REPORT ON A
SCHLUMBERGER ARRAY ELECTRICAL INDUCED POLARIZATION SURVEY
OVER THE COMSTOCK GRID

ON BEHALF OF

THE MOUNT LYELL MINING AND RAILWAY COMPANY LTD.

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PRIVATE AND CONFIDENTIAL

REPORT ON A SCHLUMBERGER ARRAY ELECTRICAL INDUCED POLARIZATION SURVEY OVER THE COMSTOCK GRID ON BEHALF OF THE MOUNT LYELL MINING AND RAILWAY COMPANY LTD.

BY

A.W. HOWLAND-ROSE

MSc,DIC,AMAusIMM,FGS.

GEOPHYSICIST

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Formerly
SEIGEL ASSOCIATES AUSTRALASIA PTY. LTD.
GEOPHYSICAL CONSULTANTS AND CONTRACTORS

SUMMARY

Due to excessive DC noise caused by electric trams in the Comstock area, a moving Schlumberger array was employed to overcome this problem. This method enabled excellent data to be produced from this area, with absolutely no noise interference.

A number of highly significant anomalies were defined which are all considered to be within 100 feet or so of surface and to be caused by disseminated sulphide sources.

1031 WELLINGTON STREET, WEST PERTH, W.A. 6005
TELEPHONE 21 6934. TELEGRAMS "SCINTREX" PERTH

6 TRAMORE PLACE, KILLARNEY HEIGHTS, N.S.W. 2087
TELEPHONE 451 5367. TELEGRAMS "SCINTREX" SYDNEY

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INTRODUCTION

On $3\frac{1}{4}$ production days between the 12th and 16th March, 1974 Scintrex Pty. Ltd. performed an electrical induced polarization survey over six lines on the Comstock grid in the Queenstown area. The survey was undertaken at the request of Mr. K. Reid, Chief Geologist for the client, and the geological supervision was undertaken by Mr. K. Wells, Senior Exploration Geologist, The single crew was under the direction of Mr. B. Ekstrom, with all field assistants and logistical support supplied by the Mt. Lyell Mining and Railway Company Ltd. Technical supervision for the project was supplied by Mr. A.W. Howland-Rose

The object of the programme was to map the distribution of sulphides over the area surveyed, and for this purpose a Scintrex IPR-8 receiver was used together with a standard Scintrex IPTA trasnmitter. The operation of this receiver is described in detail in Appendix 'IPR-8' and some general comments on the IP method are made in Appendix 'IP'.

THE METHOD

In most of the recent induced polarization surveys carried out for the Mt. Lyell Company in the Queenstown area, the standard reconnaissance method has been gradient array, with additional near surface and depth information being obtained by the use of close-coupled arrays. The reasons for the use of these arrays are described in full in previous reports.

In this case, however, extremely noisy conditions were encountered due to the operation of DC trams in the Comstock Mine, and due to the absence of major shutdowns of these trams, a different method of obtaining meaningful data had to be found. As would be expected, both dipole-dipole and pole-dipole test work demonstrated, as did gradient array, that the noise levels were too great for meaningful data to be obtained in an economic fashion. This problem was resolved by the use of a "moving Schlumberger array". This system, due to the short 500 feet current dipole and the internal potential dipole, utilises higher effective current concentrations in the vicinity of the induced polarization measurement. In practice this is some 100 fold greater than for a 10,000 feet gradient array, 40 fold greater than a 2000 feet gradient array, and some 5 to 10 times greater than for normal moving source arrays of equivalent depth penetration. The practical application of this array gave no noise problems whatsoever.

The practical limitations of the array are (i) that its maximum depth penetration is limited to just in excess of 100 metres, (ii) the current electrodes must be moved along line, and (iii) the passage of each current electrode over an anomalous concentration of chargeable material will also yield an anomalous response, but of smaller dimensions to the main response, which will be contained between the 100 feet potential dipole in the centre of the 500 feet current dipole. A to scale diagram of the array employed is shown on Plate 1, and a typical response from a narrow body is seen on line 22W where the source lies immediately below 12.5S, and the subsidiary anomalies at 9.5S and 15.5S are due to responses when the current dipoles are in close proximity to the source. The width of this zone is some 50 to 80 feet, and in these circumstances the "triple" response is easy to identify. However, in wide zones such as that observed between 8S and 11S on line 39W , the picture is somewhat more complex.

DESCRIPTION OF RESULTS

The six data profiles are displayed on Plate 1 at a horizontal scale of 1 inch = 200 feet and vertical scales of 1 inch = 10 millivolts/volt, while the resistivity was shown on a two inch log cycle and expressed in ohm-metres

At the same horizontal scale, a diagrammatic representation of the current lines and equipotential lines of the moving Schlumberger array employed in the survey are shown. The shaded area between the two potentials P_1 and P_2 represents the volume of the main area measured. As explained in the section on method above, subsidiary, but minor, response will also occur as the current electrodes C_1 and C_2 pass in close proximity to the chargeable source.

Due to the "triple peaking" effect, it is inadvisable to contour this data and for this reason, no attempt has been made to do so.

The detailed programming of the IPR-8 receiver employed in this survey is described in Appendix 'IPR-8'. In this case a two second square wave energising pulse was employed, with three slices of the decay curve, M_1, M_3 and M_5 being recorded. In practice, only M_3 is presented in Plate 1 as the M_1 and M_5 values show no departures from normal decay curve form.

The induced polarization data is expressed in terms of millivolts/volt which is not quite the same unit as previous data surveyed by Scintrex and CGG in the Queenstown area. The comparison is explained in the abovementioned appendix, but as a rule of thumb, 1 millisecond is about equivalent to $1\frac{1}{2}$ millivolts/volt.

