018865 105 K 6

PETER E. WALCOTT & ASSOC. LTD.

605 RUTLAND COURT, COQUITLAM, B.C. • TEL. 939-0383

February 15th, 1972

Mr. O. Jansen,
Anvil Mining Corp. Ltd.,
Faro, Y.T.

Dear Jake,

Enclosed please find a quotation for carrying out Turam, large vertical loop and Crone C.E.M. electromagnetic test surveys over the three deposits as discussed at our meeting in Vancouver.

I have not included a price for the E.M. 25 a low frequency high power unit that can use a ground loop or a vertical loop for a transmitter as I had intended to discuss that with the manufacturer at the Prospector's Convention in Toronto March 5th - 8th so I will drop you a line about that after I return from the Convention.

The estimated cost for doing all three is quite high so I suspect that you will limit yourself to just carrying out the test over Faro.

The cost is higher than normal as it is based on using experienced personnel on the instruments - myself and a senior operator. Hower I think it is justifiable under the circumstances (Turam will run about $200.00 per mile all inclusive except mobilization, vertical loop circa $90.00 per mile, C.E.M. circa $85.00 per mile).

Should you wish us to carry out the work you should inform us of your decision as soon as possible so that arrangements can be made regarding the reservations of the various instrumentation for a short period during the field season.

My apologies for not getting this off before but I was waiting until I ran the I.P. tests over the various rock types, copies of the results of which I enclose (undrafted).

These samples were picked up by Greg Jilson in the pit and are probably not truly representative of the rocks. I was wondering if you could supply me with a couple of samples of each, similar sizes to those noted on the maps.

The rocks although not under hydrostatic pressure show no I.P. response with the graphitic schist (not very graphitic but I suspect a good graphitic schist would crumble very easily) exhibiting the lowest conductivity.

February 15th, 1972 cont'd

I also enclose pseudo-section plots of the I.P. test we ran over Lines 48 W, 52 W and 56 W in 1970 using pulse type equipment.

I was wondering if you had any geological sections along these lines or if you could make any from the drilling in order to compare them with the I.P. results.

Should you have any queries please do not hesitate to contact us.

Yours truly,

PETER E. WALCOTT & ASSOCIATES LTD.

Peter E. Walcott

Encls.

P.S. The quotation was based on how we would carry out the test. However we can tailor the test to suit your budget, i.e. cut out some methods, use junior operator or experienced helper.

105 K 6

PETER E. WALCOTT & ASSOC. LTD.

605 RUTLAND COURT, COQUITLAM, B.C. • TEL. 939-0383

March 15th, 1972

Mr. U. Jansons,
Anvil Mining Corporation Ltd.,
P.O. Box 1000,
Faro, Y.T.

Dear Jake,

Thank you for your letter of the 9th of March and the accompanying section.

Should you desire the magnetic susceptibilities to be determined then we need to crush the specimens and you would not get them back.

I am enclosing a copy of a brochure on the E.M. 25. There is also an article on it on Page 47 of the Northern Miner of March 2nd.

So far the instrument has only been built for use at 50 c.p.s. and is of course very bulky and not suited for operation in hilly bush country. However it is planned to build one for use at 200 c.p.s., a frequency good for most Canadian exploration. The receiver coil would then be much smaller and would be suitable for back-packing thro' the bush.

As the shape of the transmitter loop is non critical, and as the receiver position relative to the transmitter is not important this instrument could be used without cut lines for reconnaissance purposes, as it has good depth penetration.

Its one big drawback is that like most E.M. systems it is affected by topography.

Costwise on a reconnaissance programme it should run about half the price of Turam, as no lines need to be cut.

We could detail anomalies (cut grid) with it or with Turam.

The 200 c.p.s. version is supposed to be out in June.

March 15th, 1972 cont'd

The present 50 c.p.s. model is in use but could be obtained on equipment plus operator plus transportation basis for a few days if not in use.

Should you desire to try out this equipment I suggest you wait for the higher frequency model (conductivity of Faro ore probably too low to be detected at depth with c.p.s.). However should you desire to try the 50 c.p.s. model I can try to set that up.

I am also enclosing two profiles for studies run over the sericite schist at different salinities (sample in same position as in original tests). You can see that as the overburden becomes less conductive and approaches that of the rock you approach the true frequency effect of the rock.

With reference to our quotation to carrying out the tests over Faro etc. we will be in the Anvil Area doing some work for Cyprus with a C.E.M. and V.E.M. equipment at the beginning of June so mobilization of crew and the above equipment could be split and no minimum rental would apply.

Yours truly,

PETER E. WALCOTT & ASSOCIATES LIMITED

Peter E. Walcott

Encl.

EM 25

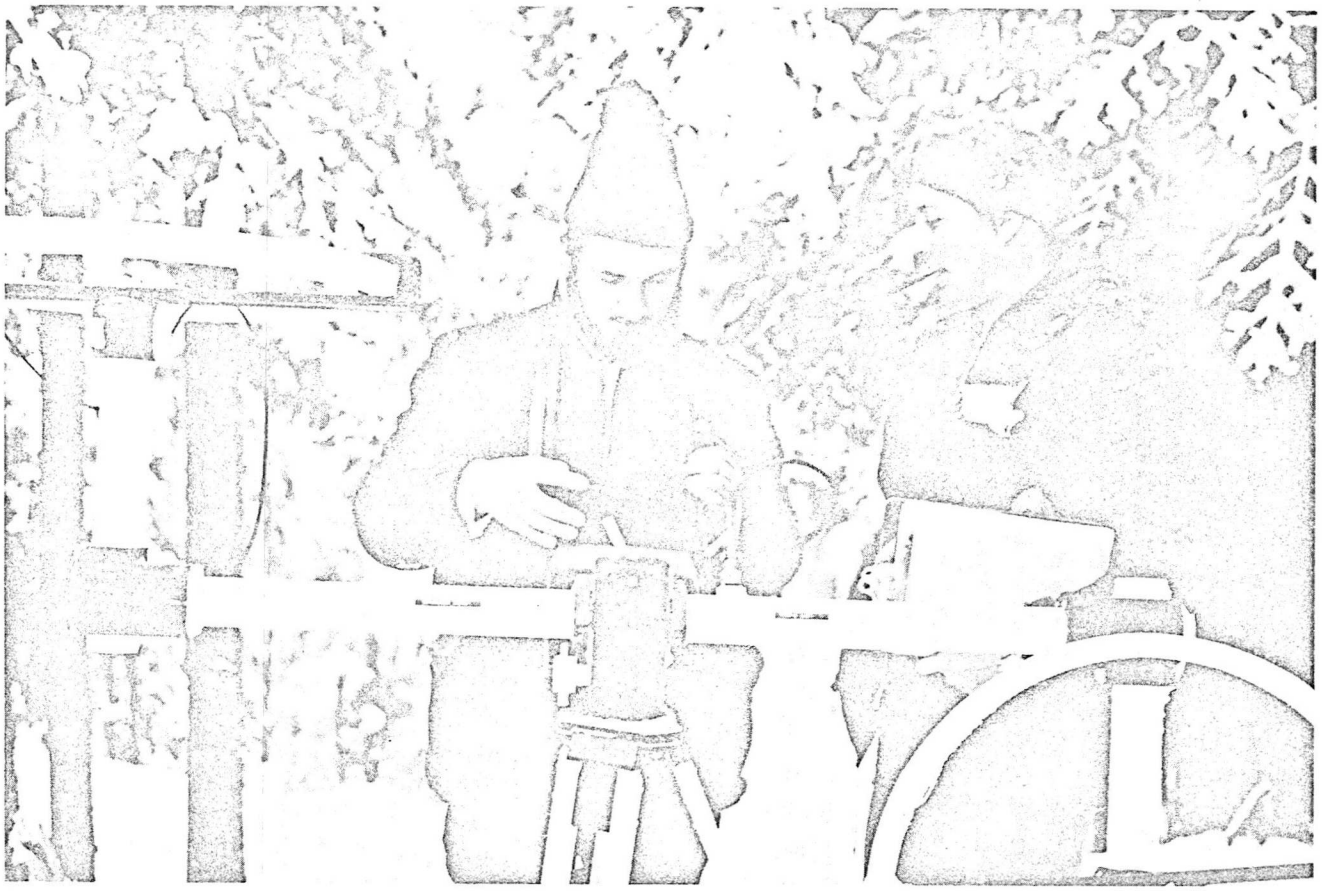
EXTREMELY LOW FREQUENCY DEEP PENETRATION EM SURVEY SYSTEM

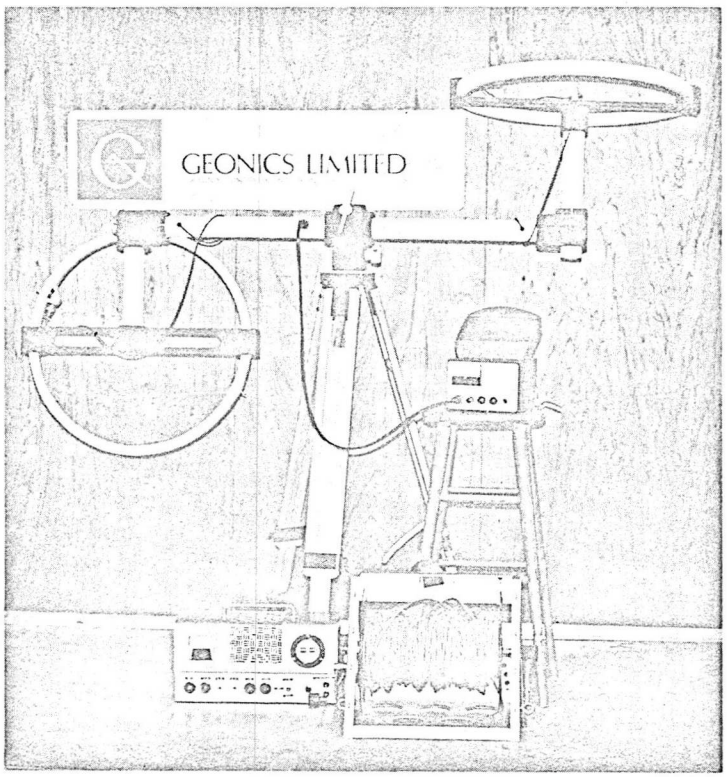
PRELIMINARY TECHNICAL INFORMATION RELEASE

Geonics has recently developed, in consultation with Norman Paterson and Associates Limited, a new type of EM system for superior depth penetration through conductive overburden, known as EM25. The method measures the dip angle and elipticity of the EM field elipse. Frequencies of operation from 50 Hz to about 2000 Hz will be available, with a variety of transmitter and receiver arrangements possible depending on frequency and transmitter-receiver separation required. A major advantage is high survey speed over large or small areas due to the non-critical transmitter layout and the one man receiver.

PROTOTYPE

The prototype system was designed to suit conditions of overburden experienced in Australia, where it is at present in use. This model operates at 60 Hz, with a transmitter power of about 200 watts and has operated with a separation in excess of 3500 feet using a 2000 x 1000 transmitter loop, and with a separation of over 1500 feet using a 100 foot diameter loop.





TOP EM25 PROTOTYPE RECEIVER AT CAVENDISH TEST AREA. LATER MODELS WILL HAVE SMALLER RECEIVER COILS WITH OPTION OF BACKPACK OR TRIPOD MOUNTING.

LEFT PROTOTYPE EM25 SHOWING COIL ASSEMBLY ON TRIPOD, RECEIVER AND TRANSMITTER CONSOLES, AND SMALL LOOP ON WINDER.

TRANSMITTER

Basic transmitter operation consists of laying a loop of wire on the ground, and driving it from a 50/60 Hz gasoline generator or an electronic inverter. The transmitter loop may be for example a 4000 x 2000 foot rectangle in the fixed mode, or, for example, a 100 foot diameter loop in the mobile mode used for detailing. The shape of the loop is completely non-critical. The non anomalous field at the receiver location will normally be vertical and linearly polarized.

RECEIVER

Only one receiver man is required and for the purpose of the measurement his exact position relative to the transmitter is not important. The receiver comprises two orthogonal coils mounted on a tripod or a backpack, and a small console carried on the operator's chest. Receiver operation consists of attaining a meter null by rotating the coils and by adjustment of a quadrature dial.

After balance the operator reads the inclinometer on the coils and the percentage on the quadrature dial. The parameters so derived are the tilt angle of the total field elipse and its elipticity and sign. (This is the same patented

principle of operation as in Geonics' well established VLF EM systems, the EM16 and EM18 except that, of course, for EM25 the field is locally generated and the frequency is much lower).

