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A REPORT ON A MISE-À-LA-MASSE SURVEY over the HOLLINGER COPPER DEPOSIT FRIPP TOWNSHIP, ONTARIO submitted to

McArthur Minerals Inc.

97-N156

February 1998 **2** · 1989 0



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#### 1. INTRODUCTION

At the request of Mr. Hermann Daxl, VAL D'OR SAGAX INC. has performed a mise-à-la-masse survey (surface and borehole) for MCARTHUR MINERALS INC. over the HOLLINGER copper deposit, located 34 km south of Timmins, Ontario. The field work was conducted by Mr. Pierre Sangala and Mr. Sylvain Morel from July 9th to July 18th, 1997. A total of 13 cross-hole mise-à-la-masse and 6 line-kilometres of hole-to-surface mise-à-la-masse were surveyed. The general purpose of the present geophysical work was to study the extension of the known mineralized zone and to establish the electrical relationship between the various sulphide-rich intersections encountered in the diamond drill holes.

After a brief description of the mise-à-la-masse method, we discuss the results obtained and attempt to interpret them in light of the available geoscientific information.

#### 2. THE HOLLINGER PROPERTY

#### 2.1. Location and access

The HOLLINGER property is located in the southeast corner of the Fripp township, west of Bartlett Lake, on claim P51071. The site can be reached by truck via 34 km of gravel road, and 1 km northeastward walking on gridline L100+00N from 400 m south of the bridge over the Splitrock River (figure 1).

#### 2.2. Description

The investigated drill holes are all located on claim P51071, whereas the hole-to-surface survey covered parts of claims P51070, P51071, P51072, P55174, P1175376, P1172112, all held by Moneta, the first four being under Ontario mining lease 10 6856 (figure 2).

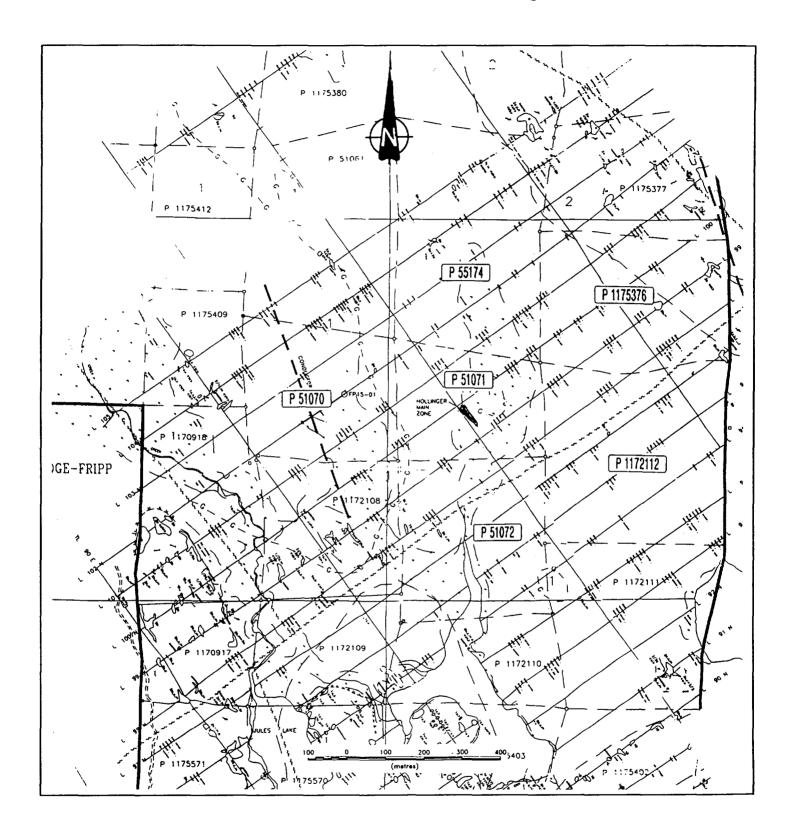
# 2.3. Survey grid

The hole-to surface mise-à-la-masse survey was carried out on a portion of the HOLLINGER property grid. The investigated area consists of eleven lines from L96+00N to L102+00N and between stations 96+00E and 105+00E. Lines are oriented E-W and spaced every 50 metres and were regularly picked and chained every 20 metres.

Figure 1: General location



Figure 2: Index of claims





## 3. TECHNICAL SPECIFICATIONS OF THE SURVEYS

# 3.1. Principles of a mise-à-la-masse survey

The mise-à-la-masse technique allows to verify the continuity of a conductor (semi-massive to massive sulfide zone) between two boreholes or to map its surface projection. When a current is injected in a rock without conductor, the observed potential simply obeys the law of the inverse distance:

$$V_{obs} = \frac{4 \pi \rho_a}{r} \cdot I$$

where r is the distance between the injection point and the observation point,  $\rho_a$  is the apparent resistivity of the ground and I the injected current. The farther the measuring point is from the source, the lower the measured potential will be. The profile of the observed potential will then look like figure 3.

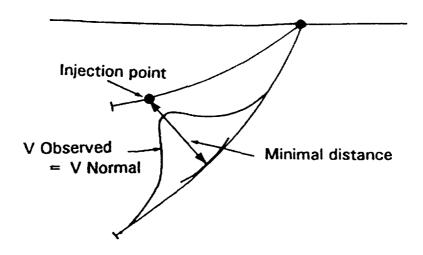


Figure 3: Profile of the potential without conductor

However, if a current is injected in a conductor, the potential does not drop within this conductor (Ohm's law), and the maximum observed potential is at the closest point from the conductor ends (see figure 4). In the observation hole, a higher apparent resistivity will be obtained at the point closest to the *mise-à-la-masse* conductor (because at that point, the potential is greater than the normal and  $\rho_a/r = V_{obs}/4\pi \cdot I$ 

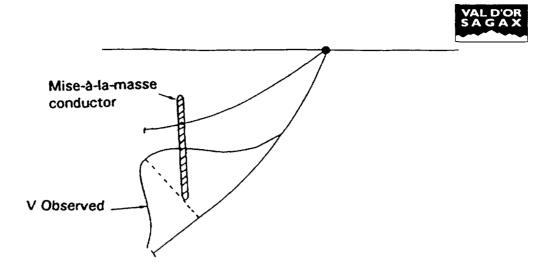


Figure 4: Profile of the potential with a conductor

### 3.2. Equipment and field set up

The equipment used for the surveys consisted of a transmitting device as well as a receiving device. A Phoenix Geophysics Ltd. model IPT-1 transmitter, powered by a motor generator capable of supplying 2 kW of continuous power, was used to provide a stable current. Stainless steel electrodes were used to transmit current. The transmitted current was a bipolar on-off (50 % duty cycle) square wave. The primary voltage  $V_p$  was measured using an IP-2 receiver, from Iris Instrument.

The cross-hole mise-à-la-masse survey was carried out by injecting the current into holes MAC-10 or MAC-11 and measuring the potential into holes MAC-2, MAC-4, MAC-15 and holes from MAC-6 to MAC-12. The injection hole MAC-10 was located at {99+54N, 99+92E}. The injection point was fixed at a depth of 26.6 m in the hole. The injection hole MAC-11 was situated at {99+54N, 99+91.3E} and current was injected at a depth of 56.7 m. The potential was measured every 0.5, 1.0, 2.0 or 4 metres at the request of the client. Figure 5 schematizes the cross-hole mise-à-la-masse set up.

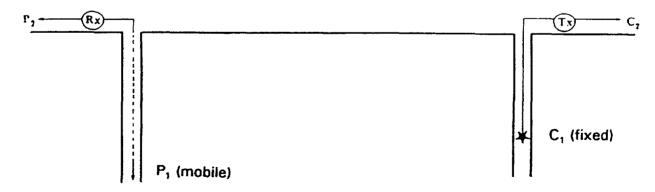


Figure 5: Borehole mise à-la-masse set up



For the hole-to surface mise-à-la-masse survey, hole MAC-10 was used for current injection. The injection point is determined by getting down the  $C_1$  current electrode in the centre of the mineralized zone, then by searching the maximum of injected current in its vicinity. The  $C_2$  reference current electrode was placed at  $\{100+00N, 93+00E\}$ . The potential is measured with a moving  $P_1$  electrode at stations spaced 5 or 10 metres along the survey lines. The reference potential electrode  $P_2$  was situated at  $\{105+95N, 100+00E\}$ .

#### 4. RESULTS AND INTERPRETATION

# 4.1. Results presentation

The hole-to surface mise-à-la-masse results are presented in the form of a contour map of normalized potential (97-N156-4.3) at a scale of 1:2000. Results for cross-hole mise-à-la-masse are presented in the form of profiles of normalized potential  $(V_p/I)$ , apparent resistivity and apparent chargeability at a scale of 1:500.

#### 4.2. Hole-to surface mise-à-la-masse

The normalized potential (see map 97-N156-4.3) gives an anomaly with potential maximum on line 99+50N. The observed anomaly is almost concentric around the current injection point. However, the anomaly shows some distorsion eastward. The highest potential value is obtained at line 99+50N and station 100+10E around the surface projection of the injection point location {99+54N, 99+92E}. The anomaly seems to have a N-S strike direction with an extension of about 100 m. The shape of the normalized potential isocontours reveals a possible dip of the anomaly to the east.

#### 4.3. Borehole mise-à-la-masse

It follows from the cross-hole results (profiles), that the measured potential reaches a maximum at different depths for each borehole. Table 1 and table 2 show these maximums when current was injected into MAC-10 and MAC-11 respectively.

