of four of the claims which form the property of British Matachewan Gold Mines Limited in Powell Township, Ontario. The purpose of the survey was to prospect the area for mineral deposits of the type found in the nearby Young-Davidson and Matachewan Consolidated Mines. The induced polarization method was selected because of its ability to detect disseminated sulphide minerals as well as the massive type, and its ability to penetrate several hundreds of feet of overlying Proterozoic sediments which are thought to be present in the area.

The field work was done under contract by Scintrex Limited and the interpretation and report was done by Paterson, Grant & Watson Limited of Toronto.

2. THE PROPERTY

The survey covered almost all of Claim 40068, parts of Claims 298187 and 298186, and the boundary between 50439 and 50440. These claims are owned by British Matachewan Gold Mines Limited and lie four miles west of the town of Matachewan in and around Mistinikon Lake in Powell Township, Larder Lake Mining Division. Access to Mistinikon Lake is by secondary road from the village of Matachewan and the claims can be reached by boat or snowmobile.

3. GEOLOGY

The claim group lies on the north boundary of a broad belt of Proterozoic sedimentary rocks which stretch north from Sudbury. The most detailed published geology map of the area is the O.D.M. preliminary map P-272 which shows the claims to be underlain almost entirely by the sediments of the Gowganda formation including quartzites, conglomerates and argillite. One exposure of the Matachewan diabase has been mapped in the middle of the lake in Claim 40068 and suggests the Proterozoic sediments are thin in this area since this diabase is not known to have penetrated the sediments. The thickness of the sediments can be expected to increase to the south as indicated by 1,052 foot drill hole about one mile southeast of the centre of Claim 40068.

The survey area is favourably located in relation to the Young-Davidson and Matachewan Consolidated Mines which lie some two miles to the east. The general strike trend of the syenite intrusives which are the host rocks for these mineral deposits is eastward toward the survey area and this survey was aimed at detecting any mineralization of the same type which may lie in any Algoman syenites beneath the Cobalt sediments.

4. PREVIOUS WORK

The O.D.M. files contain a report on a Turam and Magnetic Survey by John T. Ward, P.Eng., April 1971, covering most of the present survey area. Several conductors which could be at considerable depth were interpreted from this work and the present survey was done to confirm and further define these anomalies. No other geophysical work and no drilling or stripping has been done.

5. SURVEY SPECIFICATIONS

a) Instrumentation

The equipment used was the Scintrex Mark VII 2.5 kilowatt induced polarization system. The transmitter provides a direct current which operated on an eight second cycle composed of a two second current-on time followed by two seconds off, and then repeated with reversed polarity. The receiver was the Newmont type and measured the primary voltage when the current is on, and the secondary voltage that remains after the current is stopped. The secondary voltage is averaged across a 600 millisecond period beginning 450 milliseconds after the current is turned off. The value of chargeability is computed by dividing secondary voltage by the primary voltage and multiplying by the integration period to give the final value in milliseconds.

b) Procedures

For this survey, the pole-dipole electrode configuration was used. The dipole spacing was 200 feet and n values were 2, 3, and 4. The transmitter was established in a fixed position and an infinite electrode placed approximately one mile south of the survey area.

The water portion of the grids were done from the ice in January, 1973. The survey lines on land were done earlier before freeze-up in order to minimize the frost contact effects that sometimes plague winter surveys on the land.

6. SURVEY RESULTS

a) Presentation

The survey results are presented in profile form in Figures 099-3 to 099-12. To assist the interpretation it was decided to plot Turam and magnetic data from earlier surveys at the same scale on the chargeability and resistivity profiles. The interpretation of the profiles are shown below each line and has been transferred to a plan map, Fig. 099-2.

b) Interpretation

(i) East Grid

The chargeability exhibits a general increase from south to north which is interpreted as a change in rock type across an east-west contact. The position of this contact, which can only be determined approximately since the change is gradual, is shown in Fig. 099-2.

A very weak chargeability anomaly is shown on Line 20E at 9N. In the chargeability profiles it is seen on the n = 4 spacing but not on the other two. Its main expression is on the metal factor profiles in which it clearly stands out above background on all three spacings. In spite of this definition the anomaly is ranked very low as a possible source of sulphide mineralization for two reasons. The first is that the three chargeability profiles are not consistent with a discrete chargeable source. Normally the n = 2 and n = 3 spacings would have some expression, however weak, of an anomaly on the n = 4 spacing but this is absent in this example. Secondly, the metal factor anomaly is considerably influenced, and may be caused by, the low resistivity of the lake bottom sediments in that part of the lake. Furthermore

the metal factor profiles are inconsistent with the standard response of a discrete source: in this case the width of the anomaly becomes narrower as the n value increases instead of the other way about which is normally the case. The writer concludes that this weak anomaly does not show enough validity to stand on its own and warrant further development work. It would only become important if other detection methods showed anomalies in the same area.

The magnetic profiles on Lines 8E and 24E indicate a magnetic source within 100 feet of ground surface. If it is assumed that Cobalt sedimentary series is composed of relatively non magnetic rocks then it would be concluded that the Archean basement is within 100 feet of surface on Line 24E. The observation of Archean diabase near the centre of Claim 40068 supports this conclusion. The anomaly on Line 8E could be caused by the Keweenaw diabase which has intruded the Cobalt sediments, and in which case the sediments could be considerably thicker.

(ii) West Grid

The results on the west grid are characterized by extremely high apparent resistivity which ranges from 50,000 to 90,000 ohm-meters. This may be an expression of the Archean basement which has been uplifted west of Mistinikon Lake fault. A chargeability anomaly of about twice background occupies the southwestern corner of the grid and extends off the grid to the southwest. It has well defined boundaries on Line 12W; less well defined on Line 16W. It could represent a distribution of sulphide minerals except for two detracting factors. The equal response from all spacings indicate that the chargeable material lies near surface which is within the Cobalt sediments and an unlikely host for sulphides. The other observation is that the resistivity increases along with the chargeability, thus providing no metal factor response, and indicating the anomaly to be an expression of the highly resistive rock in this area.

In spite of this conclusion it is recommended that careful outcrop inspection for conductive minerals in this area be done for confirmation.

Line 7 south was surveyed across Mistinikon Lake to test a Turam anomaly. The resistivity profiles show the presence of a conductive lake bottom and it is believed now that the Turam conductor was caused by the lake bottom sediments. No chargeability anomalies were seen on any part of the line. The resistivity profiles on the west side of the lake showed a marked increase in resistivity compared to the east side of the lake which is consistent with the results of the other two grids.

7. SUMMARY AND CONCLUSIONS

1. An induced polarization survey was conducted over the area under discussion to confirm earlier geophysical anomalies and to prospect for mineralization of the type found in the nearby Young-Davidson and Matachewan Consolidated Mines Ltd.

