'77-#270 #6378.

REPORT ON THE INDUCED POLARIZATION AND RESISTIVITY SURVEY QUEEN CLAIMS GREENWOOD MINING DIVISION, B.C.

FOR 82E/2W

RIO TINTO CANADIAN EXPLORATION LIMITED

6378

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PHOENIX GEOPHYSICS LIMITED

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 cannot 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 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) betwen 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 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 at the top of the data profile, above the metal factor values. On a third line, below the metal factor values, are plotted the values of the percent frequency effect. 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 the 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.

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 noisy 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.

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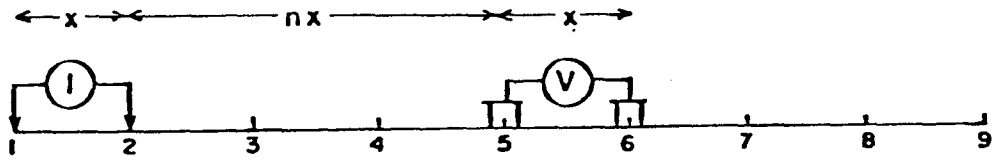
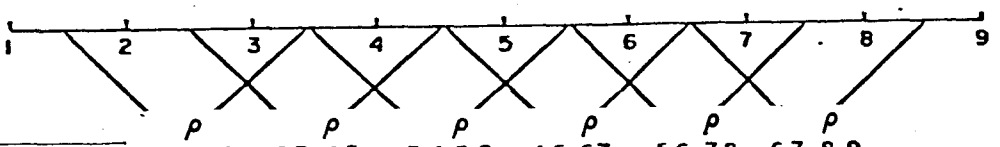
METHOD USED IN PLOTTING DIPOLE-DIPOLE INDUCED POLARIZATION AND RESISTIVITY RESULTS



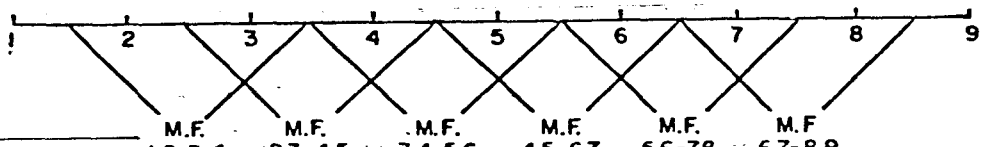
Stations on line

x = Electrode spread length
n = Electrode separation



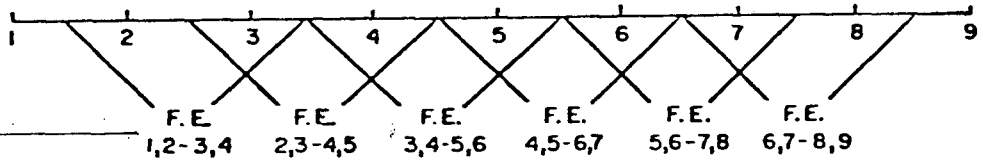
n - 1	ρ 1,2-3,4	ρ 2,3-4,5	ρ 3,4-5,6	ρ 4,5-6,7	ρ 5,6-7,8	ρ 6,7-8,9
n - 2	ρ 1,2-4,5	ρ 2,3-5,6	ρ 3,4-6,7	ρ 4,5-7,8	ρ 5,6-8,9	
n - 3	ρ 1,2-5,6	ρ 2,3-6,7	ρ 3,4-7,8	ρ 4,5-8,9		
n - 4	ρ 1,2-6,7	ρ 2,3-7,8	ρ 3,4-8,9			

Apparent Resistivity



n - 1	M.F. 1,2-3,4	M.F. 2,3-4,5	M.F. 3,4-5,6	M.F. 4,5-6,7	M.F. 5,6-7,8	M.F 6,7-8,9
n - 2	M.F. 1,2-4,5	M.F. 2,3-5,6	M.F. 3,4-6,7	M.F. 4,5-7,8	M.F. 5,6-8,9	
n - 3	M.F. 1,2-5,6	M.F. 2,3-6,7	M.F. 3,4-7,8	M.F 4,5-8,9		
n - 4	M.F. 1,2-6,7	M.F. 2,3-7,8	M.F. 3,4-8,9			

Apparent Metal Factor



n - 1	F.E. 1,2-3,4	F.E. 2,3-4,5	F.E. 3,4-5,6	F.E. 4,5-6,7	F.E. 5,6-7,8	F.E. 6,7-8,9
n - 2	F.E. 1,2-4,5	F.E. 2,3-5,6	F.E. 3,4-6,7	F.E. 4,5-7,8	F.E. 5,6-8,9	
n - 3	F.E. 1,2-5,6	F.E. 2,3-6,7	F.E. 3,4-7,8	F.E. 4,5-8,9		
n - 4	F.E. 1,2-6,7	F.E. 2,3-7,8	F.E. 3,4-8,9			

Apparent Percent Frequency Effect

Fig. A

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REPORT ON THE INDUCED POLARIZATION AND RESISTIVITY SURVEY QUEEN CLAIMS GREENWOOD MINING DIVISION, B.C. FOR RIO TINTO CANADIAN EXPLORATION LIMITED

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1. INTRODUCTION

An Induced Polarization and Resistivity survey has been completed on the Queen Claims Property for Rio Tinto Canadian Exploration Limited. The property is located approximately 8Km northwest of Greenwood, in the Greenwood Mining Division, Southern B.C. The centre of the property is positioned at about $49^{o}7.5'$ north latitude and $118^{o}46.5'$ west longitude.