DDH number Maximum potential value [mV/A] Depth [m] Geologic structure code

MAC-2 7018.3 58 PRmP

MAC-4 7706.7 78 PRMC

Table 1: Depth and measured potential maximum



DDH number	Maximum potential value [mV/A]	Depth [m]	Geologic structure code
MAC-6	9176.3	116	PRZ
MAC-7	10656.6	39	S
MAC-8	10715.7	50	S
MAC-9	10334.3	56	IFmP
MAC-11	10908.7	34	GB
MAC-12	10644.3	32	BSq-BSsc
MAC-15	10497.4	43	PCStrpb
Injection bor	ehole: MAC-10	26.6	S-BSPP

Table 2: Depth and measured potential maximum

DDH number	Maximum potential value [mV/A]	Depth [m]	Geologic structure legend
MAC-7	7307	39	S
MAC-8	7497	48	S
MAC-9	7317.7	56	IFmP
MAC-15	11055.9	38	Sbs
Injection bor	ehole: MAC-11	56.7	S

It is interesting to note that the depths corresponding to potential maximum for boreholes MAC-7, MAC-8, MAC-9 and MAC-15 are in enough good correlation for both injection holes MAC-10 and MAC-11. The measured potentials, considering all the boreholes, reach a maximum at depths varying between 6 and 90 metres for the two current injection points in borehole MAC-10 and MAC-11. Figures 6, 7, 8, 9 and 10 (in appendix) show that the potential maximum in each borehole, except borehole MAC-2, is not at the nearest point with respect to the current injection location. Therefore, the mineralized zone intersected by



borehole MAC-10 at depth of 26.6 metres has lateral extension and the maximum potential points (except MAC-2) are located on or at the apex of this zone. In the case of injection borehole MAC-11 at depth of 56.7 metres, the mineralized zone has no extension because of the following reason:

• We note a false mise-a-la-masse in the neighbour mineralized zone due to the same localisation maximum (example: MAC-8), but V/I is smaller even if the distance between holes 8 and 11 is shorter than distance between holes 8 and 10.

Apparent resistivity profiles should have given approximately the same form as normalized potential profiles. But the insufficient quantity of the acid tests along the boreholes makes the calculated resistivity values not enough accurate to be taken into consideration for the interpretation.

The apparent chargeability profiles show, in general, values varying between 1 and 7 mV/V when the current is injected into borehole MAC-10. But some moderate values (10-16 mV/V) can be observed on profile MAC-2. Considering the injection hole MAC-11, the profiles present apparent chargeability values varying between 6 and 11 mV/V.

#### 5. CONCLUSION AND RECOMMENDATIONS

The normalized potential map, obtained from hole-to surface mise-à-la-masse survey. permits to determine the extension, the strike and dip direction of the mineralized zone. It follows from the cross-hole mise-à-la-masse survey that the mineralized zone intercepted by borehole MAC-10 is electrically in relation with the sulphide-rich intersections encountered in the other drill holes (except hole MAC-2) and has therefore a good lateral extension. However, it is not the case for borehole MAC-11.

A hole-to surface mise-à-la-masse survey is recommended on the north side of line 10200N. In fact, it appears (according to the potential map) that there is a conductor in this area.

Respectfully submitted,

VAL D'OR SAGAX INC.

Pierre Sangala

Geophysicist

PS/ag

SW				NE
ELEV 0	9900 E	10000 E	10100 E	ELEV 0
		MAC-10	-7	
		MAC-8		
-100m				-100m
			FIGURE 6	
				given hole with respect to the
-200m			• Maximum normalized po	otential location —200m
			MONETA PORO MCARTHUR M	CUPINE MINES/ MINERALS J.V.
			HOLLINGER	PROPERTY COPPER ZONE
			SCALE 1:1000 SE	CTION 9,930

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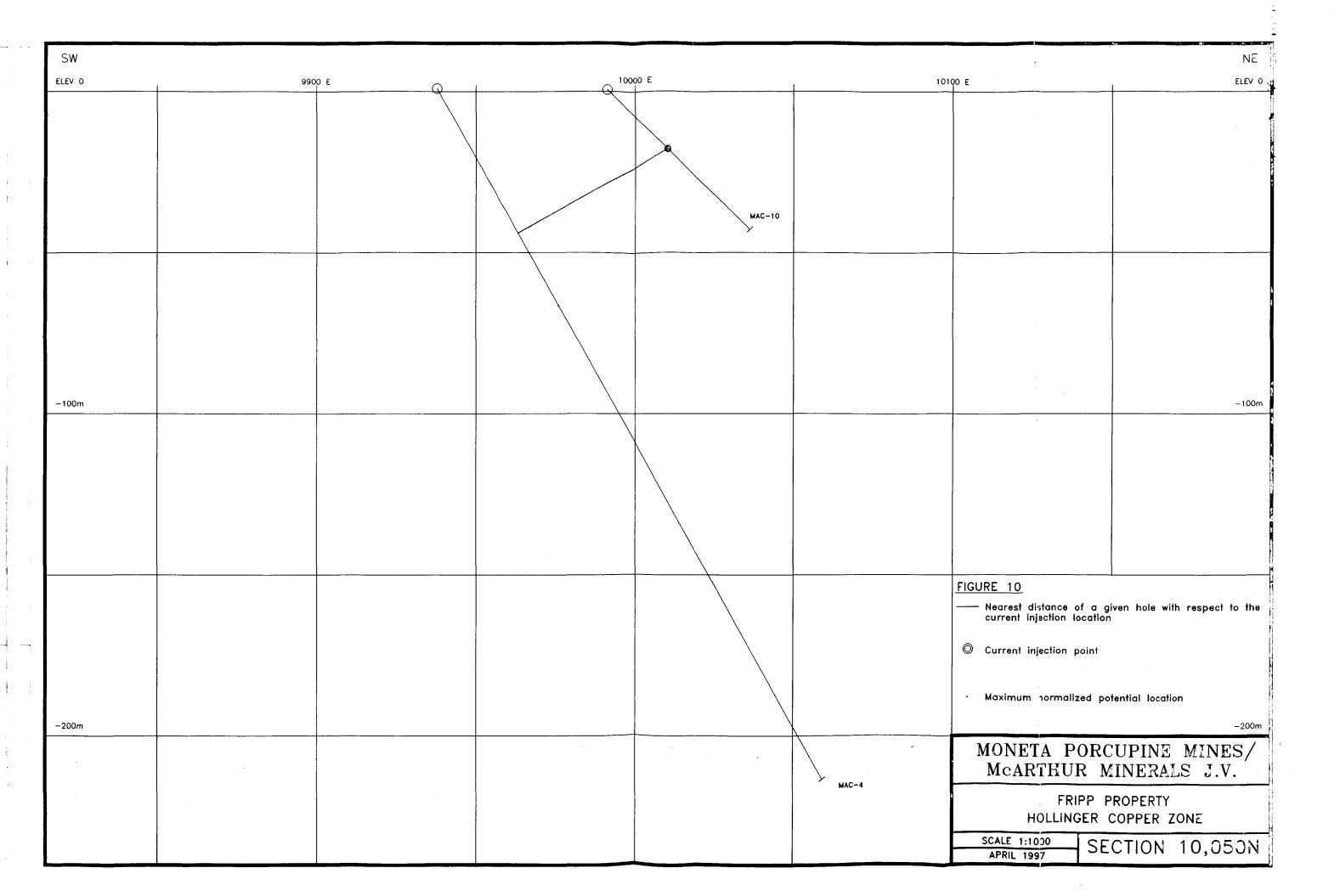
SW							NE
ELEV O	9900	E	100	00 E	101	100 E	ELEV 0
				MAC-10	0		
– 100m				MAC-11			-100m
	·			MAC-12			
−200m						FIGURE 7  Nearest distance of a current injection location  © Current injection point  Maximum normalized p	given hole with respect to the n otential location —200m
20011		·			MAC-2	FRIPP HOLLINGER	CUPINE MINES/ MINERALS J.V.  PROPERTY COPPER ZONE  ECTION 9,950N

SW				NE
ELEV 0	9900 E	10000 E	10100 E	ELEV 0
		MAC-10		
- 1		MAC-15		
–100m				-100m
			FIGURE 8	
-200m			FRIPP F HOLLINGER (	CUPINE MINES/ MINERALS J.V.  PROPERTY COPPER ZONE  CTION 9,980N

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-100m	NE
-100m	ELEV 0
-105m	
-100m	
мас-б	
MAC-6	
MAC-6	
MAC-6	
MAC-6	
	-100m
FIGURE 9	
Nearest distance of a given hole with respe	ct to the
© Current injection point	
· Maximum normalized potential location	
-200m	-200m
MONETA PORCUPINE MIN MCARTHUR MINERALS J	IES/ .V.
FRIPP PROPERTY	
HOLLINGER COPPER ZONE  SCALE 1:10:00 SECTION 10,0  APRIL 1997 SECTION 10,0	NOO

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Profiles of	normalized	ł potential,	apparent r	esistivity a	nd chargea	bility

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# **Declaration of Assessment Work Performed on Mining Land**

Mining Act, Subsection 65(2) and 66(3), R.S.O. 1990

Transaction Number (office use) W9960.00446

bsections 65(2) and 66(3) of the Mining Act. Under section 8 of the Mining Act, this sent work and correspond with the mining land holder. Questions about this collection ment and Mines, 3rd Floor, 933 Ramsey Lake Road, Sudbury, Ontario, P3E 6B5.