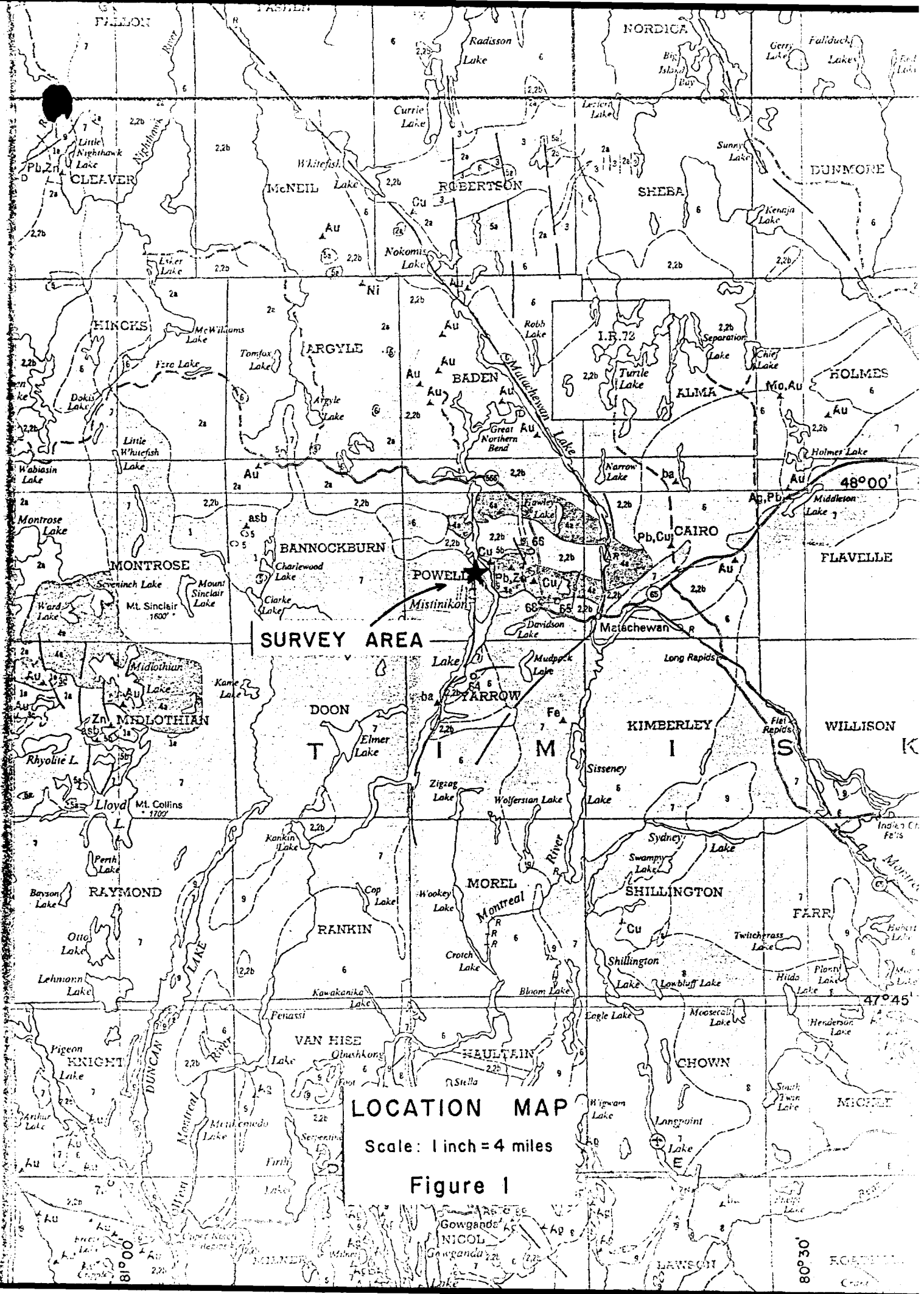
2. Two anomalies were detected but are not believed caused by sulphide mineralization. Electromagnetic conductors found earlier are now believed to be lake bottom sediments.

3. No additional development work is recommended on these claims based on this survey other than an inspection of outcrops on the West Grid anomaly.

PATERSON, GRANT & WATSON LTD.,

Roger K. Watson

Roger K. Watson, B.A.Sc., P.Eng.
Geophysicist


SURVEY AREA
LOCATION MAP
Scale: 1 inch = 4 miles
Figure 1
POWELL
BANNOCKBURN
MONTROSE
HINCKS
ARGYLE
BADEN
ALMA
CAIRO
FLAVELLE
HOLMES
DUNMORE
SHEBA
ROBERTSON
McNEIL
CLEAVER
NORDICA
I.R.72
Mistinikon
Matachewan
YARROW
DOON
TIMISKIMING
KIMBERLEY
WILLISON
MIDLOTHIAN
RAYMOND
RANKIN
MOREL
SHILLINGTON
FARR
VAN HISE
HAULTAIN
CHOWN
KNIGHT
NICOL
LAWSON
Montreal River
Lake Timiskaming
Mt. Sinclair 1600'
Mt. Collins 1700'
48°00'
47°45'
80°30'
81°00'

GEOPHYSICAL – GEOLC
TECHNICAL DA

41P15NE8270 2.1200 POWELL

900

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.

APR 12 1973

PROJECTS SECTION

Type of Survey Induced Polarization

Township or Area Powell Twp.

Claim holder(s) British Matachewan Gold Mines Ltd.,

Author of Report Roger K. Watson

Address 86-215 Mississauga Valley Blvd., Mississ.

Covering Dates of Survey Oct. 24, 1972 - Feb. 22, 1973.
(linecutting to office)

Total Miles of Line cut 4.68

SPECIAL PROVISIONS CREDITS REQUESTED		DAYS per claim
ENTER 40 days (includes line cutting) for first survey.	Geophysical	
	–Electromagnetic	
	–Magnetometer	
	–Radiometric	
ENTER 20 days for each additional survey using same grid.	–Other	
	Geological	
	Geochemical	

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

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

DATE: _____ SIGNATURE: _____
Author of Report or Agent

PROJECTS SECTION

Res. Geol. _____ Qualifications 63.1498

Previous Surveys 2.468 different claims L.D.

Checked by _____ date _____

GEOLOGICAL BRANCH _____

Approved by _____ date _____

GEOLOGICAL BRANCH _____

Approved by _____ date _____

OFFICE USE ONLY

MINING CLAIMS TRAVERSED
List numerically

(prefix)	(number)	
L.	298186	1/2
	298187	1/3 not covered.
MR.	40068	1/3 Leased claim No Credits
	50440	3/4
	50439	not covered No Credits

Area of claims not covered = 2

* See "Man days" breakdown.

If space insufficient, attach list

TOTAL CLAIMS _____

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 Scintrex Mk 7

Time domain 2 seconds off, 2 sec. on Frequency domain _____

Frequency _____ Range Integrating time 650 msec.

Power 2.5 kw.

Electrode array Pole-dipole

Electrode spacing a= 200' n=2,3 and 4

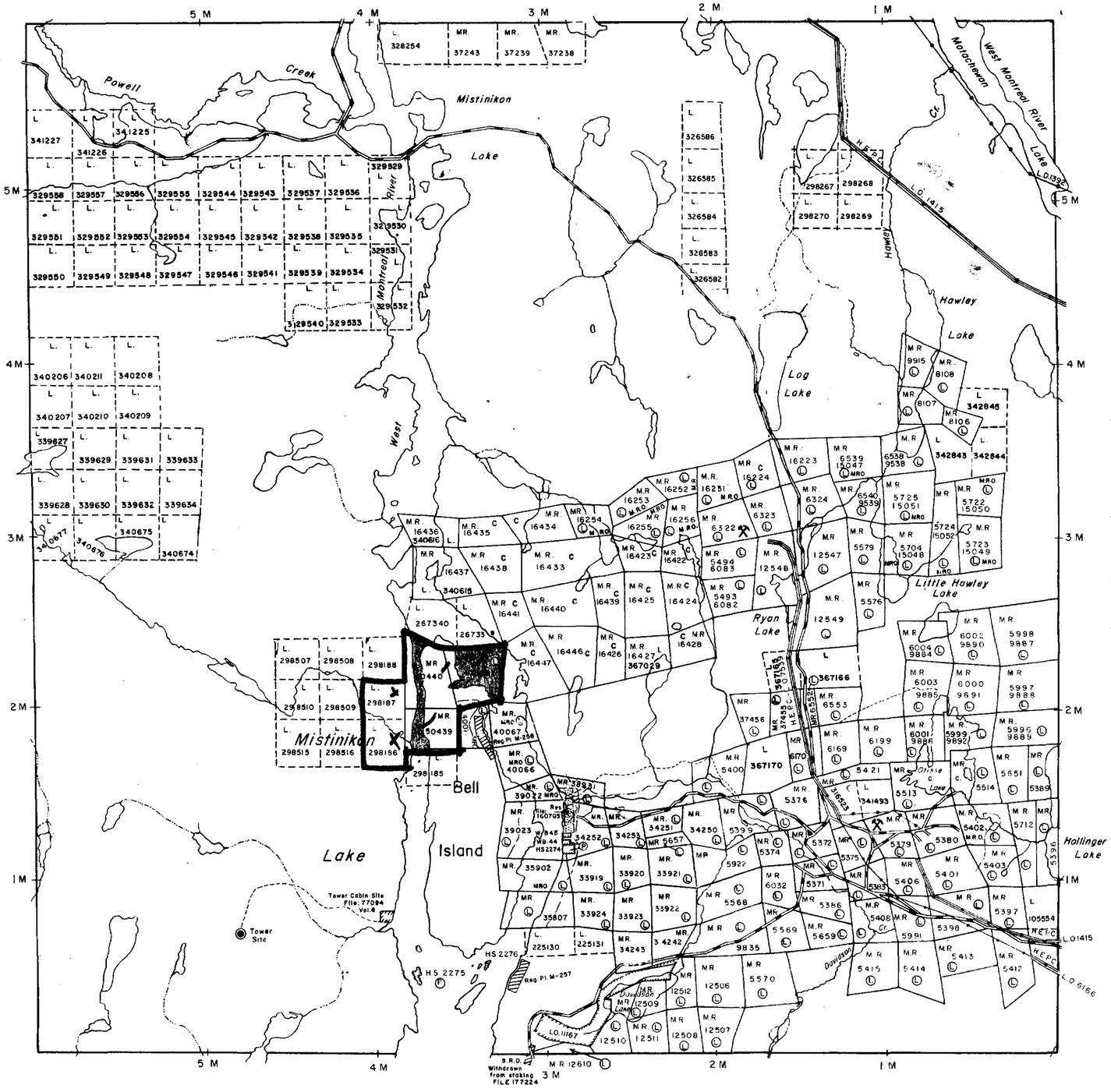
Type of electrode Stainless steel and porous pot

