

GEOPHYSICAL SURVEY REPORT

on the

LOG 1 to 4 MINERAL CLAIMS

MISSEZULA LAKE AREA

NICOLA MINING DIVISION

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|           |   |         |          |   |         |
|-----------|---|---------|----------|---|---------|
| NTS       | - | 92H/15E | UTM Grid | - | Zone 10 |
| Latitude  | - | 49°47'  | North    | - | 5516950 |
| Longitude | - | 120°34' | East     | - | 675300  |

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BEIHLEHEM COPPER CORPORATION  
Suite 2100 - Guinness Tower  
1055 West Hastings Street  
Vancouver, B.C. V6E 2H8

October 24, 1979

R. E. Anderson, P.Eng.

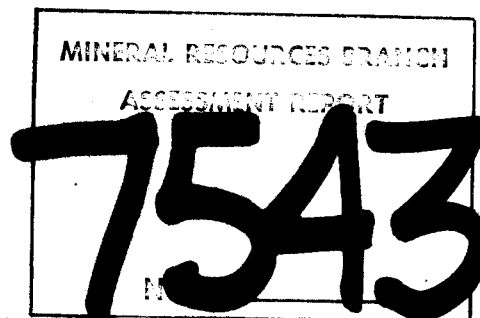


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| ML-79-1            | General Location Plan                   | 1:250,000    |
| ML-79-2            | Location Plan                           | 1: 50,000    |
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| I.P.-5155-3  | - Line 99400E         | not to scale |
| I.P.-5155-4  | - Line 99650E         | "            |
| I.P.-5155-5  | - Line 99900E         | "            |
| I.P.-5155-6  | - Line 100150E(north) | "            |
| I.P.-5155-7  | - Line 100150E(south) | "            |
| I.P.-5155-8  | - Line 100400E(north) | "            |
| I.P.-5155-9  | - Line 100400E(south) | "            |
| I.P.-5155-10 | - Line 100650E        | "            |
| I.P.-5155-11 | - Line 100900E        | "            |
| I.P.-5155-12 | - Line 101150E        | "            |

FIG. 1A

" 1B

" 2A

" 2B

Computer Inversion Data  
for Line 99900E

**BRITISH COLUMBIA**

SCALE 1:5,000,000



| REFERENCE   |             |
|-------------|-------------|
| 1:5,000,000 | 1:1,000,000 |
| 1:500,000   | 1:250,000   |
| 1:100,000   | 1:50,000    |
| 1:25,000    | 1:10,000    |
| 1:5,000     | 1:1,000     |

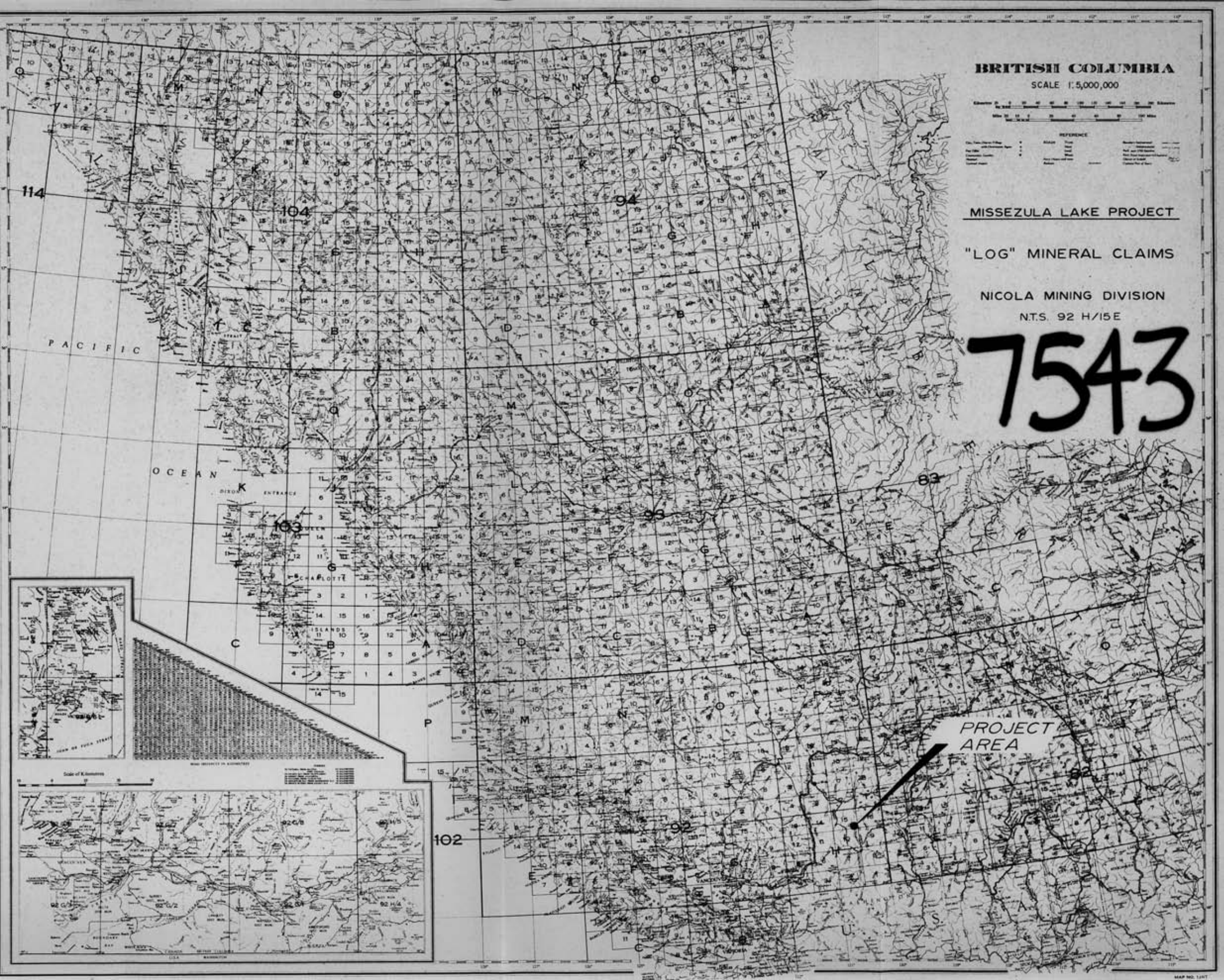
**MISSEZULA LAKE PROJECT**

**"LOG" MINERAL CLAIMS**

NICOLA MINING DIVISION

N.T.S. 92 H/15E

# 7543



## SECTION A - SUMMARY OF WORK

### Introduction:

The "LOG" Group of mineral claims was staked by Bethlehem in December 1973 following a large scale regional exploration program in the general Merritt - Princeton area during 1970 to 1972.

In late 1974 ten percussion holes were drilled. 900 metres of drilling was completed and some interesting mineralized sections were encountered in several holes. During 1975 three diamond drill holes and one rotary hole totalling 351 m and 218 m respectively were completed with low grade copper mineralization occurring in three of the four holes. Drilling problems limited the penetration to 218 m.

The majority of the drill holes were located in the eastern side of the property in the areas of shallow overburden. Holes attempted in the western portion failed to reach bedrock and this area had also never been tested by any geophysical survey. It was therefore felt that an Induced Polarization survey would provide the best approach to the untested area. The drift covered and untested zones would be checked by a survey offering moderately deep (>180 m) penetration while the mineralized area in the eastern portion of the claim block would be checked by three lines of deep (>270 m) I.P.

The report details the result of this survey.

### Location and Access:

The LOG claim group is situated over a low north-south trending valley some 3 km west of Missezula Lake at geographic co-ordinates  $49^{\circ}47'$  latitude and  $120^{\circ}34'$  longitude. The nearest

centres of population are 36 Km to the south at Princeton and 38 Km to the NNW at Merritt. Access to the property is obtained by a 9.5 Km gravel road which runs southeasterly from a point on Highway #5 some 43 Km south of Merritt. (See Drawing Nos. ML-79-1 and 2).

Mineral Title:

The property is comprised of the following four mineral claims all located in the Nicola Mining Division:

| <u>Claim</u> | <u>No. of Units</u> | <u>Record No.</u> | <u>Date Recorded</u> | <u>Current Expiry Date</u> |
|--------------|---------------------|-------------------|----------------------|----------------------------|
| LOG 1        | 12                  | 26(8)             | Aug. 28,1975         | Aug. 28,1982               |
| LOG 2        | 16                  | 27(8)             | "                    | Aug. 28,1981               |
| LOG 3        | 12                  | 28(8)             | "                    | "                          |
| LOG 4        | 16                  | 29(8)             | "                    | "                          |
|              | —                   |                   |                      |                            |
|              | 56                  |                   |                      |                            |

Induced Polarization Survey:

Phoenix Geophysics Limited was retained to carry out the I.P. and resistivity survey. Prior to their field technicians carrying out the actual survey, the grid lines were established by four field personnel employed by Bethlehem. This work was performed during the first week in May 1979 and the geophysical survey was completed between May 7 and 25, 1979.

The report on the survey follows in Section B with the accompanying drawings appended in Section E.