PORCUPINE MINING DIVISION



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Instructions: - For work performed on Crown Lands before recording a claim, use form 0240.
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ethe work was done  are of Recorded Horder or Agent A  matructions for cutting to  continue the credits claimed in rize the deletion of credits;  1. Credits are  2. Credits are  3. Credits are  4. Credits are	nent Work Regulation Writing back credits that a this declaration material be cut back from to be cut back stant to be cut back equiple to be cut back as pure t	Date	ase check (*) in the lowed by option 2 is listed last, working that the declaration of the lowed appendix of t	the above work credits claims or for applications or for applications or 3 or 4 as indicated ag backwards; or aration; or or as follows (described as follows).  Date Notifications of the Bank first contract (Sanyaue).	ow how you wish

Received Stamp

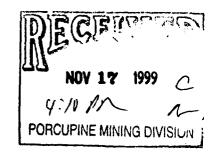
Deemed Approved Date

Date Notification Sent

Date Approved

Total Value of Credit Approved

Approved for Recording by Mining Recorder (Signature)





Ministry of Northern Development and Mines

PORCUPINE MINING DIVISION

# Statement of Costs for Assessment Credit

Transaction Number (office u	ise)_
W9960.004	15

Personal information collected on this form is obtained under the authority of subsection 6 (1) of the Assessment Work Regulation 6/96. Under section 8 of the Mining Act, this information is a public record. This information will be used to review the assessment work and correspond with the mining land holder. Questions about this collection should be directed to a Provincial Mining Recorder, Ministry of Northern Development and Mines, 3rd Floor, 933 Ramsey Lake Road, Sudbury, Ontario, P3E

6B5.			n	1 Q S	9.0
Work Type	hours/days worl	Units of work ne type of work, list the number of ked, metres of drilling, kilometres of r of samples, etc.	of S	Cost Per Unit of work	Total Cost
Down Hole Inchicol	9/10/0	<i>. 5</i>	602	2523 00/10	10 22,800
Polannofun Surveyor			0		
(Report Included		· · · · · · · · · · · · · · · · · · ·			
Surrey Cular horis	7km			300/km	210000
Couloques / Superis ses	12 diy	5	_8	223 /J-1 Y	2700.00
					as
Associated Costs (e.g. supp	lies, mobilizatio	on and demobilization).			
Trans	portation Costs				
Truck 12 Jaxs	Q \$50.0	10/dry		50 00//1	1 60000
Food ar	nd Lodging Cos	ts			
No. 1. 1970		RECEIVED	1		
		NOV 1.9 1993 Tot	al Value	of Assessment Wo	ork 8 28,200
Calculations of Filing Discounts:		GEOSCIENCE ASSESSMENT OFFICE			031
<ol> <li>Work filed within two years of pe</li> <li>If work is filed after two years an Value of Assessment Work. If th</li> </ol>	d up to five year	s after performance, it can	only be o calculatio	claimed at 50% of the	
TOTAL VALUE OF ASSESSMENT	WORK	28,200 x 0.5			of worked claimed.
Note: - Work older than 5 years is not el - A recorded holder may be requir request for verification and/or co Minister may reject all or part of	ed to verify experiently rection/clarificat	ion. If verification and/or o			
	1/- F. 10 /	y by certify, that the amounts	s shown a	ire as accurate as n	nay reasonably
(please print full name) be determined and the costs were in	ncurred while cor	ndycting assessment work	on the la	nds indicated on the	accompanying
Declaration of Work form as	rded holder, agent, or st	ale company position with signing aut		m authorized to ma	ke this certification.
0212 (03497)	VEM	Signature	M		Nov. Mgs
CO NOV 19	1999	1/			

Ministry of Northern Development and Mines Ministère du Développement du Nord et des Mines

April 5, 2000

JOHN KEVIN FILO 535 BAETLEMAN STREET TIMMINS, Ontario P4N-4X2

Dear Sir or Madam:



Geoscience Assessment Office 933 Ramsey Lake Road 6th Floor Sudbury, Ontario P3E 6B5

Telephone: (888) 415-9845 Fax: (877) 670-1555

Visit our website at: www.gov.on.ca/MNDM/MINES/LANDS/mismnpge.htm

Submission Number: 2.19890

Status

Subject: Transaction Number(s): W9960.00445 Approval After Notice

We have reviewed your Assessment Work submission with the above noted Transaction Number(s). The attached summary page(s) indicate the results of the review. WE RECOMMEND YOU READ THIS SUMMARY FOR THE DETAILS PERTAINING TO YOUR ASSESSMENT WORK.

If the status for a transaction is a 45 Day Notice, the summary will outline the reasons for the notice, and any steps you can take to remedy deficiencies. The 90-day deemed approval provision, subsection 6(7) of the Assessment Work Regulation, will no longer be in effect for assessment work which has received a 45 Day Notice. Allowable changes to your credit distribution can be made by contacting the Geoscience Assessment Office within this 45 Day period, otherwise assessment credit will be cut back and distributed as outlined in Section #6 of the Declaration of Assessment work form.

Please note any revisions must be submitted in DUPLICATE to the Geoscience Assessment Office, by the response date on the summary.

If you have any questions regarding this correspondence, please contact BRUCE GATES by e-mail at bruce.gates@ndm.gov.on.ca or by telephone at (705) 670-5856.

Yours sincerely,

ORIGINAL SIGNED BY

Blair Kite

Supervisor, Geoscience Assessment Office

Mining Lands Section

# **Work Report Assessment Results**

Submission Number:

2.19890

Date Correspondence Sent: April 05, 2000

Assessor: BRUCE GATES

**Transaction** 

First Claim

Number Township(s) / Area(s)

Status

Approval Date

W9960.00445

G.6000204

FRIPP

Approval After Notice

March 30, 2000

Section:

Number

14 Geophysical IP

The revisions outlined in the Notice dated February 14, 2000 have been corrected.

The correspondence from J. K. Filo received March 24, 2000 contained errors in calculating the 50% reduction for work more than 2 years old. The TOTAL VALUE of assessment credit that will be allowed, based on the information provided in this submission, is \$14,061.00.

Assessment work credit has been redistributed, as outlined on the attached Distribution of Assessment Work Credit sheet, to better reflect the location of the work. Assessment credit has been applied as per the Amended distribution of March 31, 2000. The excess credit of \$461 has been placed in reserve on P51071.

Linecutting - \$2,247 x 50% = \$1,123.50 (\$1,061 in letter)

Geophysics -  $$22,800 \times 50\% = $11,400 ($14,400 in letter)$ 

Supervision - \$2,475 x 50% = \$1,237.50 (\$1,237.50 in letter)

Truck -  $$600 \times 50 \% = $300$ 

Total = \$14,061

Correspondence to:

Resident Geologist South Porcupine, ON

Assessment Files Library

Sudbury, ON

Recorded Holder(s) and/or Agent(s):

JOHN KEVIN FILO TIMMINS, Ontario

DAVID V. JONES

SOUTH PORCUPINE, Ontario

MONETA PORCUPINE MINES INC.

TIMMINS, Ontario

# **Distribution of Assessment Work Credit**

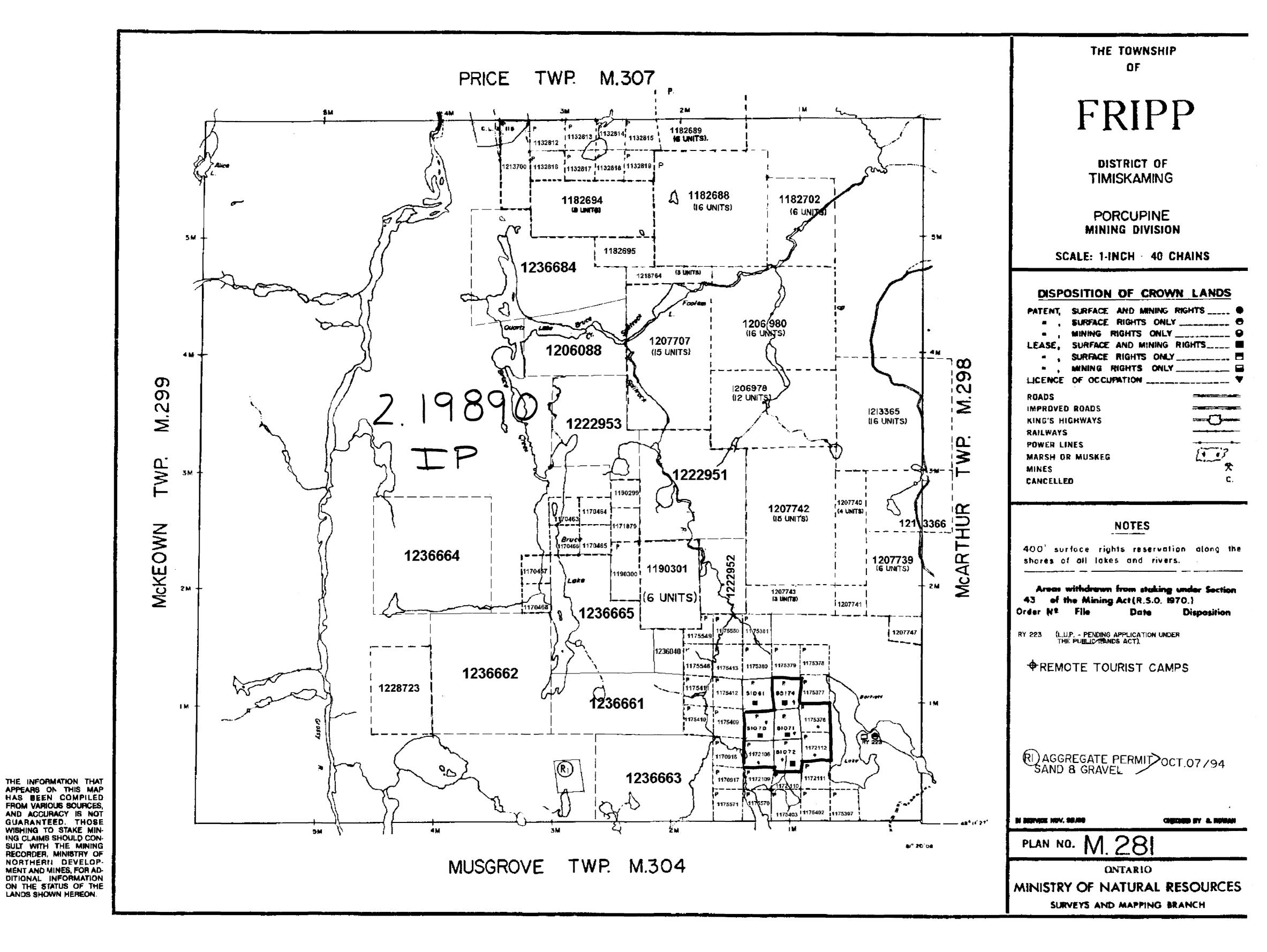
The following credit distribution reflects the value of assessment work performed on the mining land(s).