Baden Twp. (M.205)

Bannockburn Twp. (M.207)

Cairo Twp. (M. 210)

Yarrow Twp. (M.260)



THE TOWNSHIP OF

POWELL

DISTRICT OF TIMISKAMING

LARDER LAKE MINING DIVISION

SCALE: 1-INCH = 40 CHAINS

LEGEND

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

NOTES

400' Surface Rights Reservation along the shores of all lakes and rivers.

L.O. 7601 Covers Flooding Rights In This Twp To Below Contour 870'.00 To H.E.P.C. File: 12290 Vol. 2.

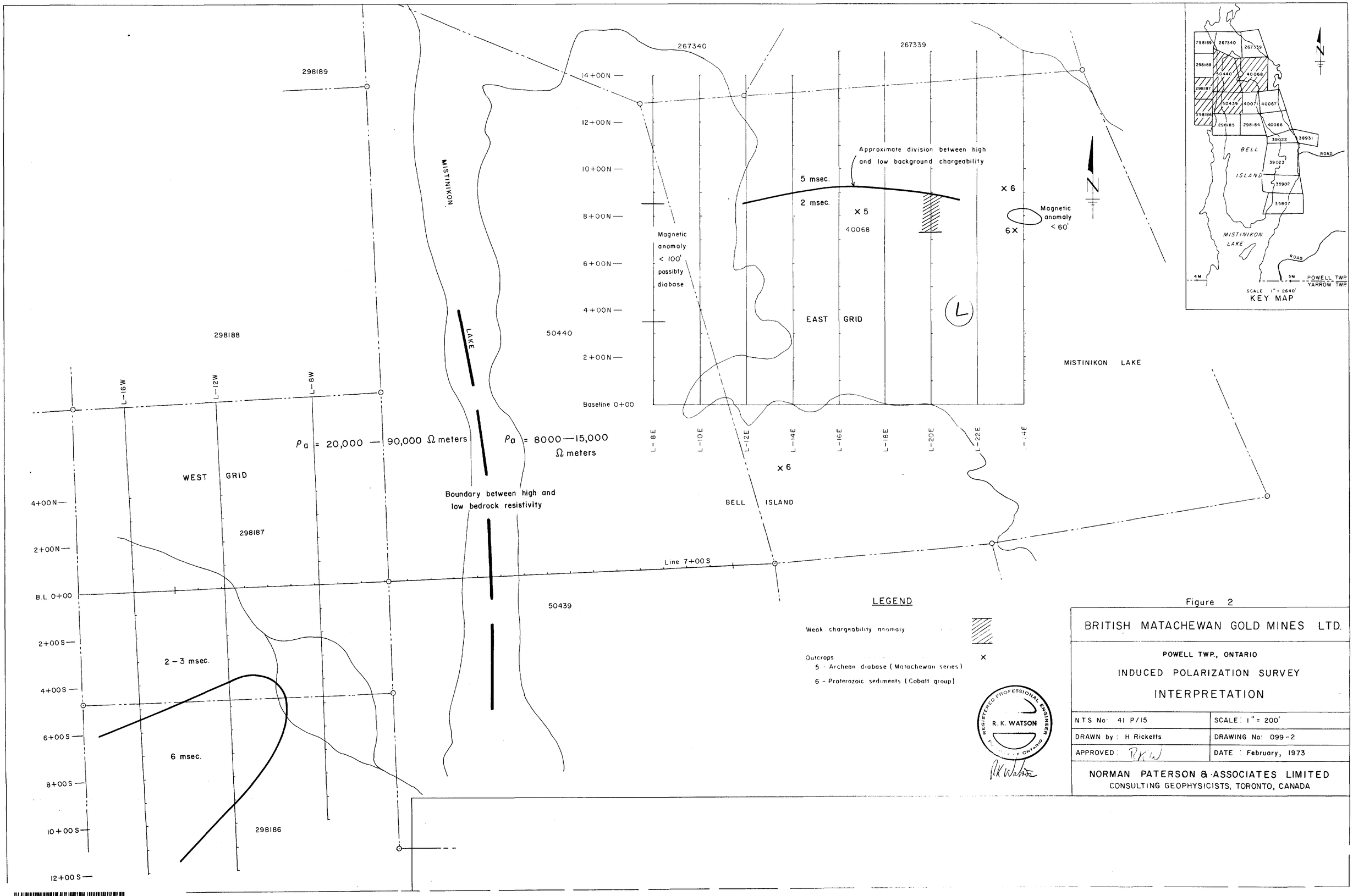
L.O. 11167 Shown thus: ---- File: 90970

- MINING LANDS -
DATE OF ISSUE
APR 18 1973
MINISTRY OF NATURAL RESOURCES

PLAN NO. M.241

ONTARIO
MINISTRY OF NATURAL RESOURCES
SURVEYS AND MAPPING BRANCH

2.1200



LEGEND

Weak chargeability anomaly

Outcrops

5 – Archean diabase (Matachewan series)

6 – Proterozoic sediments (Cobalt group)

Figure 2

BRITISH MATACHEWAN GOLD MINES LTD.