Access to the claims is by unpaved road from Greenwood. The object of the survey was to confirm and precisely locate the IP anomaly originally identified for McIntyre Mines in 1967 on Line 18, Line 19 and Line 20, and to determine if there is a detectable IP anomaly over the Pasco showing.

This showing lies on Line 9, 900M southeast of the base line.

Field work was carried out in June, 1977 under the supervision of Crew Leader, John Marsh (his certificate is appended to this report).

A McPhar P660 Frequency Domain IP System was used for the survey operating at 0.3 and 5.0 Hz.

2. DESCRIPTION OF THE PROPERTY

The Queen Claims Property of Rio Tinto Canadian Exploration Limited, consists of the following located claims, and Crown Grants:

NAME	UNITS	RECORD NO.	DATE RECORDED	DUE DATE
COP	12	481	Sept. 3, 1976	Sept. 3, 1977
WIN	8	482	Sept. 3, 1976	Sept. 3, 1977
NOVA	6	581	Nov. 26, 1976	Nov. 19, 1977
COPPER MINE CROWN GRANT L. 456	20 Acres	577	Nov. 19, 1976	Nov. 19, 1977
JUMBO CROWN GRANT L-655	39.3 Acres	576	Nov. 19, 1976	Nov. 19, 1977
COMMANDER CROWN GRANT L-1708	6.38 Acres	575	Nov. 19, 1976	Nov. 19, 1977

The following Crown Grants are held under option agreement dated May, 1977: L387; L388; L617; L650; L1572; L1713; L1851; L2311; L2611.

The following two located claims owned by Mr. D.F. Pasco of Greenwood are included within the area of the Queen claims property: JR#1, Record #35660 and JR#2, Record #35661.

3. 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 No.	Electrode Interval	Dwg. No.
9A	100 Metres	IP 5073-1
18	30 Metres	IP 5073-2
19	30 Metres	IP 5073-3

Also enclosed with this report is Dwg.I.P.P. 3032, a plan map of the Queen Claims Grid at a scale of 1:5000. The definite, probable and possible Induced Polarization anomalies are indicated by bars, in the manner shown on the legend, in this plan map as well as on 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 electrode interval length; i. e. when using 100M electrode intervals the position of a narrow sulphide body can only be determined to lie between two stations 100M apart. In order to definitely locate, and fully evaluate, a narrow, shallow source it is necessary to use shorter electrode intervals. In order to locate sources at some depth, larger electrode intervals 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 a source, the length of the indicated anomaly along the line should not be taken to represent the exact

edges of the anomalous material.

The Claims, Grid and Geological information shown on Dwg. has been taken from maps made available by the staff of Rio Tinto Canadian Exploration Ltd.

4. DESCRIPTION OF GEOLOGY

The following Discussion of Geology is taken directly from a report by Mr. R.V. Longe of Rio Tinto Canadian Exploration Ltd.

Regional:

"Much of the country between Grand Forks and Rock Creek is underlain by a sequence of volcanic and sedimentary rocks of Permian and Triassic age known as the Knob Hill and Anarchist Groups respectively. These are cut by Cretaceous granitic batholiths. Tertiary flows and pyroclastics laid down on a subdued version of the present land surface cover much of the area. Associated Tertiary dykes and sills are numerous".

Detailed:

"The claim block is underlain by sharpstones and limestones of the Anarchist group, much of which is unconformably overlain by Tertiary flows and pyroclastic rocks. The old Copper Queen mining camp, which lies in the centre of the claim block, consists of occurrences of copper sulphides, iron sulphides and skarn minerals within the Brooklyn Limestone".

5. HISTORY AND PREVIOUS WORK

"The earliest record of activity in the Copper Queen camp is found in the 1894 edition of the B.C. Dept. of Mines in which an 18 foot shaft and a 40 foot tunnel are reported on the Copper Mine. No information

exists on tonnage mined prior to 1902 but because no railroad was put into the Copper Queen camp tonnage can be assumed to have been small. The 1902 and 1903 editions of the Annual Report of the B.C. Dept. of Mines report 850 tons shipped in 1901 and "about 1,000 tons" in 1902. In 1917 the King Solomon and the Big Copper between them shipped 950 tons. After 1918 the property lay dormant until 1950 when the late W.E. McArthur carried out a programme of drilling and stripping which led to further exploration.

Prior to the end of the first world war there had been tunnelling (probably amounting to three or four hundred feet), shaft sinking (tens of feet), and mining of a few thousand tons of oxidized copper ore from the Upper Brooklyn Limestone.

In 1953 and 1954 the late W.E. McArthur of Greenwood carried out a programme of diamond drilling and stripping of the King Solomon and Copper Mine claims. This work led to the discovery of a body of sulphides from which two carloads of ore was shipped to the Tacoma Shelter.

