2824

REPORT ON THE
INDUCED POLARIZATION
AND RESISTIVITY SURVEY 92O/10W
ON THE
MONS LAKE CLAIM GROUP
CLINTON MINING DIVISION, B.C.
FOR
ROYAL CANADIAN VENTURES LTD.

BY

MARION A. GOUDIE, B.Sc.

AND

PHILIP G. HALLOF, Ph.D.

NAME AND LOCATION OF PROPERTY

MONS LAKE CLAIM GROUP

CLINTON MINING DIVISION, B.C. 51°N, 122°W - NW

DATE STARTED OCTOBER 6, 1970

DATE FINISHED OCTOBER 17, 1970

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McPHAR GEOPHYSICS

NOTES ON THE THEORY, METHOD OF FIELD OPERATION, AND PRESENTATION OF DATA FOR THE INDUCED POLARIZATION METHOD

Induced Polarization as a geophysical measurement refers to the blocking action or polarization of metallic or electronic conductors in a medium of ionic solution conduction.

This electro-chemical phenomenon occurs wherever electrical current is passed through an area which contains metallic minerals such as base metal sulphides. Normally, when current is passed through the ground, as in resistivity measurements, all of the conduction takes place through ions present in the water content of the rock, or soil, i.e. by ionic conduction. This is because almost all minerals have a much higher specific resistivity than ground water. The group of minerals commonly described as "metallic", however, have specific resistivities much lower than ground waters. The induced polarization effect takes place at those interfaces where the mode of conduction changes from ionic in the solutions filling the interstices of the rock to electronic in the metallic minerals present in the rock.

The blocking action or induced polarization mentioned above, which depends upon the chemical energies necessary to allow the ions to give up or receive electrons from the metallic surface, increases with the time that a d. c. current is allowed to flow through the rock; i. e. as ions pile up against the metallic interface the resistance to current flow increases. Eventually, there is enough polarization in the form of excess ions at the interfaces, to appreciably reduce the amount of current flow through the metallic particle. This polarization takes place at each of the infinite number of solution-metal interfaces in a mineralized rock.

When the d. c. voltage used to create this d. c. current flow is cut off, the Coulomb forces between the charged ions forming the polarization cause them to return to their normal position. This movement of charge creates a small current flow which can be measured on the surface of the ground as a decaying potential difference.

From an alternate viewpoint it can be seen that if the direction of the current through the system is reversed repeatedly before the polarization occurs, the effective resistivity of the system as a whole will change as the frequency of the switching is changed. This is a consequence of the fact that the amount of current flowing through each metallic interface depends upon the length of time that current has been passing through it in one direction.

The values of the per cent frequency effect or F. E. are a measurement of the polarization in the rock mass. However, since the measurement of the degree of polarization is related to the apparent resistivity of the rock mass it is found that the metal factor values or M. F. are the most useful values in determining the amount of polarization present in the rock mass. The MF values are obtained by normalizing the F. E. values for varying resistivities.

The induced polarization measurement is perhaps the most powerful geophysical method for the direct detection of metallic sulphide mineralization, even when this mineralization is of very low concentration. The lower limit of volume per cent sulphide necessary to produce a recognizable IP anomaly will vary with the geometry and geologic environment of the source, and the method of executing the survey. However, sulphide mineralization of less than one per cent by volume has been detected by the IP method under proper geological conditions.

The greatest application of the IP method has been in the search for disseminated metallic sulphides of less than 20% by volume. However, it has also been used successfully in the search for massive sulphides in situations where, due to source geometry, depth of source, or low resistivity of surface layer, the EM method can not be successfully applied. The ability to differentiate ionic conductors, such as water filled shear zones, makes the IP method a useful tool in checking EM anomalies which are suspected of being due to these causes.

In normal field applications the IP method does not differentiate between the economically important metallic minerals such as chalcopyrite, chalcocite, molybdenite, galena, etc., and the other metallic minerals such as pyrite. The induced polarization effect is due to the total of all electronic conducting minerals in the rock mass. Other electronic conducting materials which can produce an IP response are magnetite, pyrolusite, graphite, and some forms of hematite.

In the field procedure, measurements on the surface are made in a way that allows the effects of lateral changes in the properties of the ground to be separated from the effects of vertical changes in the properties. Current is applied to the ground at two points in distance (X) apart. The potentials are measured at two other points (X) feet apart, in line with the current electrodes is an integer number (n) times the basic distance (X).

The measurements are made along a surveyed line, with a constant distance (nX) between the nearest current and potential electrodes. In most surveys, several traverses are made with various values of (n); i.e. (n) = 1, 2, 3, 4, etc. The kind of survey required (detailed or reconnaissance) decides the number of values of (n) used.

In plotting the results, the values of the apparent resistivity, apparent per cent frequency effect, and the apparent metal factor measured for each set of electrode positions are plotted at the intersection of grid lines, one from the center point of the current electrodes and the other from the center point of the potential electrodes. (See Figure A.) The resistivity values are plotted above the line as a mirror image of the metal factor values below. On a second line, below the metal factor values, are plotted the values of the per cent frequency effect. In some cases the values of per cent frequency effect are plotted as superscripts of the metal factor value. In this second case the frequency effect values are not contoured. The lateral displacement of a given value is determined by the location along the survey line of the center point between the current and potential electrodes. The distance of the value from the line is determined by the distance (nX) between the current and potential electrodes when the measurement was made.

The separation between sender and receiver electrodes is only one factor which determines the depth to which the ground is being sampled in any particular measurement. The plots then, when contoured, are not section maps of the electrical properties of the ground under the survey line. The interpretation of the results from any given survey must be carried out using the combined experience gained from field results, model study results and theoretical investigations. The position of the electrodes when anomalous values are measured is important in the interpretation.

In the field procedure, the interval over which the potential differences are measured is the same as the interval over which the electrodes are moved after a series of potential readings has been made. One of the advantages of the induced polarization method is that the same equipment can be used for both detailed and reconnaissance surveys merely by changing the distance (X) over which the electrodes are moved each time. In the past, intervals have been used ranging from 25 feet to 2000 feet for (X). In each case, the decision as to the distance (X) and the values of (n) to be used is largely determined by the expected size of the mineral deposit being sought, the size of the expected anomaly and the speed with which it is desired to progress.

The diagram in Figure A demonstrates the method used in plotting the results. Each value of the apparent resistivity, apparent metal factor, and apparent per cent frequency effect is plotted and identified by the position of the four electrodes when the measurement was made. It can be seen that the values measured for the larger values of (n) are plotted farther from the line indicating that the thickness of the layer of the earth that is being tested is greater than for the smaller values of (n); i. e. the depth of the measurement is increased. When the F. E. values are plotted as superscripts to the MF values the third section of data values is not presented and the F. E. values are not contoured.

The actual data plots included with the report are prepared utilizing an IBM 360/75 Computer and a Calcomp 770/763 Incremental Plotting System. The data values are calculated, plotted, and contoured according to a programme developed by McPhar Geophysics. Certain symbols have been incorporated into the programme to explain various situations in recording the data in the field.

The IP measurement is basically obtained by measuring the difference in potential or voltage (ΔV) obtained at two operating frequencies. The voltage is the product of the current through the ground and the apparent resistivity of the ground. Therefore in field situations where the current is very low due to poor electrode contact, or the apparent resistivity is very low, or a combination of the two effects; the value of (ΔV) the change in potential will be too small to be measurable. The symbol "TL" on the data plots indicates this situation.

In some situations spurious noise, either man made or natural, will render it impossible to obtain a reading. The symbol "N" on the data plots indicates a station at which it is too noisey to record a reading. If a reading can be obtained, but for reasons of noise there is some doubt as to its accuracy, the reading is bracketed in the data plot ( ).

In certain situations negative values of Apparent Frequency Effect are recorded. This may be due to the geologic environment or spurious electrical effects. The actual negative frequency effect value recorded is indicated on the data plot, however the symbol "NEG" is indicated for the corresponding value of Apparent Metal Factor. In contouring negative values the contour lines are indicated to the nearest positive value in the immediate vicinity of the negative value.

The symbol "NR" indicates that for some reason the operator did not attempt to record a reading although normal survey procedures would suggest that one was required. This may be due to inaccessible topography or other similar reasons. Any symbol other than those discussed above is unique to a particular situation and is described within the body of the report.