If required the measured parameters may readily be converted to in-phase and quadrature horizontal components relative to the vertical field.

NARROW BAND

The system uses no reference cable between transmitter and receiver, but achieves very narrow bandwidth (e.g. 0.1 Hz at 60 Hz operation) and hence a high degree of noise immunity by means of phase locked loop techniques. In addition an electronic notching system is used to eliminate the possibility of overload or noise from adjacent power line frequencies. Null resolution is better than 0.5^{o} tilt (in-phase) and 0.5% quadrature.

MODELLING

Preliminary modelling has indicated that a vertical conductor of infinite strike, dip and conductivity, at a depth of half the separation will yield an anomaly of 9%. The percent anomaly, from a given conductor, of course increases as the separation is increased, eventually being limited by noise considerations. At 60 Hz, with a separation of 800 feet, a conductor of 150 mhos at a depth of 400 feet, yields approximately 5% in-phase and 4% quadrature anomaly.

OPTIONS

The system is extremely flexible. Some possibilities are given here.

RECEIVER

The receiver will be available for operation at any frequency between about 50 Hz and 2000 Hz, with standard versions available at 50/60 Hz, ≈300 Hz and ≈1500 Hz. The console will be lightweight in all cases, the coil assembly will be smaller for the higher frequencies.

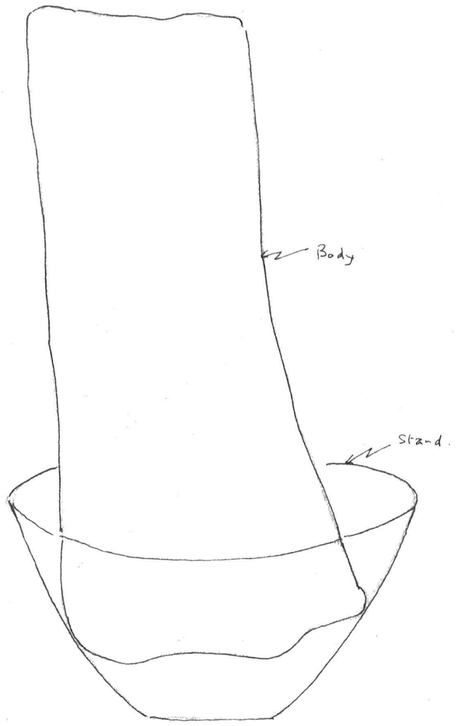
TRANSMITTER

At the lowest frequency the transmitter may be powered by a stable gasoline generator.

For higher frequencies or for any frequency where the narrowest bandwidth is to be used to overcome noisy environments, a solid state high power oscillator is used to drive the loop, power being derived from a 12V DC gasoline generator.

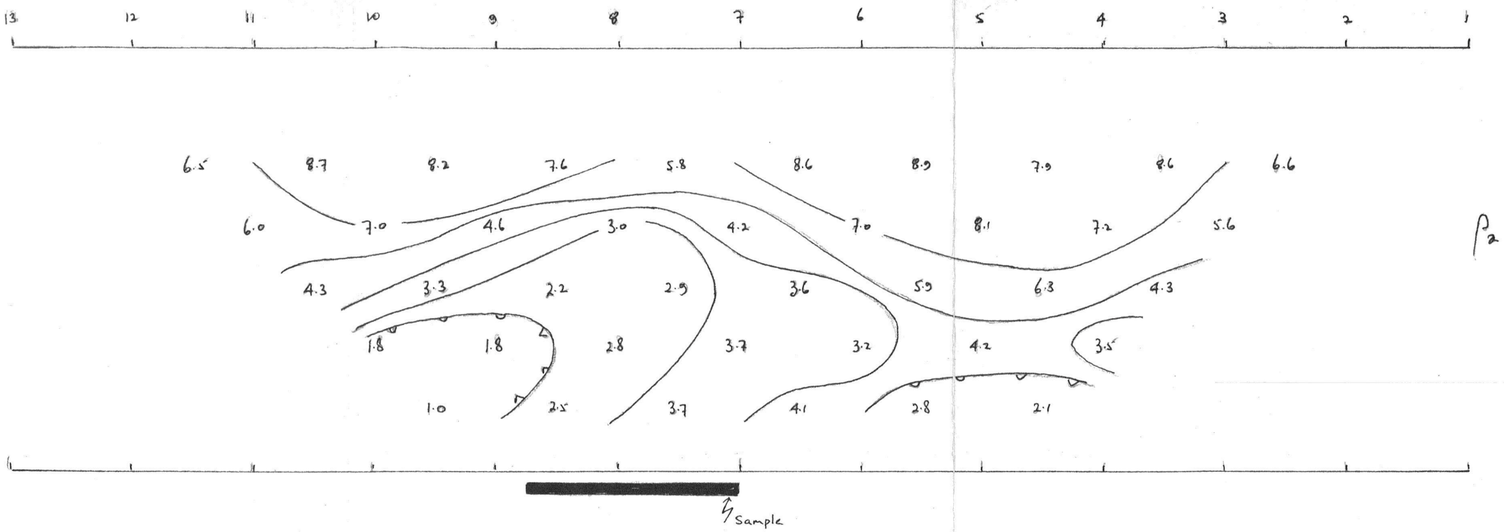
If the maximum range of many thousand feet separation is not required at the highest frequency a lower power transmitter with integral batteries and transmitting coil will be used.

105 K6

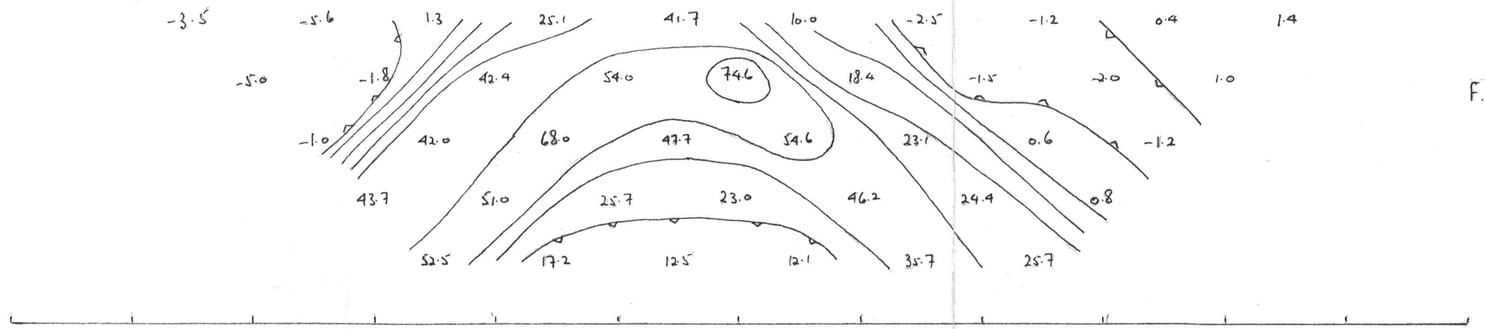


Body 7 cms wide (traverse)
23 cms long (strike length)
20 cms height
1.5 cms below surface

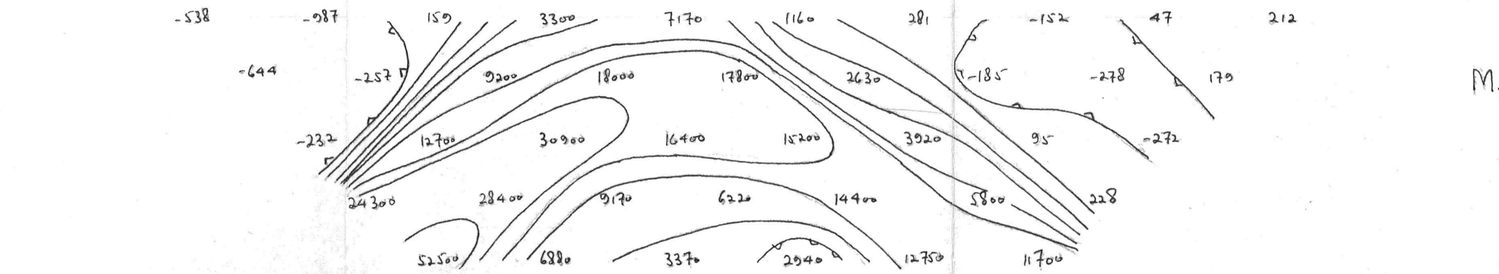
Current 0.0042 amps.
Voltage 3.0 volts



ρ_a (ohm-ms) 5 cps



F.E %



$M.F = \frac{F.E}{\rho_a} \times 1000$

SAMPLE # 1

FARO ORE

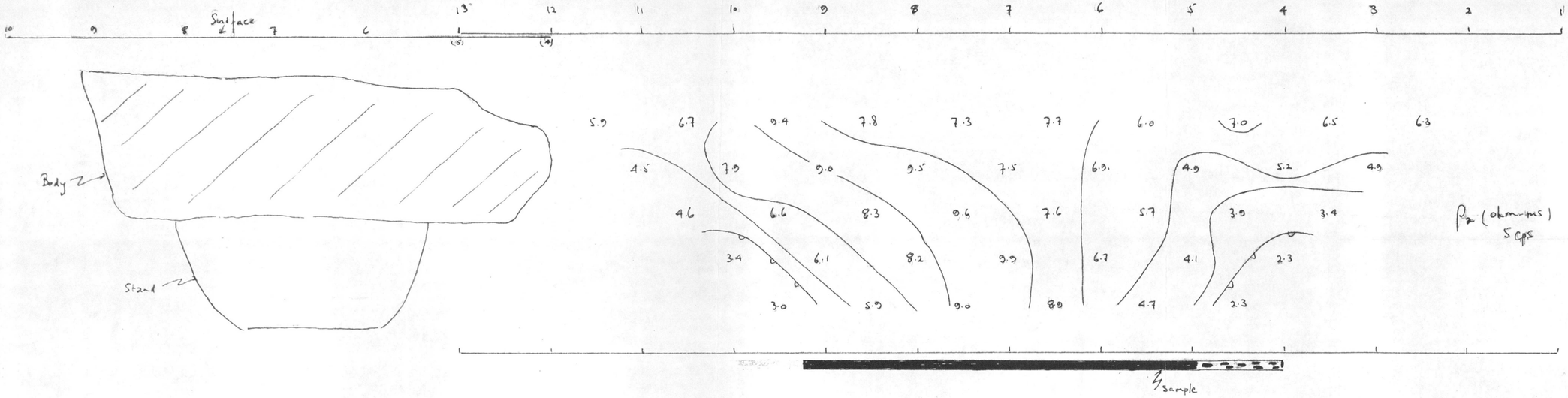
Dipole - dipole $a = 4$ cms

Freq 5 & 0.3 cps

Background ≈ 0.009 N saline soln

Scale 1" = 4 cms

Logarithmic Contours



Body 20 cms wide
15 cms long (across traverse)
6 cms thick
2 cms below surface

Current 0.0042 amps.
Voltage 30 volts

ρ_a (ohm-ms) 5 cps

F.E. %

$MF = \frac{F.E.}{\rho_a} \times 1000$

SAMPLE # 2

FARO ORE

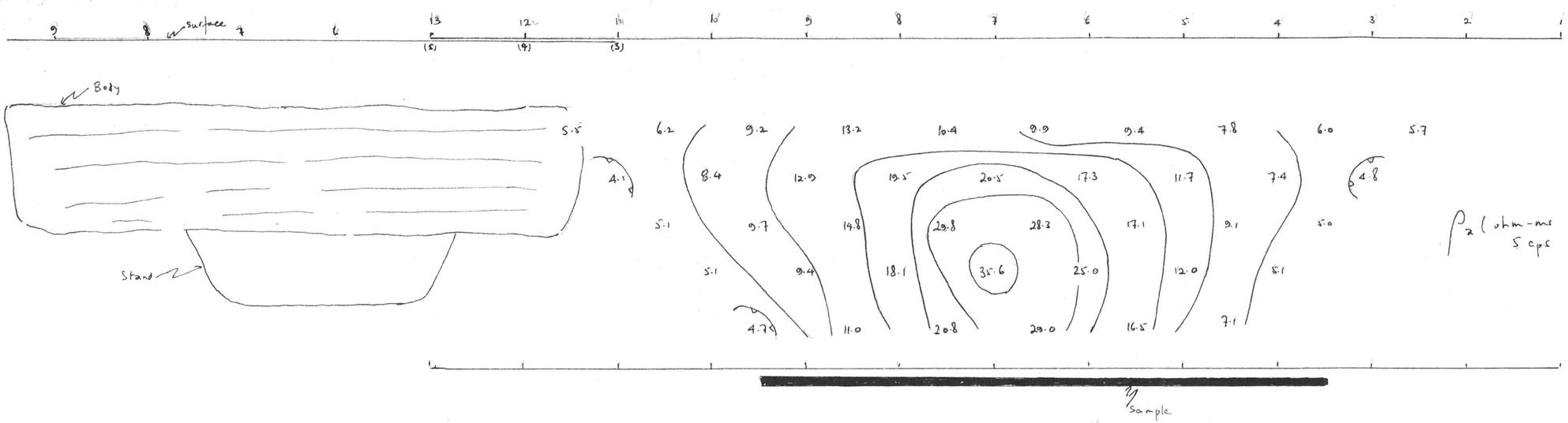
Dipole - dipole $a = 4$ cms.