At the time of writing, no detailed geology of the area is avilable, and therefore the geophysical aspects of the data only, are discussed. A line by line description of the data follows:

Line 20W The recorded apparent resistivities range from 300 ohm-metres to just in excess of 1000 ohm-metres, while the background chargeabilities range from 15 to 18 millivolts/volt which is equivalent to just over 10 milliseconds, which are the normal backgrounds observed elsewhere in the Mt. Lyell area.

The main feature observed on the apparent chargeability profile is a distinct high of about 12 millivolts/volt whose source is situated at 14S. The effective width of the zone is judged to be of the order of 100 to 120 feet, and the top of the source is assessed to be within 100 feet of surface. The chargeability peaks at 11.3S and 17S are considered to be secondary peaks due to the passage of current electrodes C_1 and C_2 over the main source at 14S.

There is no sign of any depression in the resistivity profile, and the source therefore is considered to be of a disseminated nature and of the order of 1% to 2% sulphide over the assessed 100 - 120 feet width.

Line 22W A very similar profile form was recorded on this line to that described above. The source zone is positioned at 12.5S and the width is assessed to be 70 to 80 feet. The depth is thought to be of the order of 100 feet or less. The subsidiary peaks at 9.5S and 15.5S are considered to be due to the passage of electrodes C_1 and C_2 over the chargeable source material, and not sources in themselves.

Line 26W A minor source is considered to be situated at about 7.8S agains from a disseminated source. The maximum depth is considered to be not greater than 100 feet and the width about 80 feet.

Line 30W A significant anomaly having a width of the order of 100 feet was defined at 12S. Again an absence of any depression in the resistivity profile infers a disseminated source. Similarly sources at 3.5S and 20.5S are also worthy of further interest.

Line 34W The background chargeability falls below 20 millivolts/volt only north of 4S. Superimposed on this high background, anomalous induced polarization responses were recorded between 7S and 12S, this, however, may be due to a source say between 8S and 10S. The array employed unfortunately leads to ambiguity in this case.

A second response at 14.5S should also receive careful attention.

All the anomalies defined above are inferred to come from essentially disseminated sources.

Line 39W The most substantial induced polarization anomaly recorded on this grid was defined by a 30 millivolts/volt response from 8S to 10.75S. The source is within 50 to 100 feet of surface, and the source makes a sharp contact with the enclosing host rocks. The gradual fall off on either side is most likely due to the passage of the current electrodes over the source. Asthere is only a marginal reduction in resistivity on this zone the source can clearly be seen to be of a disseminated nature.

(Please note that there was a pegging error south of 5S (inclusive). The co-ordinates referred to above have been corrected for this error.)

CONCLUSIONS

1 - The moving Schlumberger array employed in this survey proved to exhibit the noise rejection capabilities calculated for it. In practice it was less cumbersome to employ in the field than had been initially feared. The general form of the data suggests that they are easily interpretable. Additional intermediate readings would, however, have defined the sources more precisely.

2 - A number of highly significant EIP responses were defined. Without exception these are inferred to come from disseminated sources, or if massive, electrically discontinuous, as there is a complete absence of any material reduction in apparent resistivity.

RECOMMENDATIONS

1 - The following induced polarization sources are recommended for follow-up on a first priority basis:

Line	Location	Depth
39W	8S - 10.75S	within 50-100 feet
22W	12.5S (70/80 ft.wide)	within 100 feet
20W	14S (100/200 ft.wide)	within 100 feet

2 - Other anomlies worthy of further investigation as targets of seconday importance are as follows:

Line	Location	Depth
34W	8S - 10S	within 100 feet
34W	14.5S	?
30W	3.5S	within 100 feet
30W	12S	within 100 feet
30W	20.5S	?
26W	8S (100 ft. wide)	within 150 feet

3 - Detailed geological and/or soil/rock chip geochemical sampling is recommended prior to investigation by diamond drilling. Should such drilling be contemplated, we would be delighted to assist you in the planning of such a programme.

I look forward to discussing the above results when you have completed your evaluation of this report.

Respectfully submitted on behalf of:

SCINTREX PTY. LTD.

A.W. HOWLAND-ROSE, MSc,DIC,AMAusIMM,FGS.
GEOPHYSICIST

APPENDIX 'I.P.'

INTRODUCTION

For the benefit of those who are unfamiliar with the Induced Polarization method in general, or with the pulse-type method in particular, a few introductory remarks will be directed on the Induced Polarization, or overvoltage, phenomenon. Those who wish a fuller treatment of the subject are directed to Seigel (1962), which paper also includes an extensive list of references.

Induced Polarization in its broadest sense means a separation of charge to form an effective dipolar (polarised) distribution of electrical charges throughout a medium under the action of an applied electric field. When current is caused to pass across the interface between electrolyte and a metallic conducting body, double layers of charge are built up at the interface, in the phenomenon known to electrochemists as "overvoltage". This is the phenomenon which can be utilised for the detection of metallic conducting, rock-forming, minerals such as most sulphides, arsenides, a few oxides and, unfortunately, graphite. In addition, effective dipolar charge distribution occurs to some extent in all rocks, due to ion-sorting in the fine capillaries in which the current is passing.