Expenditures:

The expenses incurred during this program totalled \$17,405.58, the details of which are set out in Section D. The average cost for the 28.45 Km of line surveyed was \$611.80/Km.

Respectfully submitted,

A handwritten signature in cursive script, appearing to read "R. E. Anderson".

R. E. Anderson, P.Eng.  
Exploration Manager

PHOENIX GEOPHYSICS LIMITED

REPORT ON THE  
INDUCED POLARIZATION  
AND RESISTIVITY SURVEY  
ON THE  
LOG CLAIMS, MISSEZULA LAKE AREA  
NICOLA MINING DIVISION, B.C.  
FOR  
BETHLEHEM COPPER CORPORATION LTD.

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1. INTRODUCTION

An Induced Polarization and Resistivity survey has been carried out for Bethlehem Copper Corporation on the LOG Claims property. The property is located about 36 km north of Princeton, just west of Missezula Lake in the Nicola Mining Division, British Columbia. The centre of the property is positioned at about  $49^{\circ}47'$  north latitude and  $120^{\circ}33.5'$  west longitude.

Access to the LOG claims is by 9.5 km of gravel road leading southeasterly from the Merritt-Princeton highway #5.

The object of the survey was to detect zones of concentrated disseminated sulfides in the underlying Nicola and intrusive rocks.



The survey was carried out in early May, 1979 under the direction of Mr. John Marsh. His certificate of qualification is appended to this report.

A Phoenix IPT-1, IPV-1 frequency domain IP system was used for the survey, operating at 0.3 and 5.0 Hz.

## 2. DESCRIPTION OF CLAIMS

The LOG Claim Group consists of four claims; Log 1 - 4 inclusive. Bethlehem Copper Corporation Ltd., is the registered owner.

## 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.

| <u>Line</u> | <u>Electrode Interval</u> | <u>Dwg. No.</u> |
|-------------|---------------------------|-----------------|
| 98,900E     | 100 Meters                | IP 5155-1       |
| 99,150E     | 100 Meters                | IP 5155-2       |
| 99,400E     | 100 Meters                | IP 5155-3       |
| 99,650E     | 100 Meters                | IP 5155-4       |
| 99,900E     | 100 Meters                | IP 5155-5       |
| 100,150E    | 100 Meters                | IP 5155-6       |
| 100,150E    | 100 Meters                | IP 5155-7       |
| 100,400E    | 100 Meters                | IP 5155-8       |
| 100,400E    | 100 Meters                | IP 5155-9       |
| 100,650E    | 150 Meters                | IP 5155-10      |
| 100,900E    | 150 Meters                | IP 5155-11      |
| 101,150E    | 150 Meters                | IP 5155-12      |

Also enclosed with this report is Dwg. I.P.P. 4053, a plan map of the LOG Claims Grid at a scale of 1:10,000. The definite, probable and possible Induced Polarization anomalies are indicated by bars, in the manner shown on the legend, on 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 source, the length of the indicated anomaly along the line should not be taken to represent the exact edges of the anomalous material.

The Grid and Claims information shown on Dwg. I.P.P. 4053 has been taken from maps made available by the staff of Bethlehem Copper Corporation Ltd.

#### 4. DESCRIPTION OF GEOLOGY

Triassic Nicola volcanics and Jurassic intermediate intrusives are the dominant rock types of the region.

The LOG claims are underlain by Nicola metavolcanics that have been intruded by a small plug of medium grained syenodiorite and monzonite. This intrusive is weakly mineralized with copper and is extensively drift-covered. The lower areas of the property are covered by Tertiary flows.

## 5. DISCUSSION OF RESULTS

Resistivity levels under the survey grid vary in magnitude from low to moderately high. Lower resistivities immediately south of Zone C on Line 98,900E and Line 99,150E do not show any correlating increase in IP effect and could reflect deeper overburden or a fault zone.

All of the stronger anomalous IP effects have been grouped into three zones designated as Zone A, Zone B and Zone C.

### ZONE A - Dwgs. IP 5155-10,11 & 12

This zone was originally indicated by an earlier IP survey and is located in the east-central section of the survey grids. A drilling program has investigated a portion of Zone A, although several of the more northerly holes seem to be located outside the anomaly to the north. On Line 100,650E the anomaly is shallow relative to the 150m dipoles between 99,300N and 99,750N and appears to deepen to the north. Line 100,900E is shallow at 99,900N and may deepen to the north and south. Line 101,150E is shallow between 99,300N and 99,750N. It deepens to the north and may also deepen to the south, where the anomalous pattern is incomplete.

At the eastern end of Zone A, the anomalous patterns show broad, shallow anomalies. In this circumstance, the  $n = 1$  values measured are anomalous, and the apparent IP effects measured should be approximately equal to the true IP effects within the source. There is a slight decrease

in the resistivity of the rocks within the source, and the true frequency effects are in the range 4.0% to 6.0%.

The measurements with  $X = 150$  meters do not show any zoning within the anomaly. However, since the source is indicated to be shallow, measurements with shorter electrode intervals may give a better indication of variations within the source of the anomaly.

The zone is open both to the east and west. Zone B occurs on strike to the west and is separated from Zone A by a small lake with swampy shorelines. For this reason it was not possible to obtain IP data on Line 100.150E and Line 100.400E, the critical area between the two zones.

ZONE B - Dwgs. IP 5155-3, 4 & 5

This zone lies to the west on strike from Zone A. The anomalous patterns are more complex than those recorded under Zone A and generally show some depth to the source. On Line 99,400E two centres of higher IP effects with depths estimated at 15 - 25m occur at 99,800N and 100,150N. North of 100,300N, the anomaly is shallow and the pattern incomplete north of 100,500N.

Line 99,650E is offset about 100m at the 100N base line. The offset occurs within the anomaly and results in poor definition. South of the base line the estimated depth to the anomaly is about 100m. North of the base line, the higher IP effects are shallow relative to the 100m dipoles.

The anomaly on Line 99,900E is of moderate magnitude, has an indicated depth to the source of 30 - 50m at 100.150N, and appears to deepen to the south.

ZONE C - Dwg. IP 5155-1,-2,-3,-4, 5 & 6

Zone C is located in the southwest grid area and has been traced from Line 98,900E east to Line 100,150E.

The anomaly is weak and shallow on Line 98,900E with the pattern incomplete to the north.

On Line 99,150E and Line 99,400E the IP anomaly is shallow, moderate in magnitude with good definition.

Both Line 99,650E and Line 99,900E show an estimated depth to the source of 25 - 50m. The magnitude of the IP effects is weak to moderate and the definition is good.

The anomaly is very weak and deep on Line 100,150E. It could be an "off the end effect".

Elsewhere on the grid there are several deep, weak, poorly defined possible category anomalies. Anomalies of this nature would only be of interest if they correlate with other favourable conditions.

6. SUMMARY AND CONCLUSIONS

An Induced Polarization and Resistivity survey has been completed on the Log Claims. Zone A previously indicated by an earlier IP survey has been confirmed and traced east to Line 101,150E where the zone is still open.

To the west, Zone A is separated from Zone B by a lake and swampy ground where no IP data was obtainable. The possibility of continuity of the two zones could be investigated by surveying the intervening area with IP after freeze-up. Zone B is more complex than Zone A and usually shows some depth to the source.

Zone C is a linear anomaly that is shallow and well defined on Line 99,150E and Line 99,400E, apparently deepens under Line 99,650E and Line 99,900E and seems to terminate in the vicinity of Line 100,150E.

Previous drill programs have investigated part of Zone A near Line 100,650E and Line 100,900E. There does not appear to have been any drilling near Line 101,150E. Several trenches in this vicinity contain pyrite and chalcopyrite. The IP effects are strongest on this line. A drill hole near 99,600N would investigate the centre of the strongest IP effects.

The source of the IP anomaly has not been investigated under Zone B. Assuming vertical drill holes, the following locations would test the source of the anomalous IP effects.

Line 99,400E

- 100,150N - Drill to depth of 100m
- 100,350N - Drill to depth of 75m

Line 99,900E

- 100,150N - Drill to depth of 100m

The source of the IP anomaly under Zone C is apparently unknown. Drill hole PC-74-4 appears to have been drilled just south of the IP anomaly. The two holes suggested below, would investigate the source of the anomalous IP effects.

Line 99,400E

- 98,950N - Drill to depth of 75m

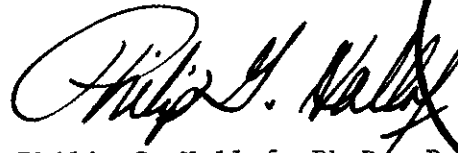
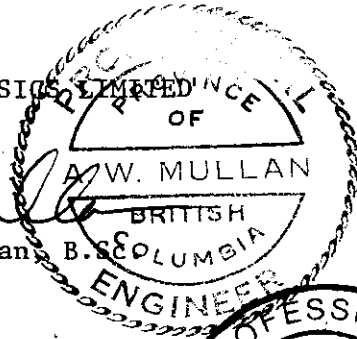
Line 99,650E

- 98,700N - Drill to depth of 150m

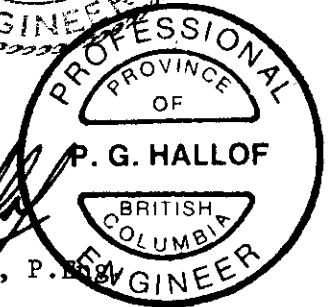
PHOENIX GEOPHYSICS LIMITED



Ashton W. Mullan,  
Geologist



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



Expiry Date: February 25, 1980

Dated: July 19, 1979





STATEMENT OF COST

Bethlehem Copper Corporation Ltd. - IP Survey  
Merritt - Princeton Highway, B.C.