Freq. 5 & 0.3 c.p.s.

Background ≃ 0.009 N saline soln

Scale 1" = 4 cms.

Logarithmic Contours



ρ_a (ohm-ms)
5 cps

SAMPLE # 3

FARO AREA
Phyllite
(Calc Silicate ?)

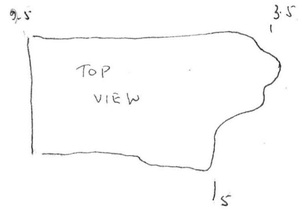
Dipole - dipole a = 4 cms

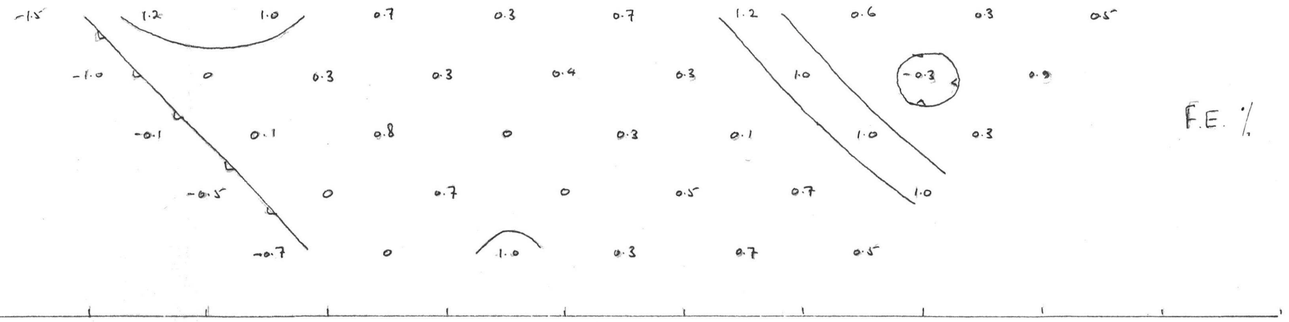
Freq 5 & 0.3 c.p.s

Background ≈ 0.009 N Saline soln.

Scale 1" = 4 cms.

Logarithmic Contours



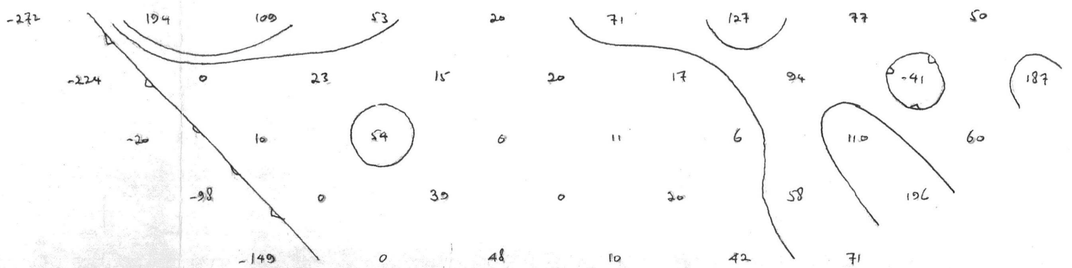


F.E. %

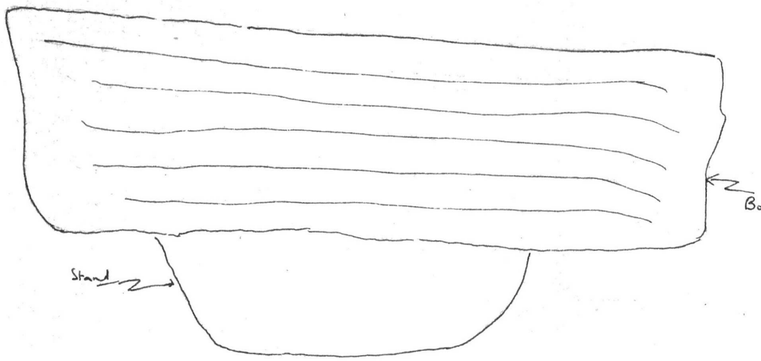
Body 24 cms wide (along traverse)
18 cms long (across traverse)
5 cms thick
3 cms below surface

Current 0.0048 amps

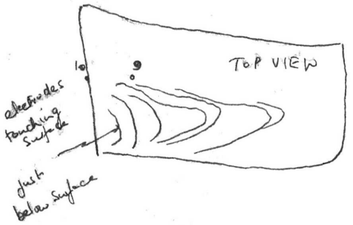
Voltage 3.0 volts



$M.F. = \frac{F.E.}{\rho_a} \times 1000$

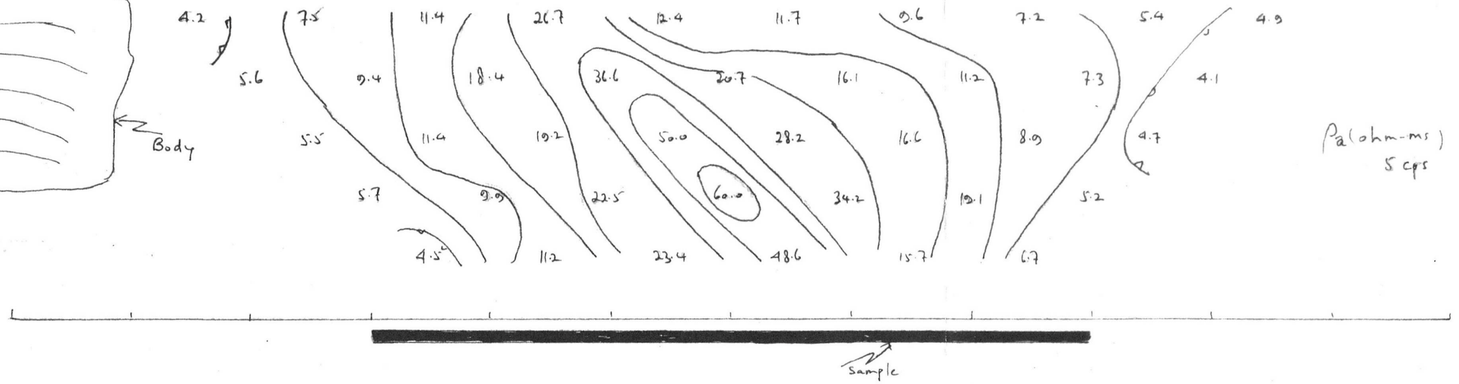


Body. 24 cms. wide (along traverse)
20.5 cms. long (i.e. across traverse)
6.5 cms. thick
2.5 cms. below surface

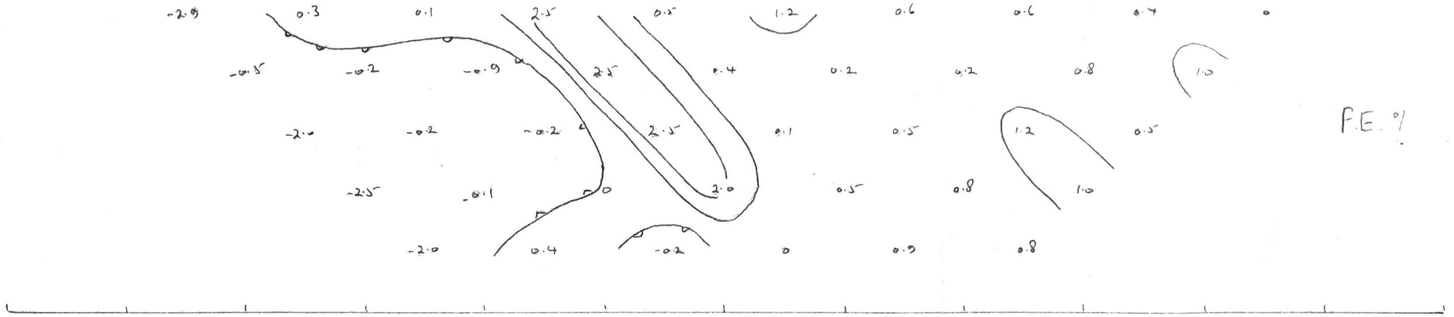


Current 0.005 amps

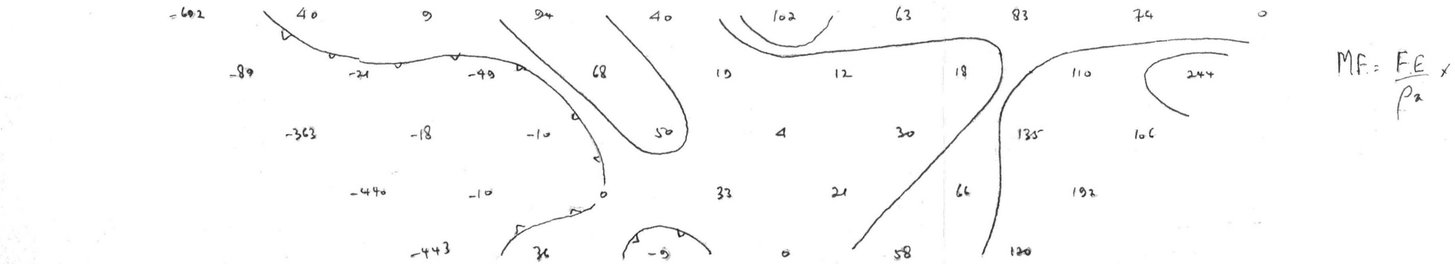
Voltage 30 volts



Pa (ohm-ms)
5 cps



F.E. %

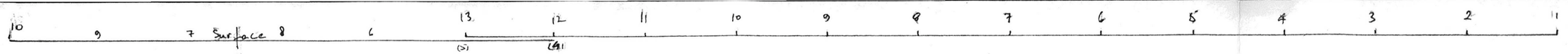


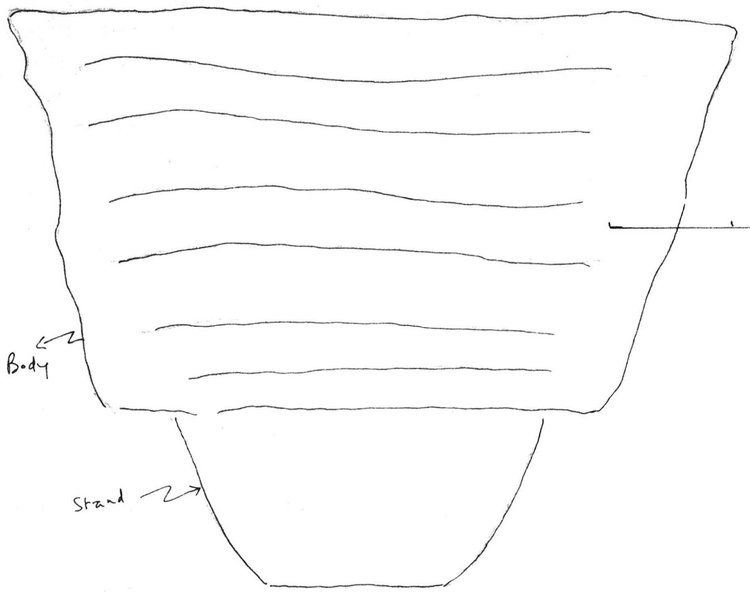
MF = $\frac{FE}{\rho_a} \times 1000$

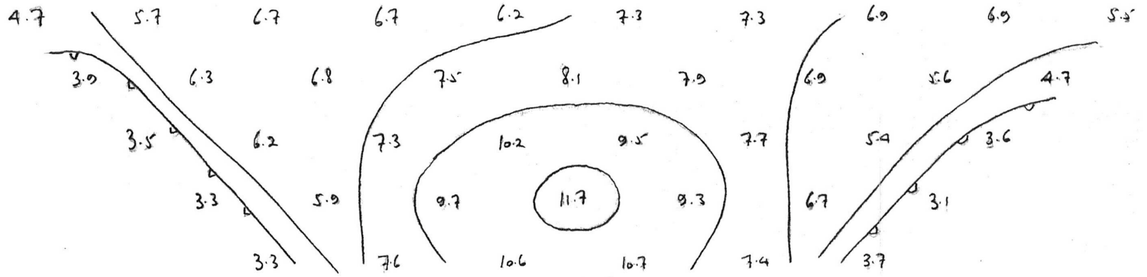
185 K 6

SAMPLE # 4
FARO AREA
Graphitic schist ?
Dipole - dipole a = 4 cms
Freq. 5 & 0.3 cps
Background ≃ 0.000 ohm Saline Soln.
Scale 1" = 4 cms
Logarithmic Contours