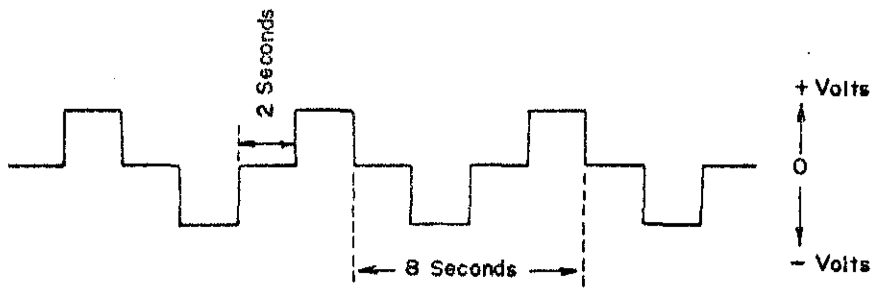
Induced Polarization responses may therefore arise from metallic or non-metallic agencies. Fortunately, the latter generally falls within fairly low and narrow limits for almost all rock types, although there is still no reliable criterion for differentiating overvoltage responses from graphite and metallic sulphides, or for distinguishing between the responses of one type of sulphide and another. Despite these limitations the Induced Polarization method has amply demonstrated its value in mineral exploration since its initial development as a useful exploration tool in 1948 (ed. Wait, 1959).

DESCRIPTION OF METHOD AND EQUIPMENT

For the present programme the pulse or time domain system was employed, using a Scintrex Induced Polarization unit. The standard current-wave form with the unit is two seconds on-time and two seconds off-time. (see Figure 1). This unit features the Newmont type self-triggered receiver which operates remote from the current transmitting equipment. Three fundamental quantities are measured with this unit - the chargeability of 'M' measurement, the 'L' measurement and the resistivity.

The receiver integrates the area under the decay curve during the time interval from 0.45 seconds to 1.1 seconds

MEASUREMENTS TAKEN



Energising frequency is a square wave having a frequency of 0·125 cps.

FIELD MEASUREMENTS MADE

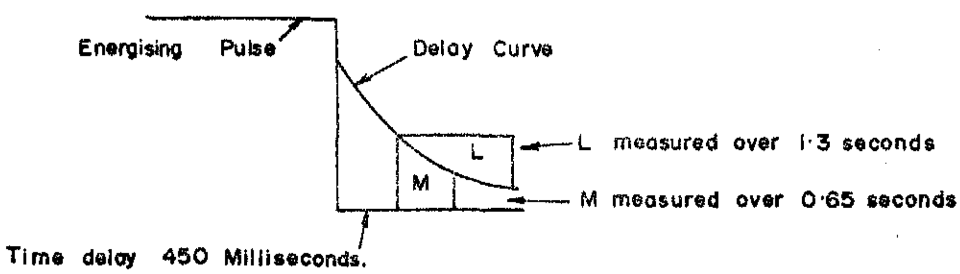


Fig. 1

after termination of the primary current pulse. This integral normalised with respect to its corresponding primary voltage is the chargeability or 'M' measurement, that is, the fundamental Induced Polarization characteristic. It is in units of milliseconds. The Induced Polarization phenomena is dependent on the existence of electronically conducting material within the matrix of ionically conducting material. The chargeability is therefore a measure of the presence of electronically conducting material within the ground being tested.

The second quantity measured is the area over the transient decay curve between 0.45 seconds and 1.75 seconds of the current off-time. This measurement is designated the 'L' measurement and is also in units of milliseconds. The ratio L/M gives a curve factor related to the shape of the transient voltage curve, and is a measure of the rate of decay of the transient voltage. This is of secondary diagnostic value in that the rate of decay of the transient voltage is partially a function of particle size. A large L/M ratio reflects a short time constant, commonly associated with finely disseminated sulphide or graphite, whereas a small L/M ratio reflects the longer time constants associated with the larger sized metallic particles.

The L/M ratio is also effective in determining the presence of electromagnetic coupling effects. With the Scintrex Induced Polarization unit, electromagnetic coupling effects are essentially eliminated by an 0.45 second delay-time following termination of the primary current pulse before measurement of the transient voltage commences. However, in extremely low resistivity areas coupling may occur. Under these conditions the presence of electromagnetic coupling can distort the Induced Polarization response, and it is extremely important to know when this occurs. The presence of such coupling is immediately recognizable from the L/M ratios.

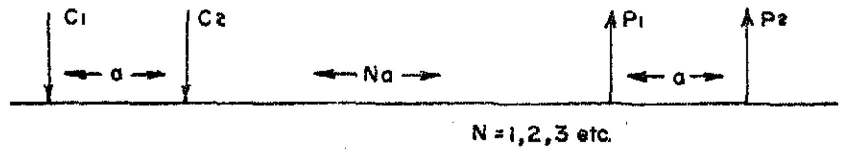
Resistivity measurements are also made as an integral part of all Induced Polarization measurement using the Scintrex Induced Polarization unit. The resistivity values are of primary importance in determining subsurface geological features such as contact zones, faulting, etc., and are of assistance in mapping the geology in general.