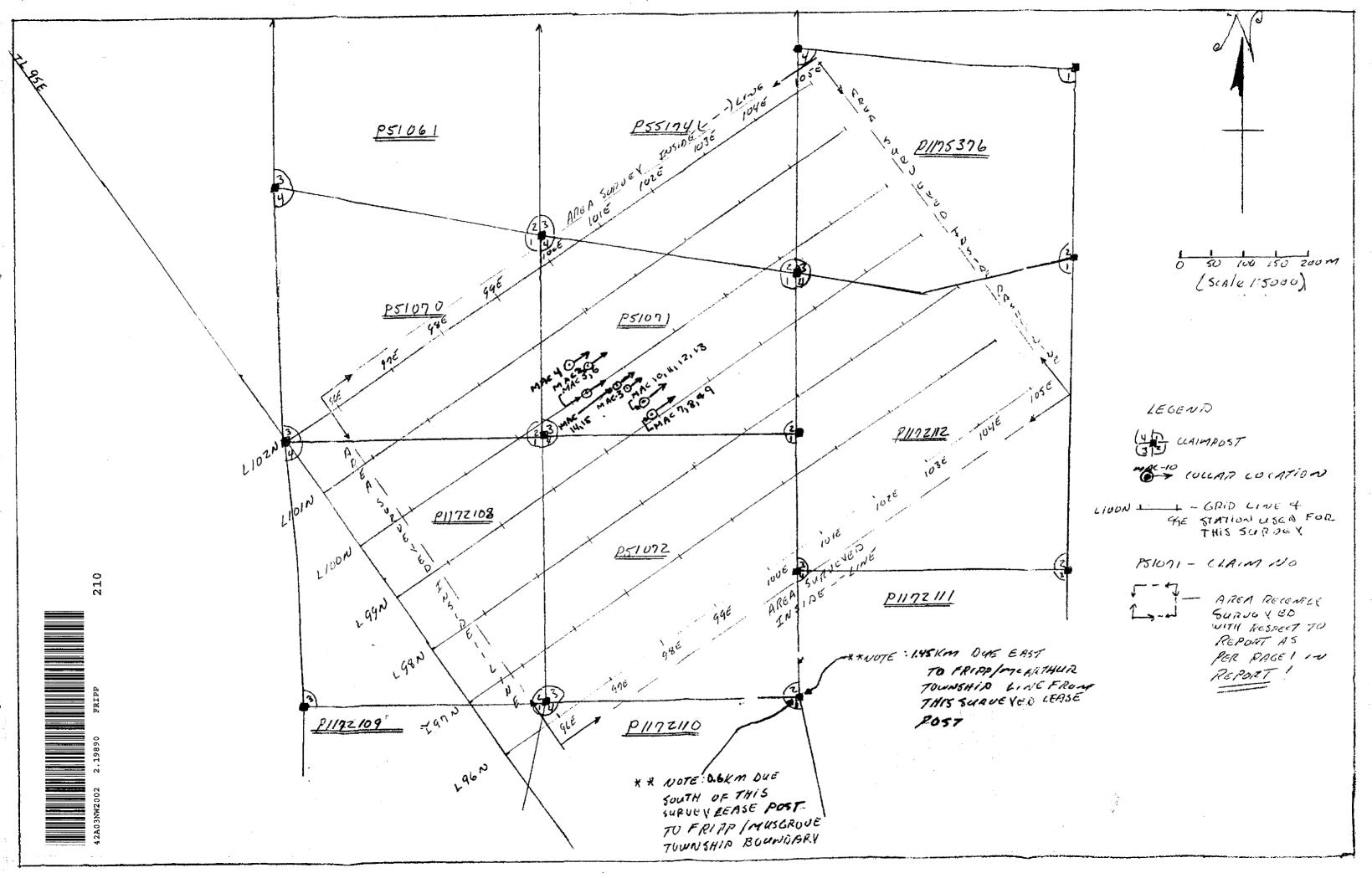
Date: April 05, 2000

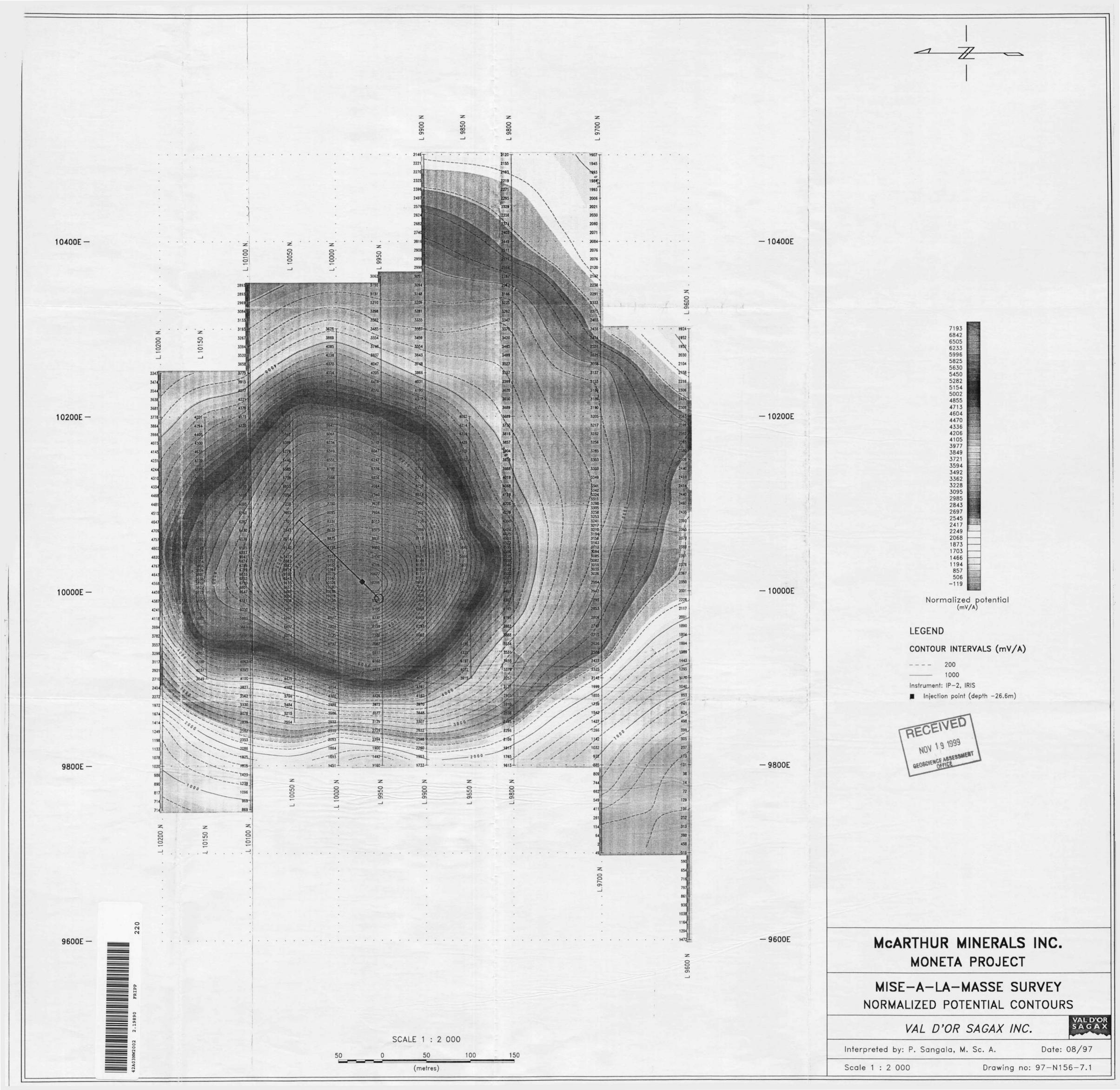
Submission Number: 2.19890

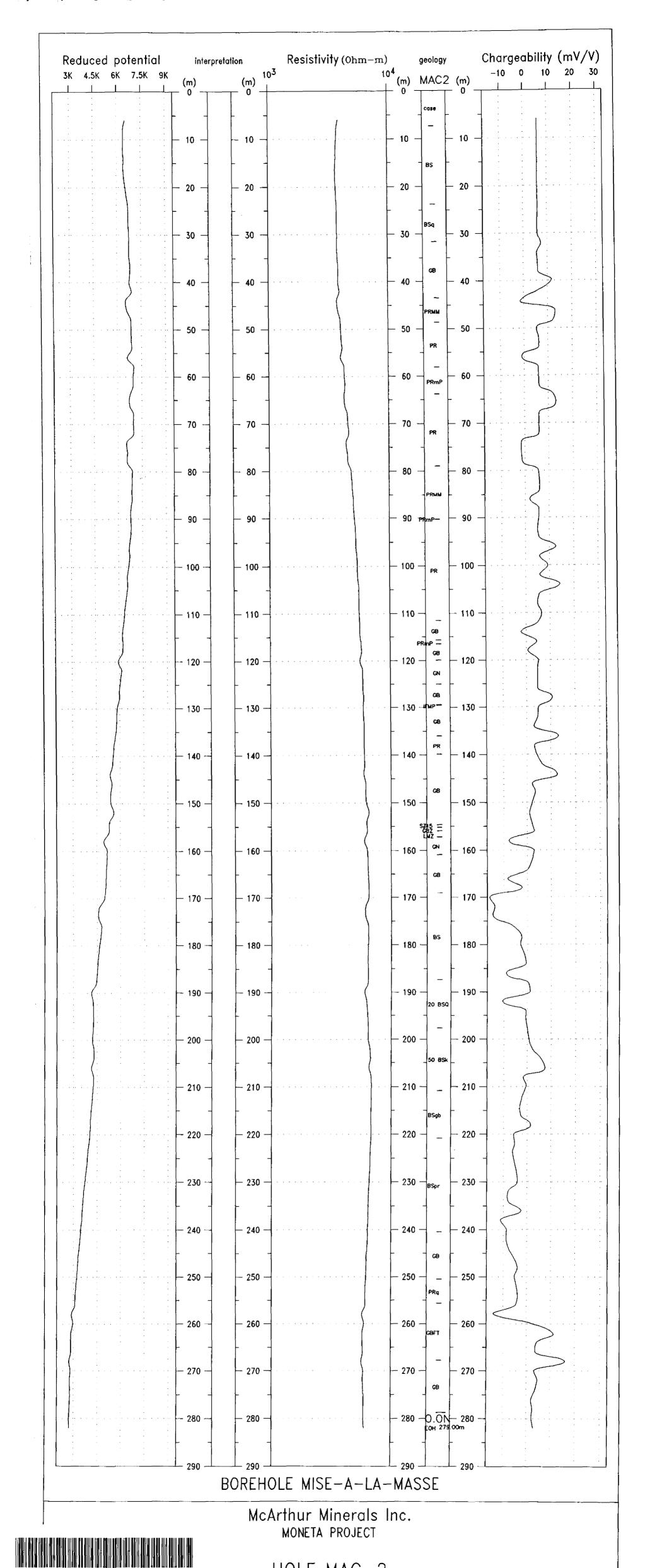
Transaction Number: W9960.00445

Claim Number	<u>Value</u>	Of Work Performed	
1175376		445.00	
51070		635.00	
51071		8,845.00	
55174		635.00	