METHOD USED IN PLOTTING DIPOLE-DIPOLE INDUCED POLARIZATION AND RESISTIVITY RESULTS

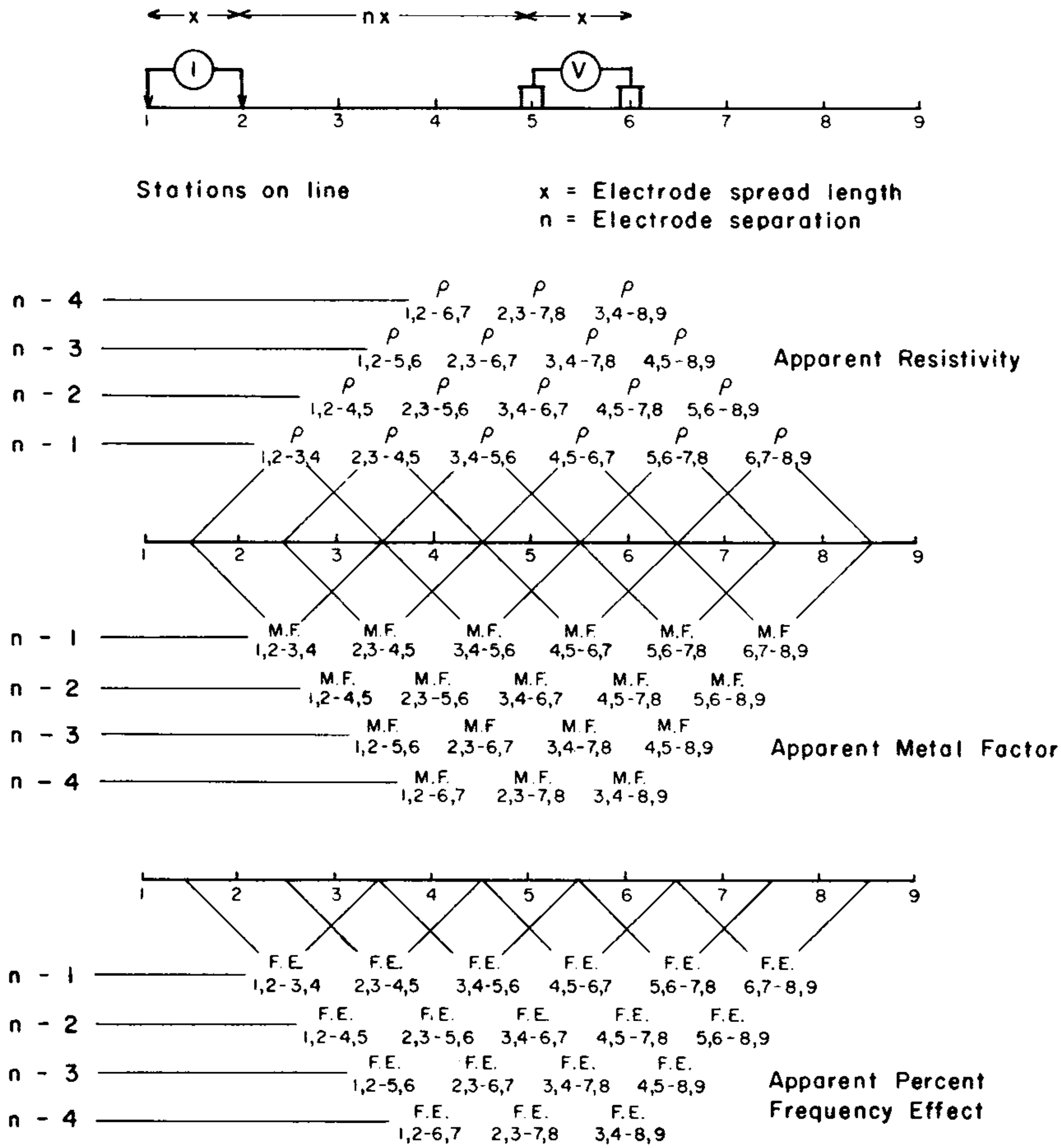

Fig. A

McPHAR GEOPHYSICS LIMITED

REPORT ON THE
INDUCED POLARIZATION
AND RESISTIVITY SURVEY
ON THE
MONS LAKE CLAIM GROUP
CLINTON MINING DIVISION, B.C.
FOR
ROYAL CANADIAN VENTURES LTD.

1. INTRODUCTION

At the request of Mr. N.B. Vallo, an induced polarization and resistivity survey has been completed on the Mons Lake Claim Group, Clinton Mining Division, British Columbia for Royal Canadian Ventures Ltd. The survey area is situated in the northwest quadrant of the one degree quadrilateral whose southeast corner is situated at 51°N latitude and 122°W longitude.

The outcrop area in the survey grid is very limited. The country rocks are hornblende granodiorite, biotite granodiorite and basalt. An assumed contact between the hornblende granodiorite and the biotite granodiorite (crossing the survey grid), has been mapped by the client. In one of the few outcrop areas, chalcopyrite mineralization has been noted.

Geochemical and magnetic surveys have been completed over the survey grid, the geochemical survey being done for total molybdenum-copper content.

The field work was carried out in mid-October 1970 using a McPhar variable frequency IP unit operating at 0.3 and 5 cps, on the following claims:-

ML	95	ML	138	
	109		139	
	111		140	
	112		141	
	113		142	
	114		143	
	115		144	
	116		145	
	117		158	
	119		160	
	132		161	
	133		162	
	134		163	
	135		164	
	136		175	Fr
	137		176	Fr

These claims are assumed to be owned or held under option by Royal Canadian Ventures Ltd.

2. PRESENTATION OF RESULTS

The induced polarization and resistivity results are shown on the following data plots in the manner described in the notes preceding this report.

Line	Electrode Intervals	Dwg. No.
48+00S	300 feet	IP 5602-1
56+00S	300 feet	IP 5602-2
64+00S	300 feet	IP 5602-3
64+00S	150 feet	IP 5602-4
72+00S	300 feet	IP 5602-5
80+00S	300 feet	IP 5602-6

Line	Electrode Intervals	Dwg. No.
88+00S	300 feet	IP 5602-7
96+00S	300 feet	IP 5602-8
104+00S	300 feet	IP 5602-9
112+00S	300 feet	IP 5602-10
120+00S	300 feet	IP 5602-11
128+00S	300 feet	IP 5602-12
136+00S	300 feet	IP 5602-13

Enclosed with this report is Dwg. I. P. P. 4703, a plan map of the Mons Lake grid at a scale of 1" = 400'. The definite and possible induced polarization anomalies are indicated by solid and broken bars respectively on this plan map as well as the data plots. These bars represent the surface projection of the anomalous zones as interpreted from the location of the transmitter and receiver electrodes when the anomalous values were measured.

Since the induced polarization measurement is essentially an averaging process, as are all potential methods, it is frequently difficult to exactly pinpoint the source of an anomaly. Certainly, no anomaly can be located with more accuracy than the spread length; i.e. when using 300' spreads the position of a narrow sulphide body can only be determined to lie between two stations 300' apart. In order to locate sources at some depth, larger spreads must be used, with a corresponding increase in the uncertainties of location. Therefore, while the centre of the indicated anomaly probably corresponds fairly well with source, the length of the indicated anomaly along the line should not be taken to represent the exact edges of the anomalous material.

3. DISCUSSION OF RESULTS

One interpretation of the results of the survey is illustrated in Dwg. I.P.P. 4703. One zone of anomalies is continuous throughout the north-south length of the survey area; there are five short zones.

One comment is valid for every anomaly located by the survey - the top of the source of every anomaly lies at a depth of less than one unit, or 300'.

Zone 2, Zone 3 and Zone 4 may be one continuous zone. The zone anomaly was not located on Line 64S or Line 96S, although it is possible that the source is present, but at a depth too shallow to be seen by 300' electrode intervals.

The client has provided a geological map of the area on which is shown an inferred contact between hornblende granodiorite and biotite granodiorite. All of the zones except Zone 6 run approximately parallel to the western contact and all of the zones except Zone 1 lie within the biotite granodiorite.

Zone 2 coincides with a geochemical anomaly. The anomalies on Line 120S also coincide with a northeast - southwest trending geochemical anomaly.

There are numerous magnetic anomalies in the survey area with a northeast - southwest trend similar to the trend of the IP zone axes. The only significant correlation is that between a magnetic high and the IP anomalies on Line 120S and Line 128S.

Zone 1

The anomalies of Zone 1 lie on Line 80S and Line 88S. The source appears to be narrow, shallow and stronger on Line 88S. This is the only zone (in the hornblende granodiorite) to the west of the geological contact.

Zone 2 and Zone 3

These two zones are similar in that the source is narrow, weak and shallow. The anomalies might benefit by being detailed with shorter electrode intervals. (See Appendix).

Zone 4

The anomalies of this zone are broader than those previously mentioned. On Line 112S, that portion of the anomaly from 16E to 19E is definite and suggests concentrated mineralization, whereas the remainder of the anomaly suggests disseminated mineralization. The Zone 4 anomaly on Line 120S also has a stronger portion. The anomalies in Zone 4 reflect a source with a top at a depth of less than one unit (300') and would possibly improve when detailed with shorter electrode intervals. (See Appendix).