Electrode geometries (see Figure 2) utilised in obtaining field measurements are important and no one electrode array is applicable for all conditions. In areas where a low resistivity oxidised surface layer overlies a much higher resistivity freshrock, a high degree of

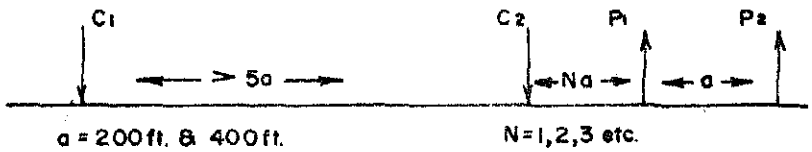
COMMONLY USED ELECTRODE ARRAYS

CLOSE – COUPLED ARRAYS

DIPOLE – DIPOLE



POLE – DIPOLE



GRADIENT ARRAY

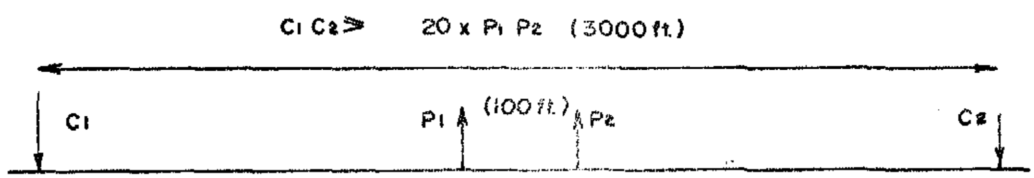


Fig. 2

masking occurs using any of the close-coupled arrays, such as pole-dipole or dipole-dipole. An electrode spacing many times greater than the depth to freshrock must be used in order to obtain responses reasonably representative of the freshrock. With such large electrode spacings the physical properties are effectively averaged over so large a volume that we lose the ability to detect moderate sized bodies of polarizable material. However, under these conditions the gradient array is both feasible and desirable in that it minimises the effects of masking and at the same time has a high degree of resolution for small targets.

In the present areas of investigation, abnormal induced polarization responses may be expected to arise from the electronically conducting sulphide minerals such as pyrite, pyrrhotite, chalcopyrite and pentlandite, plus graphite and magnetite. The response from magnetite has been found to be quite variable and somewhat unpredictable, reflecting the great variation in the mode of electrical conduction in this material. It is not always possible to differentiate between these potential sources of high chargeability from the Induced Polarization and resistivity data alone. Complementary geophysical, geochemical and geological data enable a more complete interpretation to be made of the Induced Polarization data.

REFERENCES

Seigel, 1962	"Induced Polarization and Its Role in Mineral Exploration" H.O. Seigel, Canadian Mining and Metallurgical Bulletin, April, 1962.
ed. Wait, 1959	"Overvoltage Research and Geophysical Applications" editor J.R. Wait, Pergamon Press, London, 1959.

APPENDIX IPR-8

I INTRODUCTION

The basic equipment required for an Induced Polarization survey consists of a transmitter, a receiver, wire and electrodes.

Most time domain induced polarization transmitters transmit square waves with equal "on" and "off" times. Polarity is automatically changed between the pulses. The waveform shown below indicates how the current is usually transmitted. The pulse times range from 1 to 8 seconds.

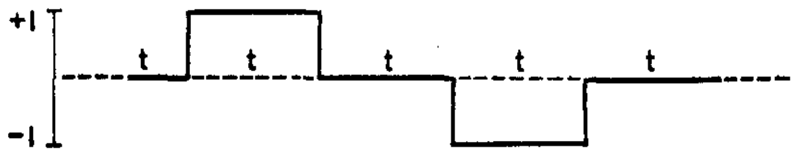


FIGURE 1A

The transmitter is powered by batteries (portable type units or a motor driven generator. Scintrex manufactures various time domain induced polarization transmitters ranging in power from 25 watts to 15 kW. The choice of a transmitter depends on various factors such as: the electrode spacings to be employed, contact resistance and the resistivity of the subsurface. The IPR-8 receiver is designed for use with any time domain induced polarization transmitter.

The IPR-8 time domain induced polarization receiver is of the state-of-the-art design, packaged in a rugged and portable manner. Using integration and automatic normalization, it measures the characteristics of an induced polarization decay curve set up by overvoltage and other effects occurring in rocks. When induced polarization effects (such as due to metallic-non metallic interfaces in rocks) occur, the waveform received at the receiver is not the same square wave as transmitted by the transmitter. The waveform shown below indicates the sort of wave distortion which is caused by the induced polarization phenomena.

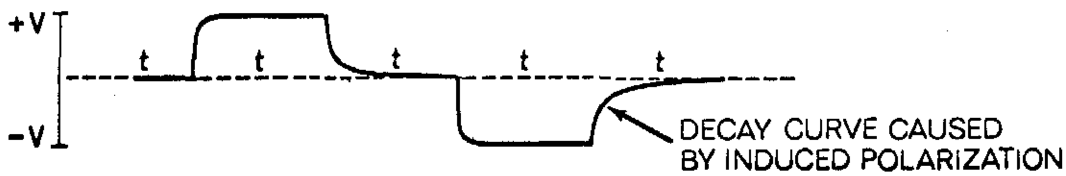


FIGURE 1B

II SPECIFICATIONS

The IPR-8 has the following specifications:

Input Impedance	3 megohms
Primary Voltage (Vp) Range	300 microvolts full scale to 40 volts full scale in 10 ranges
Accuracy of Vp Measurement	±3% of full scale
Vs/Vp Ranges	20 and 100 mV/V full scale
Vs/Vp Accuracy	±3% of full scale
Primary SP Buckout Range	±1 volt
Accuracy of SP Measurement	±3%, ±5 mV
Automatic SP Tracking Range	6 x Vp, maximum ±1 volt
Continuity Meter Reading	0 - 500 k ohms
50 or 60 Hz Powerline Rejection	-50 db (300x)*
Low Pass Filter	6 db/octave with fc = 20 Hz and 12 db/octave with fc = 36 Hz
Required Stability of Transmitter Timing	Need only exceed measuring program selected (1 or 2 seconds)
Operating Temperature Range	-30°C to +60°C
Dimensions	320 mm x 135 mm x 160 mm
Weight, Complete with Lid and Batteries	3.6 kg
Power Supply	4 D cells - Eveready No. 1050 or equivalent; estimated battery life 2 months intermittent duty at 25°C 1 Alkaline cell Eveready No. E91 or equivalent; estimated life 1 year

* 50 or 60 Hz depending on power system.