POWELL TWP., ONTARIO

INDUCED POLARIZATION SURVEY

INTERPRETATION

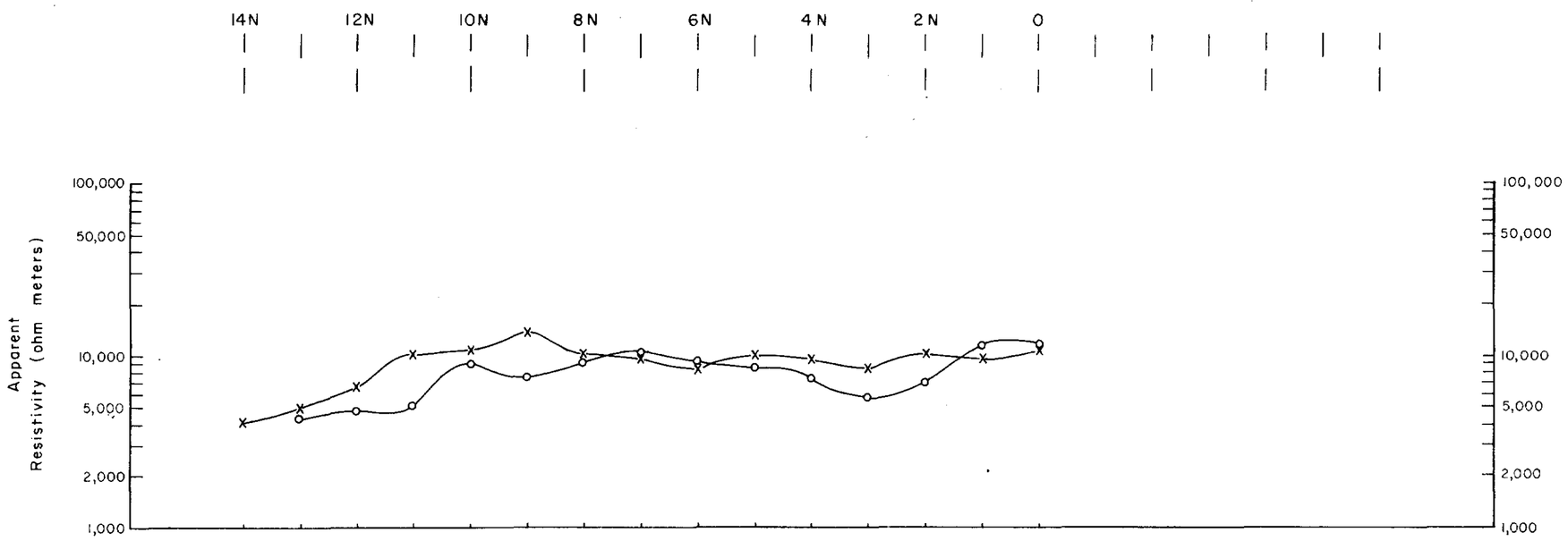
NTS No: 41 P/15	SCALE: 1" = 200'
DRAWN by: H. Ricketts	DRAWING No: 099-2
APPROVED: RKW	DATE: February, 1973