Zone 5

The anomalies comprising Zone 5 are generally broader than those to the west. The pattern of the anomalies suggests that the source consists of disseminated mineralization with irregular lenses of more concentrated mineralization. It is possible that the stronger portions of the anomalies may reflect pyritic zones; consequently, both types of anomalies should be checked. The possibility of testing both types of anomalies with one drill hole exists on Line 96S, but the anomaly should be detailed with shorter electrode intervals to better locate and define the source of the anomaly before drilling is contemplated.

The zone anomaly on Line 128S coincides with a geochemical anomaly and a magnetic anomaly.

Zone 6

The zone has a relatively short strike length, which may be due to lack of information on the lines to the south of Line 72S. The anomalies are shallow, broad and relatively weak. The anomaly on Line 64S, which had a stronger portion from 47E to 40E with 300' electrode intervals, was detailed with 150' electrode intervals and the stronger portion was not confirmed. This suggests that the pod or lens of concentrated mineralization is very localized.

4. CONCLUSIONS AND RECOMMENDATIONS

Six anomalous zones were outlined by the induced polarization and resistivity survey. The sources of the anomalies all appear to lie at a depth of less than one unit, or 300'. The pattern of the anomalies suggests irregular concentrations of mineralization in a background of disseminated mineralization within the country rock.

It has been recommended that several of the anomalies should be detailed with shorter electrode intervals to better locate and define the source or sources of the anomalies. With this accomplished, both types of anomalies, one reflecting disseminated mineralization and the other concentrated mineralization, should be tested by drilling. From the results of this work, the geophysical data should then be re-evaluated before further recommendations are made.

McPHAR GEOPHYSICS LIMITED

Marion A. Goudie,
Geologist.

Philip G. Hallof,
Geophysicist.

Dated: December 4, 1970

ASSESSMENT DETAILS

PROPERTY: Mons Lake Claim Group		MINING DIVISION: Clinton
SPONSOR: Royal Canadian Ventures Ltd.		PROVINCE: British Columbia
TYPE OF SURVEY: Induced Polarization		
OPERATING MAN DAYS:	26	DATE STARTED: October 6, 1970
EQUIVALENT 8 HR. MAN DAYS:	39	DATE FINISHED: October 17, 1970
CONSULTING MAN DAYS:	2	NUMBER OF STATIONS: 234
DRAUGHTING MAN DAYS:	6	NUMBER OF READINGS: 1809
TOTAL MAN DAYS:	47	MILES OF LINE SURVEYED: 8.4

CONSULTANTS:

Marion A. Goudie, 739 Military Trail, West Hill, Ontario.
Philip G. Hallof, 5 Minorca Place, Don Mills, Ontario.

FIELD TECHNICIANS:

K. Drobot, c/o 20122 64th Avenue, Langley, B.C.
M. McDonald, 6135 Bow Crescent, N.W. Calgary, Alberta.
Plus 2 helpers supplied by client.

DRAUGHTSMEN:

F. Hurst, 230 Woburn Avenue, Toronto 12, Ontario.
J. Duffy, 7 Waddington Crescent, Willowdale, Ontario.
B. Marr, 19 Kenewen Court, Toronto 16, Ontario.

McPHAR GEOPHYSICS LIMITED

Marion A. Goudie,
Geologist

Dated: December 4, 1970

STATEMENT OF COST

Royal Canadian Ventures Ltd.
Mons Lake Claim Group, Clinton Mining Division, B.C.

Crew (2 men) K. Drobot
M. McDonald

$6\frac{1}{2}$ days	Operating		@ $265.00/day	$1,722.50
$3\frac{1}{2}$ days	Travel	)		
1 day	Bad Weather	) $5\frac{1}{2}$ days	@ $100.00/day	550.00
1 day	Preparation	)		
Less than 10 days operating				200.00
				2,472.50

Expenses

Rented Vehicles	$ 44.09	
Meals and Accommodation	32.95	
Telephone and Telegraph	2.40	
Supplies	28.68	
Estimated expenses not yet billed	100.00	
	208.12	
Plus 10%	20.81	
	$228.93	228.93
		$2,701.43

McPHAR GEOPHYSICS LIMITED

Marion A. Goudie,
Geologist.

Dated: December 4, 1970

CERTIFICATE

I, Philip George Hallof, of the City of Toronto, Province of Ontario, do hereby certify that:

1. I am a geophysicist residing at 5 Minorca Place, Don Mills, (Toronto), Ontario.

2. I am a graduate of the Massachusetts Institute of Technology with a B.Sc. Degree (1952) in Geology and Geophysics, and a Ph.D. Degree (1957) in Geophysics.

3. I am a member of the Society of Exploration Geophysicists and the European Association of the Exploration Geophysicists.

4. I am a Professional Geophysicist, registered in the Province of Ontario, the Province of British Columbia and the State of Arizona.

5. I have no direct or indirect interest, nor do I expect to receive any interest directly or indirectly, in the property or securities of Royal Canadian Ventures Ltd. or any affiliate.

6. The statements made in this report are based on a study of published geological literature and unpublished private reports.

7. Permission is granted to use in whole or in part for assessment and qualification requirements but not for advertising purposes.

Dated at Toronto

This 4th day of December 1970

Philip G. Hallof, Ph.D.

CERTIFICATE

I, Marion A. Goudie, of the City of Toronto, Province of Ontario, do hereby certify that:

1. I am a Geologist residing at 739 Military Trail, West Hill, Ontario.
2. I am a graduate of the University of Western Ontario with a B.Sc. Degree (1950) in Honours Geology.
3. I am a member of the Geological Society of America.
4. I have been practising my profession for 20 years.
5. I have no direct or indirect interest, nor do I expect to receive any interest directly or indirectly, in the property or securities of Royal Canadian Ventures Ltd. or any affiliate.
6. The statements made in this report are based on a study of published geological literature and unpublished private reports.
7. Permission is granted to use in whole or in part for assessment and qualification requirements but not for advertising purposes.

Dated at Toronto

This 4th day of December 1970

Marion A. Goudie, B.Sc.

McPHAR GEOPHYSICS

APPENDIX

THE INTERPRETATION OF INDUCED POLARIZATION ANOMALIES FROM RELATIVELY SMALL SOURCES

The induced polarization method was originally developed to detect disseminated sulphides and has proven to be very successful in the search for "porphyry copper" deposits. In recent years we have found that the IP method can also be very useful in exploring for more concentrated deposits of limited size. This type of source gives sharp IP anomalies that are often difficult to interpret.

The anomalous patterns that develop on the contoured data plots will depend on the size, depth and position of the source and the relative size of the electrode interval. The data plots are not sections showing the electrical parameters of the ground. When the electrode interval (X) is appreciably greater than the width of the source, a large volume of unmineralized rock is averaged into each measurement. This is particularly true for the large values of the electrode separation (n).

The theoretical scale model results shown in Figure 1 and Figure 2 indicate the effect of depth. If the depth to the top of the source is small compared to the electrode interval (i. e. d X) the measurement for n = 1 will be anomalous. In Figure 1 the depth is 0. 5 units (X = 1. 0 units) and the n = 1 value is definitely anomalous; the pattern on the contoured data plot is typical for a relatively shallow, narrow, near-vertical tabular source. The results in Figure 2 are for the same source with the depth increased to 1. 5 units. Here the n = 1 value is not anomalous; the larger values of (n) are anomalous but the magnitudes are much lower than for the source at less depth.

When the electrode interval is greater than the width of the source, it is not possible to determine its width or exact position between the electrodes. The true IP effect within the source is also indeterminate; the anomaly from a very narrow source with a very large true IP effect will be much the same as that from a zone with twice the width and 1/2 the true IP effect. The theoretical scale model data shown in Figure 3 and Figure 4 demonstrate this problem. The depth and position of the source are unchanged but the width and true IP effect are varied. The anomalous patterns and magnitudes are essentially the same, hence the data are insufficient to evaluate the source completely.

The normal practise is to indicate the IP anomalies by solid, broken, or dashed bars, depending upon their degree of distinctiveness. These bars represent the surface projection of the anomalous zones as interpreted from the location of the transmitter and receiver electrodes when the anomalous values were measured. As illustrated in Figure 1, Figure 2, Figure 3 and Figure 4, no anomaly can be located with more accuracy than the spread length. While the centre of the solid bar indicating the anomaly corresponds fairly well with the source, the length of the bar should not be taken to represent the exact edges of the anomalous material.