In 1954 Noranda Mines Ltd., drilled for extensions of the roughly-conformable body passing through the Copper Queen and King Solomon claims. It is believed, that four holes were drilled by Noranda. In 1955 the Consolidated Mining & Smelting Company drilled a further four holes, again in search of the conformable body passing through the Copper Queen claim. This drilling intersected mineralized limestone but of too low a grade.

In 1967 McIntyre Porcupine Mines held options on several of the crown grants in the vicinity and carried out geological mapping, soil sampling, induced polarization surveys, bulldozer stripping and diamond drilling. McIntyre drilled four holes.

In 1970 Pechiney Development staked a block of eleven claims to the east of the Copper Queen camp. Work included geological mapping, magnetometry and geochemical soil sampling (B.C. Dept. of Mines Assessment Report 2453). No sub-surface testing was undertaken".

6. DISCUSSION OF RESULTS

The skarn-zone type of mineralization that is the target of the IP test survey completed on the Queen Claims Property is difficult to locate with geophysical techniques. The high-grade copper mineralization is quite massive and would be expected to be an excellent conductor. However, the tonnages are quite low and the sources are small. These zones, particularly if they are at some depth, make difficult targets.

However, the dips of the limestones in the area have now been ascertained to be to the southeast. Therefore DDH-M1 and DDH-M2, previously drilled on Line 18 and Line 19 were not properly placed to intersect mineralization within the dipping sediments. Therefore, the IP anomalies located in this area by the previous survey, could be of considerable importance. The previous drilling by Noranda and CM & S apparently intersected low-grade mineralization in the limestones; therefore, there may be other types of mineralization present in the sub-surface.

In 1967, the IP measurements were made with a X = 200 feet electrode interval. The anomalous patterns were somewhat complex, suggesting that the source of the measured anomaly was not a single, simple source. The present test survey on Line 18 and Line 19 was made using X = 30 meter (100') electrode intervals.

Anomalous effects were measured on both lines, but the most definite, localized anomaly is centered at 450E to 480E on Line 18S. The

region from 420E to 540E on Line 18S and from 420E to 480E on Line 19S, appears to be underlain by a rock type that has slightly higher IP effects than the rocks to either side. However, on Line 18S there is a more definite, narrow source indicated within the broad anomaly.

The narrow anomaly centered at depth, at about 465E, Line 18S is exactly similar to what one would expect from a small volume of concentrated metallic mineralization within a broader zone of much weaker mineralization.

The measurements made on Line 9A were made using X = 100 metres. There is a mineralized showing (The Pasco Showing) about fifty metres south of Station 0+00 on Line 9A. The resistivity measurements show clearly the effect of overburden in the valley to the east of about 150E. There is no IP anomaly, but if the mineralization in the showing is quite narrow, no anomalous effects could be expected using X = 100 metres.

There is a fairly definite, low magnitude IP anomaly centred at 5W to 4W on Line 9A. This would be about 500 metres to the northeast of the showing. The previous survey on Line 11 showed similar IP effects about 1000 to 1100 metres southeast of the base line. The Pasco Showing lies approximately between these two anomalies. Further work would seem to be warranted in this area, with shorter electrode intervals.

7. CONCLUSIONS AND RECOMMENDATIONS

The IP results on the three lines surveyed on the Queen Claims Property seem to confirm the previous IP work. On Line 18S and Line 19S the measurements with X = 30 metres show correlating IP effects. On Line 18S, the anomalous pattern suggests a narrow, more definite source, at depth, within the broad, weaker anomaly. Since the zones of high-grade copper

mineralization in the skarn zones are expected to be small, this type of anomaly could be of significance.

From a geophysical point of view, it would be worthwhile to confirm the anomaly centred at approximately Line 18S, 465E. This could be done by surveying closely-spaced parallel lines at 30 metre intervals, and by repeating the X = 30 metre measurements with the electrode positions moved 15 metres.

However, the known dip and outcrop position of the favourable limestone sediments limits, to a certain extent, the possible position for a sulphide zone of interest. Therefore an angle drill hole could be considered to pass beneath Line 18S, 450E to 980E at a depth of 30 to 60 metres. The hole should be drilled from southeast to northwest to be at approximately right angles to the dips. Careful attention should be paid to the topography in the area, in the spotting of the drill-hole, to make certain that the desired volume of rock is tested.

If the drill hole is drilled on Line 18S, and sulphide mineralization of economic interest is intersected, further work would be warranted in this area, and also in the area from Line 9A to Line 11, surrounding the Pasco showing.