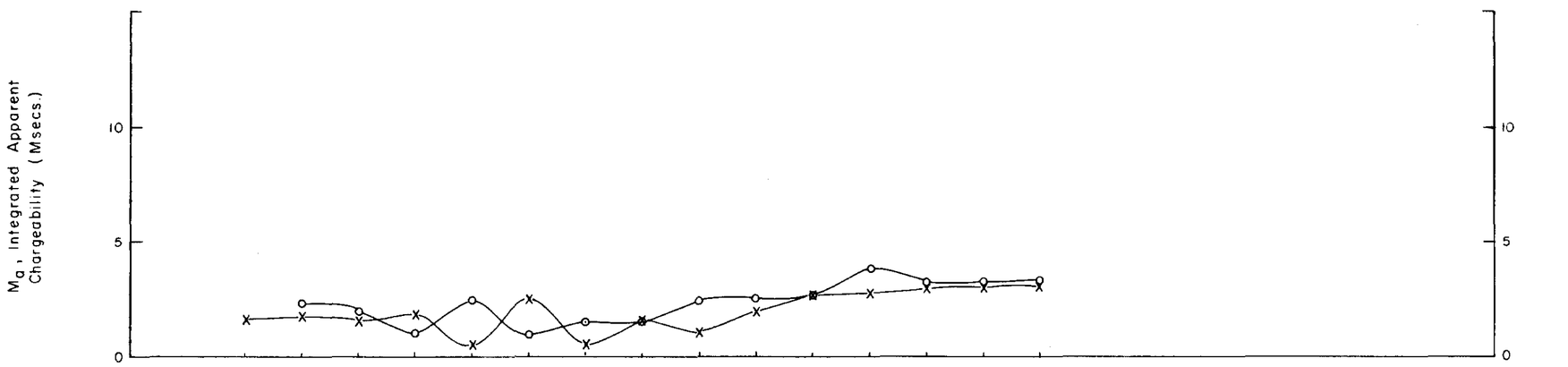
NORMAN PATERSON & ASSOCIATES LIMITED
CONSULTING GEOPHYSICISTS, TORONTO, CANADA

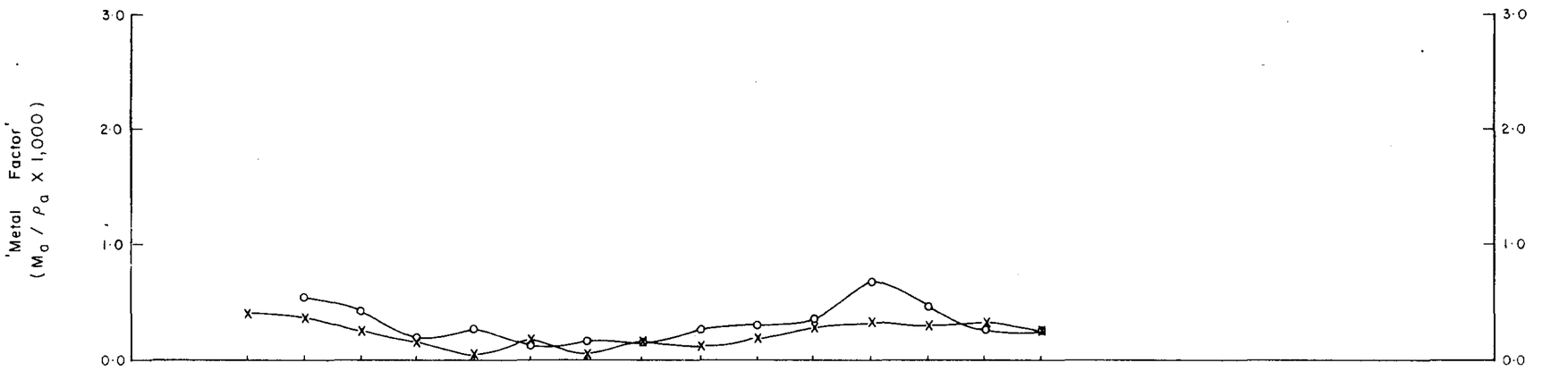
REGISTERED PROFESSIONAL ENGINEER R. K. WATSON PROVINCE OF ONTARIO

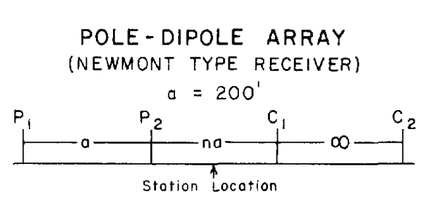
RK Watson

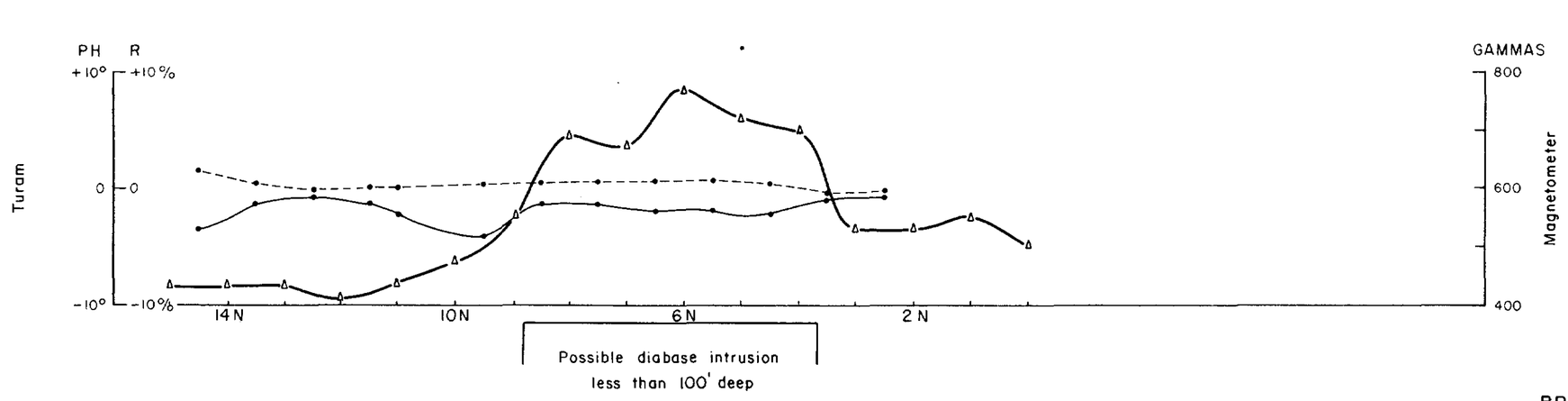
41P15NE8270 2.1200 POWELL











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POWELL TWP, ONTARIO

GEOPHYSICAL PROFILES
LINE — 8 E

Figure 3

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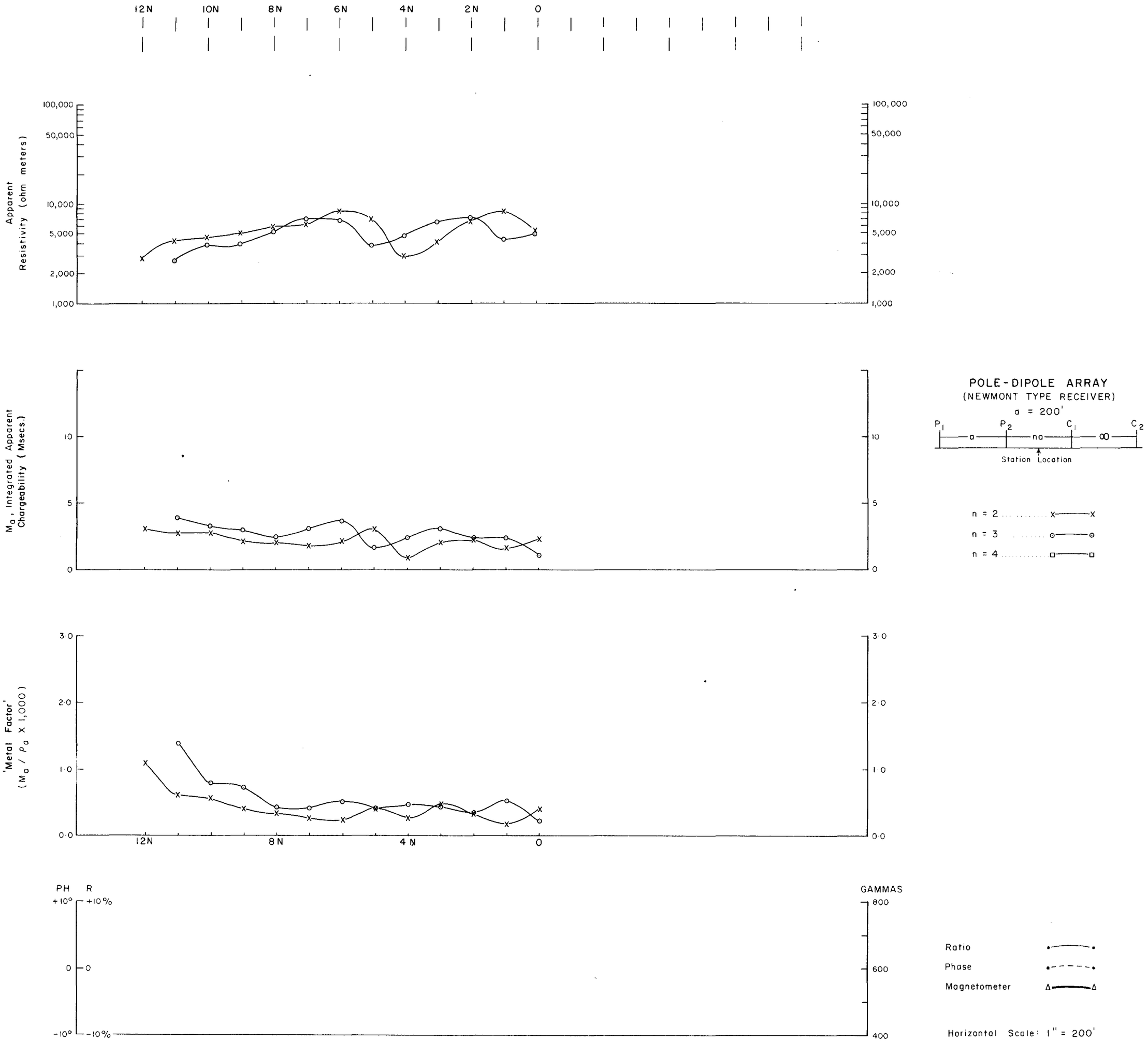

POLE-DIPOLE ARRAY
(NEWMONT TYPE RECEIVER)

a = 200'

n = 2 ..... x——x

n = 3 ..... o——o

n = 4 ..... □——□

Ratio •——•

Phase •- - - -•

Magnetometer Δ——Δ

Horizontal Scale: 1" = 200'

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POWELL TWP, ONTARIO

GEOPHYSICAL PROFILES
LINE – 10E

Figure 4

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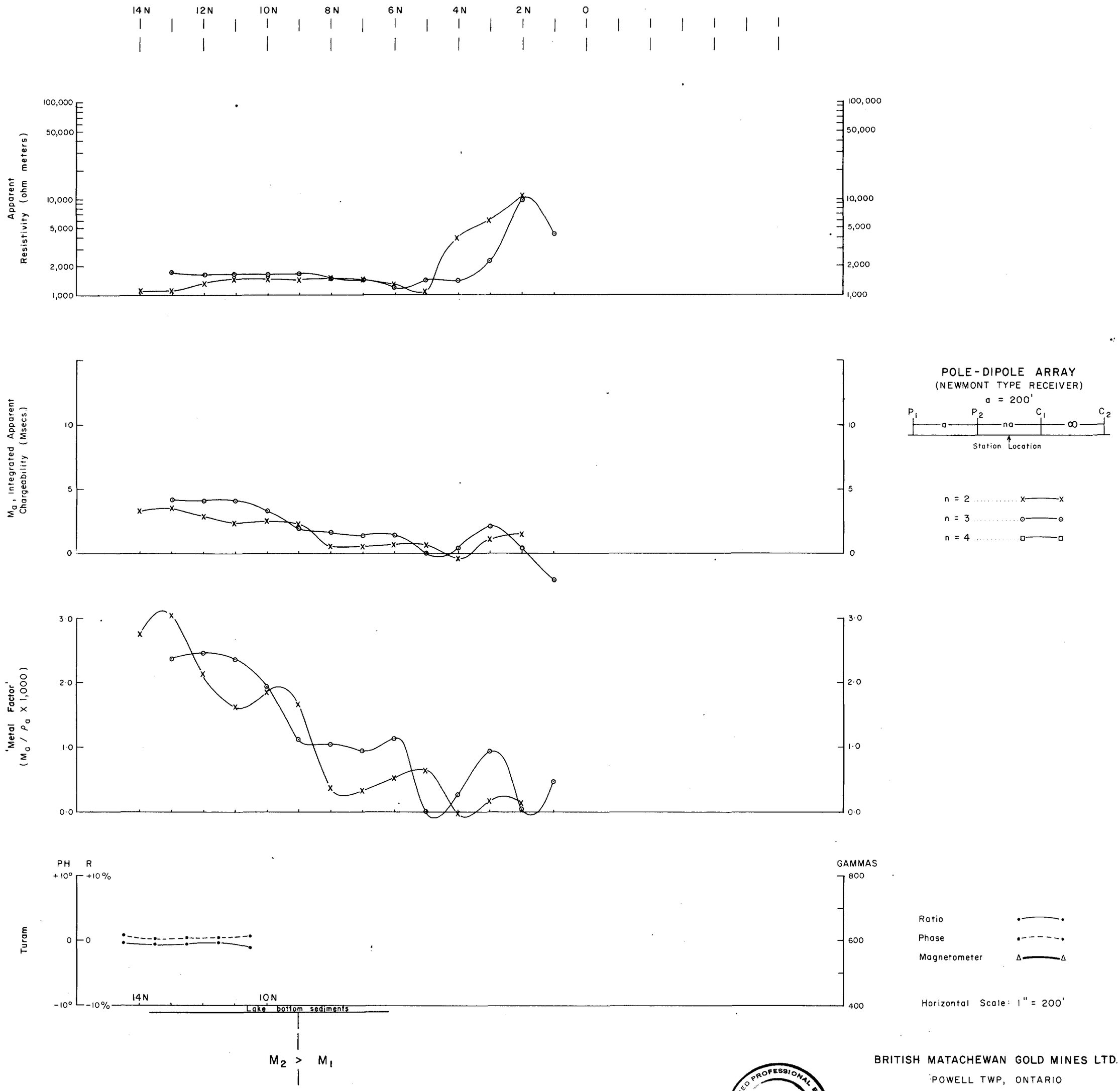

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GEOPHYSICAL PROFILES
LINE – 14 E

Figure 5

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14N 12N 10N 8N 6N 4N 2N 0

Apparent Resistivity (ohm meters)

100,000 50,000 10,000 5,000 2,000 1,000

M_a, Integrated Apparent Chargeability (Msecs.)