---

CREW: J. Marsh - G. Richardson

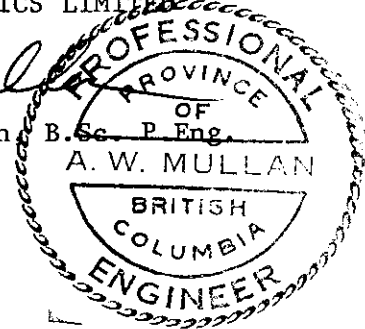
EXTRA LABOURER: R. Bouchard

PERIOD: May 7 - 25, 1979

|                        |                |             |
|------------------------|----------------|-------------|
| 26.85 Frequency Domain | @ \$470.00/Km. | \$13,156.56 |
| 1 Standby day          | @ \$350.00/day | 350.00      |
| Mobilization           |                | 1,150.00    |
|                        |                | <hr/>       |
|                        |                | \$14,656.56 |
|                        |                | <hr/>       |

PHOENIX GEOPHYSICS LIMITED

*A. W. Mullan*  
Ashton W. Mullan B.Sc. P. Eng.  
Geologist



Dated: July 19, 1979

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 310 - 885 Dunsmuir 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 Bethlehem Copper Corporation 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 Vancouver

This 19th day of July, 1979

A.W. Mullan



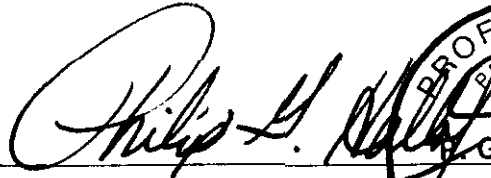
CERTIFICATE

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 Bethlehem Copper Corporation 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 19th day of July, 1979

  
Philip G. Hallof, Ph.D.



Expiry Date: February 25, 1980

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.

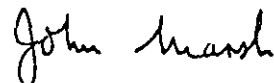
2. I am a graduate of the City of Norwich Technical College, U.K., ordinary National Certificate (Electrical Engineering)

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

# PHOENIX GEOPHYSICS LIMITED

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

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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) 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 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 ( $\Delta V$ ) 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 ( $\Delta V$ ) the change in potential will be too small to be measurable. The symbol "TL" on the data plots indicates this situation.

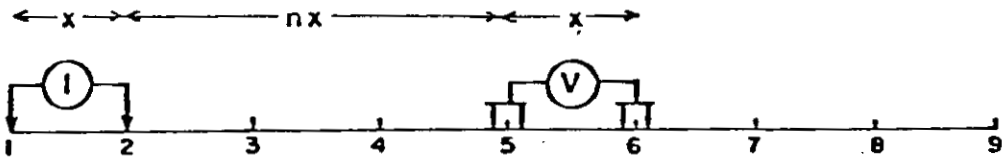
In some situations spurious noise, either man made or natural, will render it impossible to obtain a reading. The symbol "N" on the data plots indicates a station at which it is too noisy to record a reading. If a reading can be obtained, but for reasons of noise there is some doubt as to its accuracy,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

PHOENIX GEOPHYSICS LIMITED.

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



Stations on line

$x$  = Electrode spread length  
 $n$  = Electrode separation

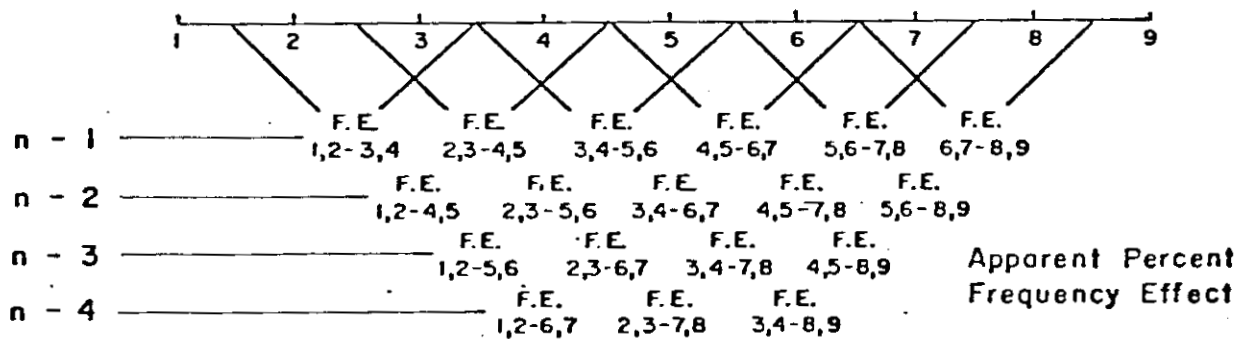
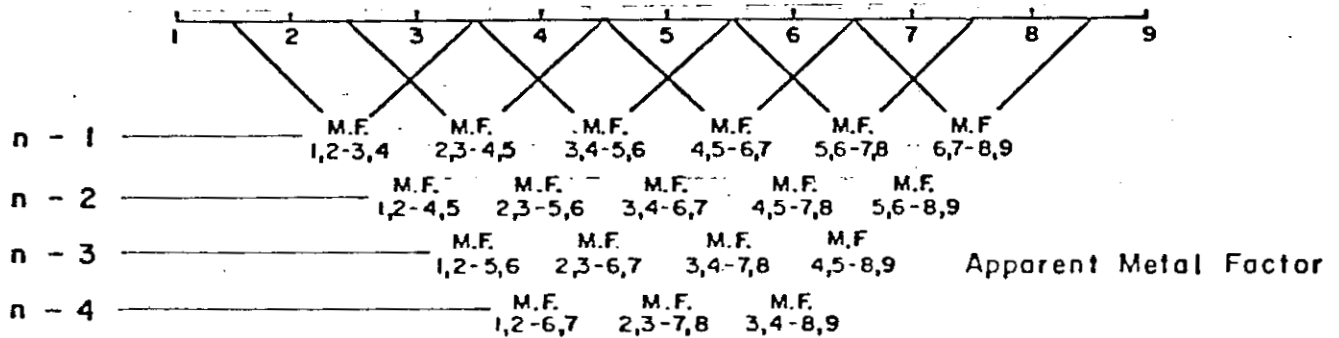
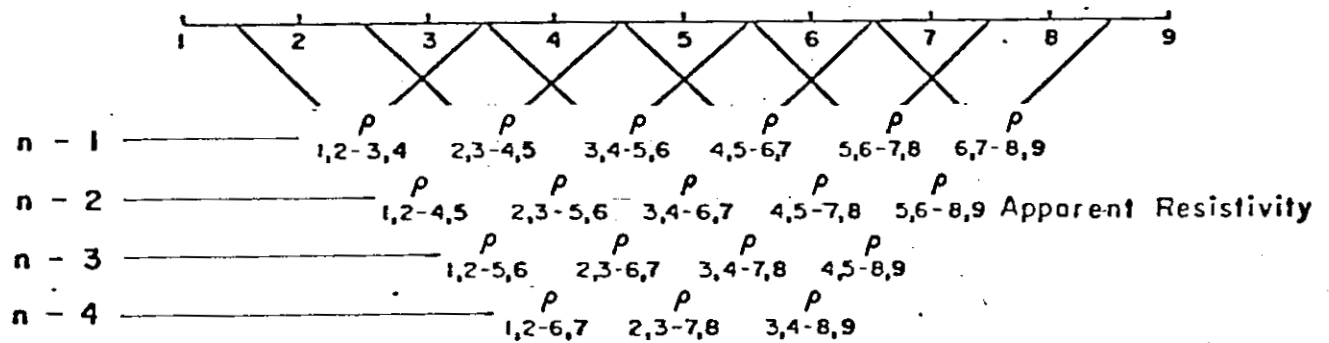


Fig. A

SECTION D - STATEMENT OF EXPENDITURES

Expense Period - May 1 to August 28, 1979

1. Contractor's Expenditures (see accompanying invoice)

|                                      |                 |
|--------------------------------------|-----------------|
| (a) Phoenix Geophysics Limited       |                 |
| - I.P. and Resistivity Survey        |                 |
| carried out during the period        |                 |
| from May 7 to 25, 1979               |                 |
| Invoice No. 1457 dated June 26, 1979 | \$14,656.56     |
| <br>TOTAL CONTRACTOR EXPENDITURES    | <br>\$14,656.56 |