III QUANTITIES MEASURED BY THE IPR-8

Figure 2 shows the different parameters measured by the IPR-8. The usual measurements are Vp, the received primary voltage and "M", a parameter related to the transient curve. The Vp measurement is used in resistivity calculations while M is the chargeability (induced polarization) parameter. In addition, absolute values of the self-potential (SP) can be measured.

In all cases, the M quantity measured by the IPR-8 is the mean value of the transient voltage over a selected time interval to which the following normalizations have been applied:

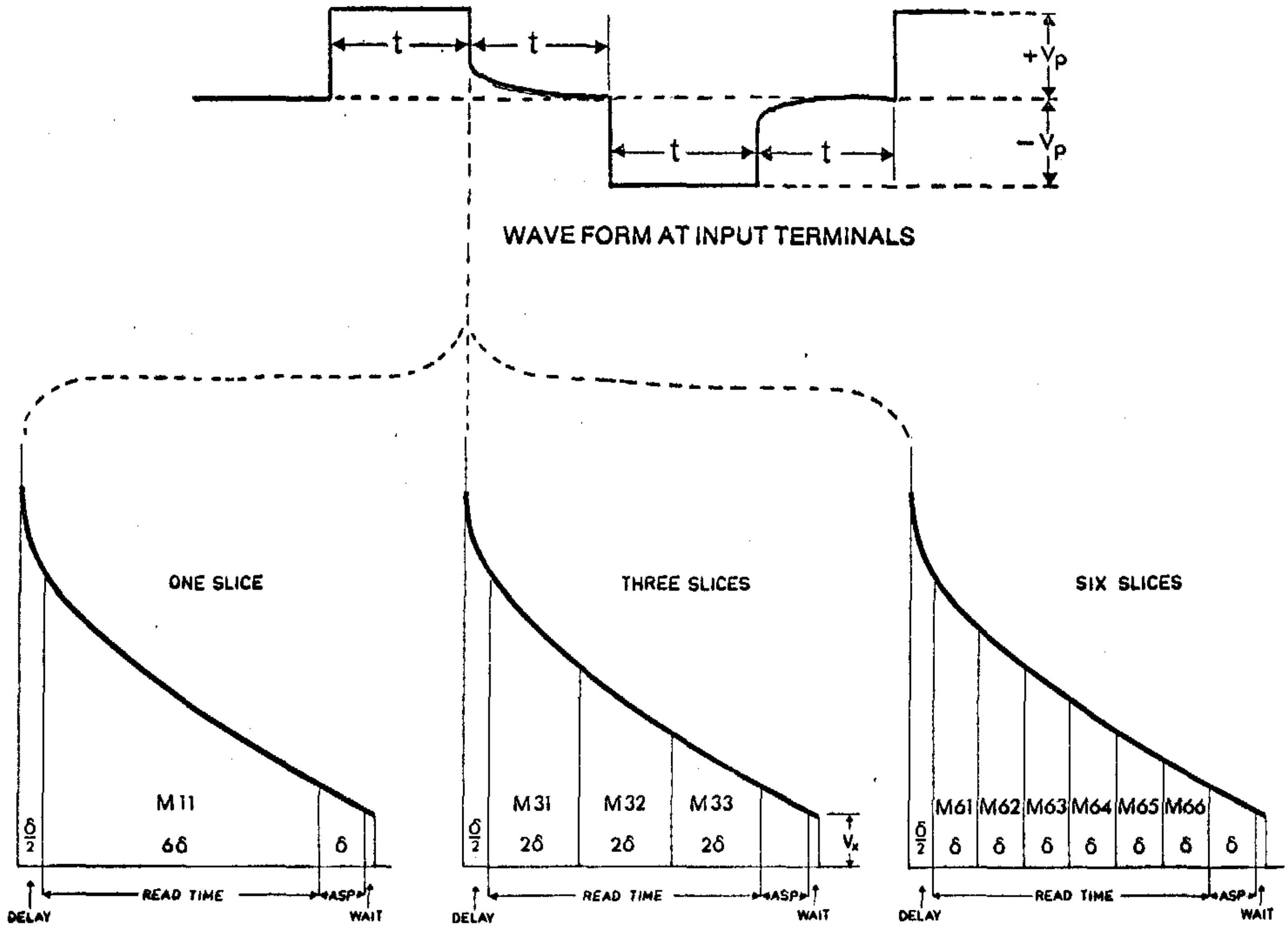
- normalization for the length of the integration interval
- normalization for the primary steady state voltage (Vp)
- normalization for curve shape
- normalization for number of pulses

The units of the quantities measured are, therefore, dimensionless and are normally expressed in "millivolts per volt".

In the various modes of operation the transient voltage following the interruption of the primary current pulse is either integrated over one long period of time or sliced into either 3 or 6 slices. By using 6 slices, a good record of the decay curve shape can be obtained. The 3 slice mode gives some curve shape information and provides an economical standard mode in which to operate. The centre slice of this mode is reasonably close to the measurement made by the Scintrex IPR-7 and other receivers of the "Newmont Type", while the first and last slices can be used for a rapid check of curve shape. A more precise relationship is, however, presented later in this section.