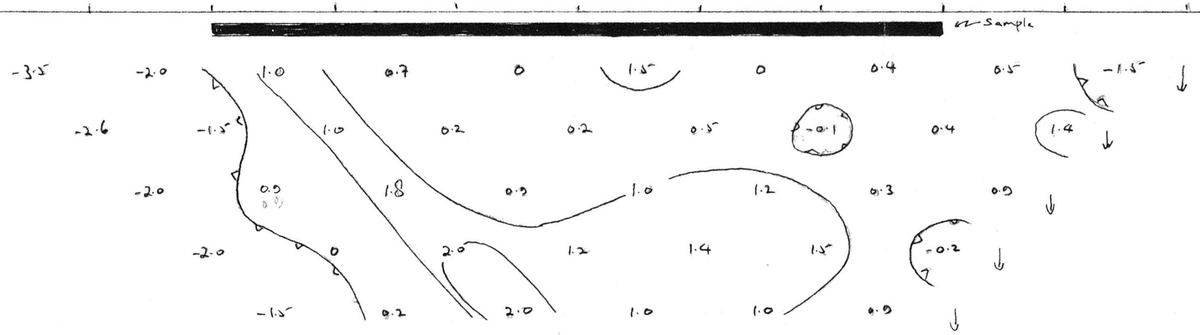
105 K 6







ρ_a (ohm-ms)
5 cps

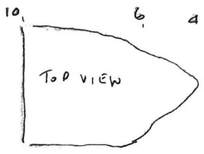


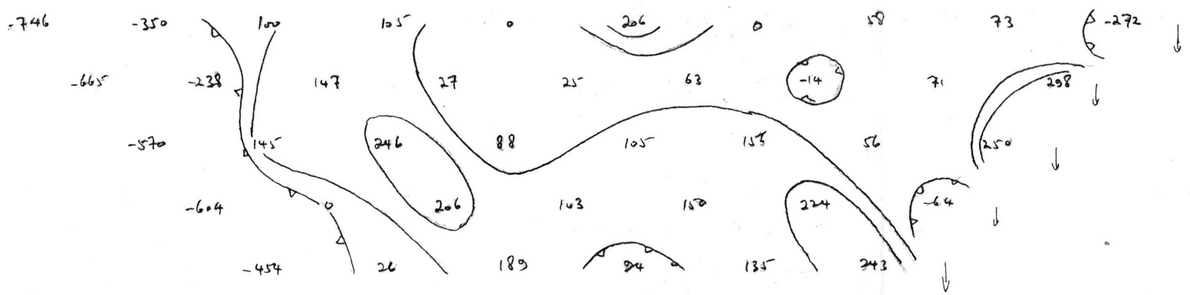
F.E %

SAMPLE # 5
FARO AREA
Sericite Schist

Dipole-dipole a = 4 cms
Freq 5 & 0.3 cps
Background ≈ 0.009 N Saline Soln.

Scale 1" = 4 cms.
Logarithmic Contours



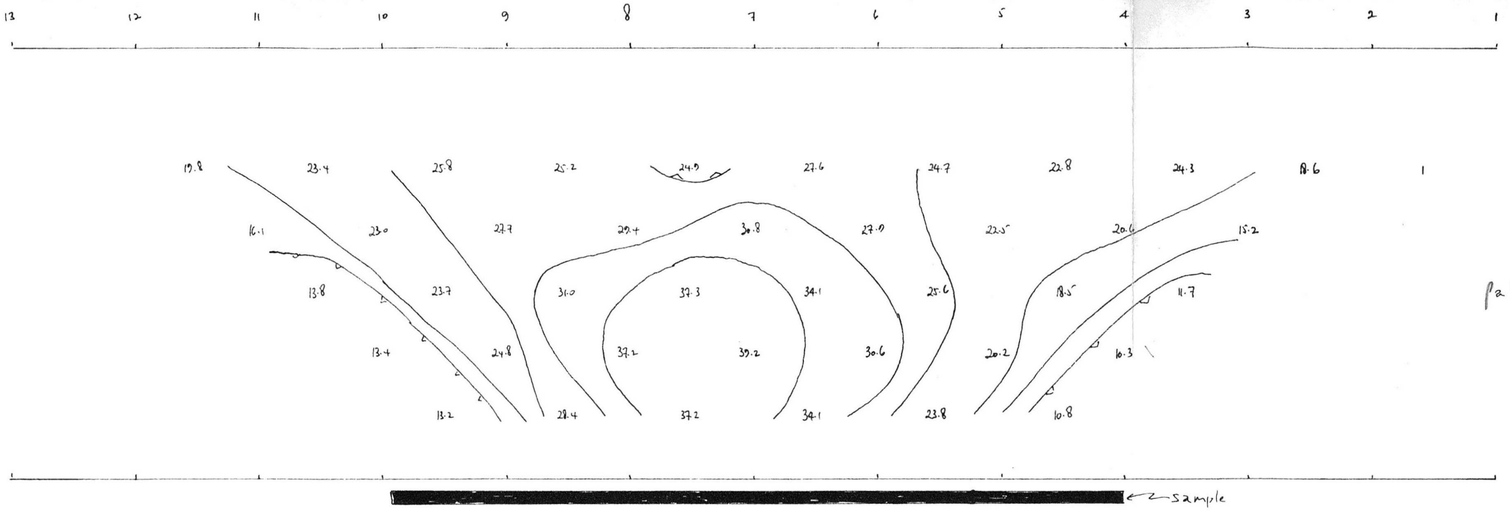


M.P = $\frac{F.E}{\rho_a} \times 1000$

Body 24 cms wide (along traverse)
22 cms long
13 cms deep
6.5 cms below surface

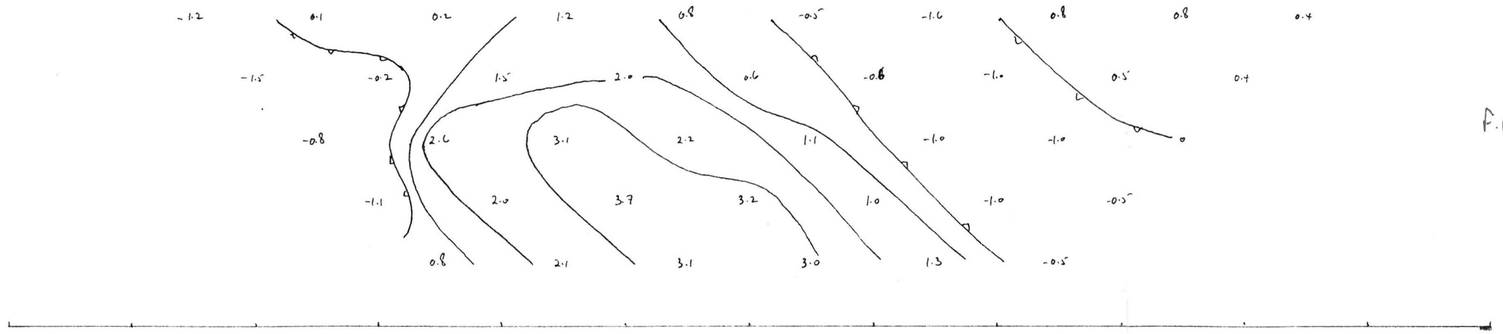
Current 0.005 amps

Voltage 3.0 Volts

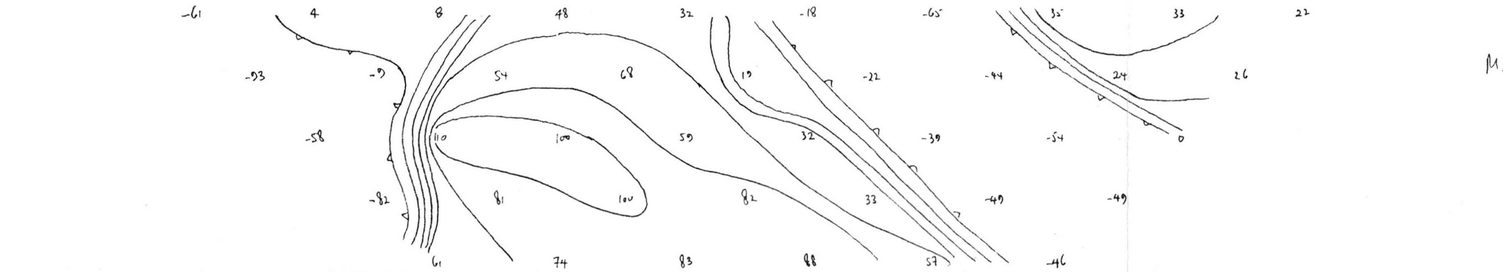


ρa (ohm-ms)
5 cps

SAMPLE # 5
FARO AREA
Sericite Schist
Dipole - Dipole a = 4 cms
Freq. 5 & 0.3 cps.
Background ≈ 0.002 N saline s/l
Scale 1" = 4 cms
Logarithmic Contours