2. Bethlehem Expenditures

(a) Personnel

|  |                 |
|--|-----------------|
| R.E. Anderson, P.Eng. - Exploration Manager      |                 |
| 2 days in general project supervision            |                 |
| @ \$185.00/day                                   | \$ 370.00       |
| <br>R.J. Nethery, P.Eng. - Project Geologist     |                 |
| 3 days in project supervision                    |                 |
| @ \$123.20/day                                   | \$ 369.60       |
| <br>J.G. Collins - Field Supervisor              |                 |
| 1 day (May 14) in project supervision            |                 |
| @ \$85.13/day                                    | \$ 85.13        |
| <br>B. Kynoch - Field Assistant                  |                 |
| 4 days (May 1-4) in I.P. grid line               |                 |
| cutting @ \$62.13/day                            | \$ 248.52       |
| <br>R. Harden - Field Assistant                  |                 |
| 4 days (May 1-4) in I.P. grid line cutting       |                 |
| @ \$52.87/day                                    | \$ 211.48       |
| <br>S. Kemp - Field Assistant                    |                 |
| 4 days (May 1-4) in I.P. grid line cutting       |                 |
| @ \$51.55/day                                    | \$ 206.20       |
| <br>B. Konst - Field Assistant                   |                 |
| 4 days (May 1-4) in I.P. grid line cutting       |                 |
| @ \$51.55/day                                    | \$ 206.20       |
| <br>E. Andersen - Property Agent                 |                 |
| 3 days in project co-ordination, data            |                 |
| compilation and report preparation @ \$96.23/day | \$ 288.69       |
| <br>A. Emo - Secretary                           |                 |
| 1 day @ \$55.52/day                              | \$ 55.52        |
| <br>TOTAL PERSONNEL                              | <br>\$ 2,041.34 |

SECTION D - STATEMENT OF EXPENDITURES (Contd.)

2 (b) Transportation

|  |           |
|--|-----------|
| R. J. Nethery - Ford F-150 4WD Pick-up<br>2 days @ \$35.00/day | \$ 70.00  |
| J. G. Collins - Ford F-250 4WD Pick-up<br>1 day @ \$35.00/day  | \$ 35.00  |
| B. Kynoch - Ford F-150 4WD Pick-up<br>4 days @ \$35.00/day     | \$ 140.00 |
| TOTAL TRANSPORTATION   | \$ 245.00 |

(c) Lodging and Meals

|   |           |
|---|-----------|
| B. Kynoch - expenses for the period<br>May 1-4, 1979      | \$ 255.48 |
| R. Harden - expenses for the period<br>May 1-4, 1979      | \$ 149.45 |
| R. J. Nethery - expenses for the period<br>May 7, 8, 1979 | \$ 57.75  |
| TOTAL LODGING   | \$ 462.68 |

|                              |   |             |
|------------------------------|---|-------------|
| TOTAL BETHLEHEM EXPENDITURES | - | \$ 2,749.02 |
| TOTAL PROJECT EXPENDITURES   | - | \$17,405.58 |
| TOTAL LINE SURVEYED          | - | 28.45 Km    |
| ∴ AVERAGE COST/KM            | - | \$ 611.80   |

3. Cost Apportionment

| <u>Claim</u> | <u>Line Surveyed</u> | <u>Cost @ \$611.80/Km</u> |
|--------------|----------------------|---------------------------|
| LOG 1        | 6.00 Km              | \$3,670.77                |
| LOG 2        | 7.65 Km              | \$4,680.24                |
| LOG 3        | 9.00 Km              | \$5,506.16                |
| LOG 4        | 5.80 Km              | \$3,548.41                |
|              | 28.45 Km             | \$17,405.58               |



# PHOENIX Geophysics Limited

200 YORKLAND BLVD., WILLOWDALE, ONTARIO, CANADA M2J 1R5

TELEPHONE (416) 493-6350  
Cable Address: PHEXCO TORONTO

File - Miscellaneous  
- Contracts  
- Geophysical  
HGE ✓  
RFB  
EA ✓

## I N V O I C E

June 26, 1979  
INVOICE NO. 1457

Bethlehem Copper Corporation,  
2100- 1055 West Hastings Street,  
Vancouver, B.C.  
V6E 2H8

Attention: Mr. R.J. Netherly

REFERENCE: Contract Number PV-1034 - IP Survey  
Merritt-Princeton Highway - B.C.

CREW: J. Marsh - G. Richardson

PERIOD: May 7 - 25, 1979

|                                     |                |                    |
|-------------------------------------|----------------|--------------------|
| 26.85 Frequency Domain              | @ \$470.00/km  | \$13,156.56        |
| 1 day Standby                       | @ \$350.00/ km | 350.00             |
| Mobilization                        |                | 1,150.00           |
|                                     |                | <u>\$14,656.56</u> |
| Less deposit on signing of contract |                | 2,000.00           |
|                                     |                | <u>\$12,656.56</u> |

PHOENIX GEOPHYSICS LIMITED

Vancouver Office: 310-885 Dunsmuir Street, British Columbia V6C 1N5  
Denver Office: 4690 Ironton Street, Colorado, 80239, U.S.A.

Telephone (604) 684-2285  
Telephonè (303) 373-0332

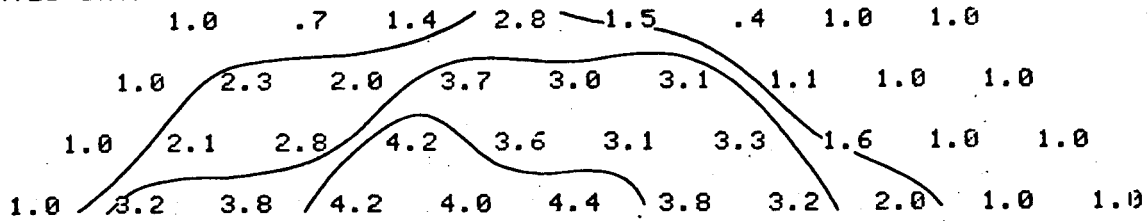
14-848

SECTION E - ILLUSTRATIONS

| <u>Drawing No.</u> | <u>Title</u>                            | <u>Scale</u> |
|--------------------|---|--------------|
| ML-79-1            | General Location Plan                   | 1:250,000    |
| ML-79-2            | Location Plan                           | 1: 50,000    |
| I.P.P.-4053        | 1979 Geophysical Survey -<br>LOG Claims | 1: 10,000    |
|                    | <u>I.P. and Resistivity Data Plots</u>  |              |
| I.P.-5155-1        | - Line 98900E                           | not to scale |
| I.P.-5155-2        | - Line 99150E                           | "            |
| I.P.-5155-3        | - Line 99400E                           | "            |
| I.P.-5155-4        | - Line 99650E                           | "            |
| I.P.-5155-5        | - Line 99900E                           | "            |
| I.P.-5155-6        | - Line 100150E(north)                   | "            |
| I.P.-5155-7        | - Line 100150E(south)                   | "            |
| I.P.-5155-8        | - Line 100400E(north)                   | "            |
| I.P.-5155-9        | - Line 100400E(south)                   | "            |
| I.P.-5155-10       | - Line 100650E                          | "            |
| I.P.-5155-11       | - Line 100900E                          | "            |
| I.P.-5155-12       | - Line 101150E                          | "            |
| FIG. 1A            | Computer Inversion Data                 |              |
| " 1B               | for Line 99900E                         |              |
| " 2A               |   |              |
| " 2B               |   |              |



OBSERVED DATA



ZONE "B"

x = 100m.

100\*DIAGONAL OF INFORMATION DENSITY MATRIX

|    |     |     |     |     |     |     |     |     |    |    |
|----|-----|-----|-----|-----|-----|-----|-----|-----|----|----|
| 0. | 3.  | 6.  | 7.  | 6.  | 1.  | 0.  | 0.  |     |    |    |
| 0. | 8.  | 12. | 17. | 17. | 11. | 5.  | 0.  | 0.  |    |    |
| 1. | 13. | 12. | 9.  | 13. | 10. | 12. | 9.  | 0.  | 0. |    |
| 2. | 16. | 12. | 13. | 21. | 23. | 13. | 14. | 12. | 0. | 0. |