10 5 0

'Metal Factor' (M_a / ρ_a X 1,000)

3·0 2·0 1·0 0·0

"Frost electrode" effects

Turam

PH +10° −10° R +10% −10%

0

14N 10N 6N 2N

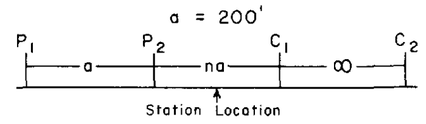
$M_2 > M_1$

GAMMAS 900 700 500

Magnetometer

POLE-DIPOLE ARRAY
(NEWMONT TYPE RECEIVER)

a = 200'



n = 2 ..... X—X

n = 3 ..... ⊙—⊙

n = 4 ..... □—□

Ratio

Phase

Magnetometer

Horizontal Scale: 1" = 200'

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PROVINCE OF ONTARIO

R K Watson

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POWELL TWP, ONTARIO

GEOPHYSICAL PROFILES
LINE – 16 E

Figure 6

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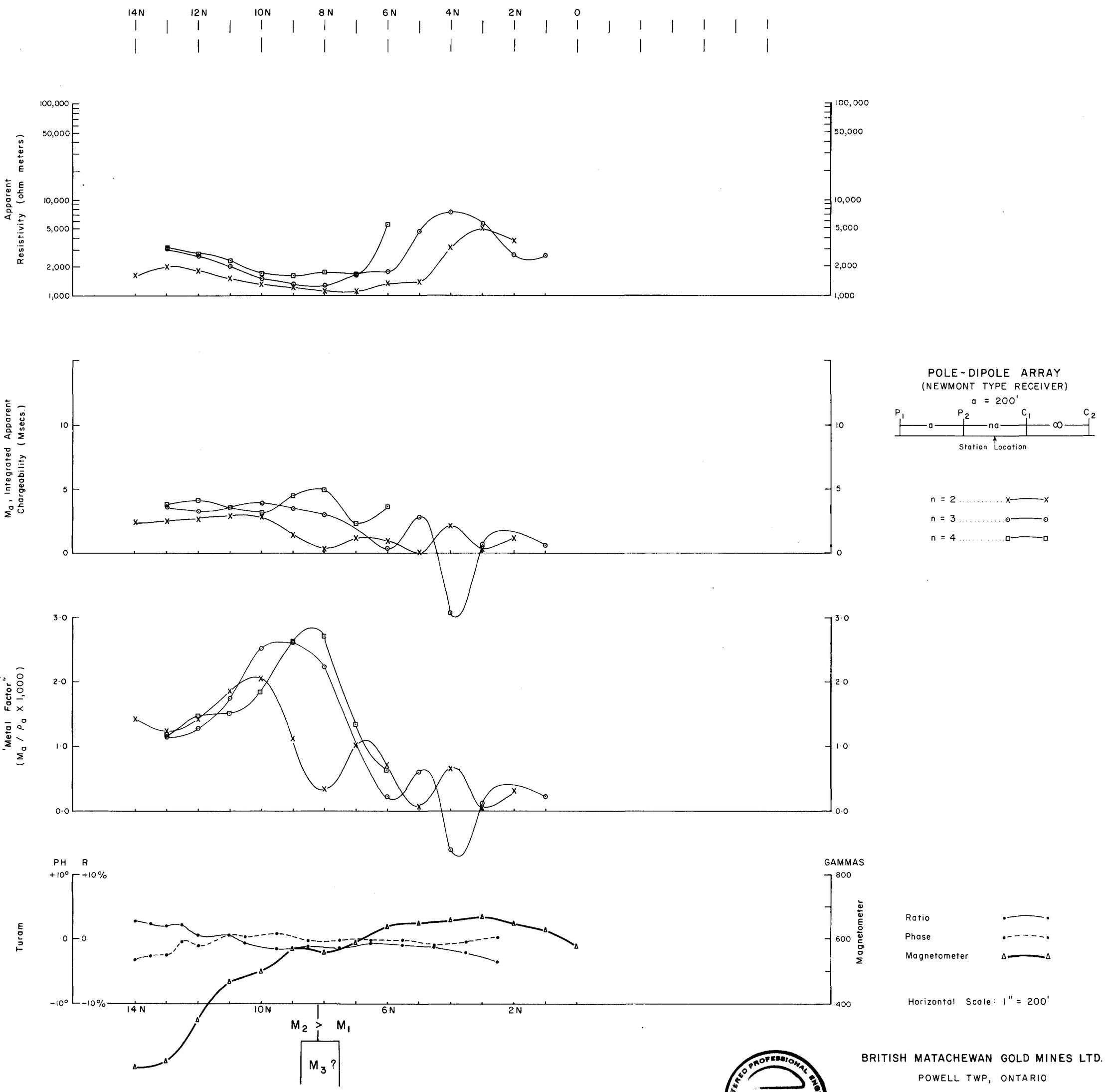

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GEOPHYSICAL PROFILES
LINE – 20 E

Figure 7

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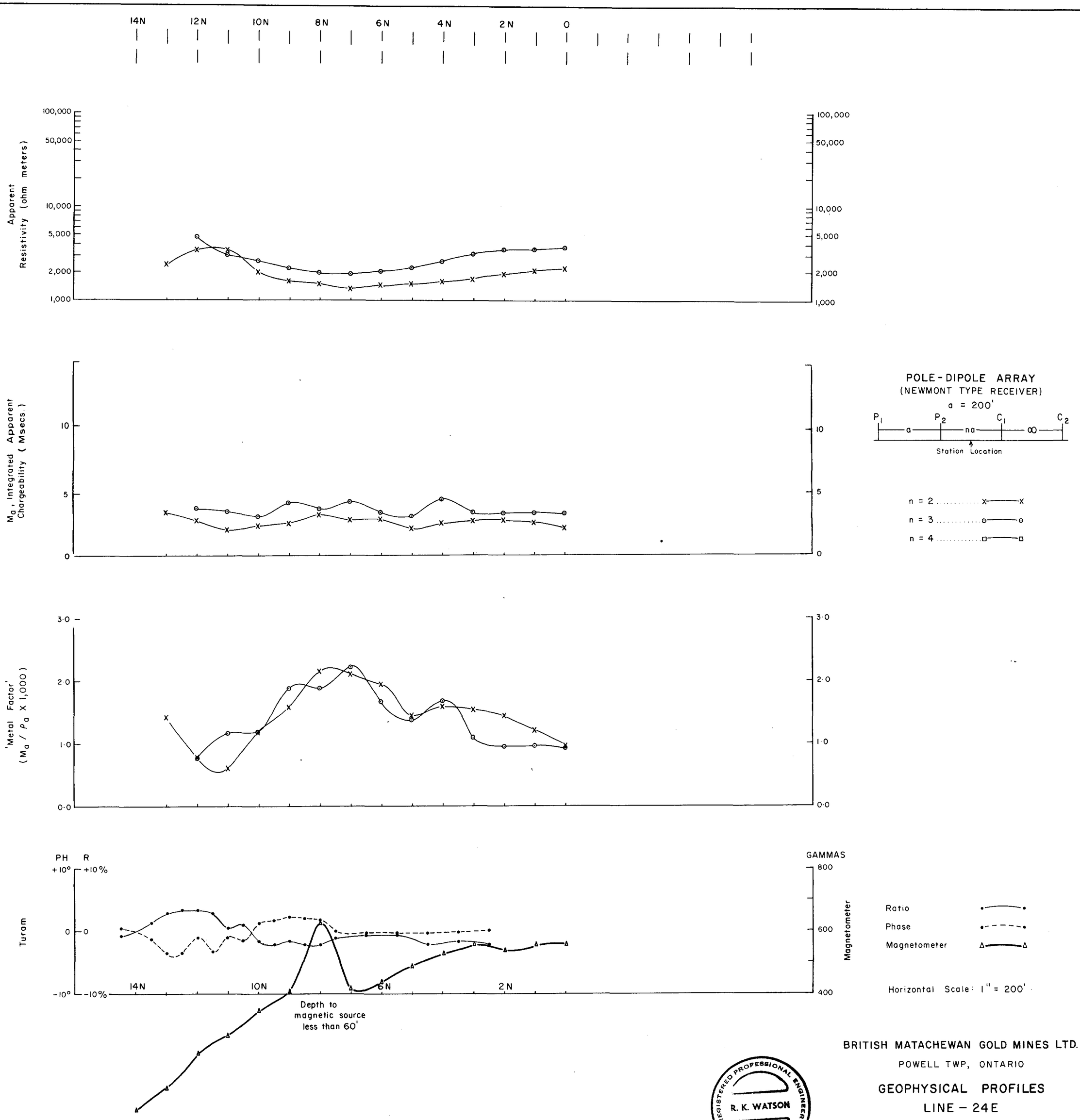