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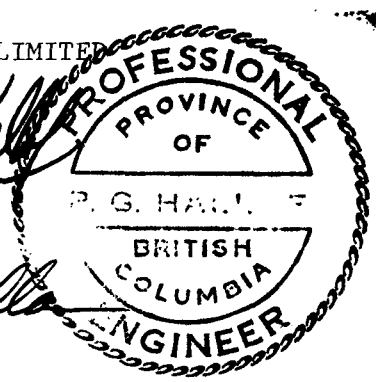
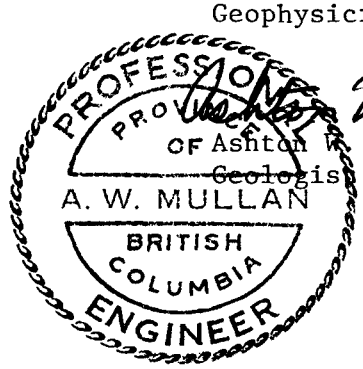
Philip G. Hallof,
Geophysicist



Ashton W. Mullan,
Geologist



Expiry Date: February 25, 1978

Dated: August 4, 1977

ASSESSMENT DETAILS

PROPERTY: Queen Claims

MINING DIVISION: Greenwood

SPONSOR: Rio Tinto Canadian Exploration Ltd.

PROVINCE: British Columbia

LOCATION: Greenwood Area

TYPE OF SURVEY: Induced Polarization

OPERATING DAYS:	3.0	DATE STARTED:	June 18, 1977
EQUIVALENT 8 HR.MAN DAYS:	4½	DATE FINISHED:	June 24, 1977
CONSULTING MAN DAYS:	3.0	NUMBER OF STATIONS:	55
DRAFTING MAN DAYS:	4.0	NUMBER OF READINGS:	498
TOTAL MAN DAYS:	14½	KM OF LINE SURVEYED:	3.1 Km

CONSULTANTS:

A.W. Mullan, Phoenix Geophysics Ltd., 1424 - 355 Burrard Street, Vancouver, B.C.
Philip G. Hallof, 15 Barnwood Court, Don Mills, Ontario.

FIELD TECHNICIANS:

J. Marsh, 200 Yorkland Blvd. Willowdale, Ontario.
G. Gauthier, 3166 Turner Street, Vancouver, B.C.
Extra Labourers:
Thomas Knight)
David Pascoe) Phoenix Geophysics Ltd. 1424 - 355 Burrard St. Vancouver, B.C.
Floyd Lang)

DRAUGHTSMEN:
R.C. Norris, 23 Chipwood Cres. Willowdale, Ontario.
B. Boden, R. R.#1, Omemee, Ontario.

PHOENIX GEOPHYSICS LIMITED

Ashton W. Mullan B.Sc. P.Eng.

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
A. W. MULLAN

Dated: August 4, 1977

STATEMENT OF COST

Rio Tinto Canadian Exploration Ltd. - IP Survey
Greenwood Mining Division, B.C.

CREW: J. Marsh - G. Gauthier

PERIOD: June 18 - 24, 1977

2 Operating days		@ $770.00/day	$1,540.00
2 Travel Days)	5 days	@ $280.00/day	1,400.00
3 Standby days)			
Mobilization Fee			1,200.00
			$4,140.00

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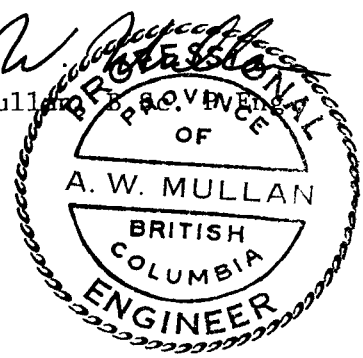
Ashton W. Mullan, B.Sc., P.Eng.



Dated: August 4, 1977

CERTIFICATE

I, Ashton W. Mullan, of the City of Vancouver, in the Province of British Columbia, hereby certify:

1. That I am a geologist/geophysicist and a fellow of the Geological Association of Canada, Geophysics Division, with a business address at 1424 - 355 Burrard Street, Vancouver, B.C.

2. That I am registered as a member of the Association of Professional Engineers of the Provinces of Ontario and British Columbia.

3. That I hold a B.Sc. degree from McGill University.

4. That I have been practising my profession as a geologist/geophysicist for over twenty-five 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 Rio Tinto Canadian Exploration Limited, 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 Vancouver

This 4th day of August, 1977

A.W. Mullan, B.Sc. P.Eng.

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
A.W. MULLAN

CERTIFICATE

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

1. I am a geophysicist residing at 15 Barnwood Court, Don Mills, 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 Rio Tinto Canadian Exploration Limited, 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 August, 1977

Philip G. Hallof, Ph.D., P. Eng.

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
P. G. HALLOF

Expiry Date: February 25, 1978

CERTIFICATE

I, JOHN MARSH, of the Municipality of North York, Ontario, DO HEREBY CERTIFY THAT:

1. I am a geophysical crew leader residing at 200 Yorkland Blvd., Willowdale, Ontario.

2. I am a graduate of the City of Norwich Technical College, U.K., ordinary National Certificate (Electrical Engineering)

3. I worked with McPhar Geophysics Company from 1968 to 1975 as a geophysical crew leader.

4. I am presently employed as a geophysical crew leader by Phoenix Geophysics Ltd. of 1424 - 355 Burrard Street, Vancouver, B.C.

Dated at Vancouver, B.C.

This 29th Day of July, 1977

John Marsh.