CALCULATED DATA

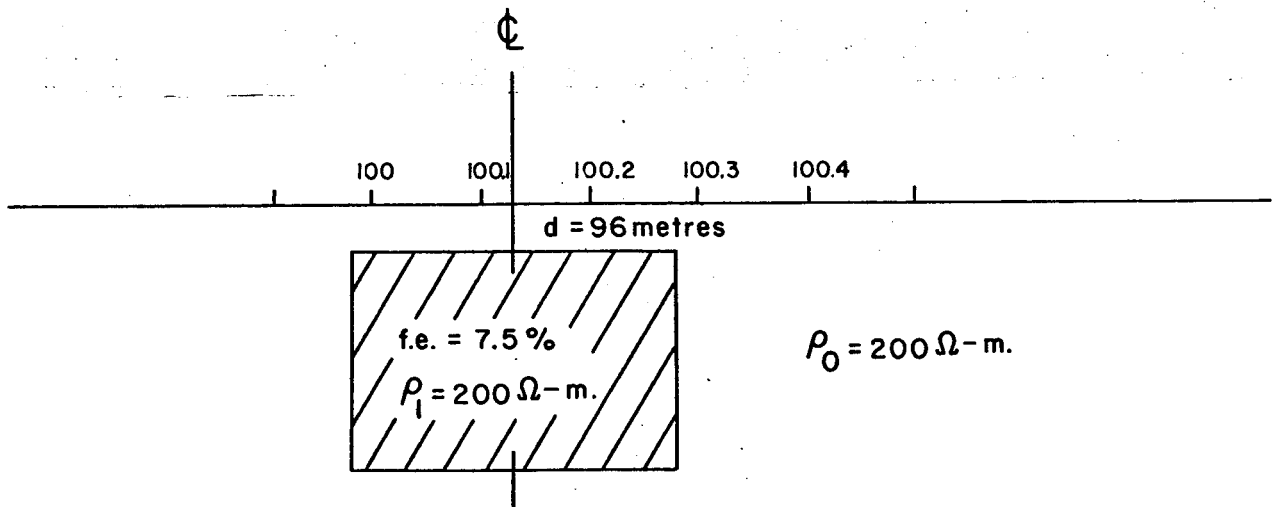
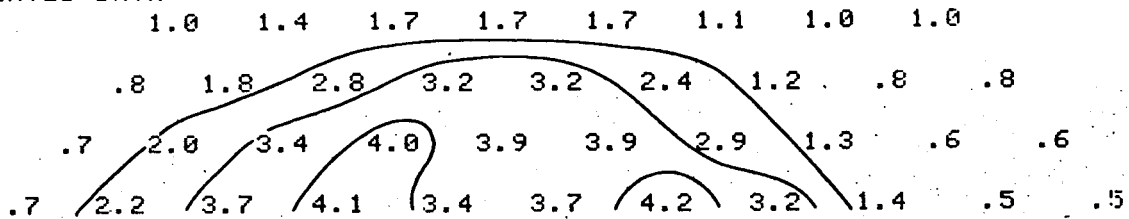


FIG. IA

BETHLEHEM COPPER LOG CLAIMS

Line 99,900E

ZONE "B"

x = 100 m.

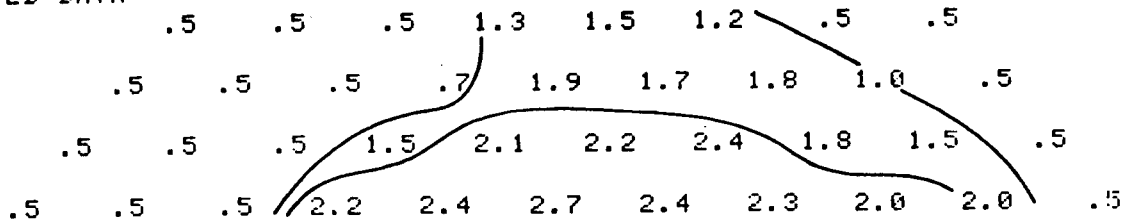
RIDGE SUMMARY

|   |            |            |            |
|---|------------|------------|------------|
| 0 | 3.10674+00 | 0.00000    | 0.00000    |
| 1 | 4.01392-01 | 0.00000    | 0.00000    |
| 2 | 2.74042-01 | 2.65573-01 | 2.65074-01 |
| 3 | 2.59539-01 | 2.59272-01 | 2.59272-01 |
| 4 | 2.59241-01 | 2.59240-01 | 2.59240-01 |
| 5 | 2.59236-01 | 0.00000    | 0.00000    |

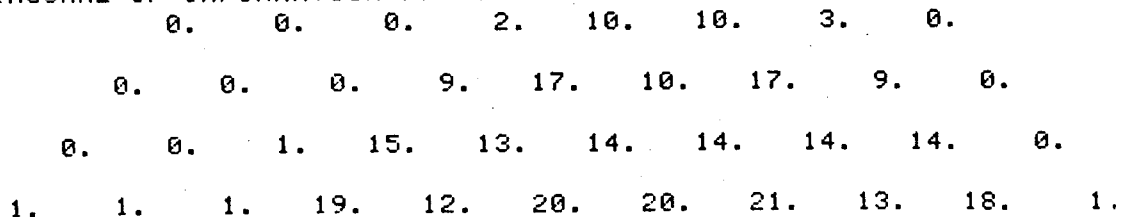
PARAMETER SUMMARY

| ITER | RCSV      | CENTR----SPCT | DEPTH----SPCT    | IFBODY----SPCT      |
|------|-----------|---------------|------------------|---------------------|
| 0    | 3.1067+00 | 1.0000+01 .0  | 5.0000+01 .0     | 8.0000+00 .0        |
| 1    | 4.0139-01 | 1.0100+01 1.5 | 7.2366+01 21.4   | 6.1331+00 14.1      |
| 2    | 2.6507-01 | 1.0306+01 1.6 | 9.4387+01 10.8   | 7.0446+00 11.4      |
| 3    | 2.5927-01 | 1.0275+01 1.1 | 9.6352+01 9.1    | 7.4857+00 11.3      |
| 4    | 2.5924-01 | 1.0271+01 1.0 | 9.6448+01 9.2    | 7.4969+00 11.4      |
| 5    | 2.5924-01 | 1.0270+01 1.0 | 9.6432+01 9.2    | 7.4957+00 11.5      |
|      |           | 100.127 ± 1%  | 96 metres ± 9.2% | 7.5 % p.f.e. ± 0.8% |

OBSERVED DATA



100\*DIAGONAL OF INFORMATION DENSITY MATRIX



CALCULATED DATA

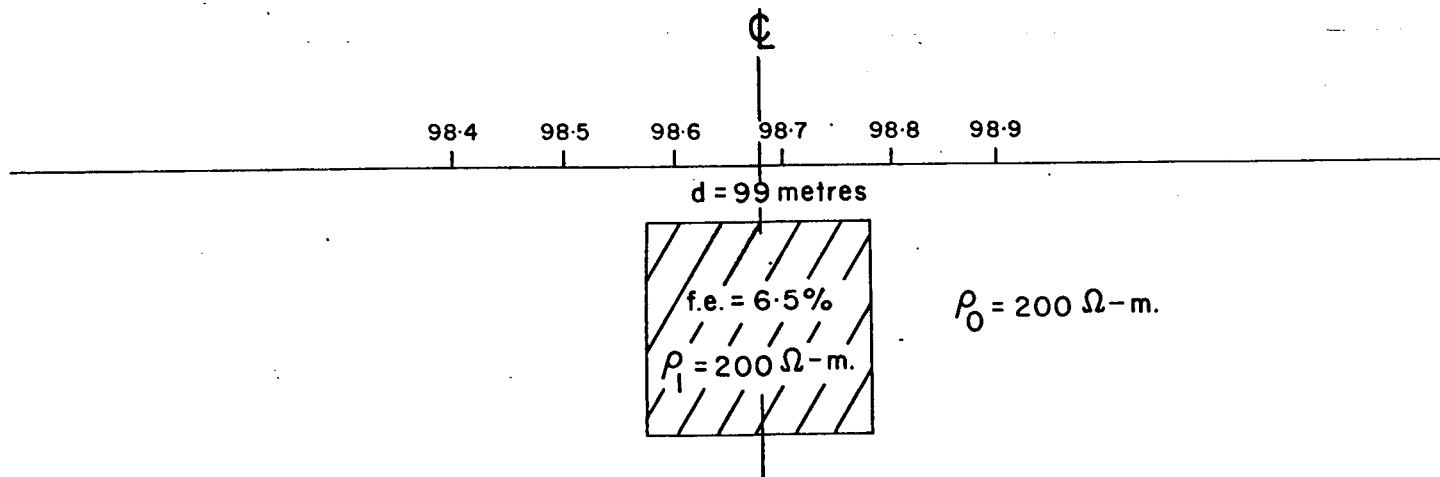
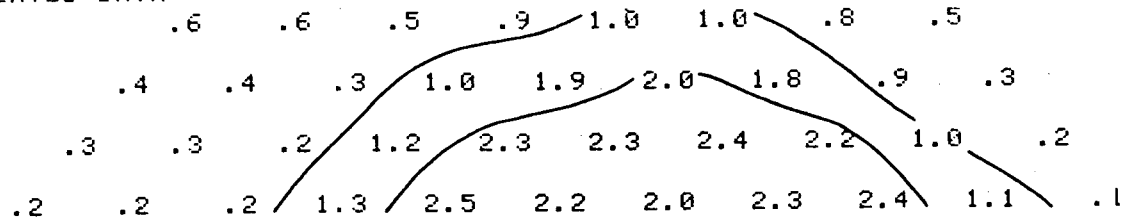


FIG. 2A

BETHLEHEM COPPER LOG CLAIMS Line 99,900 E

RIDGE SUMMARY

ZONE "C"

x = 100 m.

|   |            |            |            |
|---|------------|------------|------------|
| 0 | 2.40907-01 | 0.00000    | 0.00000    |
| 1 | 1.36153-01 | 1.33770-01 | 1.33573-01 |
| 2 | 1.24715-01 | 1.24422-01 | 1.24397-01 |
| 3 | 1.23745-01 | 1.23633-01 | 1.23631-01 |
| 4 | 1.23635-01 | 1.23636-01 | 1.23636-01 |
| 5 | 1.23636-01 | 0.00000    | 0.00000    |