If the source is shallow, the anomaly can be better evaluated using a shorter electrode interval. When the electrode interval used approaches the width of the source, the apparent effects measured will be nearly equal to the true effects within the source. When there is some depth to the top of the source, it is not possible to use electrode intervals that are much less than the depth to the source. In this situation, one must realize that a definite ambiguity exists regarding the width of the source and the IP effect within the source.

Our experience has confirmed the desirability of doing detail. When a reconnaissance IP survey using a relatively large electrode interval indicates the presence of a narrow, shallow source, detail with shorter electrode intervals is necessary in order to better locate, and evaluate, the source. The data of most usefulness is obtained when the maximum apparent IP effect is measured for n = 2 or n = 3. For instance, an anomaly originally located using X = 300' may be checked with X = 200' and then X = 100'. The data with X = 100' will be quite different from the original reconnaissance results with X = 300'.

The data shown in Figure 5 and Figure 6 are field results from a greenstone area in Quebec. The expected sources were narrow (less than 30' in width) zones of massive, high-grade, zinc-silver ore. An electrode interval of 200' was used for the reconnaissance survey in order to keep the rate of progress at an acceptable level. The anomalies located were low in magnitude.

The very weak, shallow anomaly shown in Figure 5 is typical of those located by the X = 200' reconnaissance survey. Several anomalies of this type were detailed using shorter electrode intervals. In most cases the detail measurements suggested broad zones of very weak mineralization. However, in the case of the source at 20N to 22N, the measurements with shorter electrode intervals confirmed the presence of a strong, narrow source. The X = 50' results are shown in Figure 6. Subsequent drilling has shown the source to be 12.5' of massive sulphide mineralization containing significant zinc and silver values.

The change in the anomaly that results when the electrode interval is reduced is not unusual. The X = 50' data more accurately locates the narrow source, and permits the geophysicist to make a better evaluation of its importance. The completion of this type of detail is very important, in order to get the maximum usefulness from a reconnaissance IP survey.

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Theoretical Induced Polarization and Resistivity Studies

Scale Model Cases

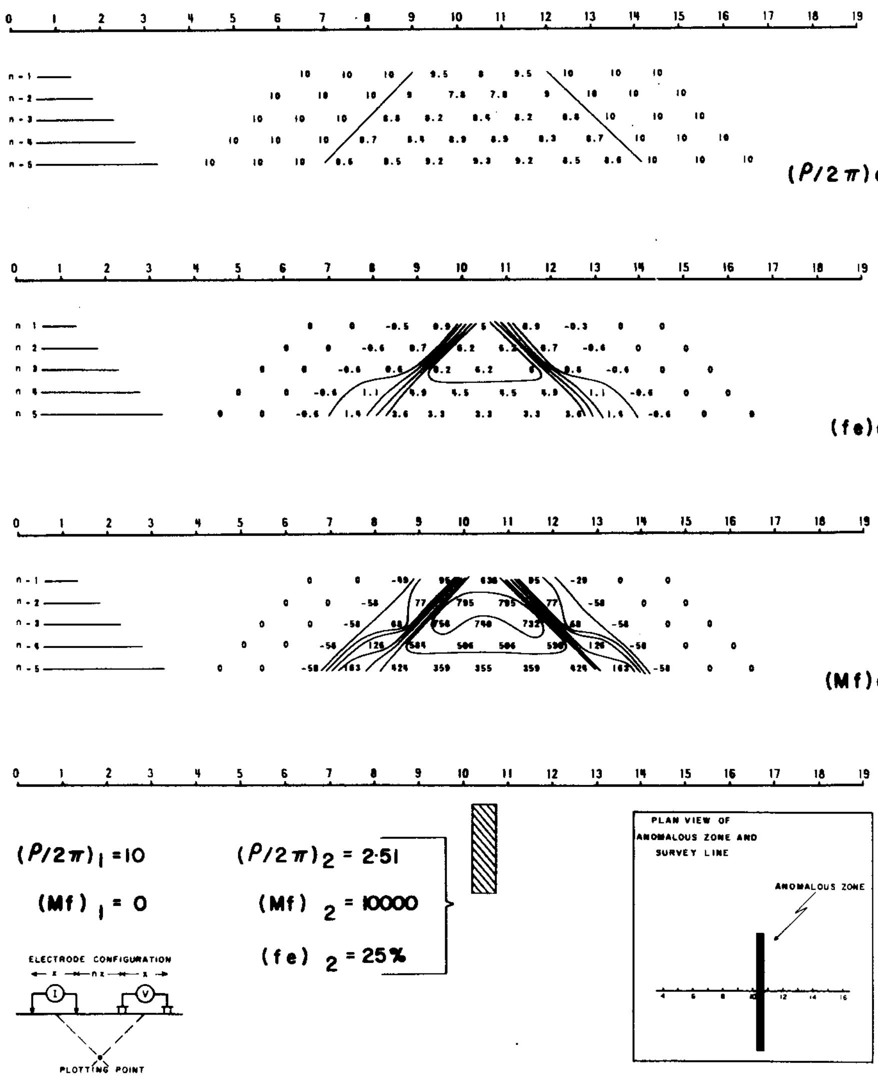

FIG 1

CASE II-0.5-BU-10-a

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Theoretical Induced Polarization and Resistivity Studies