John Marsh

McPHAR

P660 VARIABLE FREQUENCY

INDUCED POLARIZATION EQUIPMENT

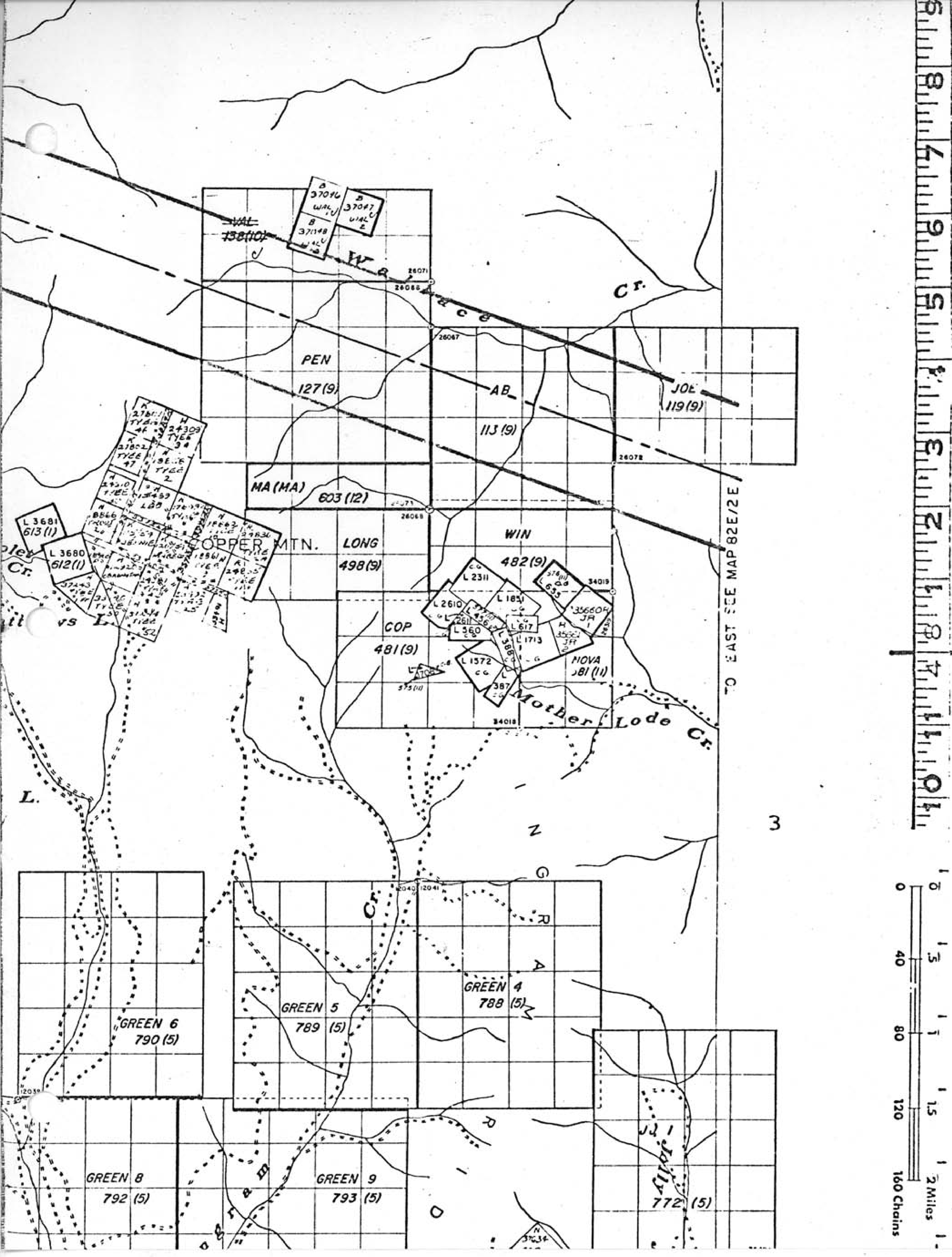
SPECIFICATIONS:

TRANSMITTER

Operating Voltage Range	:	30-700V R.M.S.
Maximum current at full voltage	:	5 amps
Minimum current at full voltage	:	20 ma.
Current regulation	:	3% (max) output current change for 10% input voltage change; .1% is typical.
Operating Temperature	:	$-40^{o}C$ to $60^{o}C$
Weight	:	34 pounds packboard mounted with nylon waterproof hood.