Figure 2 shows the actual times used. For the receiver to operate, the transmitter timing may be any time period of one second or greater (i.e. $t \geqq 1$ second) although transmitter and receiver timings of 2 seconds are considered normal for most surveys. Equal on and off timing assures the best noise rejection as the signal is averaged over the longest possible time, and the automatic self-potential adjustment is made closest to the reading time.

With the receiver set at $t = 1$ second, the decay ($\delta/2$) from the current-off time to the commencement of the measurement is 65 milliseconds and the slice width (δ) is 130 milliseconds. With the receiver set at $t = 2$ seconds the delay is 130 milliseconds and the slice width is 260 milliseconds. Fuller information on the programs is available from the tables in Figure 2.



SECONDARY DECAY CURVE SHAPES AS APPLIED TO THE INTEGRATORS

t sec.	δ	delay time	waiting time	M 11				M 31			M 32			M 33			length
				from	to	mean	length	from	to	mean	from	to	mean	from	to	mean	
1	130	65	25	65	845	455	780	65	325	195	325	585	455	585	845	715	260
2	260	130	50	130	1690	910	1560	130	650	390	650	1170	910	1170	1690	1430	520

t sec.	M 61			M 62			M 63			M 64			M 65			M 66			length
	from	to	mean	from	to	mean	from	to	mean	from	to	mean	from	to	mean	from	to	mean	
1	65	195	130	195	325	260	325	455	390	455	585	520	585	715	650	715	845	780	130
2	130	390	260	390	650	520	650	910	780	910	1170	1040	1170	1430	1300	1430	1690	1560	260

FIGURE 2

PARAMETERS MEASURED WITH TIMES OF RECEIVER PROGRAM IN MILLISECONDS.

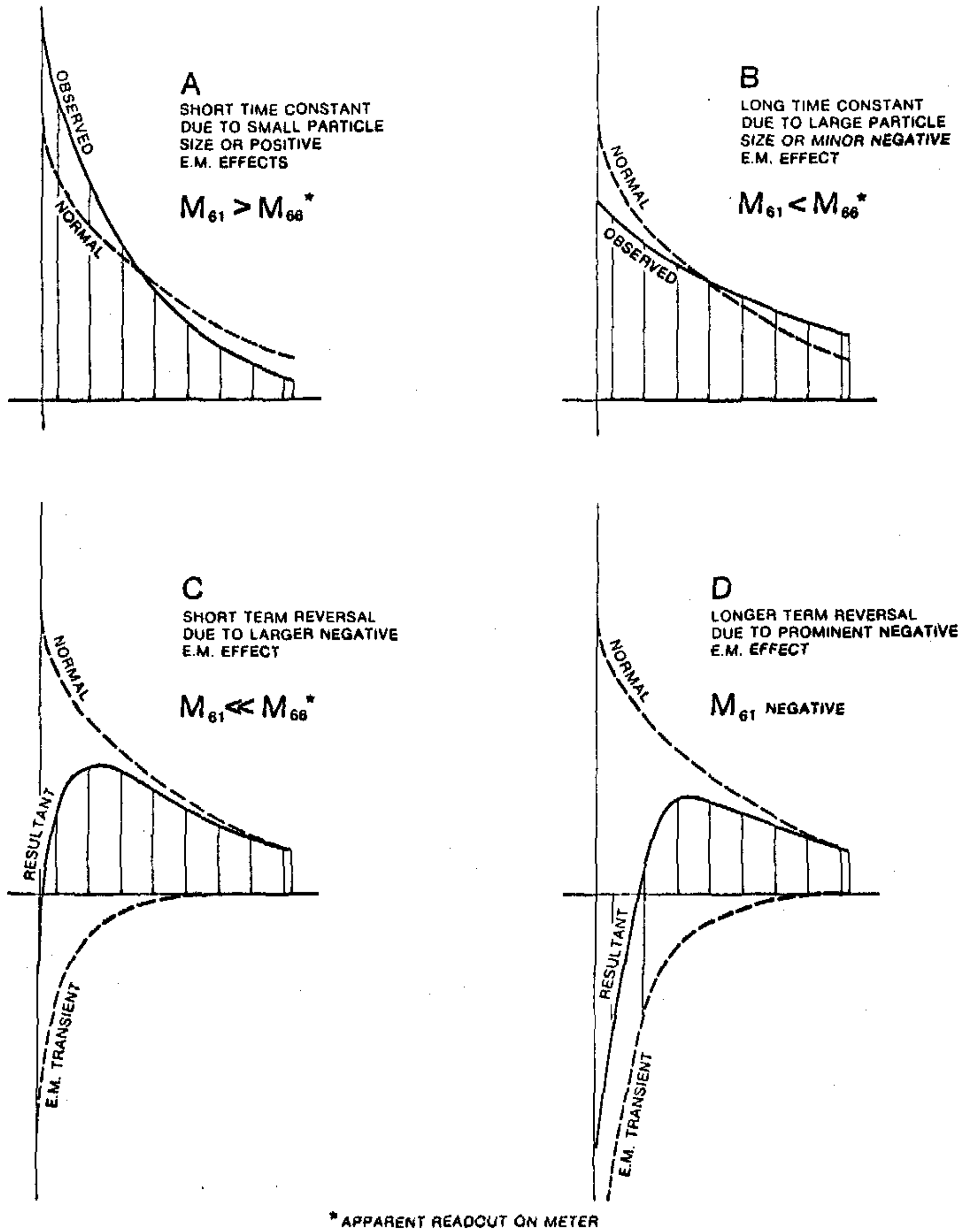


FIGURE 3

THE SIGNIFICANCE OF CURVE SHAPE INFORMATION GAINED USING 6 SLICE READINGS.