51072		1,590.00	
1172112		1,275.00	
1172108		636.00	
	Total: \$	14,061.00	





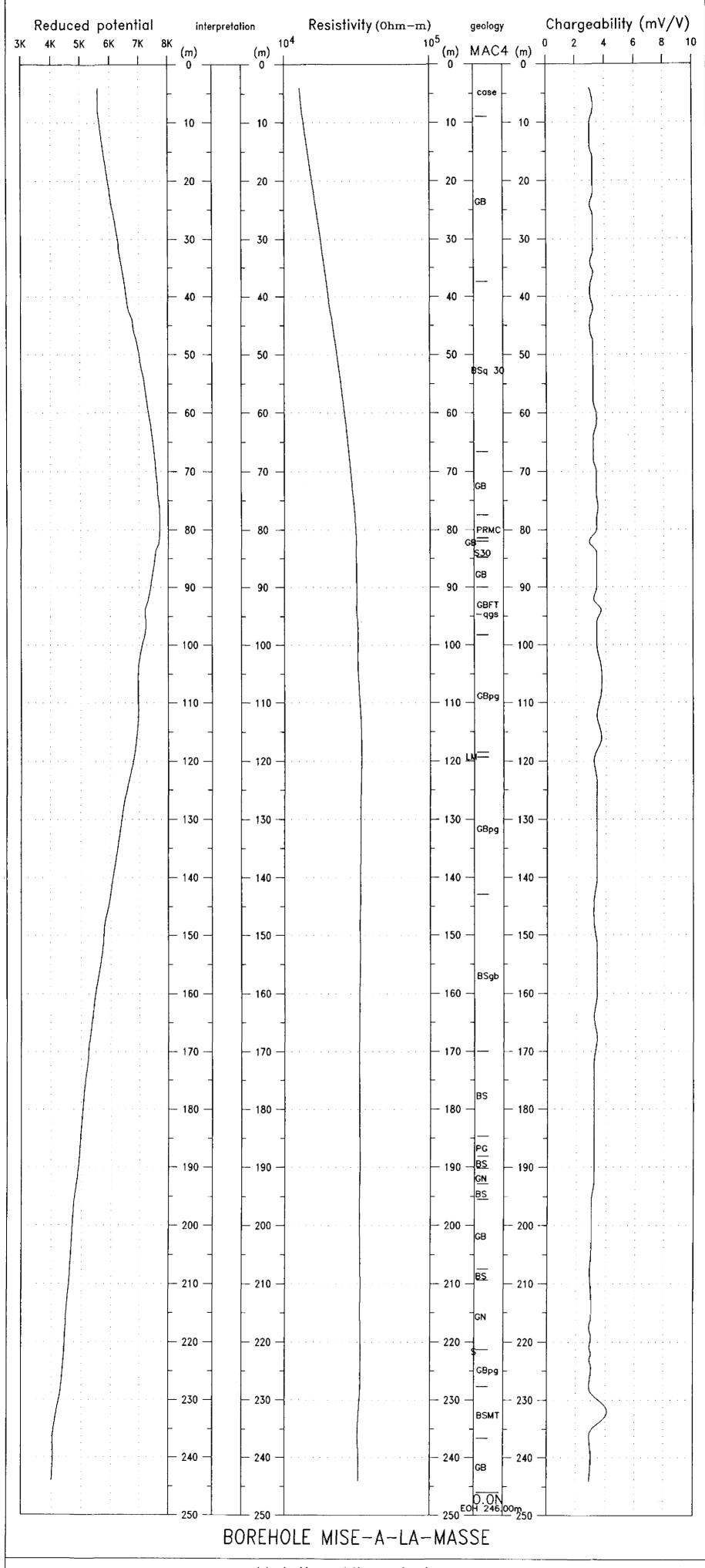




Interpreted by Pierre Sangala Date: July 1997 Surveyed by Pierre Sangala Map no HOLE MAC-2

230

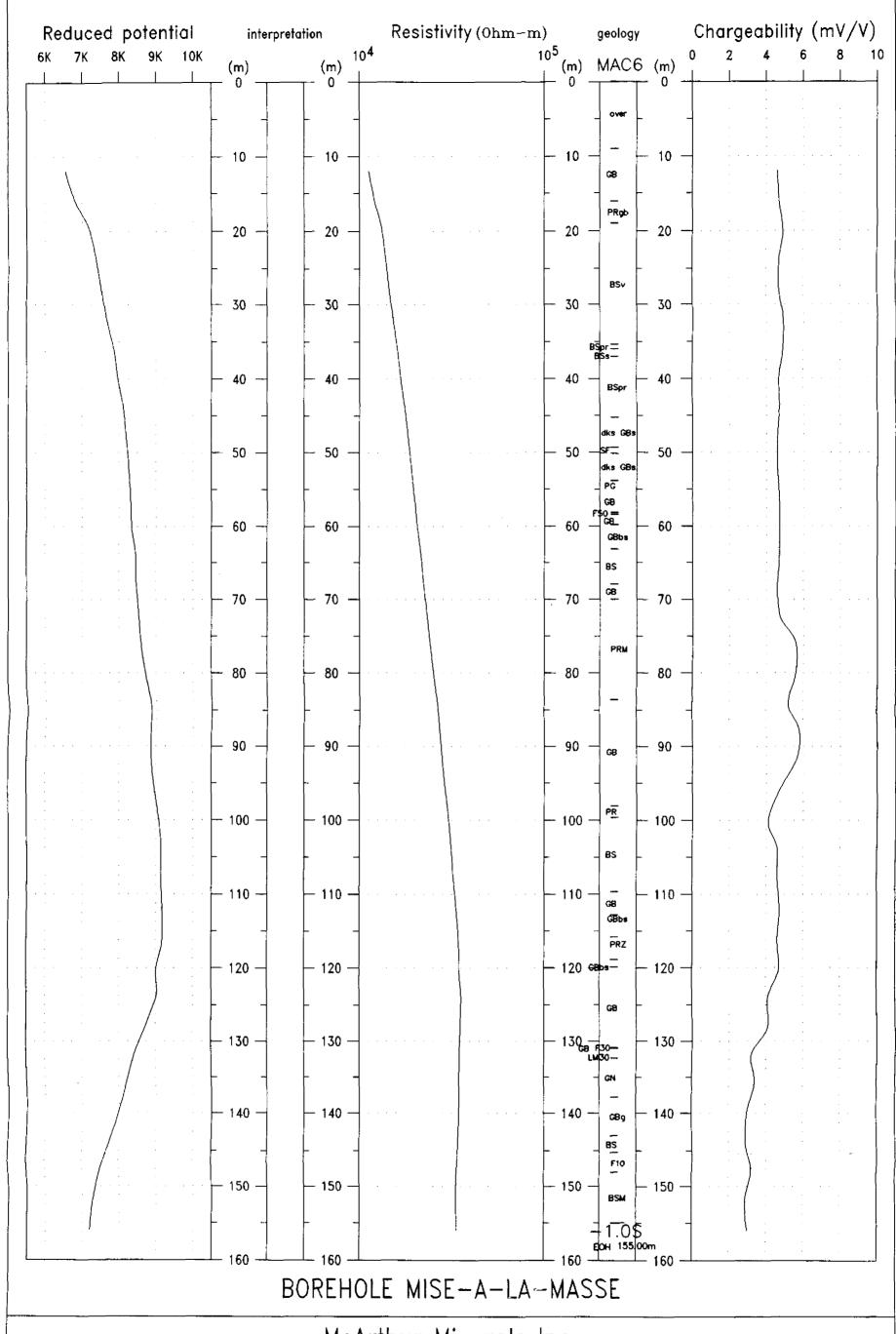
Current electrode in hole MAC-10 Electrode position: -27 m