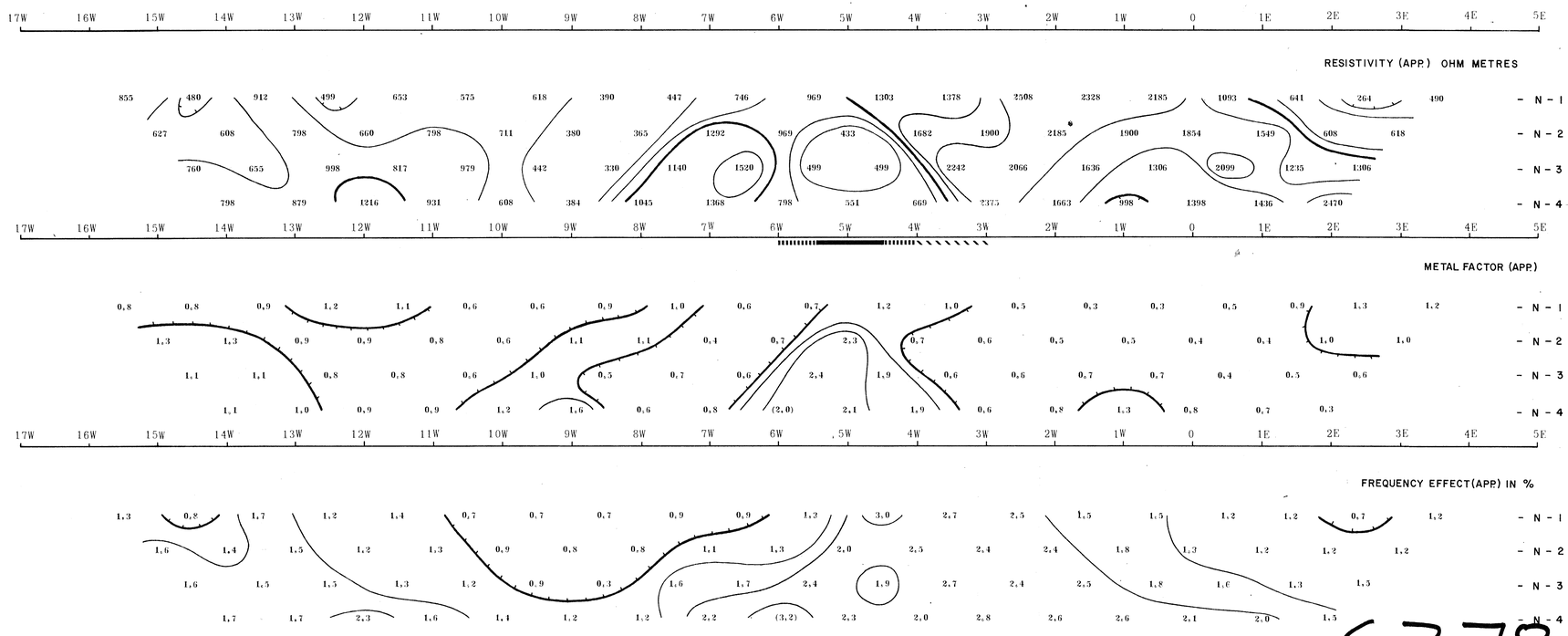
MOTOR GENERATOR

Output frequency	:	400 Hz nominal
Output voltage	:	125 Volts (nominal)
Output power	:	2.5 KVA
Voltage regulation	:	-5% no load to full load
Weight	:	Back pack mounted: 79 pounds



PEN
127(9)
AB
113(9)
JOE
119(9)
MA (MA)
603 (12)
LONG
498(9)
WIN
482(9)
COP
481(9)
NOVA
381 (11)
COPPER MTN.
L 3681
613 (1)
L 3680
612(1)
L 2311
L 2610
L 1851
L 617
L 1713
L 1572
L 387
L 360
L 388
L 653
Wallace Cr.
Mother Lode Cr.
TO EAST SEE MAP 82E/2E
GREEN 4
788 (5)
GREEN 5
789 (5)
GREEN 6
790 (5)
GREEN 8
792 (5)
GREEN 9
793 (5)
JJ 1
772 (5)
Cr.
L.
GRANBY
0 40 80 120 160 Chains
0 .5 1 1.5 2 Miles

3



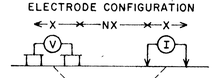
DWG. NO.- I.P.- 5073-1

RIO TINTO CANADIAN EXPL., LTD.

QUEEN CLAIMS - GREENWOOD, M.D., B.C.

LINE NO.- 9A

ELECTRODE CONFIGURATION



SURFACE PROJECTION OF ANOMALOUS ZONE

DEFINITE

PROBABLE

POSSIBLE

FREQUENCIES 0.3 - 5.0 HZ.

DATE SURVEYED JUNE 1977

APPROVED

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

DATE

PHOENIX GEOPHYSICS LIMITED

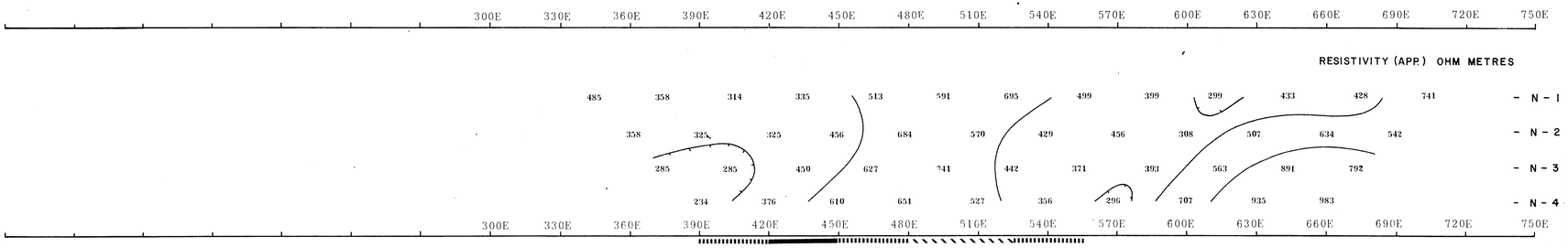
INDUCED POLARIZATION AND RESISTIVITY SURVEY