PARAMETER SUMMARY

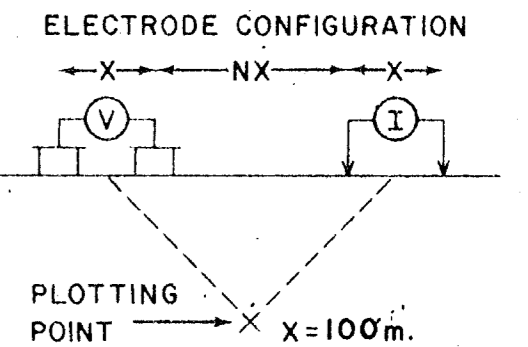
| ITER | RCSV      | CENTR----    | SPCT | DEPTH----     | SPCT | IFBODY----  | SPCT |
|------|-----------|--------------|------|---------------|------|-------------|------|
| 0    | 2.4091-01 | 1.1500+01    | .0   | 1.0000+02     | .0   | 8.0000+00   | .0   |
| 1    | 1.3357-01 | 1.1744+01    | .9   | 1.0270+02     | 11.7 | 6.7859+00   | 15.5 |
| 2    | 1.2440-01 | 1.1911+01    | 1.5  | 1.0313+02     | 10.4 | 6.7786+00   | 13.8 |
| 3    | 1.2363-01 | 1.1927+01    | .8   | 9.9164+01     | 10.4 | 6.5047+00   | 13.8 |
| 4    | 1.2363-01 | 1.1927+01    | .8   | 9.9164+01     | 10.4 | 6.5047+00   | 13.8 |
| 5    | 1.2363-01 | 1.1927+01    | .8   | 9.9164+01     | 9.9  | 6.5047+00   | 13.0 |
|      |           | 98.69 ± 0.8% |      | 99 feet ± 10% |      | 6.5% ± 0.7% |      |

**BETHLEHEM COPPER CORP. LTD.**

LOG CLAIMS, MISSEZULA LAKE AREA

NICOLA M.D., BRITISH COLUMBIA

LINE NO.- 98,900 E



SURFACE PROJECTION OF ANOMALOUS ZONE

DEFINITE

PROBABLE

POSSIBLE

FREQUENCIES 0.3-5.0 HZ.

DATE SURVEYED MAY 1979

APPROVED

P. G. HALLOF

DATE 7/19/79

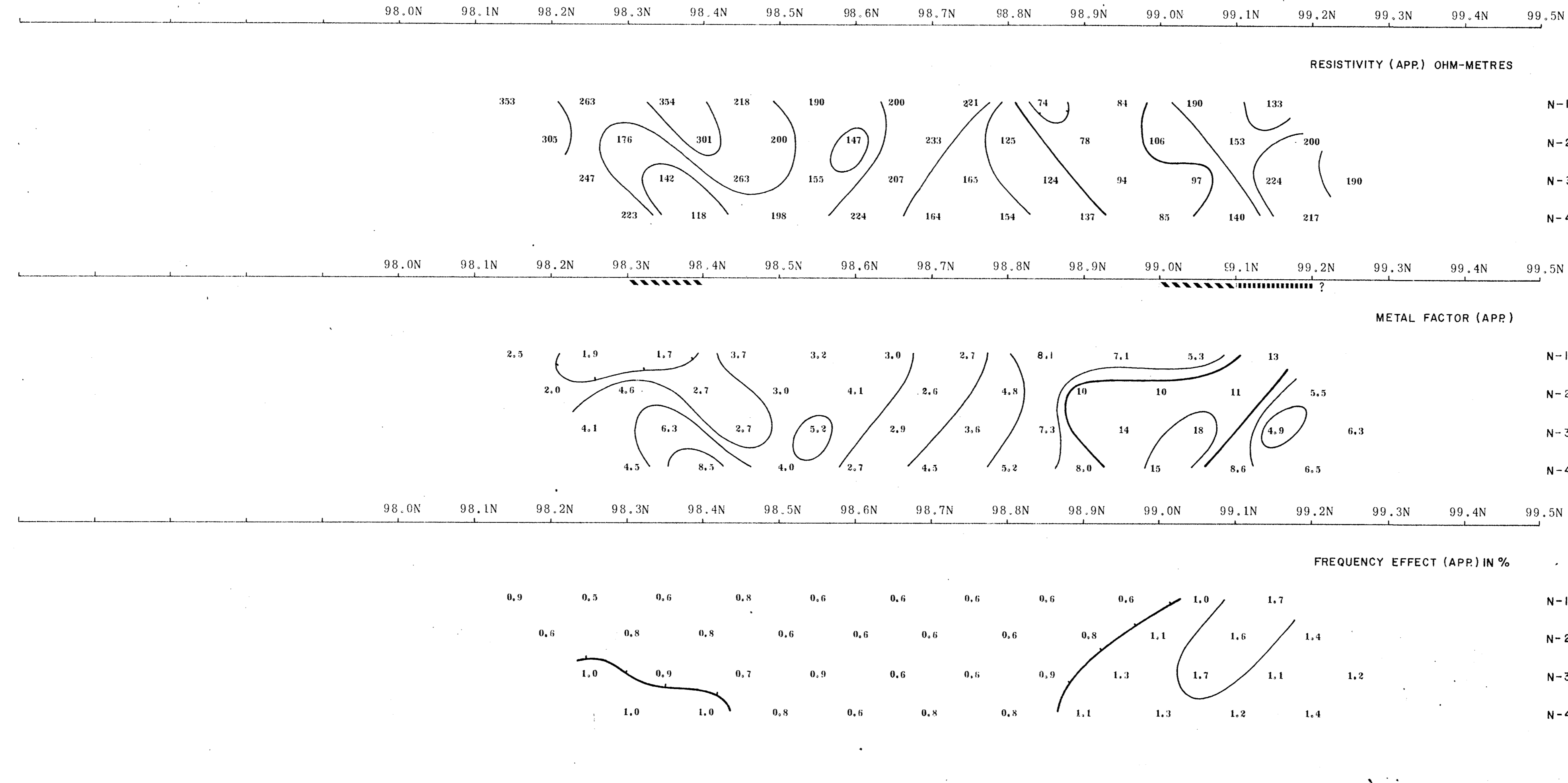
ENGINEER

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

**7543**

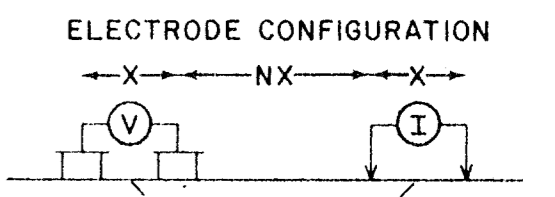
**PHOENIX GEOPHYSICS LIMITED**

INDUCED POLARIZATION AND RESISTIVITY SURVEY



**BETHLEHEM COPPER CORP. LTD.**  
 LOG CLAIMS, MISSEZULA LAKE AREA  
 NICOLA M.D., BRITISH COLUMBIA

LINE NO.- 99,150E



PLOTTING POINT → X=100m.

SURFACE PROJECTION OF ANOMALOUS ZONE  
 DEFINITE   
 PROBABLE   
 POSSIBLE

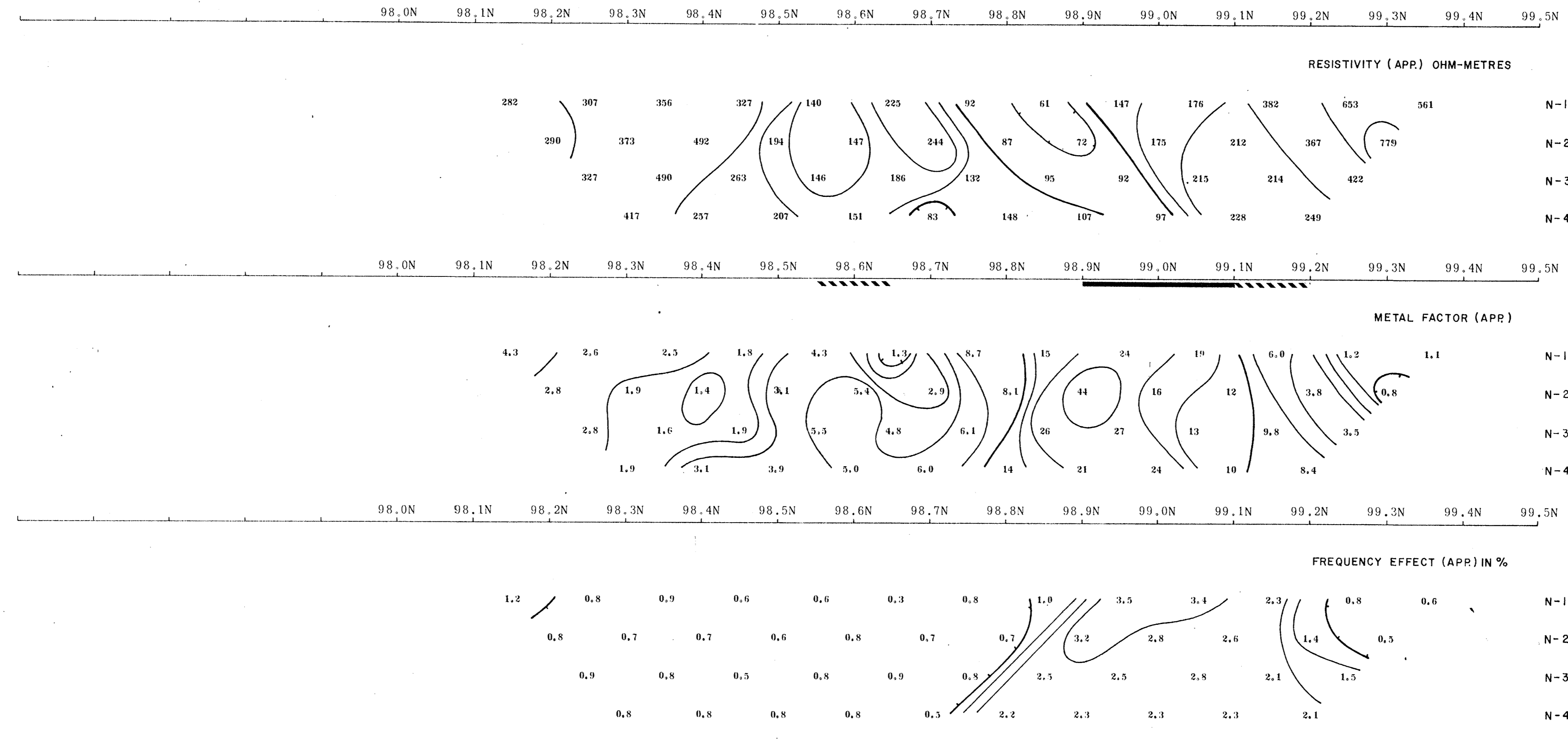
FREQUENCIES 0.3-5.0HZ.