Scale Model Cases

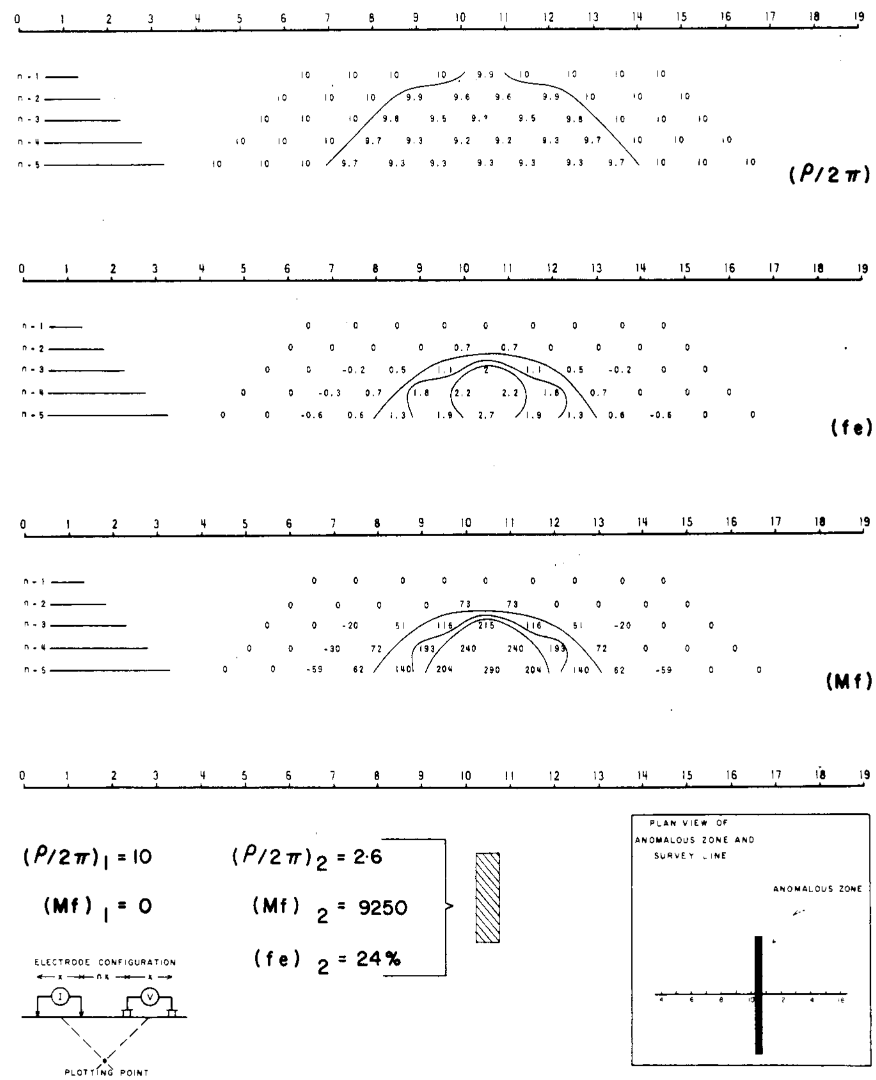


FIG 2

CASE II-1.5-BU-10-a

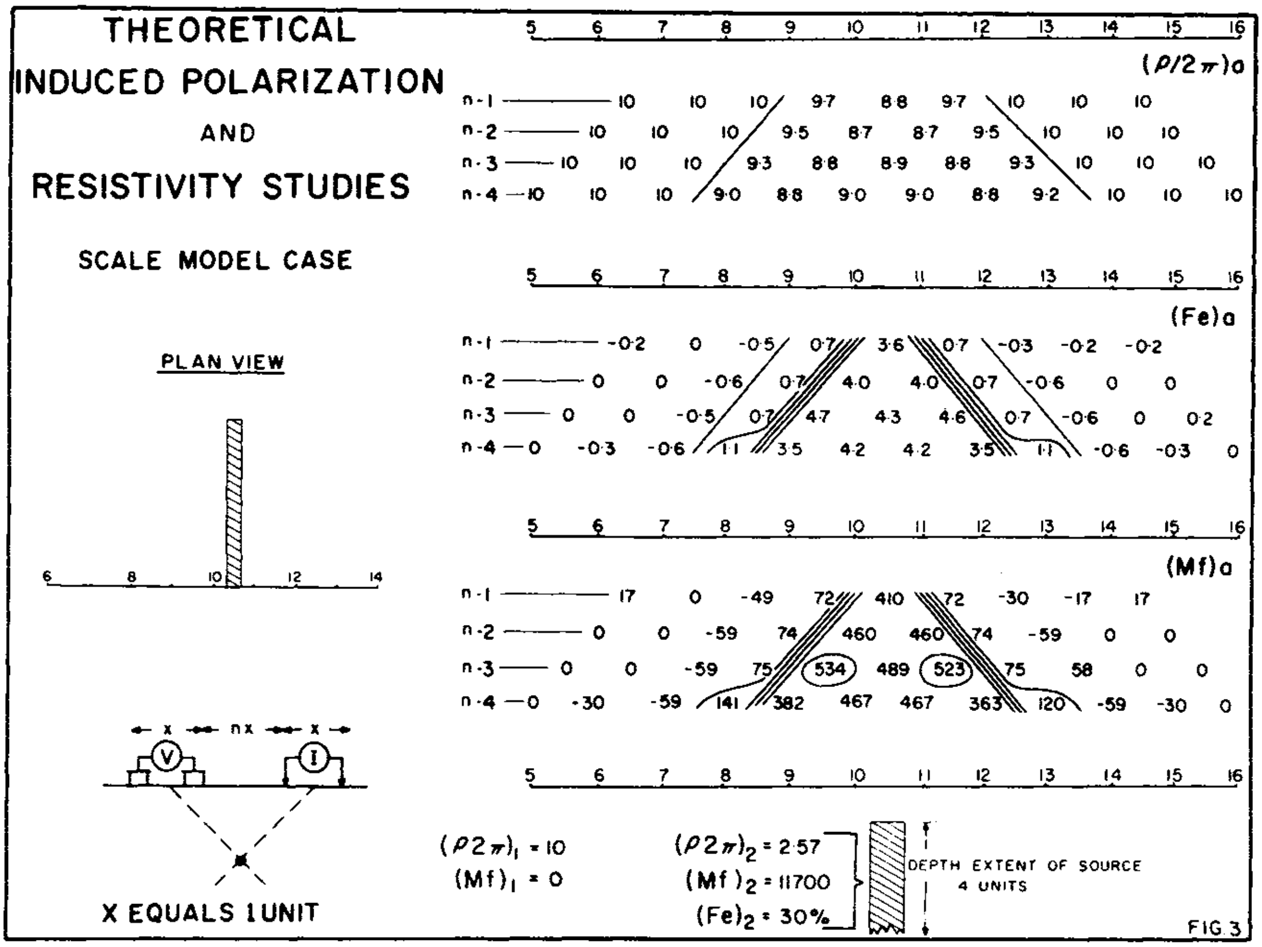

THEORETICAL
INDUCED POLARIZATION
AND
RESISTIVITY STUDIES
SCALE MODEL CASE
PLAN VIEW
6 8 10 12 14
X EQUALS 1 UNIT
5 6 7 8 9 10 11 12 13 14 15 16
(ρ/2π)a
n-1 10 10 10 9.7 8.8 9.7 10 10 10
n-2 10 10 10 9.5 8.7 8.7 9.5 10 10 10
n-3 10 10 10 9.3 8.8 8.9 8.8 9.3 10 10 10
n-4 10 10 10 9.0 8.8 9.0 9.0 8.8 9.2 10 10 10
(Fe)a
n-1 -0.2 0 -0.5 0.7 3.6 0.7 -0.3 -0.2 -0.2
n-2 0 0 -0.6 0.7 4.0 4.0 0.7 -0.6 0 0
n-3 0 0 -0.5 0.7 4.7 4.3 4.6 0.7 -0.6 0 0.2
n-4 0 -0.3 -0.6 1.1 3.5 4.2 4.2 3.5 1.1 -0.6 -0.3 0
(Mf)a
n-1 17 0 -49 72 410 72 -30 -17 17
n-2 0 0 -59 74 460 460 74 -59 0 0
n-3 0 0 -59 75 534 489 523 75 58 0 0
n-4 0 -30 -59 141 382 467 467 363 120 -59 -30 0
(ρ2π)1 = 10
(Mf)1 = 0
(ρ2π)2 = 2.57
(Mf)2 = 11700
(Fe)2 = 30%
DEPTH EXTENT OF SOURCE
4 UNITS