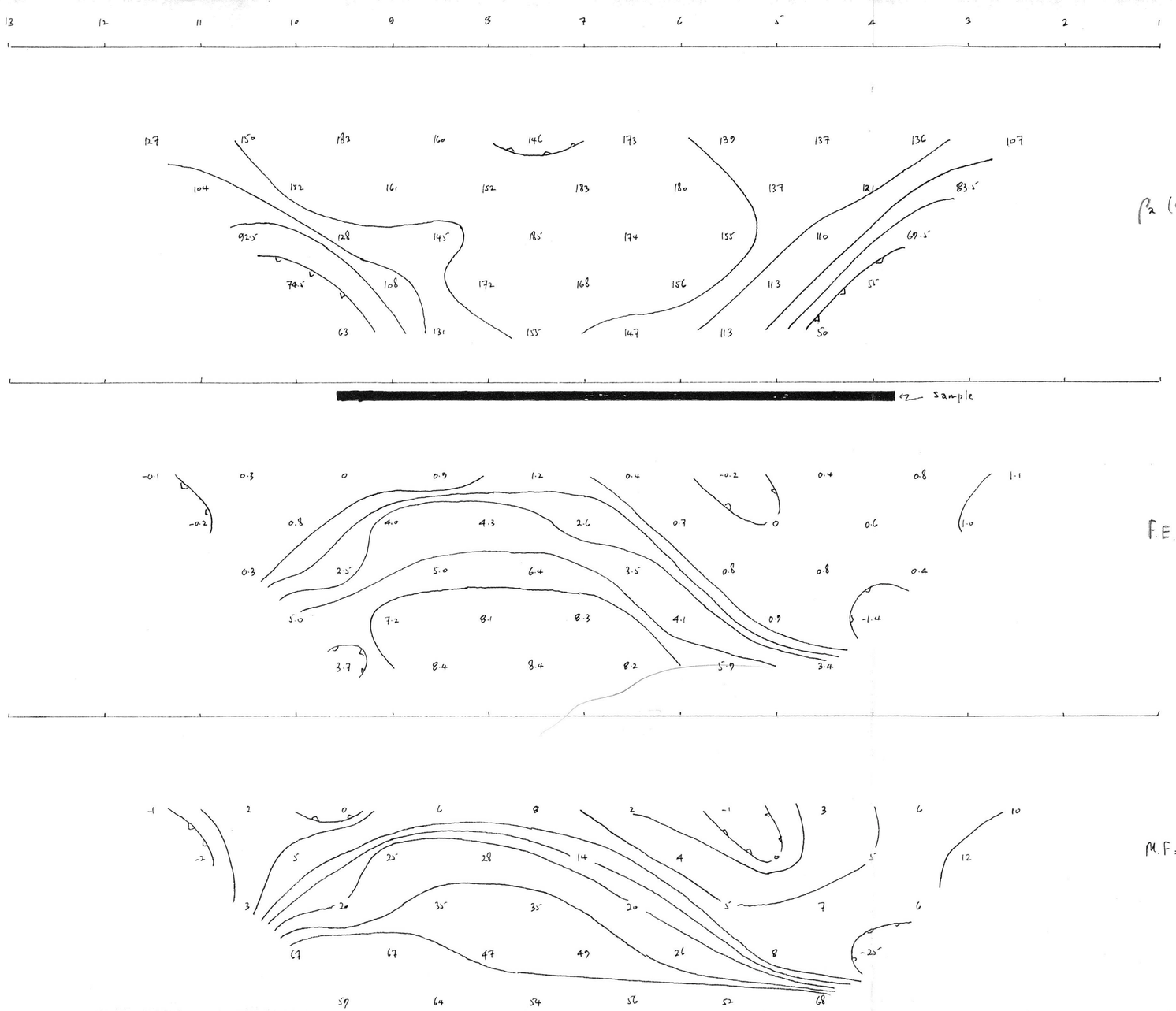


F.E %



M.F. $\frac{F.E \times 1000}{\rho_a}$

Current 0.0036 amps
Voltage 6 volts



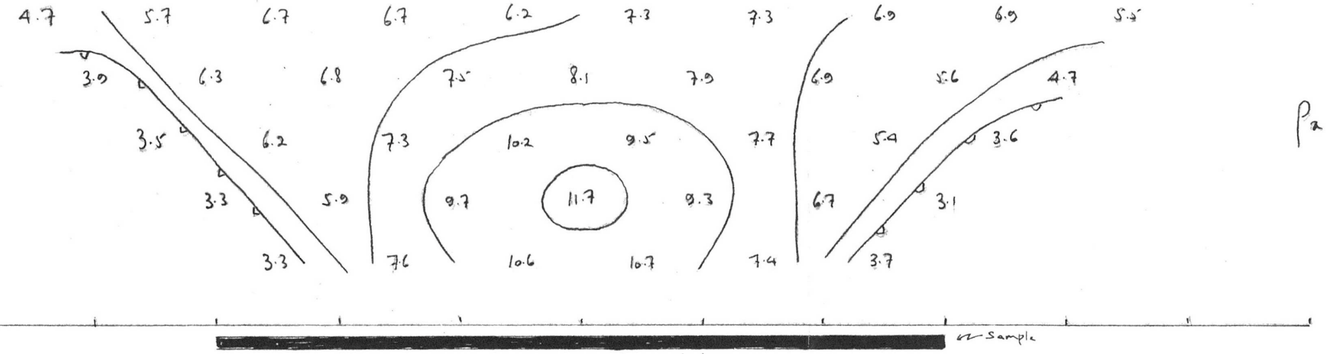
ρ_a (ohm-ms)
5 c.p.s

F.E. %

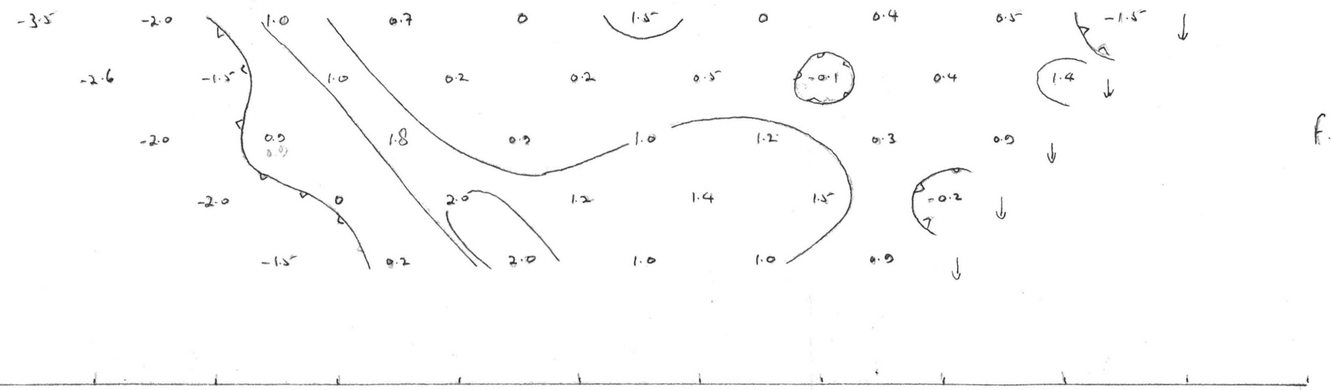
SAMPLE # 5
FARO AREA
Sericite Schist
Dipole-Dipole a = 4 cms
Freq. 5 & 0.3 c.p.s
Background = 0.0002 N saline soln
Scale 1" = 4 cms.
Logarithmic contours

Current 0.0011 amps
Voltage 12 volts

M.F. = $\frac{F.E}{\rho_a} \times 1000$



ρ_a (ohm-ms
5 cps



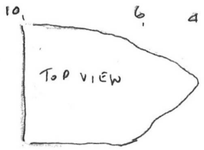
F.E %

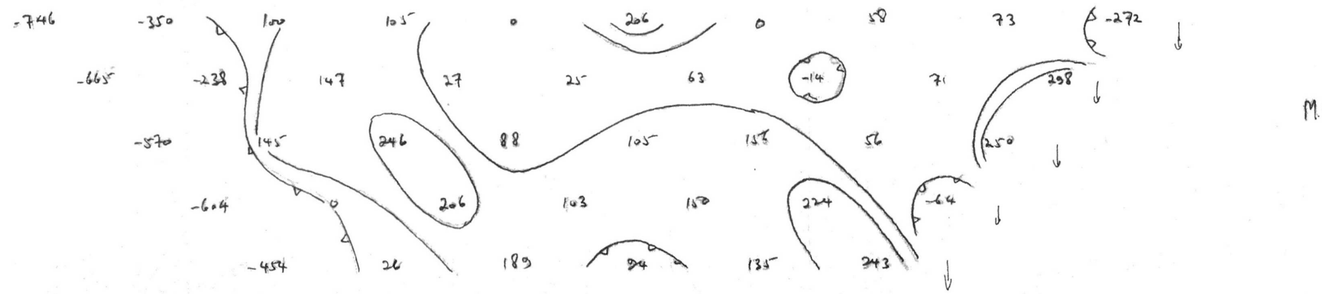
SAMPLE #5
FARO AREA
Sericite Schist

Dipole-dipole a = 4 cms
Freq 5 & 0.3 cps
Background ≈ 0.009 N saline soln.

Scale 1" = 4 cms.

Logarithmic Contours



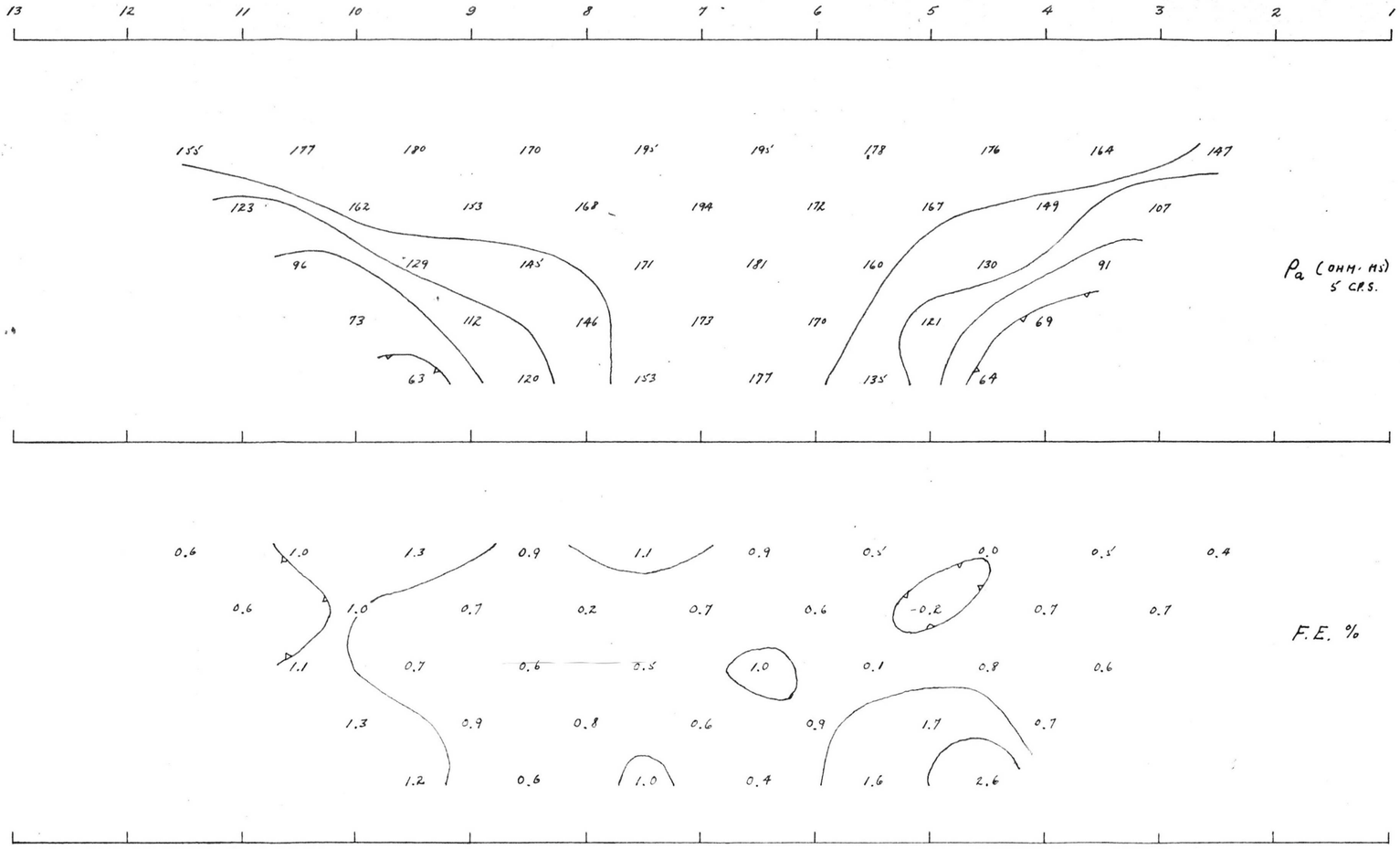


MP = $\frac{F.E.}{\rho_a} \times 1000$

Body 24 cms wide (along traverse)
22 cms long
13 cms deep
6.5 cms below surface

Current 0.005 amps

Voltage 3.0 Volts



GLASS TANK :

61 CMS. × 30.5 CMS. × 30.5 CMS

RESISTIVITY LOWS AT SIDES DUE TO EFFECTS OF TANK SIDES

P_a (OHM·MS) 5 CPS.

F.E. %

BACKGROUND

≃ 0.0002 N SALINE SOL.

DIPOLE - DIPOLE a = 4 CMS.

FREQ = 5 ± 0.3 C.P.S.

SCALE 1" = 4 CMS.