DATE SURVEYED MAY 1979

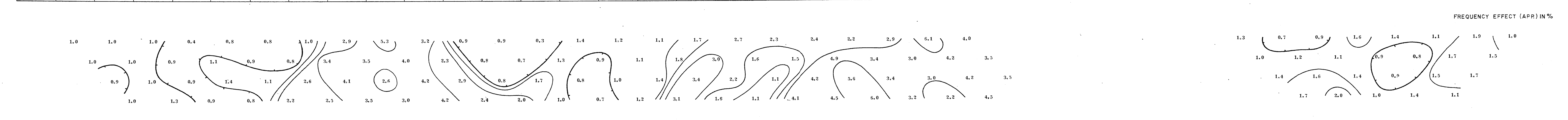
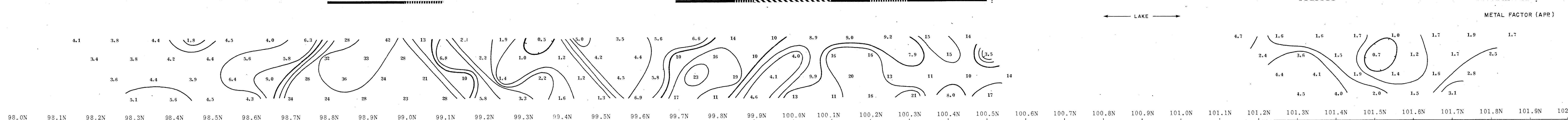
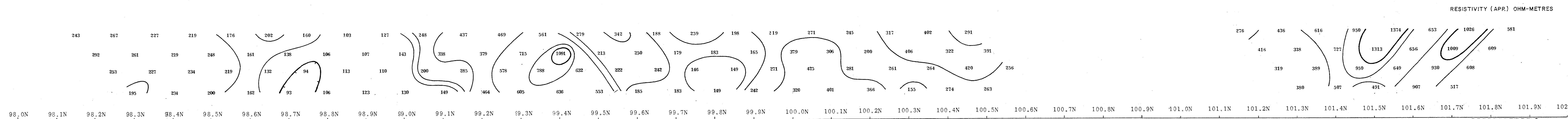
APPROVED   
 P. G. HALLOF  
 DATE 7/19/79  
 ENGINEER  
 Expiry Date: February 25, 1980

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

**7543**  
**PHOENIX GEOPHYSICS LIMITED**  
 INDUCED POLARIZATION AND RESISTIVITY SURVEY



98.0N 98.1N 98.2N 98.3N 98.4N 98.5N 98.6N 98.7N 98.8N 98.9N 99.0N 99.1N 99.2N 99.3N 99.4N 99.5N 99.6N 99.7N 99.8N 99.9N 100.0N 100.1N 100.2N 100.3N 100.4N 100.5N 100.6N 100.7N 100.8N 100.9N 101.0N 101.1N 101.2N 101.3N 101.4N 101.5N 101.6N 101.7N 101.8N 101.9N 102.0N



LAKE

RESISTIVITY (APP.) OHM-METRES

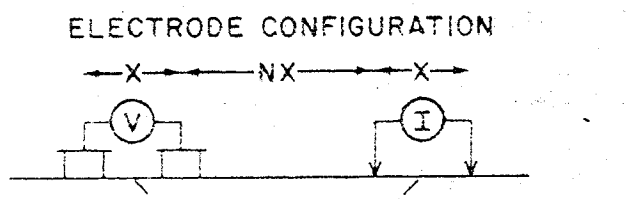
METAL FACTOR (APP.)

FREQUENCY EFFECT (APP.) IN %

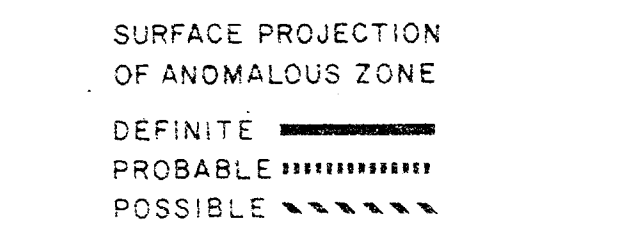
BETHLEHEM COPPER CORP. LTD.  
LOG CLAIMS, MISSEZULA LAKE AREA  
NICOLA M.D., BRITISH COLUMBIA

DWG. NO. - I.P. - 5155-3

LINE NO. - 99,400E



PLOTTING POINT X=100m.



FREQUENCIES 0.3-5.0 HZ. DATE SURVEYED MAY 1979

APPROVED PROFESSIONAL ENGINEER

P. G. HALLOF

DATE

EXPIRY DATE: FEBRUARY 25, 1981

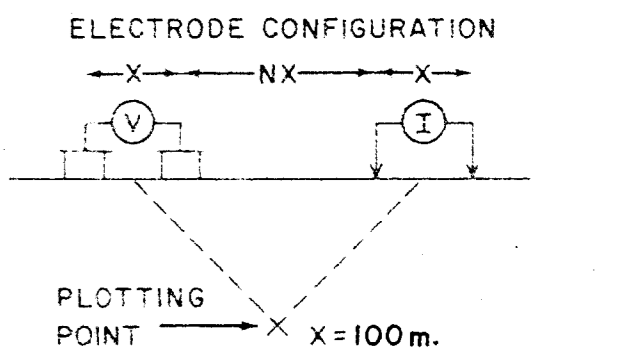
NOTE - CONTOURS AT LOGARITHMIC INTERVALS 1, -1.5, -2, -3, -5, -7.5, -10

7543

PHOENIX GEOPHYSICS LIMITED  
INDUCED POLARIZATION AND RESISTIVITY SURVEY

**BETHLEHEM COPPER CORP. LTD.**  
 LOG CLAIMS, MISSEZULA LAKE AREA  
 NICOLA M.D., BRITISH COLUMBIA

LINE NO. - 99,650E



SURFACE PROJECTION OF ANOMALOUS ZONE  
 DEFINITE   
 PROBABLE   
 POSSIBLE

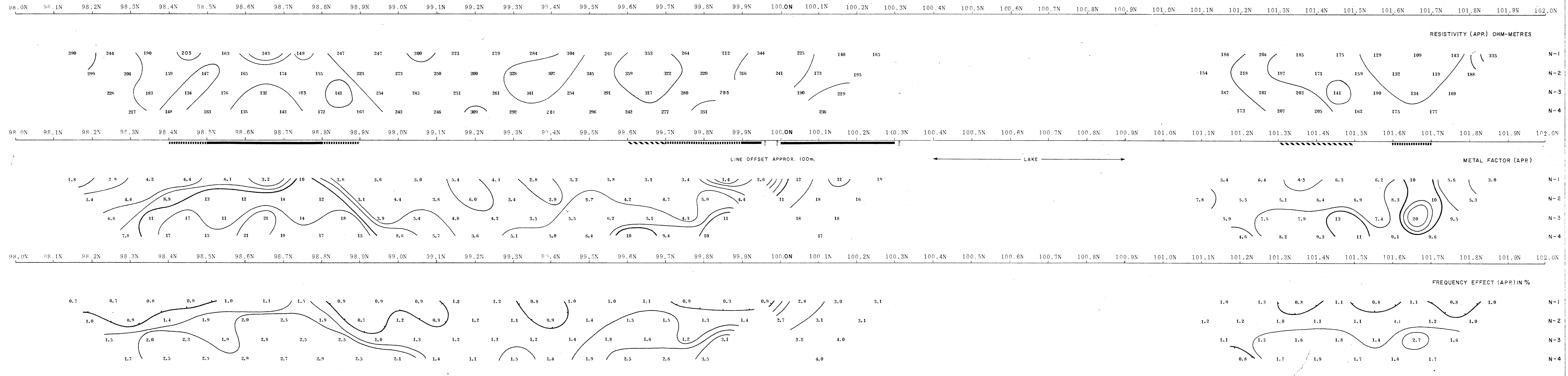
FREQUENCIES 0.3-5.0 HZ. DATE SURVEYED MAY 1979