HOLE MAC-4

Interpreted by Pierre Sangala Date: July 1997 Surveyed by Pierre Sangala Map no Current electrode in hole MAC-10 Electrode position: -27 m

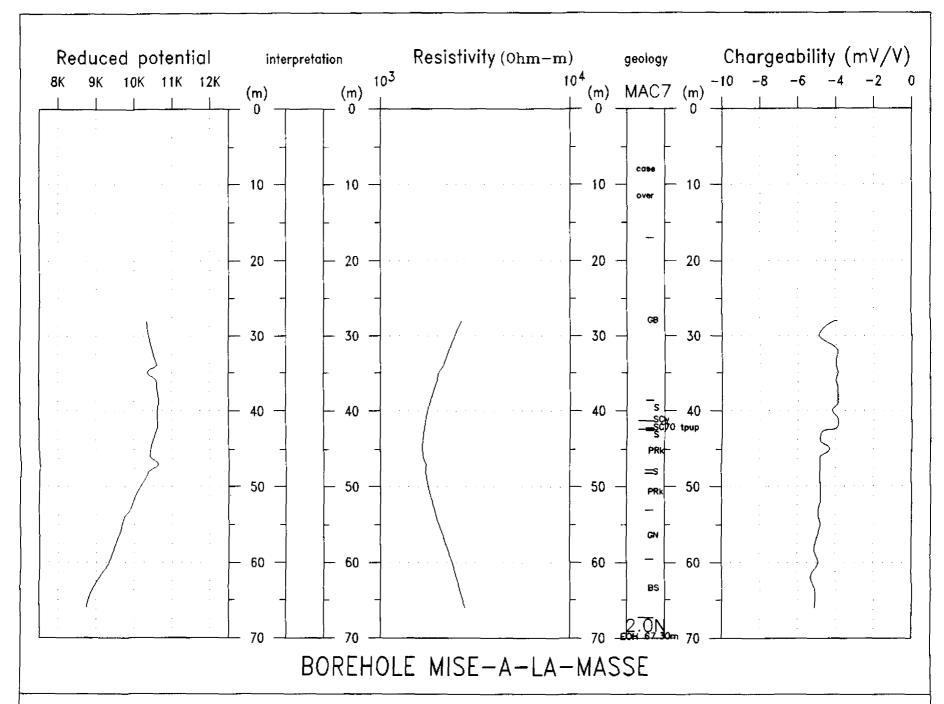


250

HOLE MAC-6

Interpreted by Pierre Sangala Date: July 1997 Surveyed by Pierre Sangala Map no

Current electrode in hole MAC-10 Electrode position: -27 m



HOLE MAC-7

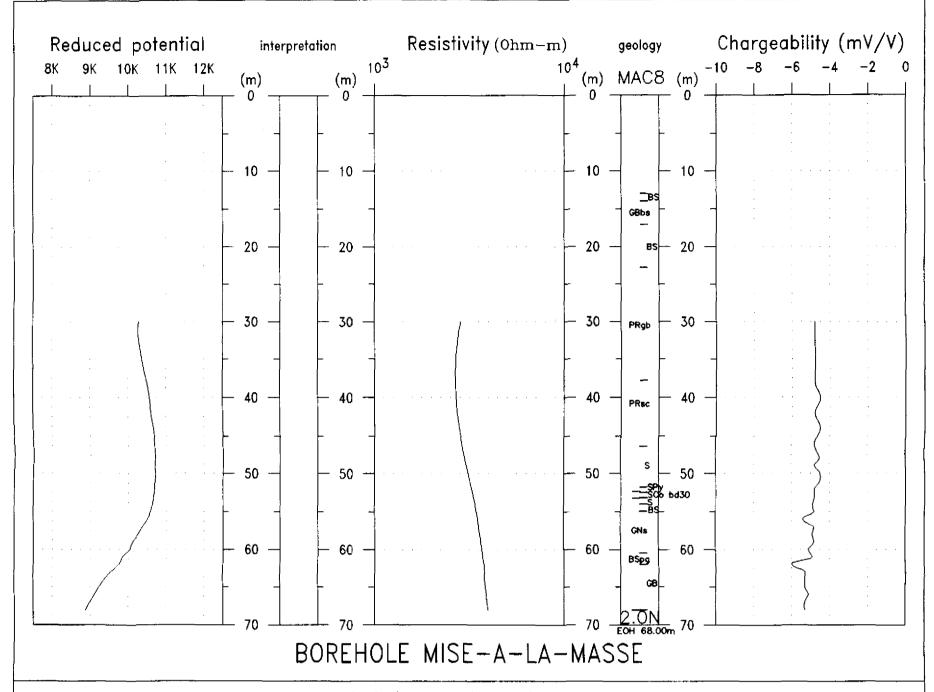
Interpreted by Pierre Sangala Date: July 1997 Surveyed by Pierre Sangala Map no

Current electrode in hole MAC-10 Electrode position: -27 m



42A03NW2002 2.1

FRIPE



HOLE MAC-8

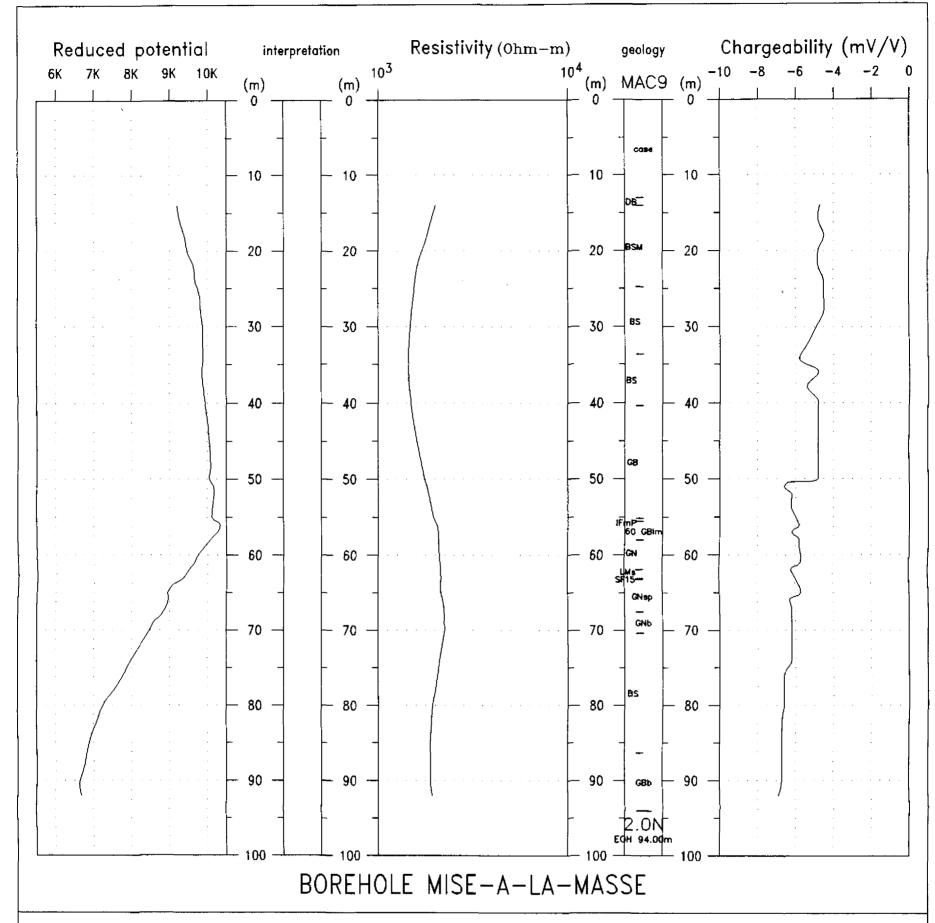
interpreted by Pierre Sangala Date: July 1997 Surveyed by Pierre Sangala Map no