BRITISH MATACHEWAN GOLD MINES LTD.

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GEOPHYSICAL PROFILES
LINE – 24E

Figure 8

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14W 12W 10W 8W 6W 4W 2W 0 2E 4E 6E 8E 10E

Apparent Resistivity (ohm meters)

100,000 50,000 10,000 5,000 2,000 1,000

?

M_a, Intergrated Apparent Chargeability (Msecs.)

10 5 0

'Metal Factor' (M_a / ρ_a X 1,000)

3·0 2·0 1·0 0·0

PH R

+10° +10% 0 0 −10° −10%

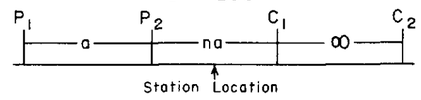
GAMMAS

800 600 400

12W 8W 4W 0 4E 8E

Lake

POLE-DIPOLE ARRAY
(NEWMONT TYPE RECEIVER)
a = 200'



n = 2 ..... x——x

n = 3 ..... ⊙——⊙

n = 4 ..... □——□

Ratio •——•

Phase •- - - -•

Magnetometer Δ——Δ

Horizontal Scale: 1" = 200'

REGISTERED PROFESSIONAL ENGINEER
R. K. WATSON
PROVINCE OF ONTARIO

RK Watson

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POWELL TWP, ONTARIO

GEOPHYSICAL PROFILES
LINE — 7S

Figure 9

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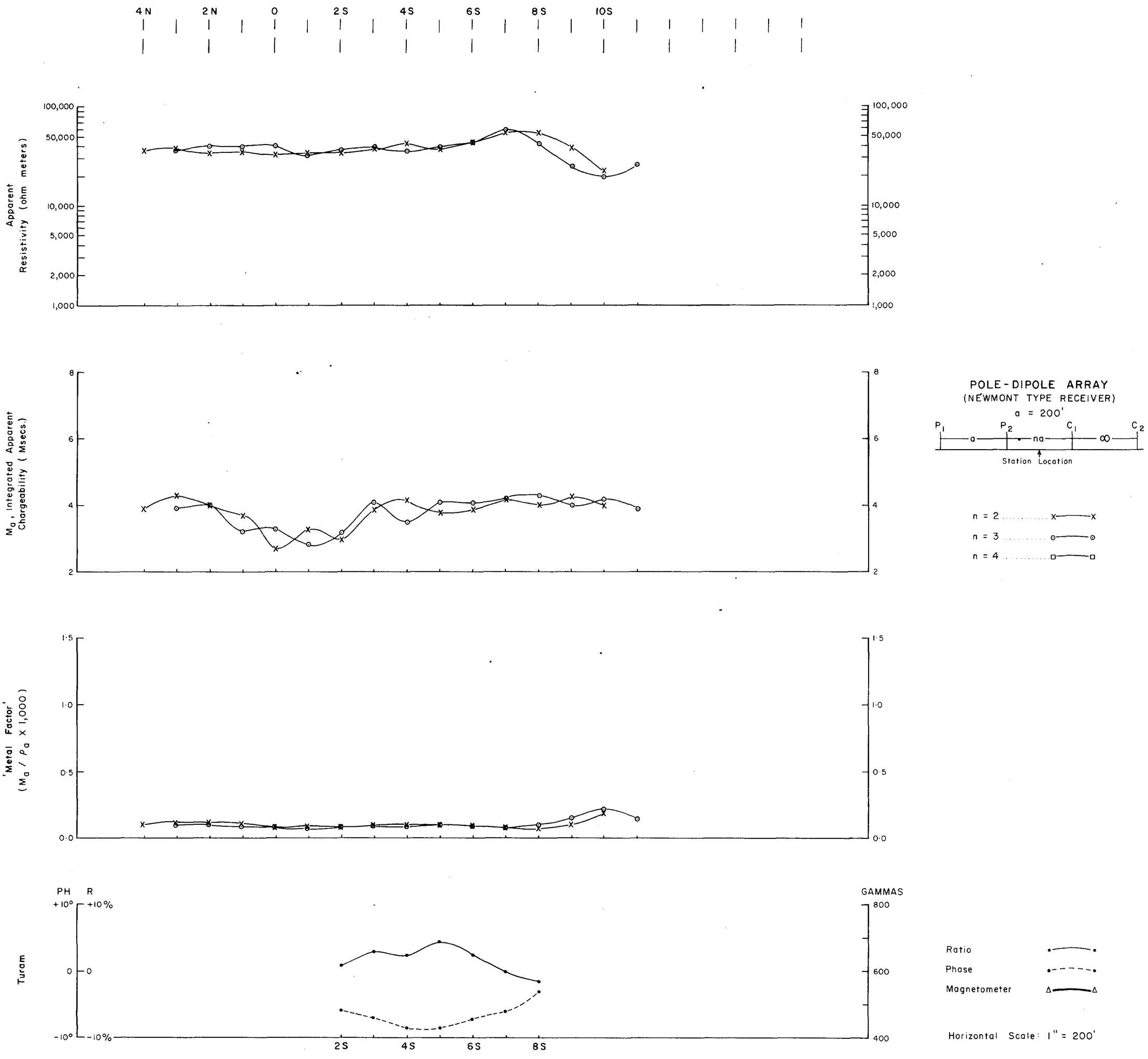

BRITISH MATACHEWAN GOLD MINES LTD.