FIG. 3

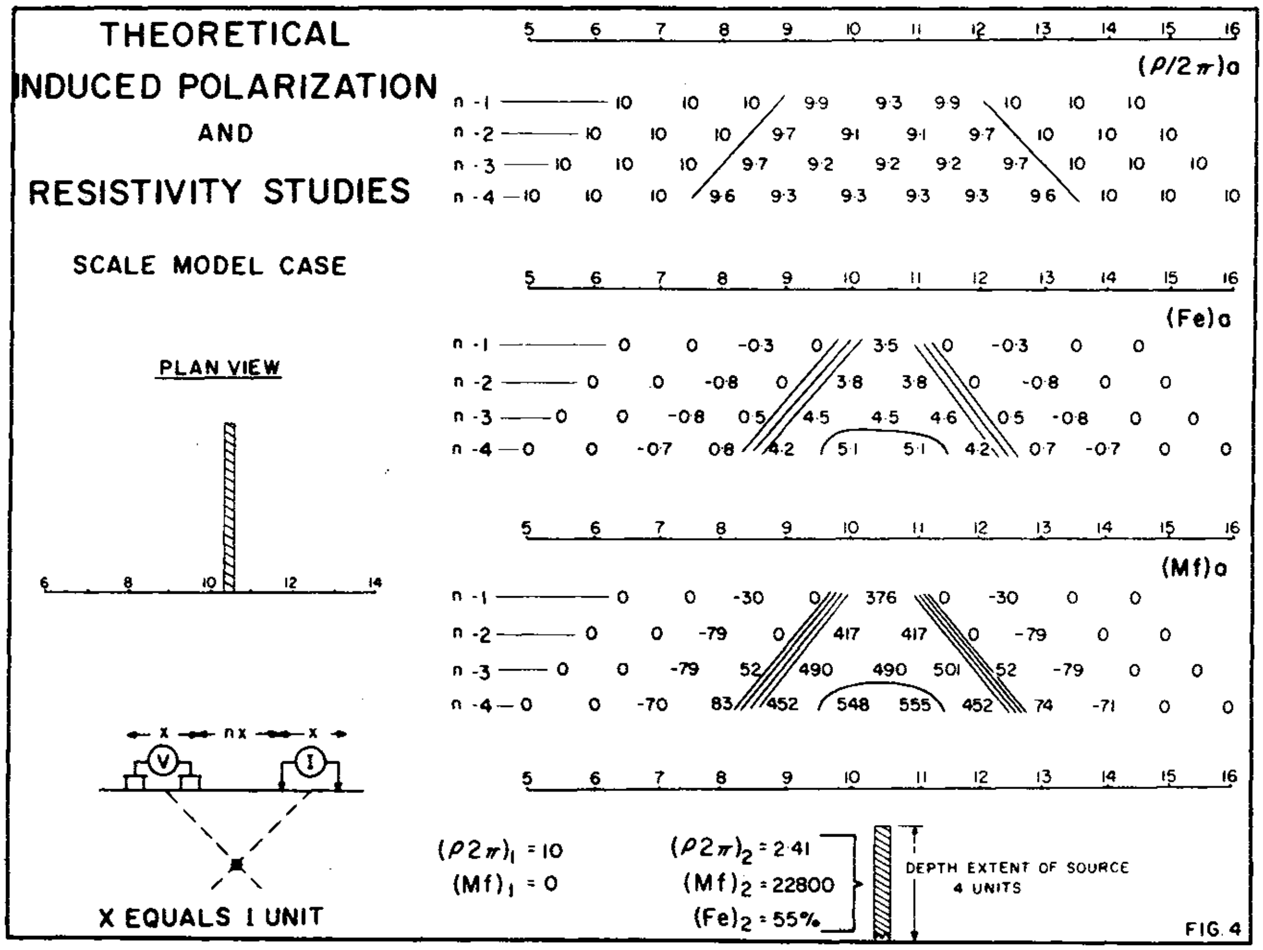
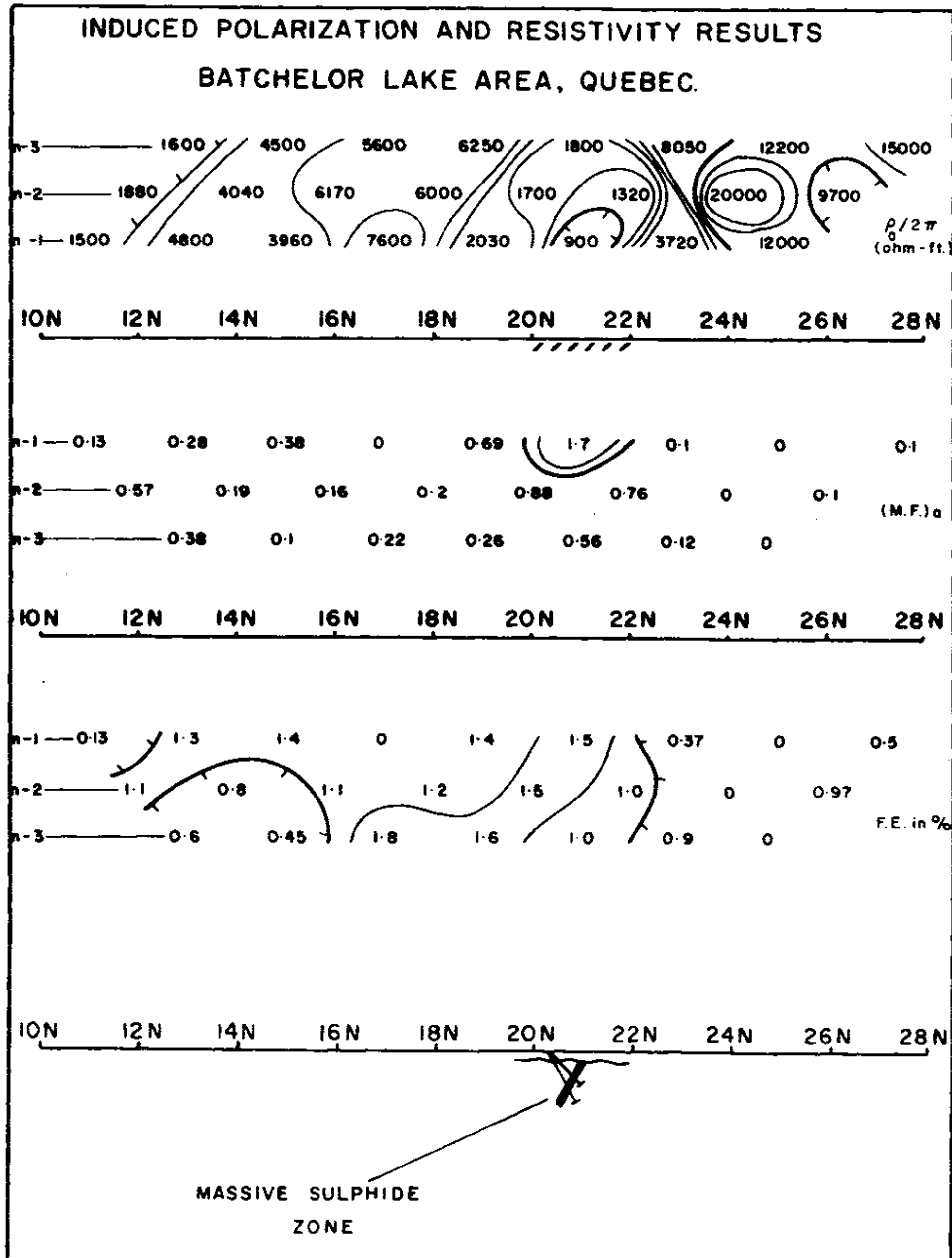
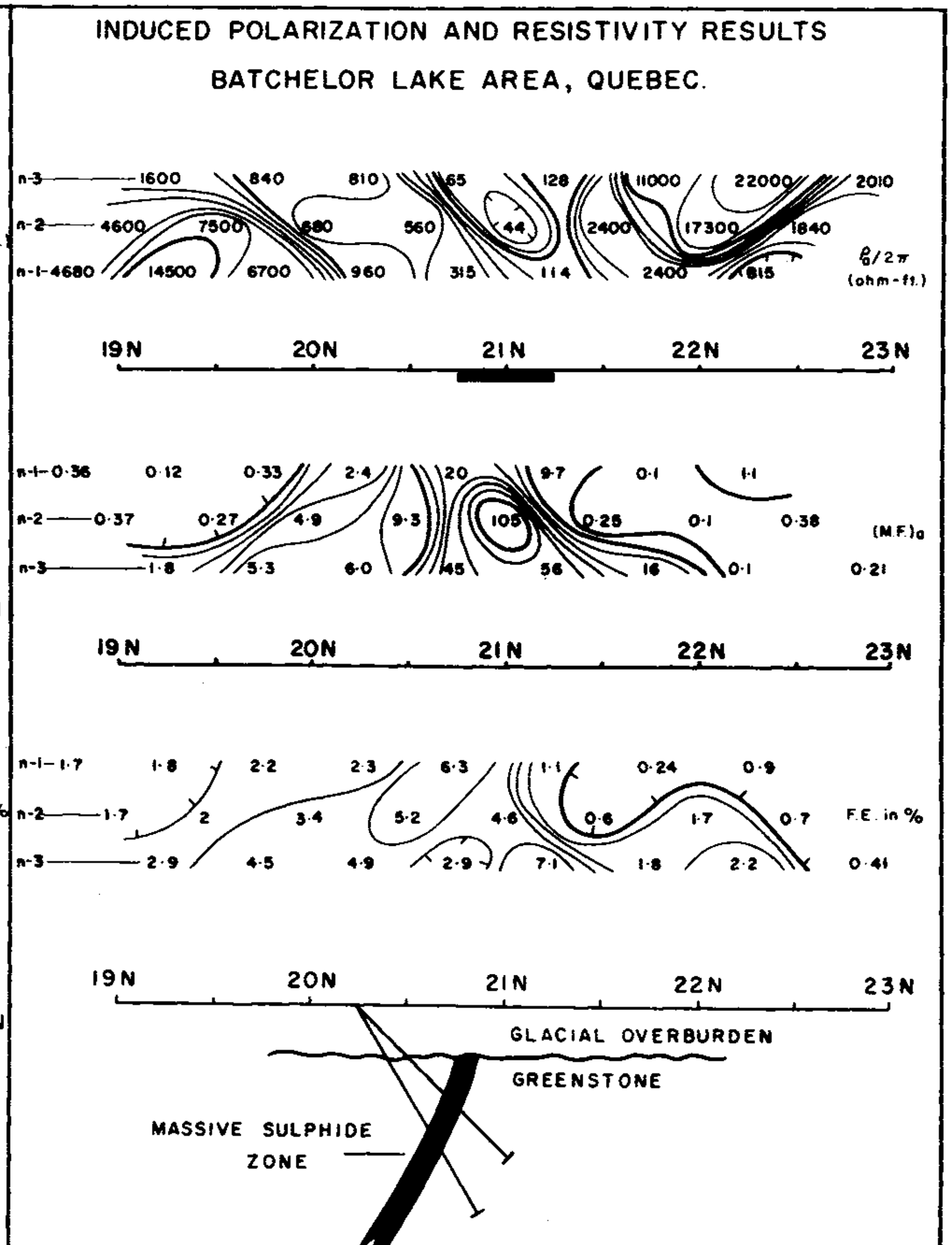

THEORETICAL
INDUCED POLARIZATION
AND
RESISTIVITY STUDIES
SCALE MODEL CASE
PLAN VIEW
6 8 10 12 14
X EQUALS 1 UNIT
5 6 7 8 9 10 11 12 13 14 15 16
(ρ/2π)a
n-1 10 10 10 9.9 9.3 9.9 10 10 10
n-2 10 10 10 9.7 9.1 9.1 9.7 10 10 10
n-3 10 10 10 9.7 9.2 9.2 9.2 9.7 10 10 10
n-4 10 10 10 9.6 9.3 9.3 9.3 9.3 9.6 10 10 10
(Fe)a
n-1 0 0 -0.3 0 3.5 0 -0.3 0 0
n-2 0 0 -0.8 0 3.8 3.8 0 -0.8 0 0
n-3 0 0 -0.8 0.5 4.5 4.5 4.6 0.5 -0.8 0 0
n-4 0 0 -0.7 0.8 4.2 5.1 5.1 4.2 0.7 -0.7 0 0
(Mf)a
n-1 0 0 -30 0 376 0 -30 0 0
n-2 0 0 -79 0 417 417 0 -79 0 0
n-3 0 0 -79 52 490 490 501 52 -79 0 0
n-4 0 0 -70 83 452 548 555 452 74 -71 0 0
(ρ2π)1 = 10
(Mf)1 = 0
(ρ2π)2 = 2.41
(Mf)2 = 22800
(Fe)2 = 55%
DEPTH EXTENT OF SOURCE
4 UNITS