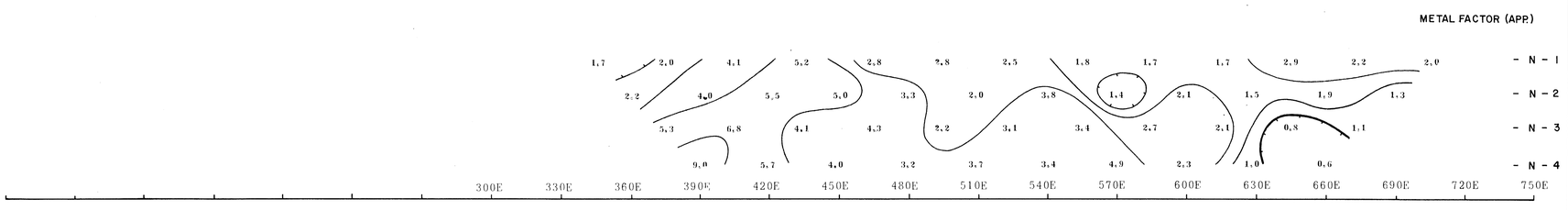
DWG. NO.- I.P.- 5073-2

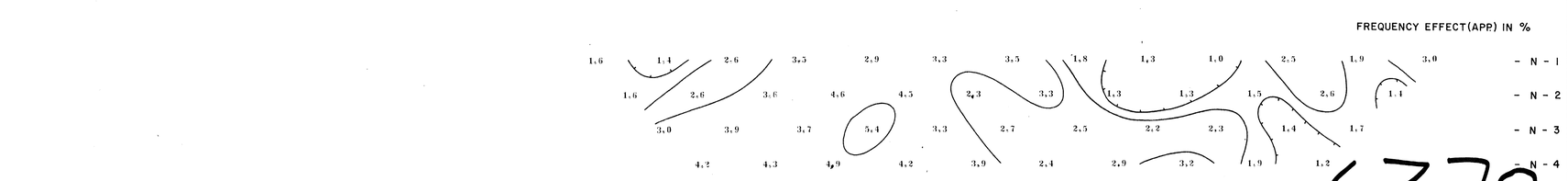
RIO TINTO CANADIAN EXPL., LTD.

QUEEN CLAIMS - GREENWOOD, M.D., B.C.

LINE NO.- 18

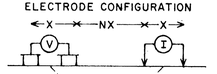






6378

ELECTRODE CONFIGURATION



PLOTTING POINT → × X = 30m.

SURFACE PROJECTION OF ANOMALOUS ZONE

DEFINITE ——

PROBABLE ·····

POSSIBLE ~~~~~

FREQUENCIES 0·3 – 5·0 HZ.

DATE SURVEYED JUNE 1977

APPROVED

DATE

NOTE – CONTOURS AT LOGARITHMIC INTERVALS 1, 1·5, 2, 3, 5, 7·5, 10

PHOENIX GEOPHYSICS LIMITED

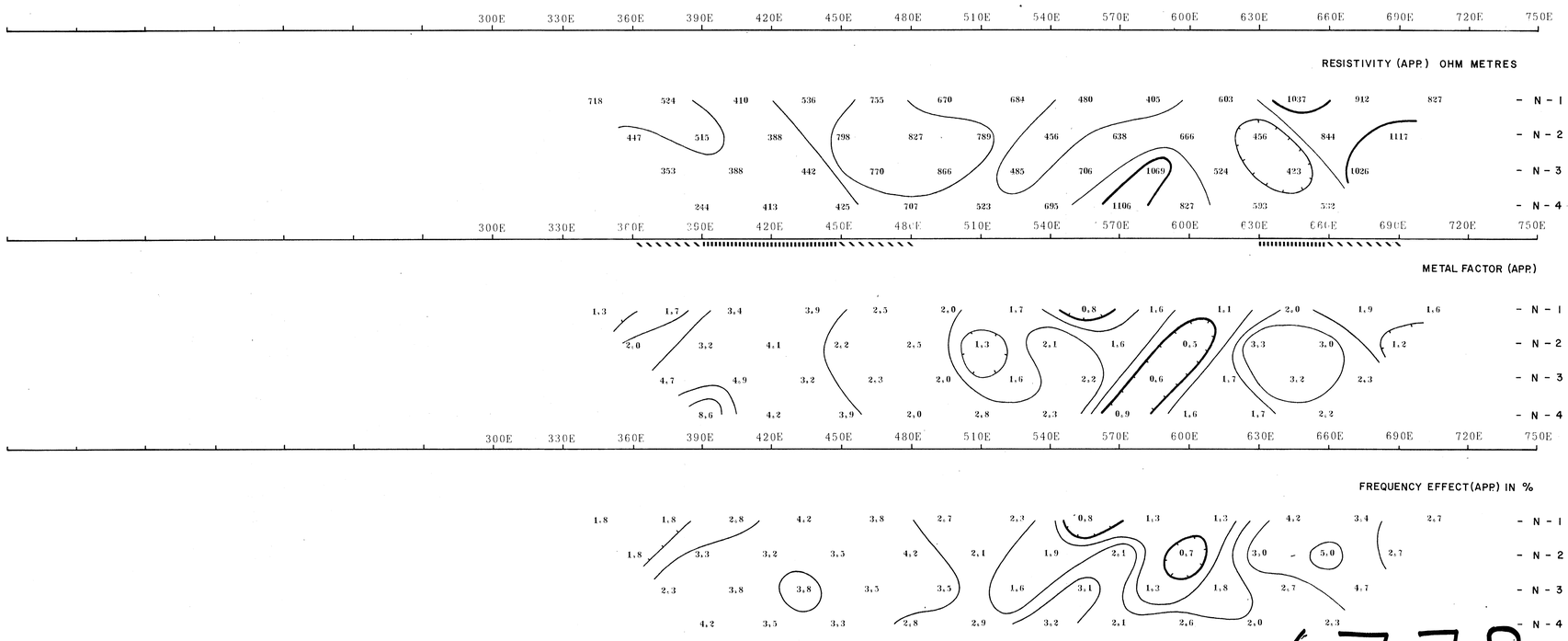
INDUCED POLARIZATION AND RESISTIVITY SURVEY