Current electrode in hole MAC-10 Electrode position: -27 m



42A03NW2002 2.19890

FRIPE



HOLE MAC-9

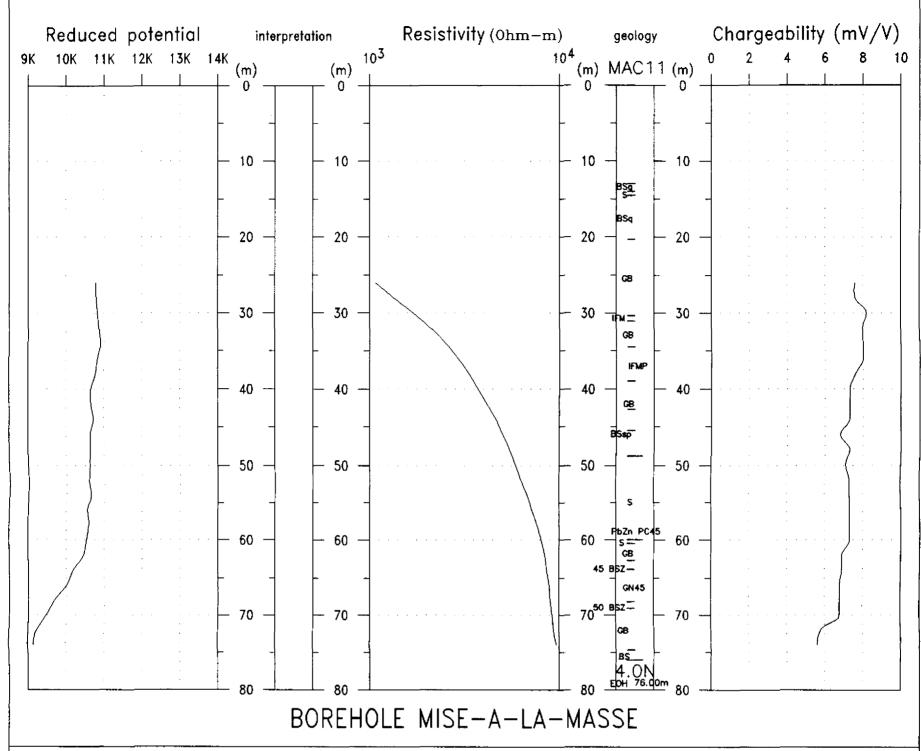
Interpreted by Pierre Sangala Date: July 1997 Surveyed by Pierre Sangala Map no

Current electrode in hole MAC-10 Electrode position: -27 m



12A03NW2002 2.19890

FRIPE



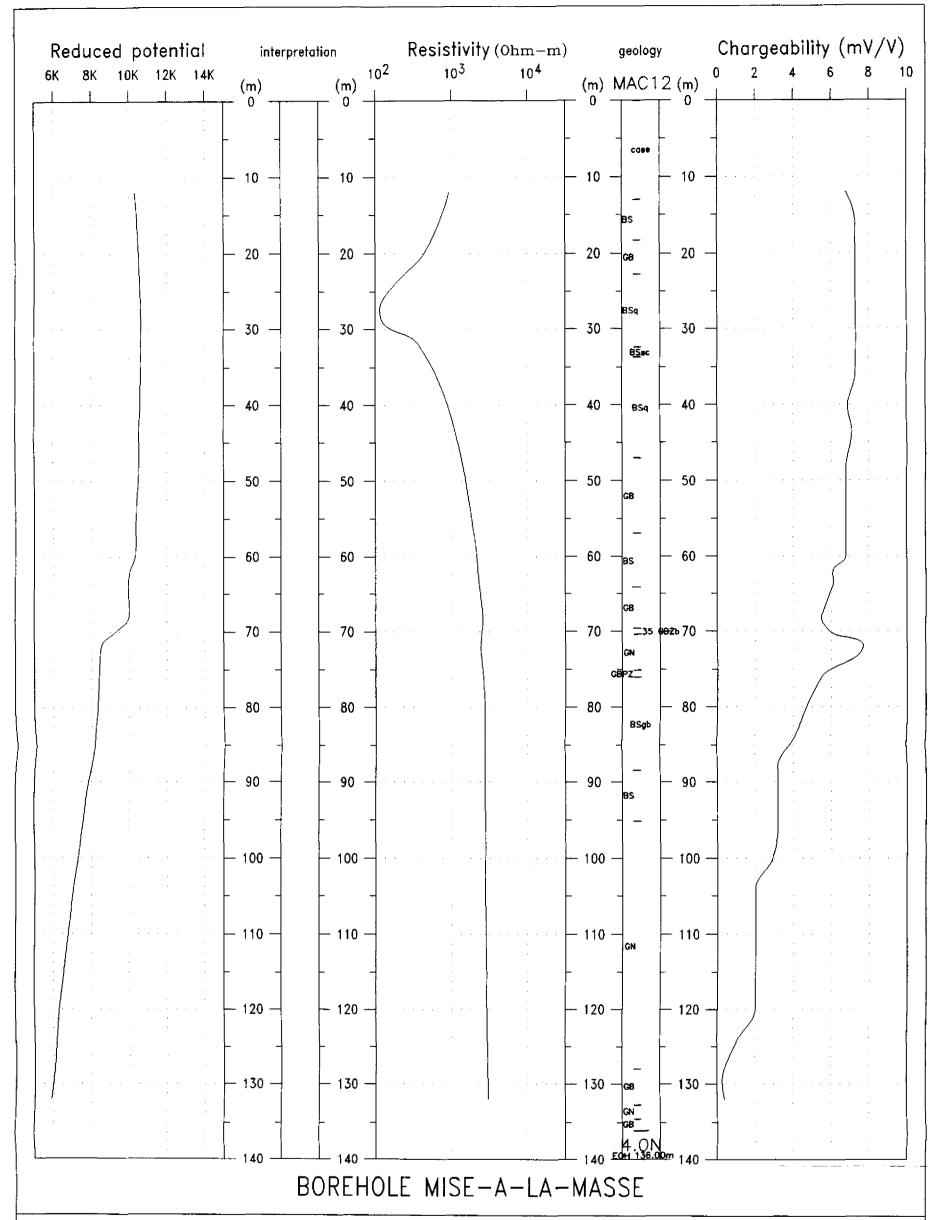


290

HOLE MAC-11

Interpreted by Pierre Sangala Date: July 1997 Surveyed by Pierre Sangala Мар по

Current electrode in hole MAC-10 Electrode position: - 27 m



HOLE MAC-12

Interpreted by Pierre Sangala Date: July 1997 Surveyed by Pierre Sangala Map no

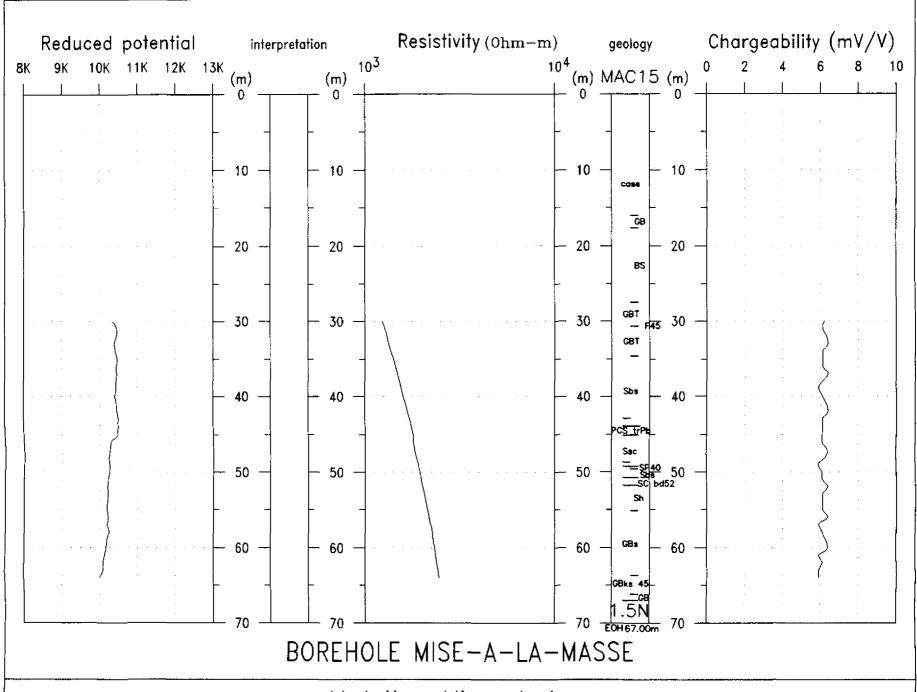
Current electrode in hole MAC-10 Electrode position: -27 m