POWELL TWP, ONTARIO

GEOPHYSICAL PROFILES

LINE — 8W ;

Figure 10

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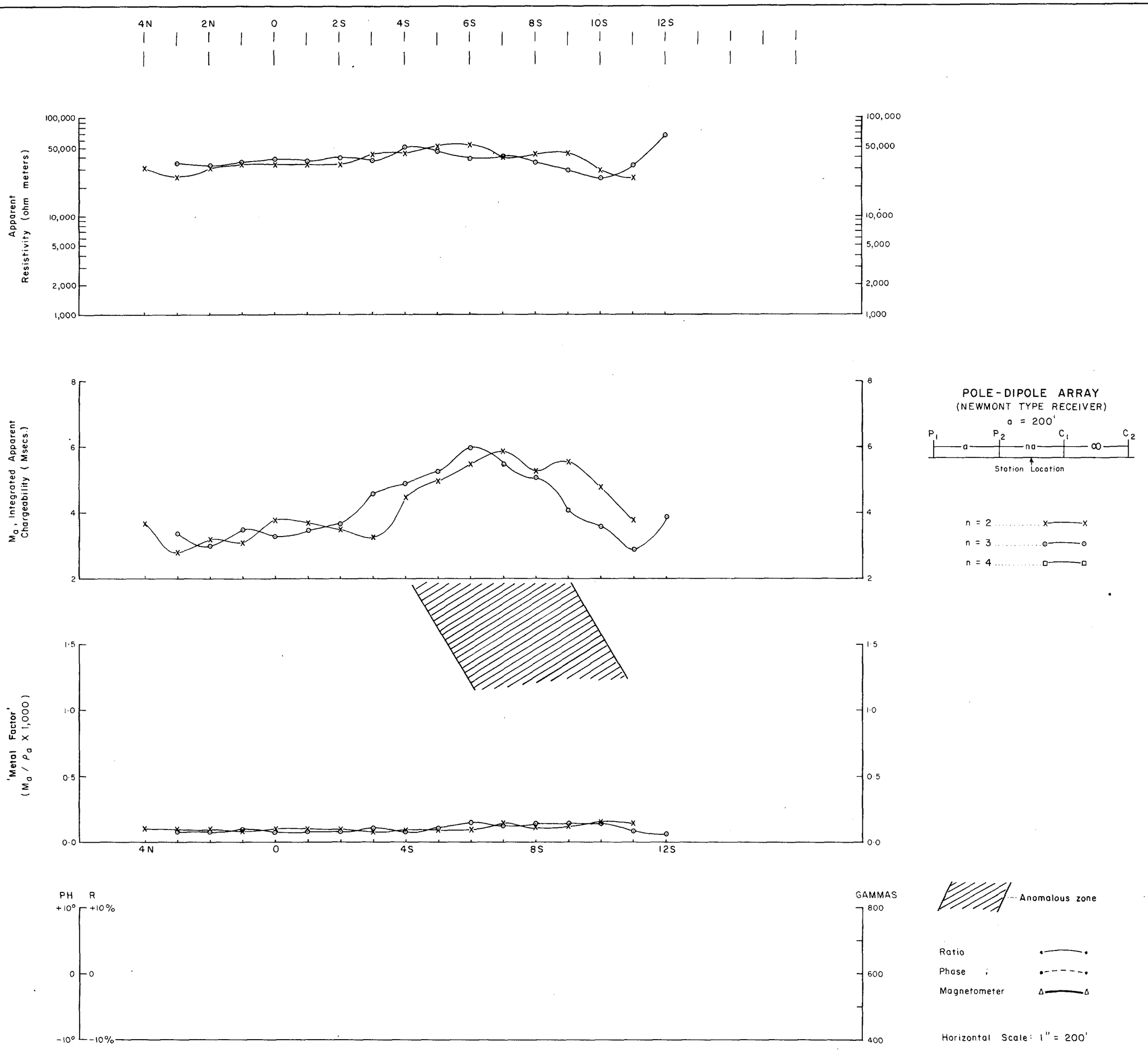

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R K Watson

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POWELL TWP, ONTARIO

GEOPHYSICAL PROFILES

LINE – 12W

Figure 11

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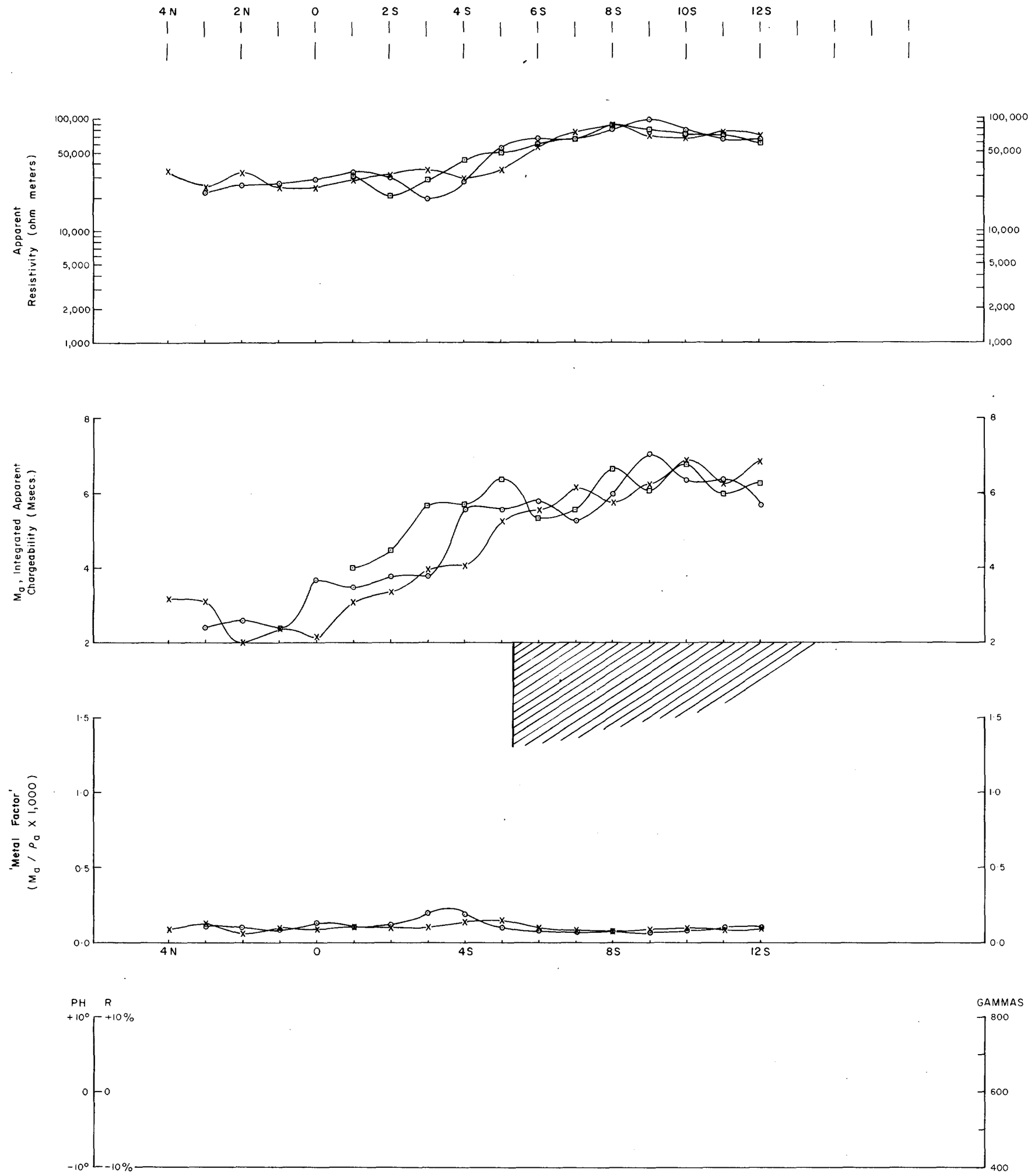
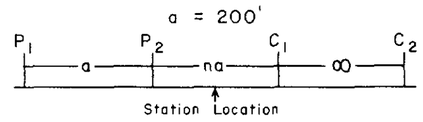


POLE-DIPOLE ARRAY
(NEWMONT TYPE RECEIVER)
a = 200'



n = 2 .....
n = 3 .....
n = 4 .....

Anomalous zone

Ratio
Phase
Magnetometer

Horizontal Scale: 1" = 200'

REGISTERED PROFESSIONAL ENGINEER
R. K. WATSON
PROVINCE OF ONTARIO

BRITISH MATACHEWAN GOLD MINES LTD.
POWELL TWP, ONTARIO

GEOPHYSICAL PROFILES
LINE - 16W

Figure 12

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