Each integration is normalized with respect to the Standard Induced Polarization Decay Curve which has been established by Newmont Exploration Limited. (ref. Dolan and McLaughlin in bibliography) This is achieved by choosing the sensitivities of the integrators so, that if the curve shape is normal, all slices within a given mode show the same amplitude of measurement. A further normalization is built in for the slice width, be it full, one-third or one-sixth of the total integration period. The net effect is that the reading will be the same regardless of the slice measured, providing that a standard transient decay curve form is present and that the same measuring cycle is used for transmitter and receiver (1 second or 2 seconds). Any departure from this standard curve form will be immediately obvious to the operator, without performing any calculations. For instance, a steeper decay will give a higher reading on earlier slices than on later slices. Reconstruction of the actual decay curve is easily effected by using the correction factors given in Table 1.

The shape of a time domain induced polarization decay curve can be altered by electromagnetic or interline coupling, by variations in the average size or degree of interconnection of the metallic particles in the bedrock or by other I.P. sources. Figure 3 illustrates the advantage of breaking the decay curve into slices. Utilizing only one wide slice, there is no indication of the shape of the decay curve. Positive electromagnetic coupling effects or small particle size may give rise to an abnormally short time constant (Case A) which, for multi-slice modes will be indicated by higher normalized readings of the earlier slices with respect to the later slices. An increase in the later slices over the earlier ones (Case B) may imply a longer time constant due to a minor negative EM transient or I.P. responses from large metallic particles, etc. Cases C and D, where the values of the initial slices are considerably reduced or are even negative, show the effect of negative EM transients of increasing amplitude.

A system of symbols has been created to indicate each of the measurable slices.

The general symbol is M_{txy} where:

- t is the timing chosen (i.e. 1 or 2 seconds)
- x is the number of slices in the mode chosen (i.e. 1, 3 or 6)
- y is the number of the slice referred to (i.e. 1, 2, 3, 4, 5 or 6)

Wherever two subscripts only are given, eg. M_{32}, it is understood to apply equally for t = 1 sec. or t = 2 sec.

A chargeability reading is defined by the following formula:

$$M = \frac{V_s \cdot 1000}{V_p} \quad \text{in mV/V}$$

where $$V_s = \frac{{}_{t_1}\int^{t_2} V_s \, dt}{t_r} + V_x$$

and t_1 = time at beginning of slice

t_2 = time at end of slice

V_x = residual transient voltage at the end of the automatic self potential correction

$t_r = t_2 - t_1$, i.e. the integrating period

Chargeability values, uncorrected for curve shape, can be easily calculated if required. Normalizations for all slices are made using the M_{232} value as reference. In other words, there is no curve shape normalization applied to this slice; the M_{232} readout is, therefore, directly as measured. The same statement holds for the M_{132} slice, however, its value is one-half the value for M_{232} provided that the transmitter timing matches the receiver timing.

To restore the true transient curve shape (M true), the observed M readings (M read) are multiplied by the factors in Table 1.

TABLE 1

$$M_{true} = M_{read} \bullet k_1$$

Slice	k_1
M_{11}	1.09
M_{31}	1.47
M_{32}	1.00 ← NORMAL
M_{33}	0.81
M_{61}	1.68
M_{62}	1.27
M_{63}	1.06
M_{64}	0.94
M_{65}	0.85
M_{66}	0.78

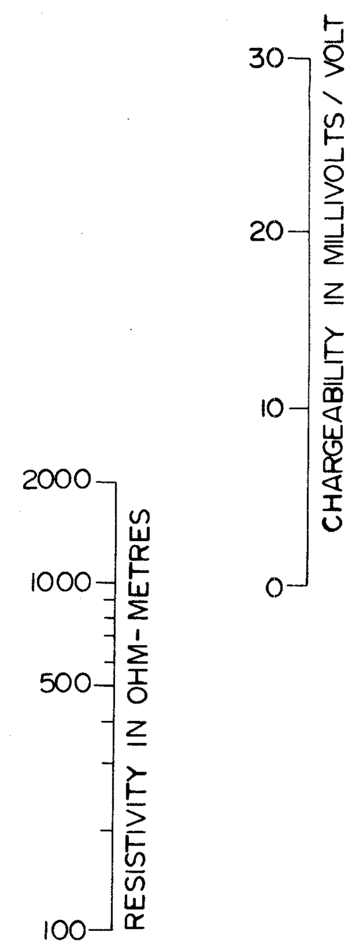
For the ideal "normal" I.P. transient curve form $M_{2xy} = 2M_{1xy}$ where M_{2xy} is for a 2-second on-off transmitter cycle and M_{1xy} is for a 1-second on-off cycle. The relationship between readings taken with differing transmitter and receiver timings is more complicated, particularly if the curve shapes are not normal.