42A03NW200

2.19890

FRIPP



HOLE MAC-15

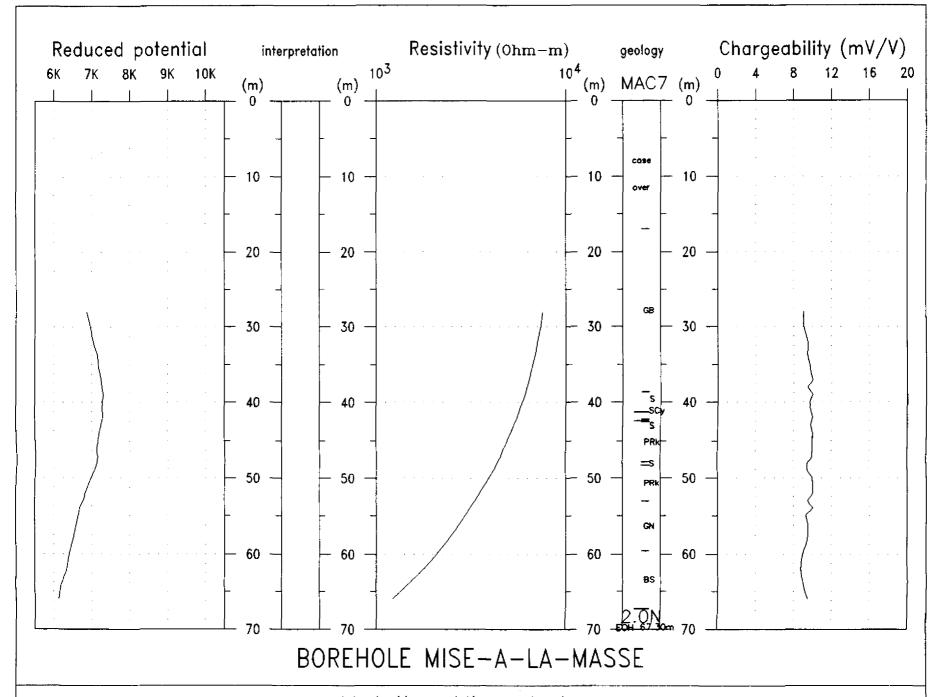
Interpreted by Pierre Sangala Date: July 1997 Surveyed by Pierre Sangala Map no

Current electrode in hole MAC-10 Electrode position: -27 m



₩2002 2.198

FRIP

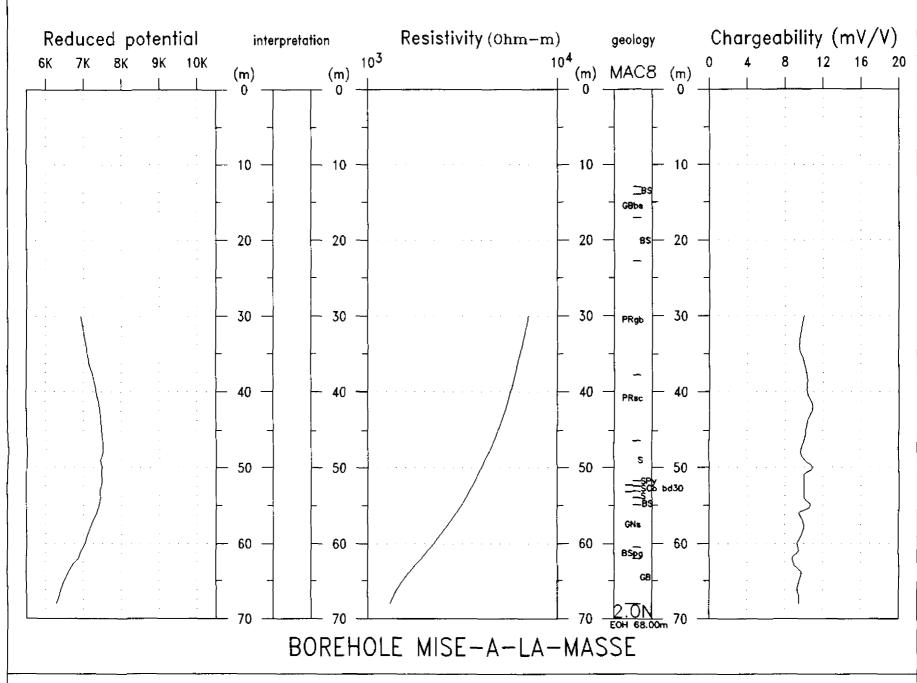


HOLE MAC-7

Interpreted by Pierre Sangala Date: July 1997 Surveyed by Pierre Sangala Map no

Current electrode in hole MAC-11 Electrode position: -57 m

2.19890



HOLE MAC-8

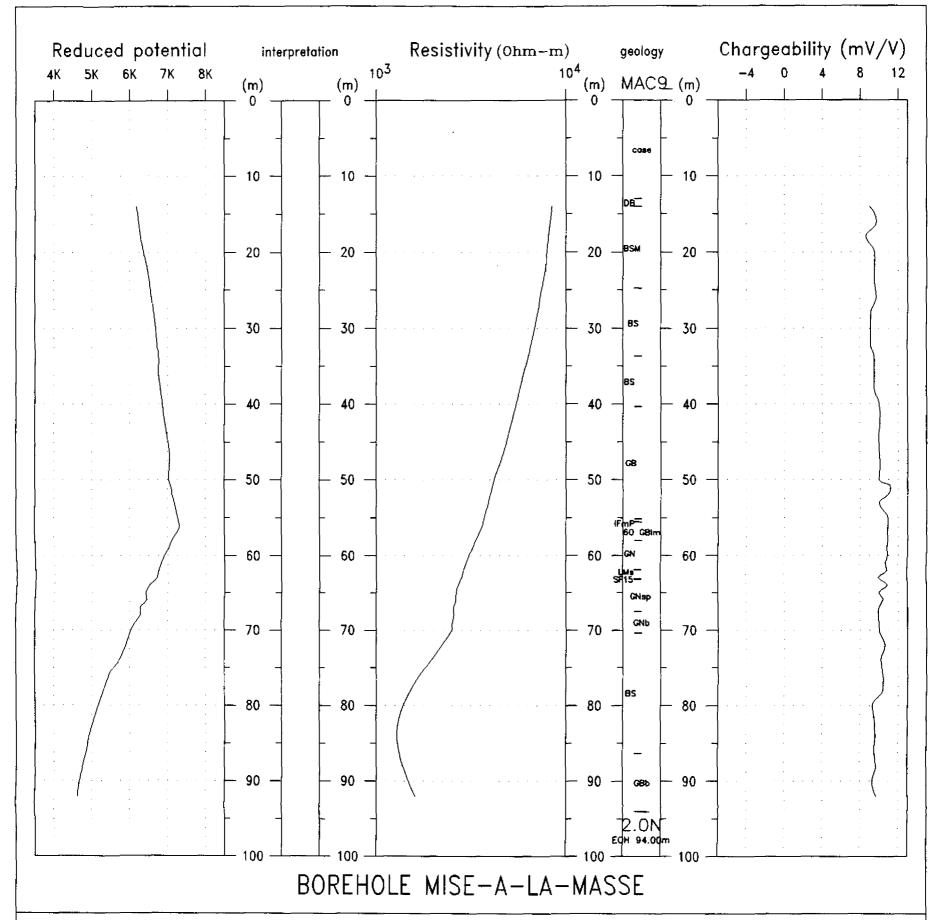
Interpreted by Pierre Sangala Date: July 1997 Surveyed by Pierre Sangala Map no

Current electrode in hole MAC-11 Electrode position: -57 m



2.19890

FRIP



HOLE MAC-9

Interpreted by Pierre Sangala Date: July 1997 Surveyed by Pierre Sangala Map no

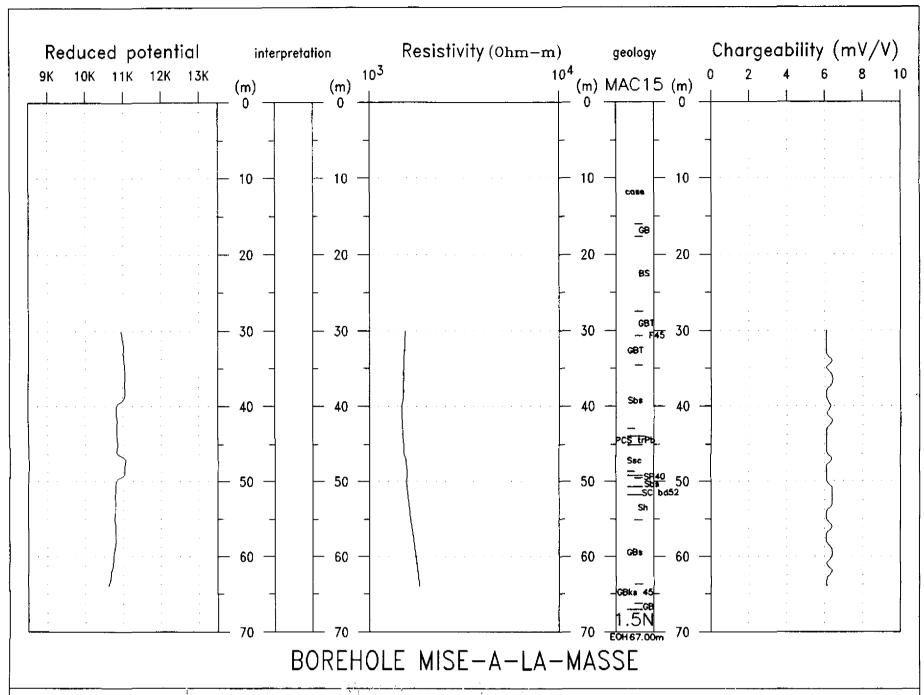
Current electrode in hole MAC-11 Electrode position: -57 m



42A03NW2002

2.19890

FRIPE



HOLE MAC-15

Interpreted by Pierre Sangala Date: July 1997 Surveyed by Pierre Sangala Map no

Current electrode in hole MAC-11 Electrode position: -57 m



42A03NW2002

2.19890

FRIPP