LOGARITHMIC CONTOURS

CURRENT ≃ 0.0009 AMPS

VOLTAGE ≃ 12 VOLTS

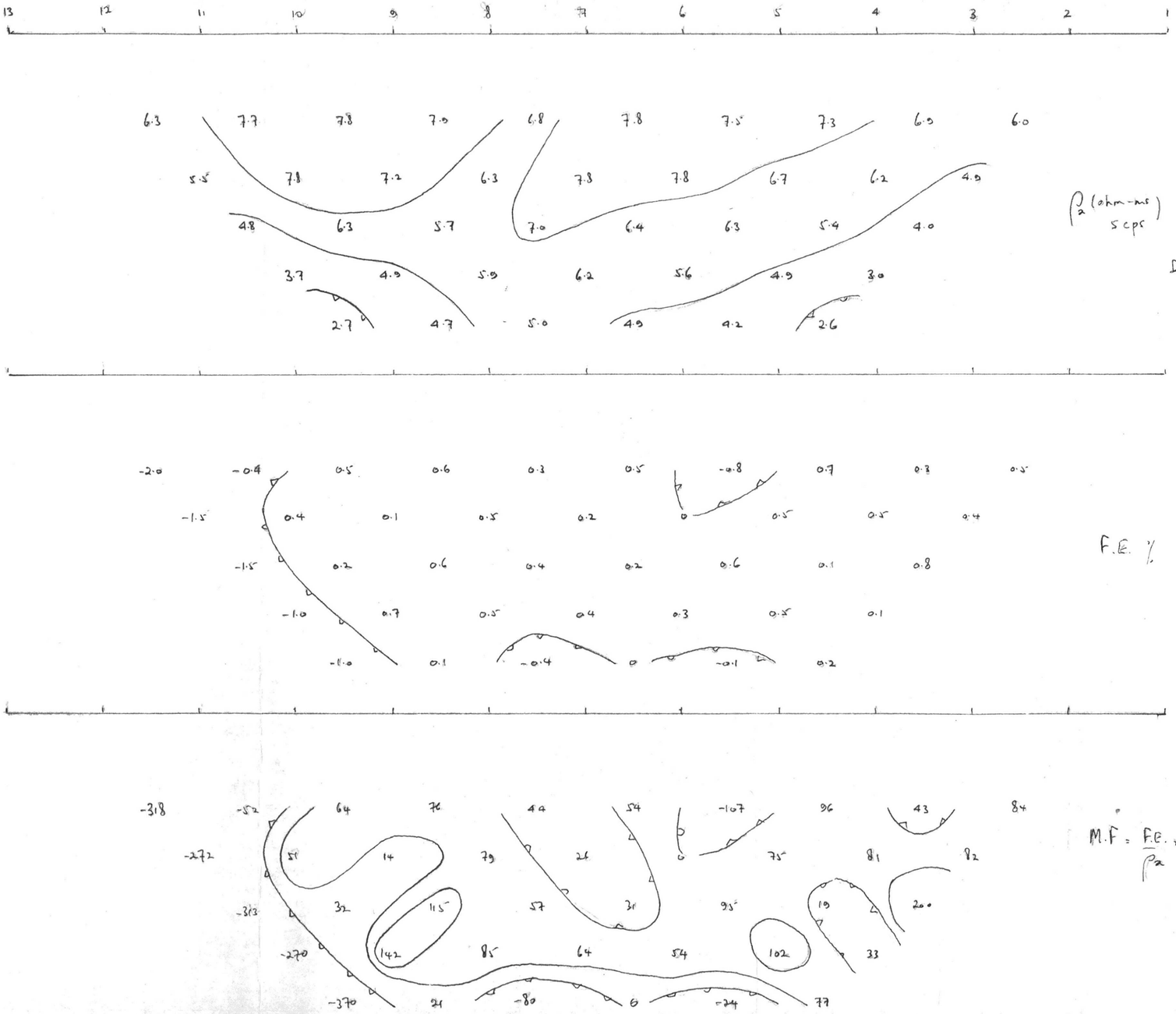
$M.F. = \frac{F.E.}{P_a} \times 1000$

June 12
Walcott & Assoc

GLASS TANK

TANK SIZE 61 x 30.5 x 30.5 cms

Resistivity lows at sides due to effects of tank sides



BACKGROUND

ρ_a (ohm-ms) ≃ 0.009 N Saline soln

5 cps

Dipole-dipole a = 4 cms

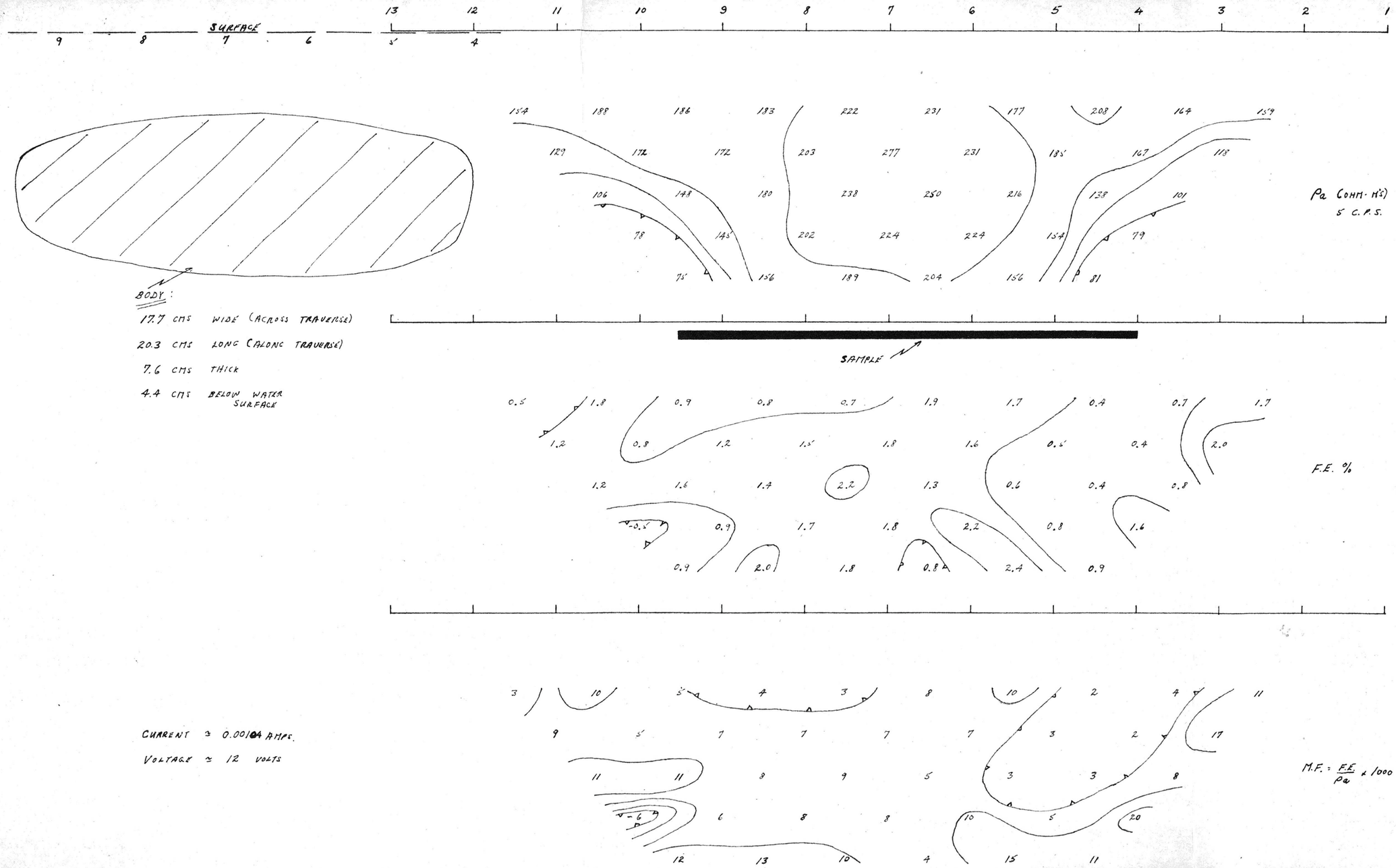
Freq 5 & 0.3 cps.

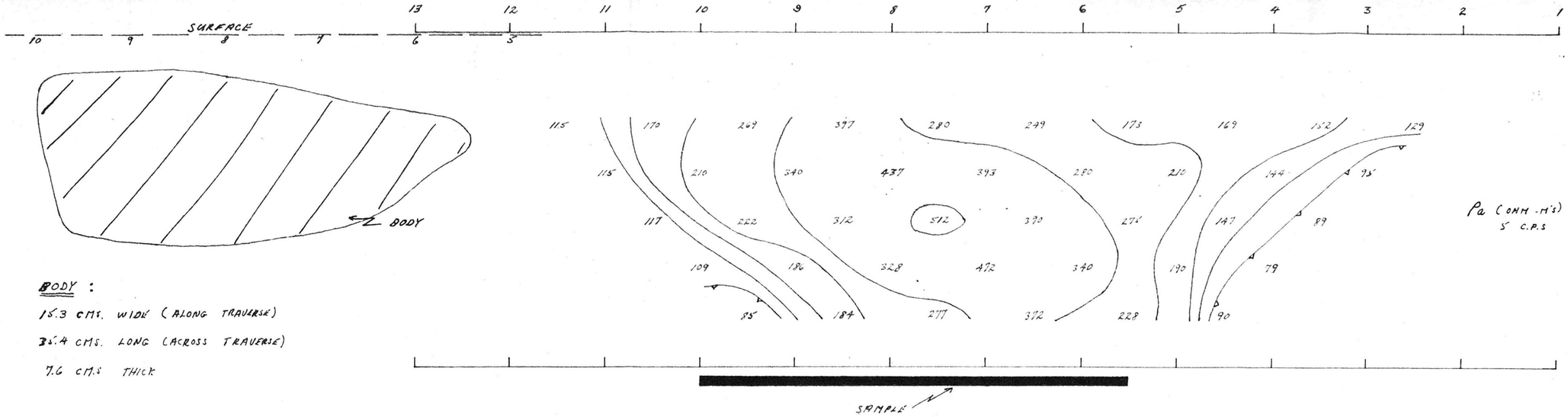
Scale 1" = 4 cms

Logarithmic Contours.

F.E. %

$M.F = \frac{F.E. \times 1000}{\rho_a}$


SURFACE
13 12 11 10 9 8 7 6 5 4 3 2 1
9 8 7 6 5 4
154 188 186 183 222 231 177 208 164 159
129 172 172 203 277 231 185 167 118
106 148 180 238 250 216 138 101
78 145 202 224 224 154 79
75 156 189 204 156 81
Pa (OHM-FT)
5 C.P.S.
BODY:
17.7 CMS WIDE (ACROSS TRAVERSE)
20.3 CMS LONG (ALONG TRAVERSE)
7.6 CMS THICK
4.4 CMS BELOW WATER SURFACE
SAMPLE
0.5 1.8 0.9 0.8 0.7 1.9 1.7 0.4 0.7 1.7
1.2 0.8 1.2 1.5 1.8 1.6 0.5 0.4 2.0
1.2 1.6 1.7 2.2 1.3 0.6 0.4 0.8
-0.5 0.9 1.7 1.8 2.2 0.8 1.6
0.9 2.0 1.8 0.8 2.4 0.9
F.E. %
3 10 5 4 3 8 10 2 4 11
9 5 7 7 7 7 3 2 17
11 11 8 9 5 3 3 8
-6 6 8 8 10 5 20
12 13 10 4 15 11
M.F. = F.E. / Pa x 1000
CURRENT ≃ 0.00104 AMPS.
VOLTAGE ≃ 12 VOLTS
BIOTITE - MUSCOVITE SCHIST
DIPOLE - DIPOLE a = 4 CMS
FREQ. = 5 ± 0.3 C.P.S
BACKGROUND ≃ 0.0002 N SALINE SOL.
SCALE 1" = 4 CMS.
LOGARITHMIC CONTOURS



BODY :