FIG. 4



INDUCED POLARIZATION AND RESISTIVITY RESULTS
BATCHELOR LAKE AREA, QUEBEC.
$\rho_a/2\pi$ (ohm-ft.)
(M.F.)a
F.E. in %
10N 12N 14N 16N 18N 20N 22N 24N 26N 28N
MASSIVE SULPHIDE ZONE

FIG. 5



INDUCED POLARIZATION AND RESISTIVITY RESULTS
BATCHELOR LAKE AREA, QUEBEC.
$\rho_a/2\pi$ (ohm-ft.)
(M.F.)a
F.E. in %
19N 20N 21N 22N 23N
GLACIAL OVERBURDEN
GREENSTONE
MASSIVE SULPHIDE ZONE

FIG. 6

2824

DWG. NO.- I.P.-5602-1

ROYAL CANADIAN VENTURES LTD.

MONS LAKE

CLINTON M.D., B.C.

LINE NO.- 48S

ELECTRODE CONFIGURATION

PLOTTING POINT X = 300'

SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE

PROBABLE

POSSIBLE

FREQUENCIES: 0.31-5.0 HZ

DATE SURVEYED: OCT 1970

APPROVED:

DATE: 1 Dec 70

NOTE: CONTOURS AT LOGARITHMIC INTERVALS 1.-1.5-2.-3.-5.-7.5-10

McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

NOTE: THIS PLOT WAS PRODUCED WITH AN IBM 360/65 COMPUTER AND A CALCOMP PLOTTER

DWG. NO.- I.P.-5602 -2

ROYAL CANADIAN VENTURES LTD.

MONS LAKE

CLINTON M.D., B.C.

LINE NO.- 56S

ELECTRODE CONFIGURATION

PLOTTING POINT X = 300'

SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE

PROBABLE

POSSIBLE

FREQUENCIES: 0.31-5.0 HZ

DATE SURVEYED: OCT 1970

APPROVED

DATE:

NOTE: CONTOURS AT LOGARITHMIC INTERVALS 1.-1.5-2.-3.-5.-7.5-10

McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

NOTE: THIS PLOT WAS PRODUCED WITH AN IBM 360/65 COMPUTER AND A CALCOMP PLOTTER

DWG. NO.- I.P.-5602-3

ROYAL CANADIAN VENTURES LTD.

MONS LAKE

CLINTON M.D., B.C.

LINE NO.- 64S

ELECTRODE CONFIGURATION

X — NX — X

V I

PLOTTING POINT X = 300'

SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE

PROBABLE

POSSIBLE

FREQUENCIES: 0.31-5.0 HZ

DATE SURVEYED: OCT 1970

APPROVED:

DATE:

NOTE: CONTOURS AT LOGARITHMIC INTERVALS 1.-1.5-2.-3.-5.-7.5-10

McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

NOTE: THIS PLOT WAS PRODUCED WITH AN IBM 360/65 COMPUTER AND A CALCOMP PLOTTER

DWG. NO.- I.P.-5602-4

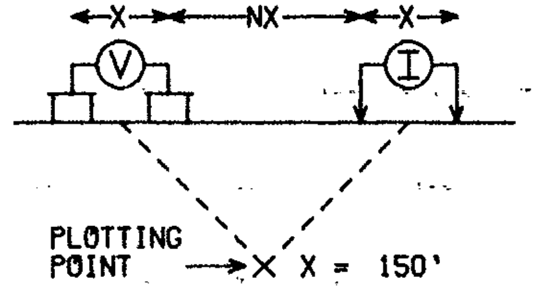
ROYAL CANADIAN VENTURES LTD.

MONS LAKE

CLINTON M.D., B.C.

LINE NO.- 64S

ELECTRODE CONFIGURATION



SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE
PROBABLE
POSSIBLE

FREQUENCIES: 0.31-5.0 HZ

DATE SURVEYED: OCT 1970

APPROVED

DATE: 1 Dec 70

NOTE: CONTOURS AT LOGARITHMIC INTERVALS 1,-1.5-2,-3,-5,-7.5-10

McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

NOTE: THIS PLOT WAS PRODUCED WITH AN IBM 360/65 COMPUTER AND A CALCOMP PLOTTER

DWG. NO.- I.P.-5602-5

ROYAL CANADIAN VENTURES LTD.

MONS LAKE

CLINTON M.D., B.C.

LINE NO.- 72S

ELECTRODE CONFIGURATION

PLOTTING POINT → X   X = 300'

SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE ▬▬▬

PROBABLE ııııııııııı

POSSIBLE / / / / /

FREQUENCIES: 0.31-5.0 HZ

DATE SURVEYED: OCT 1970

APPROVED:

DATE: Dec 70

NOTE: CONTOURS AT LOGARITHMIC INTERVALS 1.-1.5-2.-3.-5.-7.5-10

McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

NOTE: THIS PLOT WAS PRODUCED WITH AN IBM 360/65 COMPUTER AND A CALCOMP PLOTTER

DWG. NO.- I.P.-5602-6

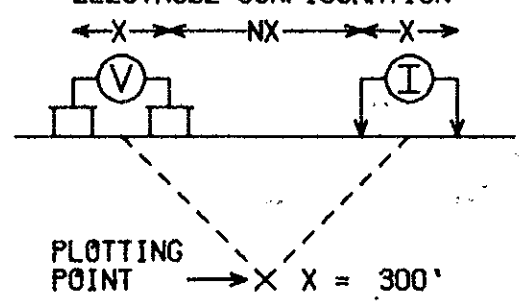
RØYAL CANADIAN VENTURES LTD.

MØNS LAKE

CLINTØN M.D., B.C.

LINE NØ.- 80S

ELECTRØDE CONFIGURATIØN



SURFACE PRØJECTIØN ØF ANØMALØUS ZØNES

DEFINITE
PRØBABLE
PØSSIBLE

FREQUENCIES: 0.31-5.0 HZ

DATE SURVEYED: ØCT 1970

APPRØVED

DATE

NØTE: CØNTØURS AT LØGARITHMIC INTERVALS 1,-1.5-2,-3,-5,-7.5-10

McPHAR GEØPHYSICS

INDUCED PØLARIZATIØN AND RESISTIVITY SURVEY

NØTE: THIS PLØT WAS PRØDUCED WITH AN IBM 360/65 CØMPUTER AND A CALCØMP PLØTTER

DWG. NO.- I.P.-5602-7

ROYAL CANADIAN VENTURES LTD.

MONS LAKE
CLINTON M.D., B.C.

LINE NO.- 88S

ELECTRODE CONFIGURATION

X = 300'

PLOTTING POINT

SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE
PROBABLE
POSSIBLE

FREQUENCIES: 0.31-5.0 HZ

DATE SURVEYED: OCT 1970

APPROVED:

DATE: 1 Dec

NOTE: CONTOURS AT LOGARITHMIC INTERVALS 1.-1.5-2.-3.-5.-7.5-10

McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

NOTE: THIS PLOT WAS PRODUCED WITH AN IBM 360/65 COMPUTER AND A CALCOMP PLOTTER

DWG. NO.- I.P.-5602-8

ROYAL CANADIAN VENTURES LTD.

MONS LAKE

CLINTON M.D., B.C.

LINE NO.- 96S

ELECTRODE CONFIGURATION

PLOTTING POINT X = 300'

SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE

PROBABLE

POSSIBLE

FREQUENCIES: 0.31-5.0 HZ

DATE SURVEYED: OCT 1970

APPROVED

DATE: 1 Dec

NOTE: CONTOURS AT LOGARITHMIC INTERVALS 1.-1.5-2.-3.-5.-7.5-10

McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

NOTE: THIS PLOT WAS PRODUCED WITH AN IBM 360/65 COMPUTER AND A CALCOMP PLOTTER

DWG. NO.- I.P.-5602-9

ROYAL CANADIAN VENTURES LTD.

MONS LAKE

CLINTON M.D., B.C.