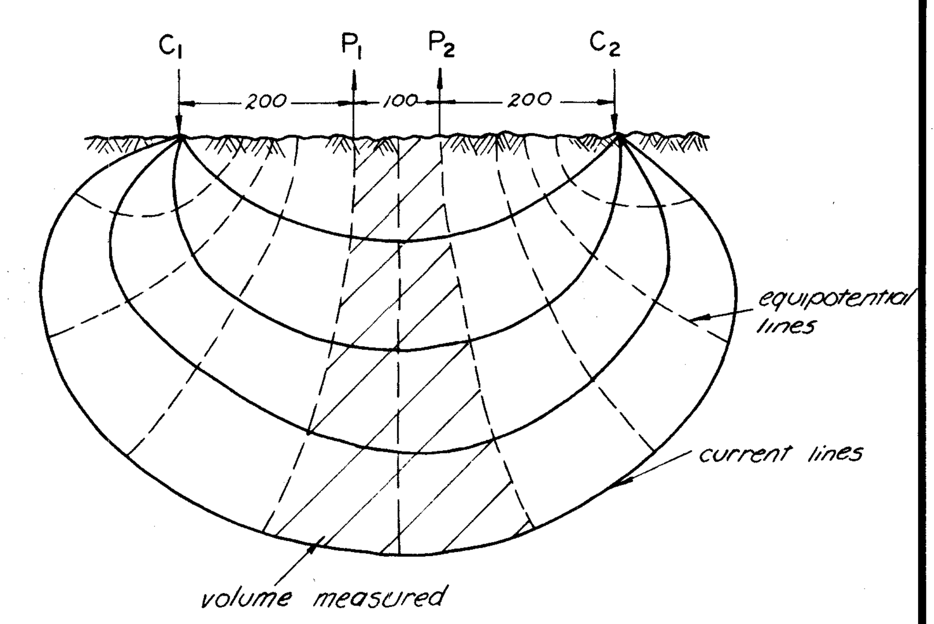
Table 1 still applies for the case where the transmitting times are longer than the receiving times in order to reconstruct the relative curve shape.

Relationship between IPR-8 and
"Newmont Type" Receiver Measurements

The "Newmont Type" receivers (eg. Scintrex IPR-7) integrate the area under the transient curve from 0.45 seconds to 1.1 seconds. This is then multiplied internally be an instrumental factor to obtain the chargeability M in milliseconds.

For a normal decay curve form, the approximate relationship between the IPR-8 measurements and the Newmont Type chargeability is given by M_{232} (in mV/V) = M_N (in milliseconds) • 0.7.





LEGEND

CHARGEABILITY SCALE, 1" = 10 Millivolts/volt
BASE LEVEL = 0 Millivolts/volt
SYMBOL = ·———·———·

RESISTIVITY SCALE, 2" = 1 Logarithmic cycle
BASE LEVEL = 1000 Ohm-metres
SYMBOL = ·— — —·— — —

THE MOUNT LYELL MINING AND RAILWAY COMPANY LTD.

COMSTOCK GRID
WEST COAST, TASMANIA

ELECTRICAL INDUCED POLARIZATION
SCHLUMBERGER PROFILES

5 cm

SURVEYED AND COMPILED BY
SCINTREX PTY. LTD.

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MARCH, 1974

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vol 1/2.

JOB No. TAS. 018 D SHEET 1 of 1 PLATE 1

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REPORT ON A
SCHLUMBERGER ARRAY ELECTRICAL INDUCED POLARIZATION SURVEY
OVER THE COMSTOCK GRID
ON BEHALF OF
THE MOUNT LYELL MINING AND RAILWAY COMPANY LTD.

TABLE OF MEASUREMENTS

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STATION INTERVAL	IN	FEET
RESISTIVITY	IN	OHM-METRES
CHARGEABILITY (M_3)	IN	MILLIVOLTS/VOLT

SCHLUMBERGER ARRAY

LINES 2000W
2200W
2600W
3000W
3400W
3900W

Station	Resistivity	Chargeability
LINE 2000W		
850S	863	17.3
950S	1027	13.9
1050S	1204	21.0
1150S	951	25.0
1250S	844	17.8
1350S	729	34.0
1450S	496	28.0
1550S	463	17.5
1650S	852	28.0
1750S	336	28.0
1850S	679	27.0
1950S	602	26.0
LINE 2200W		
750S	956	17.0
850S	598	15.0
950S	671	20.8
1050S	804	17.0
1150S	718	17.0
1250S	632	32.0
1350S	615	20.0
1450S	480	15.5
1550S	506	21.5
1650S	621	17.5
1750S	478	15.0
1850S	584	14.0

Station	Resistivity	Chargeability
LINE 2600W		
450S	707	18.0
550S	739	12.5
650S	521	13.5
750S	653	18.5
850S	427	16.5
950S	416	13.5
1050S	629	16.5
1150S	346	16.3
1250S	522	16.8
1350S	477	19.0
1450S	561	18.3
1550S	507	15.8
1650S	673	17.9
1750S	592	19.3
1850S	552	20.0
1950S	545	22.0
LINE 3000W		
250S	1222	11.7
350S	951	17.0
450S	1106	9.3
550S	1257	12.5
650S	885	15.5
750S	826	17.5
850S	637	20.3
950S	657	16.0
1050S	505	17.5
1150S	556	24.0
1250S	605	23.0

Station	Resistivity	Chargeability
1350S	465	15.0
1450S	459	17.5
1550S	399	18.3
1650S	673	19.3
1750S	450	20.0
1850S	477	22.9
1950S	701	26.0
2050S	611	29.0
2150S	1011	28.0
2250S	708	30.5
LINE 3400W		
150S	1581	11.0
250S	1087	16.5
350S	1168	17.5
450S	1463	20.3
550S	1440	19.5
650S	1012	25.2
750S	906	28.8
850S	843	27.8
950S	959	30.8
1050S	812	27.8
1150S	783	29.8
1250S	897	20.0
1350S	588	24.3
1450S	455	28.8
1550S	728	25.0

Station	Resistivity	Chargeability
LINE 3900W		
350S	1088	17.2
450S	1302	22.5
550S	1187	22.2
650S	1380	27.3
750S	880	35.7
850S	899	50.3
950S	905	46.5
1050S	843	48.0
1150S	765	36.5
1250S	782	31.0
1350S	688	25.7
1450S	963	21.7