15.3 CMS. WIDE (ALONG TRAVERSE)

35.4 CMS. LONG (ACROSS TRAVERSE)

7.6 CM.S THICK

Pa (OHM-M's)
5 C.P.S

F.E. %

M.F. = $\frac{F.E.}{Pa} \times 1000$

CALC SILICATE

DIPOLE - DIPOLE a = 4 CMS

FREQ : 5 & 0.3 C.P.S

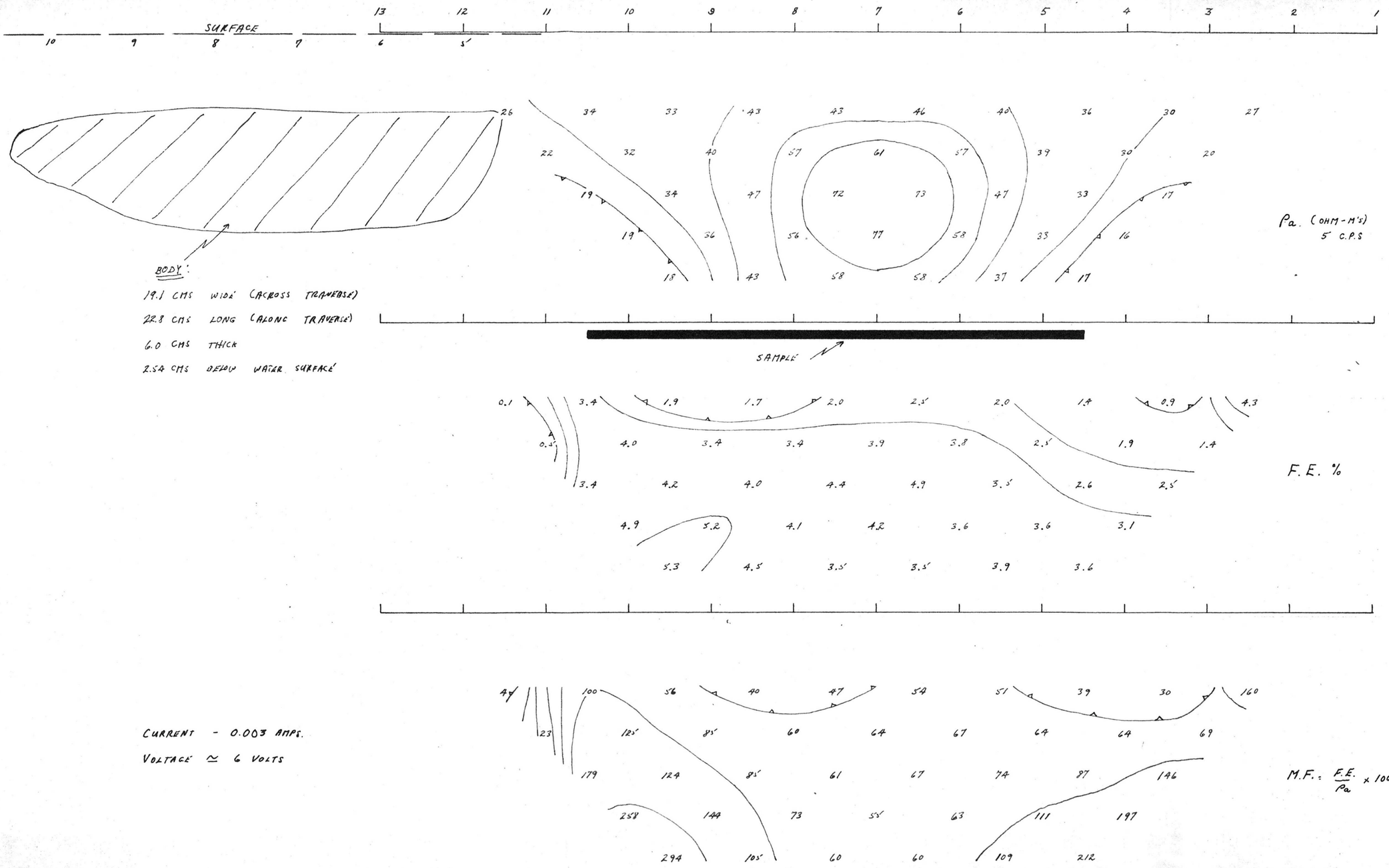
BACKGROUND ≃ 0.0002 N SALINE SOL.

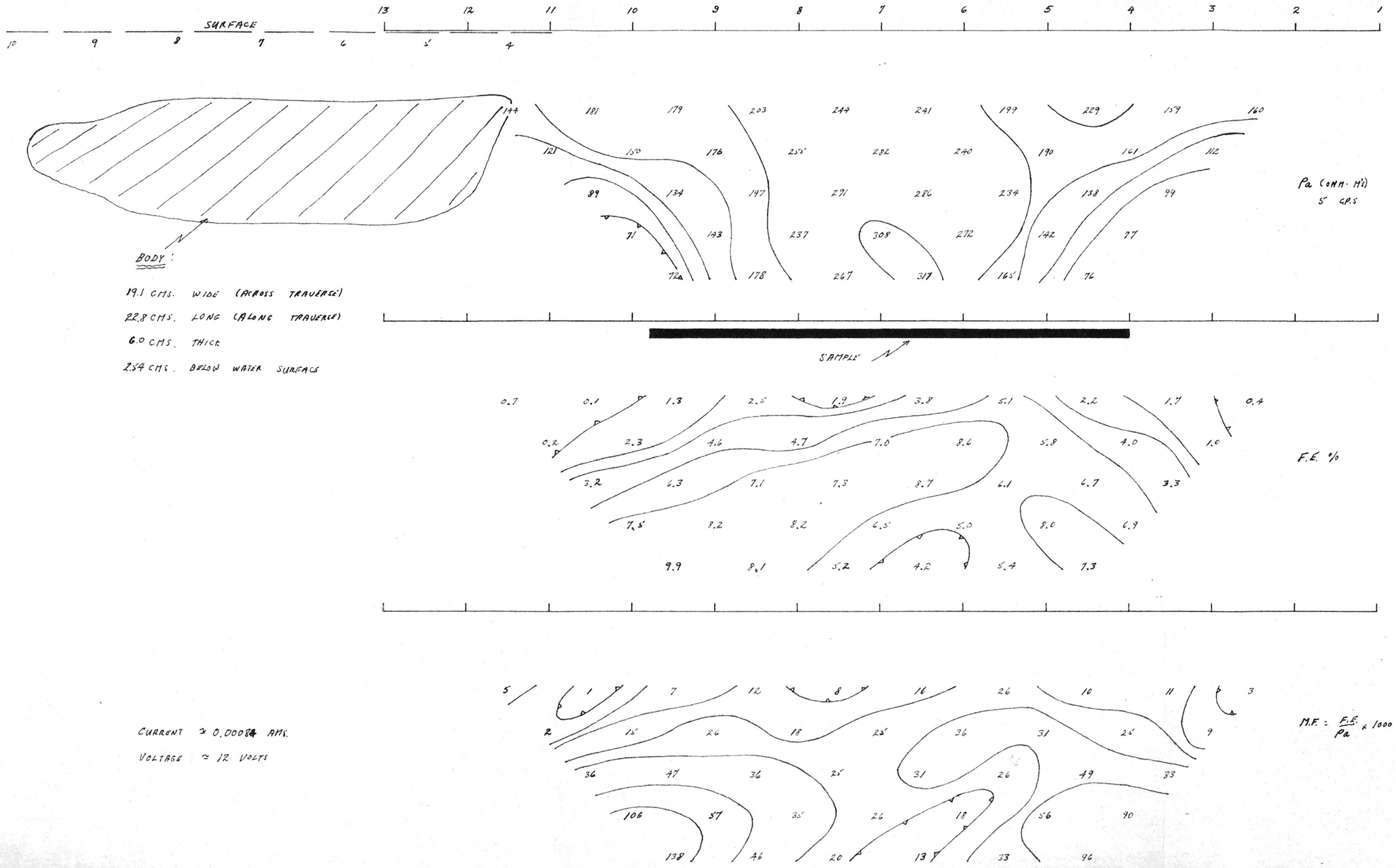
SCALE 1" = 4 CMS.

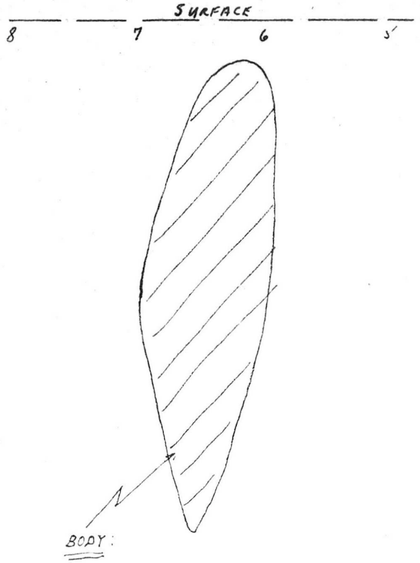
LOGARITHMIC CONTOURS

CURRENT ≃ 0.001 AMPS.

VOLTAGE ≃ 12 VOLTS


SURFACE
13 12 11 10 9 8 7 6 5 4 3 2 1
10 9 8 7 6 5
BODY:
19.1 CMS WIDE (ACROSS TRAVERSE)
22.8 CMS LONG (ALONG TRAVERSE)
6.0 CMS THICK
2.54 CMS BELOW WATER SURFACE
SAMPLE
Pa. (OHM-M's)
5 C.P.S
F.E. %
M.F.: F.E. / Pa x 1000
CURRENT - 0.003 AMPS.
VOLTAGE ≃ 6 VOLTS
GRAPHITIC PHYLLITE
DIPOLE - DIPOLE a = 4 CMS.
FREQ.: 5 & 0.3 CPS
BACKGROUND ≃ 0.002 N SALINE SOL.
SCALE 1": 4 CMS.
LOGARITHMIC CONTOURS


SURFACE
BODY :
19.1 CMS. WIDE (ACROSS TRAVERSE)
22.8 CMS. LONG (ALONG TRAVERSE)
6.0 CMS. THICK
2.54 CMS. BELOW WATER SURFACE
SAMPLE
Pa (OHM-Ft)
5 C.P.S
F.E. %
M.F. = F.E. / Pa x 1000
CURRENT ≈ 0.00084 AMS.
VOLTAGE ≈ 12 VOLTS
GRAPHITIC PHYLLITE
DIPOLE - DIPOLE a = 4 CMS.
FREQ = 5.4 0.3 C.P.S.
BACKGROUND ≈ 0.0002 N SALINE SOL.
SCALE 1" = 4 CMS
LOGARITHMIC CONTOURS



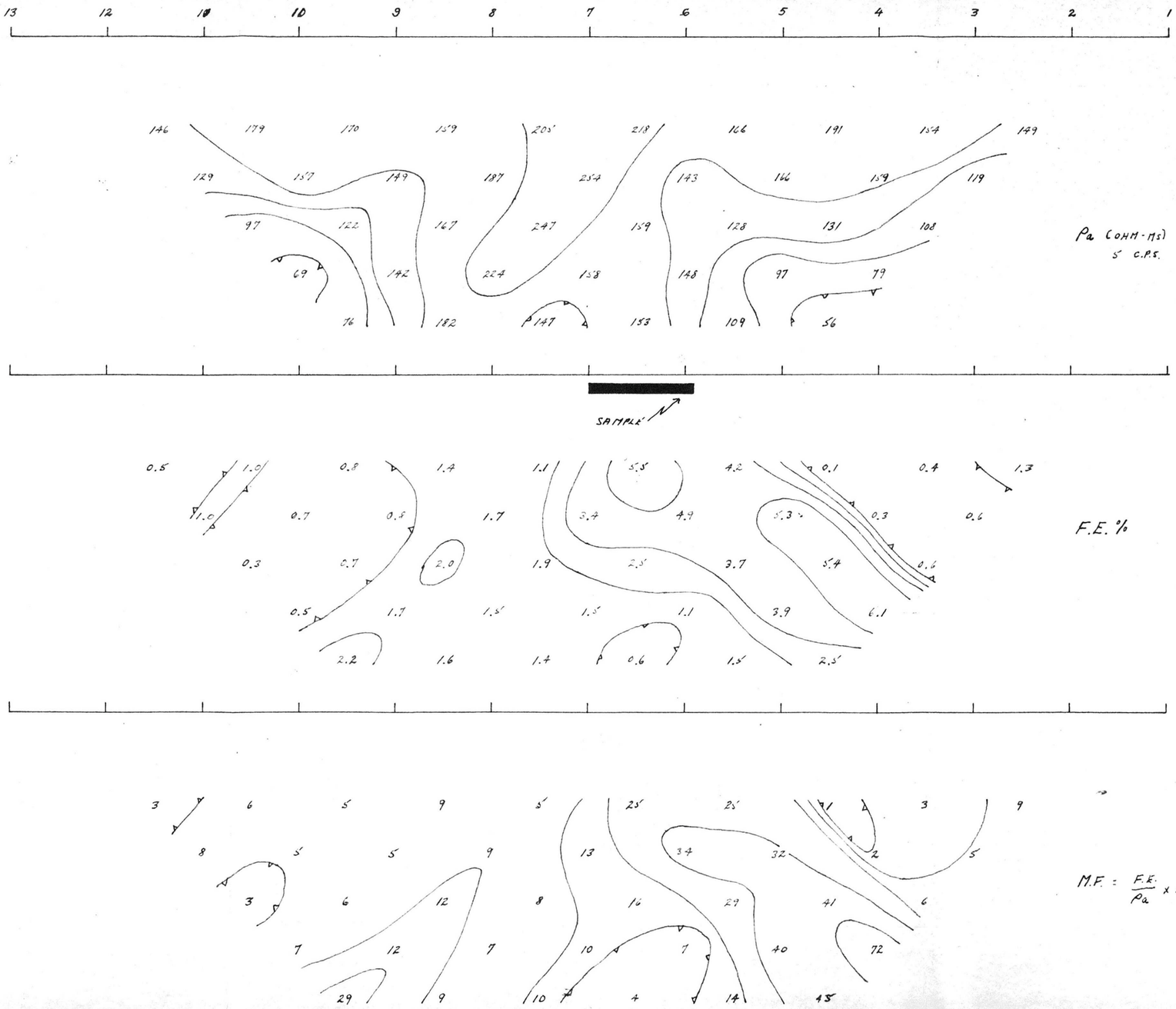
15.2 CMS WIDE (WITH DEPTH)

22.8 CMS LONG (ACROSS TRAVERSE

3.9 CMS THICK (ALONG TRAVERSE)

CURRENT ≃ 0.00182 AMPS

VOLTAGE ≃ 12 VOLTS



Pa (OHM-MS) 5 C.P.S.