LINE NO.- 104S

ELECTRODE CONFIGURATION

X NX X

PLOTTING POINT X = 300'

SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE

PROBABLE

POSSIBLE

FREQUENCIES: 0.31-5.0 HZ

DATE SURVEYED: OCT 1970

APPROVED

DATE

NOTE: CONTOURS AT LOGARITHMIC INTERVALS 1.-1.5-2.-3.-5.-7.5-10

McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

NOTE: THIS PLOT WAS PRODUCED WITH AN IBM 360/65 COMPUTER AND A CALCOMP PLOTTER

DWG. NO.- I.P.-5602-10

ROYAL CANADIAN VENTURES LTD.

MONS LAKE

CLINTON M.D., B.C.

LINE NO.- 112S

ELECTRODE CONFIGURATION

X NX X

PLOTTING POINT X = 300'

SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE

PROBABLE

POSSIBLE

FREQUENCIES: 0.31-5.0 HZ

DATE SURVEYED: OCT 1970

APPROVED

DATE: 1 Dec

NOTE: CONTOURS AT LOGARITHMIC INTERVALS 1.-1.5-2.-3.-5.-7.5-10

McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

NOTE: THIS PLOT WAS PRODUCED WITH AN IBM 360/65 COMPUTER AND A CALCOMP PLOTTER

DWG. NO.- I.P.-5602-11

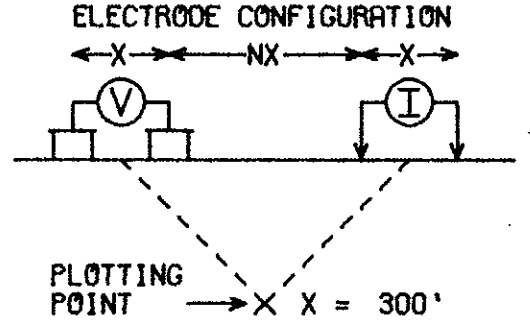
ROYAL CANADIAN VENTURES LTD.

MONS LAKE

CLINTON M.D., B.C.

LINE NO.- 120S

ELECTRODE CONFIGURATION



SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE ▬▬▬

PROBABLE ||||||||||||||

POSSIBLE /////

FREQUENCIES: 0.31-5.0 HZ

DATE SURVEYED: OCT 1970

APPROVED:

DATE: 1 Dec 70

NOTE: CONTOURS AT LOGARITHMIC INTERVALS 1.-1.5-2.-3.-5.-7.5-10

McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

NOTE: THIS PLOT WAS PRODUCED WITH AN IBM 360/65 COMPUTER AND A CALCOMP PLOTTER

DWG. NO.- I.P.-5602-12

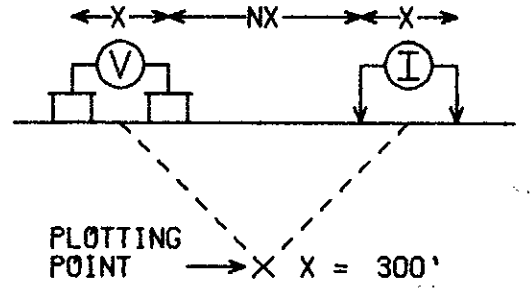
ROYAL CANADIAN VENTURES LTD.

MONS LAKE

CLINTON M.D., B.C.

LINE NO.- 128S

ELECTRODE CONFIGURATION



SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE
PROBABLE
POSSIBLE

FREQUENCIES: 0.31-5.0 HZ

DATE SURVEYED: OCT 1970

APPROVED:

DATE: 1 Dec 70

NOTE: CONTOURS AT LOGARITHMIC INTERVALS 1.-1.5-2.-3.-5.-7.5-10

McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

NOTE: THIS PLOT WAS PRODUCED WITH AN IBM 360/65 COMPUTER AND A CALCOMP PLOTTER

DWG. NO.- I.P.-5602-13

ROYAL CANADIAN VENTURES LTD.

MONS LAKE

CLINTON M.D., B.C.

LINE NO.- 136S

ELECTRODE CONFIGURATION

X — NX — X

PLOTTING POINT → X   X = 300'

SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE

PROBABLE

POSSIBLE

FREQUENCIES: 0.31-5.0 HZ

DATE SURVEYED: OCT 1970

APPROVED

DATE: 1 Dec 70

NOTE: CONTOURS AT LOGARITHMIC INTERVALS 1,-1.5-2,-3,-5,-7.5-10

McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

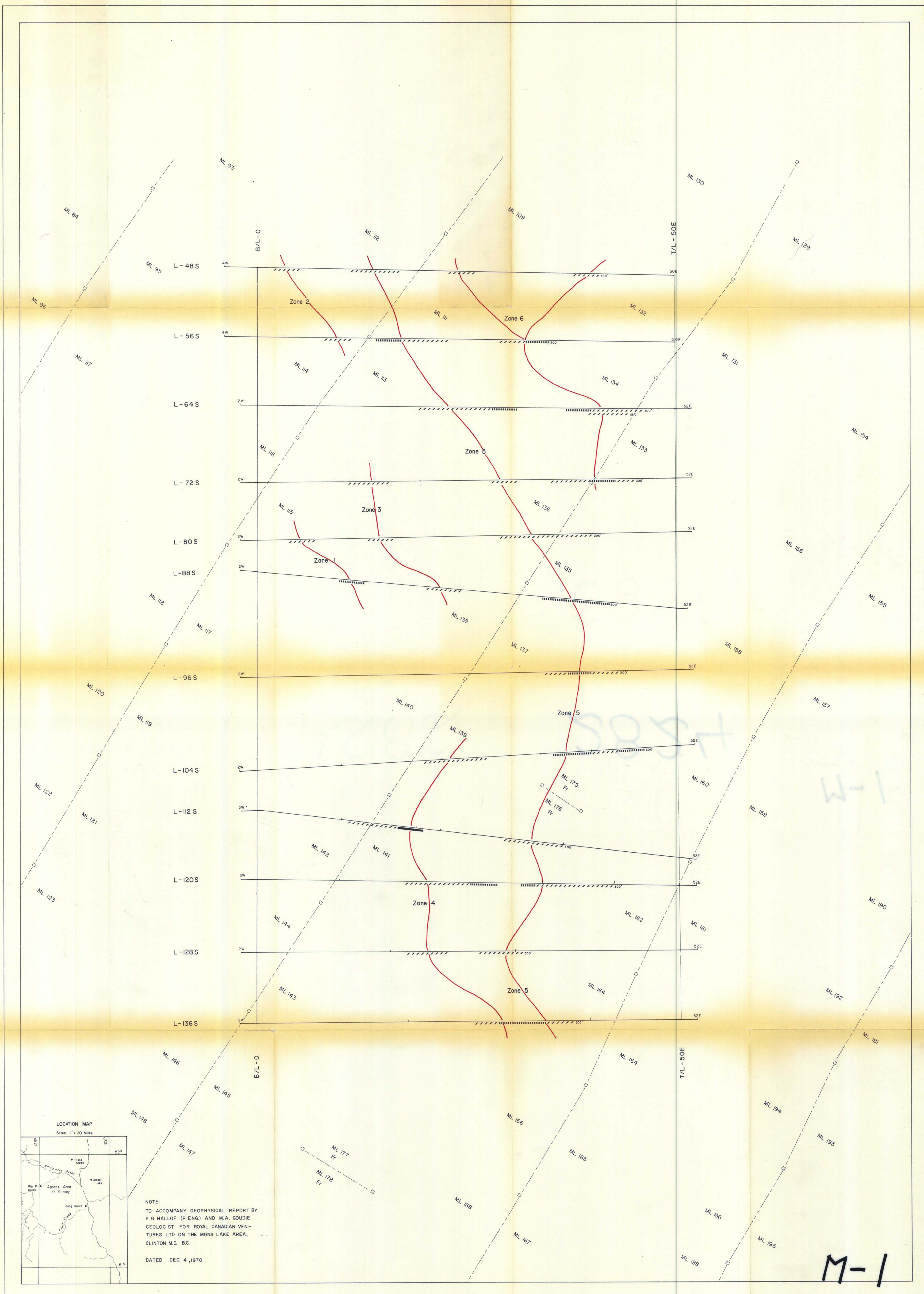
NOTE: THIS PLOT WAS PRODUCED WITH AN IBM 360/65 COMPUTER AND A CALCOMP PLOTTER

DWG. I.P.P. - 4703

McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

PLAN MAP



SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE

PROBABLE

POSSIBLE

Number at the end of anomaly indicates spread used

ROYAL CANADIAN VENTURES LTD.

MONS LAKE, CLINTON M.D., B.C.

SCALE

ONE INCH EQUALS FOUR HUNDRED FEET

2824

Department of Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 2824 MAP #1

Philip G. Hallof 4 Dec 70

Expiry Date: February 25, 1971

DWG. I.P.P. - 4703