DWG. NO.- I.P.-5073-3

RIO TINTO CANADIAN EXPL., LTD.

QUEEN CLAIMS - GREENWOOD, M.D., B.C.

LINE NO.- 19



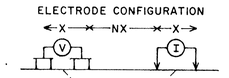
SURFACE PROJECTION OF ANOMALOUS ZONE

DEFINITE

PROBABLE

POSSIBLE

ELECTRODE CONFIGURATION



PLOTTING POINT → X = 30 m.

FREQUENCIES 0·3 – 5·0 HZ.

DATE SURVEYED JUNE 1977

APPROVED

NOTE – CONTOURS AT LOGARITHMIC INTERVALS 1, 1·5, 2, 3, 5, 7·5, 10

DATE PLOTTED JULY 1977

MINERAL RESOURCES BRANCH ASSESSMENT REPORT NO. 6378

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA

Expiry Date: February 25, 1978

6378

PHOENIX GEOPHYSICS LIMITED

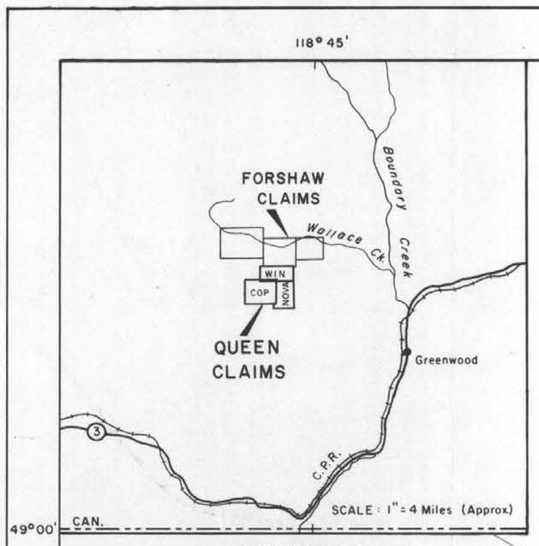
INDUCED POLARIZATION AND RESISTIVITY SURVEY

DWG.NO.- I.P.P - 3032

PHOENIX GEOPHYSICS LIMITED

INDUCED POLARIZATION AND RESISTIVITY SURVEY

PLAN MAP



LOCATION MAP

L. 21 L. 20 L. 19 L. 18 L. 19 L. 3 L. 9 L. 9A 17W

L. 24 L. 23 L. 22 L. 16 L. 15 L. 14 L. 12 L. 11 L. 10

BASE LINE

L 2610 5000 L 2511 L 456 L 2611 L 660 L 1851 L 655 L 1708 L 1572 L 388 L 617 4500 L 1713

DDH M-1 DDH M-2 DDH M-3 DDH M-4 DDH C-1 DDH C-2 DDH C-3 DDH C-4 DDH N-1 DDH N-2 DDH N-3 DDH N-4 DDH N-5

PASCO

N 30°

SURFACE PROJECTION OF ANOMALOUS ZONE

DEFINITE
PROBABLE
POSSIBLE

NUMBER AT END OF ANOMALIES INDICATE SPREAD USED.

RIO TINTO CANADIAN EXPL., LTD.

QUEEN CLAIMS - GREENWOOD, M.D., B. C.

SCALE

100 0 100 200 300 400 500 METRES

1:5,000

NOTE:
TO ACCOMPANY GEOPHYSICAL REPORT FOR RIO TINTO CANADIAN EXPL., LTD. ON THE QUEEN CLAIMS IN THE GREENWOOD AREA, GREENWOOD M.D., B.C., BY PHILIP G. HALLOF P. ENG., GEOPHYSICIST, AND A.W. MULLAN P. ENG., GEOLOGIST.

DATED AUGUST 4, 1977.

6378

MINERAL RESOURCES BRANCH
ASSESSMENT REPORT
NO. 6378

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
P. G. HALLOF

DRAWN BY:
DATE: AUG. 1977
APPROVED:
DATE: Aug. 4/77
Expiry Date: February 25, 1978

DWG. NO.- I.P.P.- 3032