F.E. %

M.F. = $\frac{F.E.}{Pa} \times 1000$

SERICITE SCHIST

DIPOLE - DIPOLE a = 4 CMS

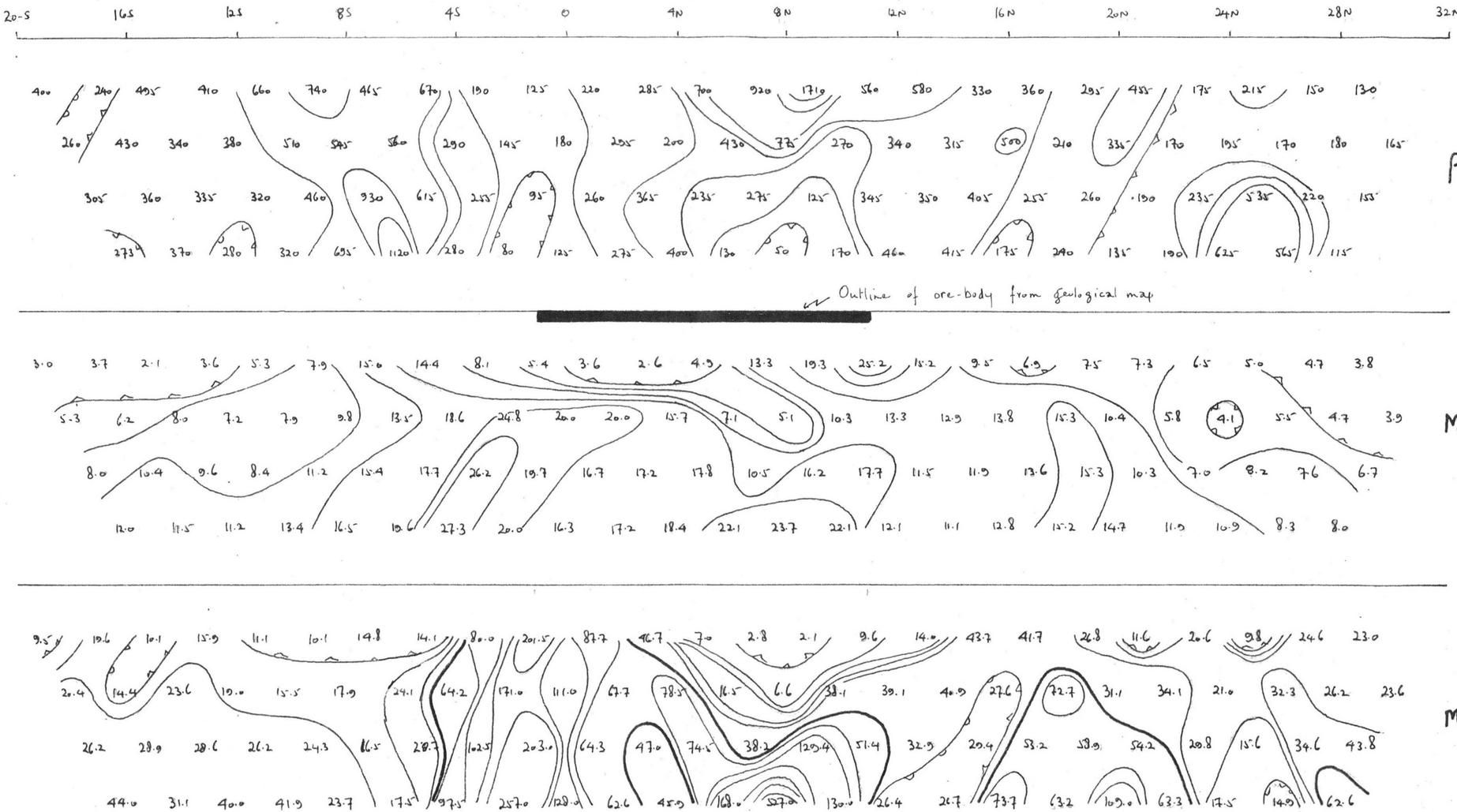
FREQ. = 5 & 0.3 CPS.

BACKGROUND ≃ 0.0002 N SALINE SOL.

SCALE: 1" = 4 CMS.

LOGARITHMIC CONTOURS

105 K 6



ρ_a (ohm-m's)

M_a (milliseces)

$M.F = \frac{M_a}{\rho_a} \times 1000$

L-48+00W

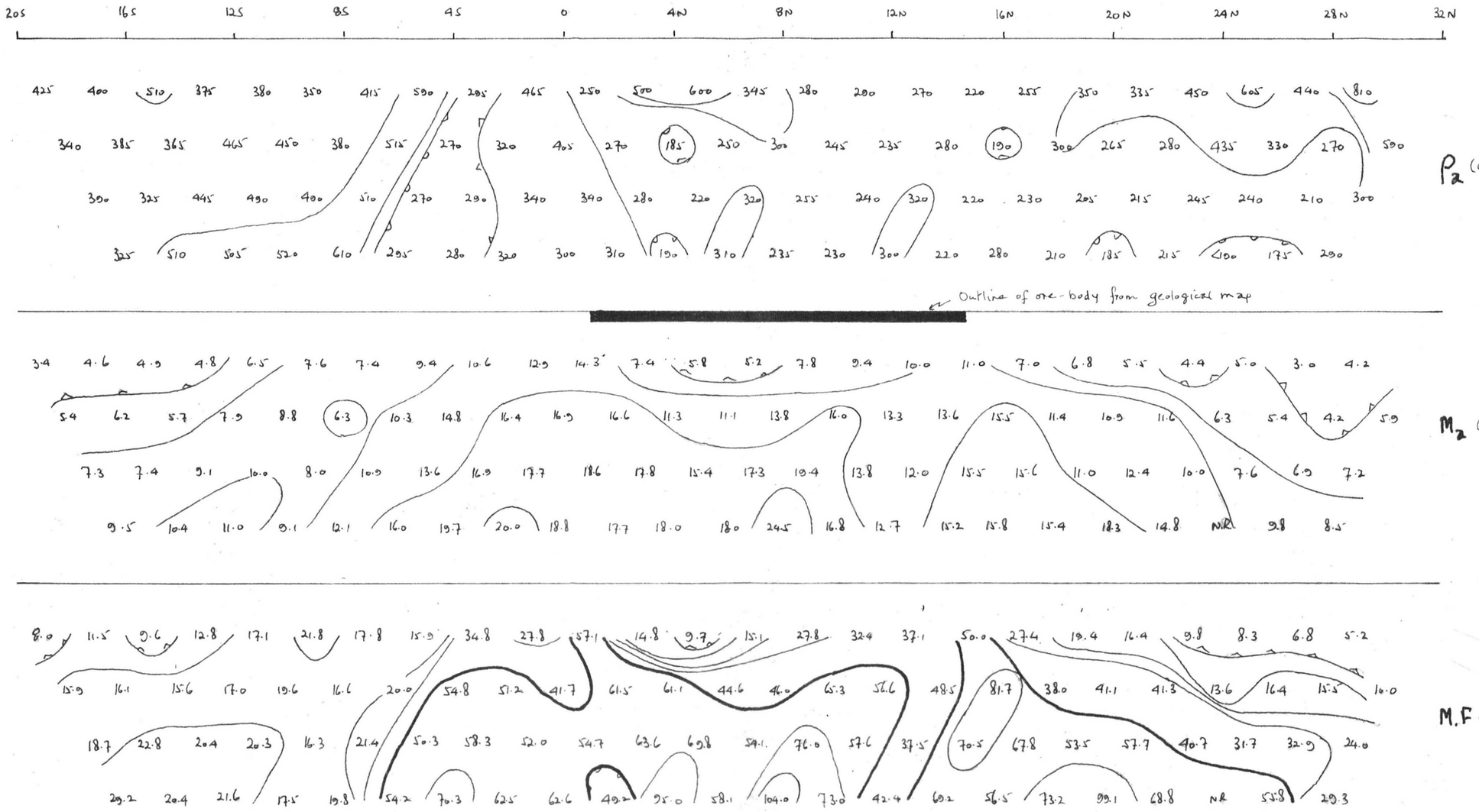
FARO # 3

Pole-dipole array

$a = 200'$

Scale $1'' = 400'$

Logarithmic Contours



ρ_a (ohm-ms)

M_a (milliSecs)

$M.F = \frac{M_a}{\rho_a} \times 1000$

165 K6

L-52+00W

FARO #3

Pole-dipole array

a = 200'

Scale 1" = 400'

Logarithmic Contours

105 K 6

L-56+00 W

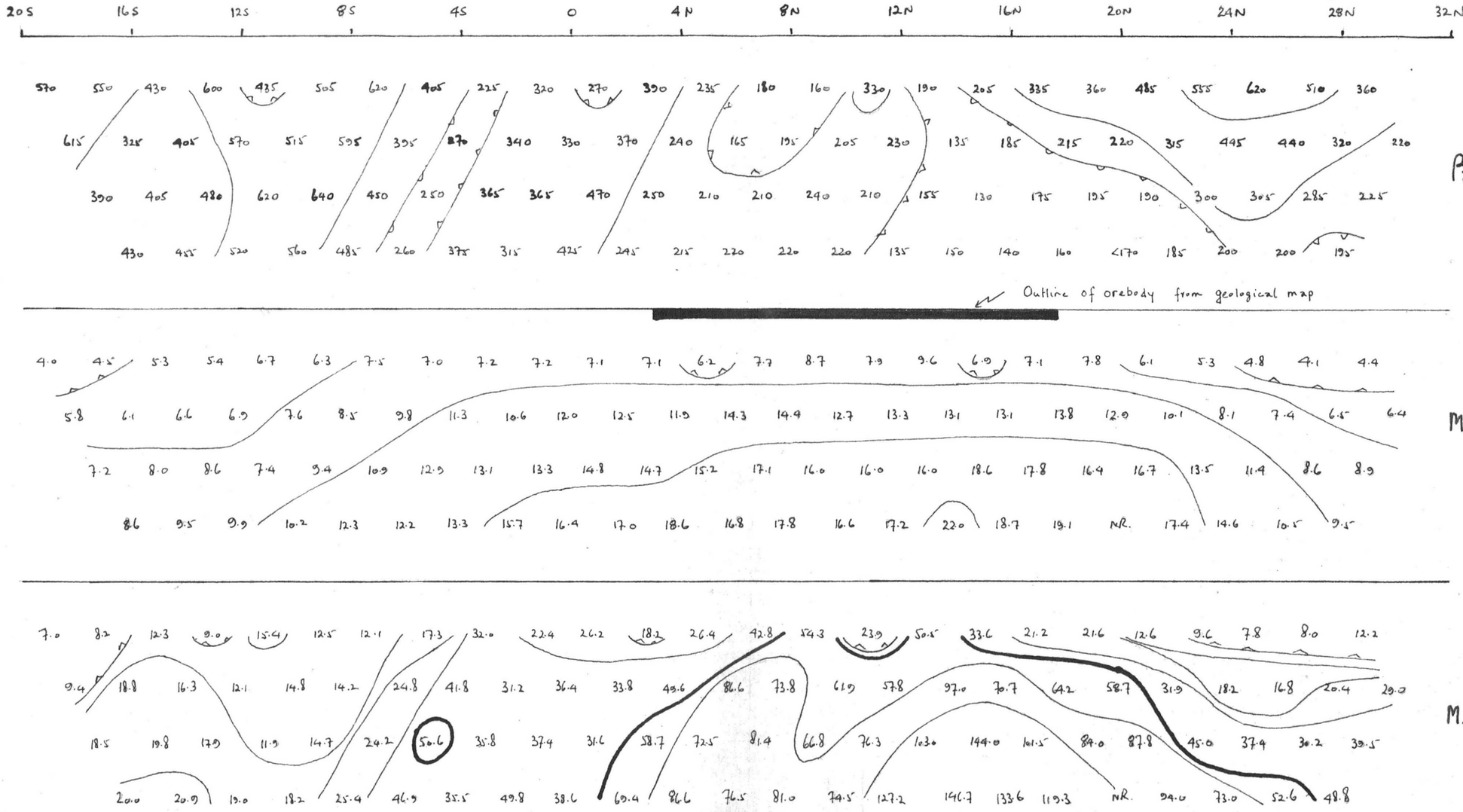
FARO # 3

Pole-dipole array

a = 200'

Scale 1" = 400'

Logarithmic Contours



P. WALCOTT et al 1970

cf.
SMELLIE
LINE 56
a = 300
Dipole-Dipole
1966