APPROVED   
 P. G. HALLOF  
 ENGINEER  
 DATE 1/25/80  
 Expiry Date: February 25, 1980

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

**7543**

**PHOENIX GEOPHYSICS LIMITED**  
 INDUCED POLARIZATION AND RESISTIVITY SURVEY

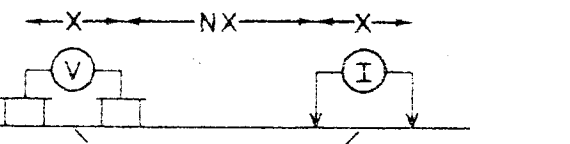




**BETHLEHEM COPPER CORP. LTD.**  
 LOG CLAIMS, MISSEZULA LAKE AREA  
 NICOLA M.D., BRITISH COLUMBIA

LINE NO. - 99,900E

ELECTRODE CONFIGURATION



PLOTTING POINT X=100m.

SURFACE PROJECTION OF ANOMALOUS ZONE  
 DEFINITE   
 PROBABLE   
 POSSIBLE

FREQUENCIES 0.3-5.0 HZ. DATE SURVEYED MAY 1979

APPROVED PROFESSIONAL ENGINEER

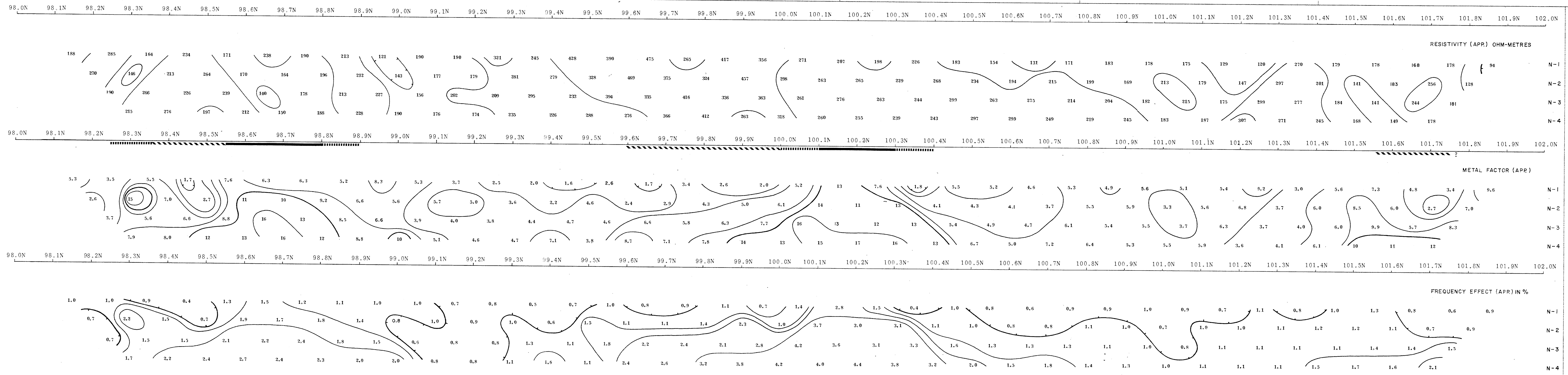
P. G. HALLOF  
 7/12/79  
 BRITISH COLUMBIA  
 ENGINEER

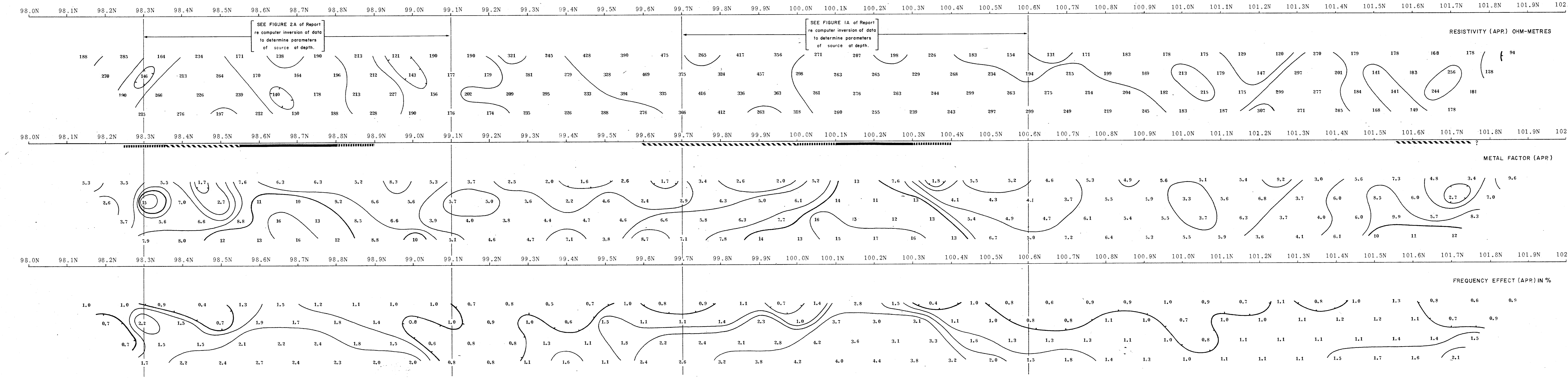
Expiry Date: February 25, 1980

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

**7543**

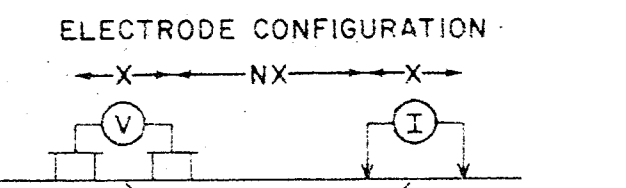
**PHOENIX GEOPHYSICS LIMITED**  
 INDUCED POLARIZATION AND RESISTIVITY SURVEY





**BETHLEHEM COPPER CORP LTD.**  
 LOG CLAIMS, MISSEZULA LAKE AREA  
 NICOLA M.D., BRITISH COLUMBIA

LINE NO - 99,900E



PLOTTING POINT X=100m.

SURFACE PROJECTION OF ANOMALOUS ZONE  
 DEFINITE  
 PROBABLE  
 POSSIBLE

FREQUENCIES 0.3-5.0HZ.

DATE SURVEYED MAY 1979

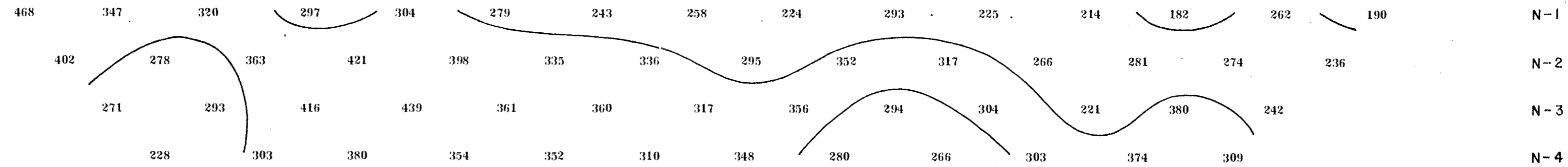
APPROVED *P.L. Hall*  
 DATE 7/19/79

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

**7543**  
**PHOENIX GEOPHYSICS LIMITED**  
 INDUCED POLARIZATION AND RESISTIVITY SURVEY

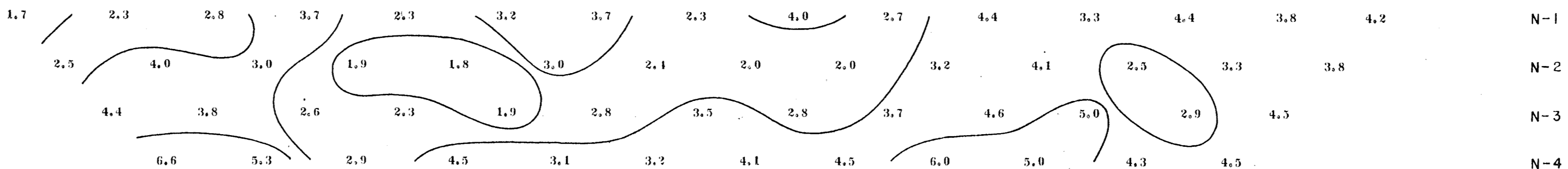
100.3N 100.4N 100.5N 100.6N 100.7N 100.8N 100.9N 101.0N 101.1N 101.2N 101.3N 101.4N 101.5N 101.6N 101.7N 101.8N 101.9N 102.0N

RESISTIVITY (APP.) OHM-METRES



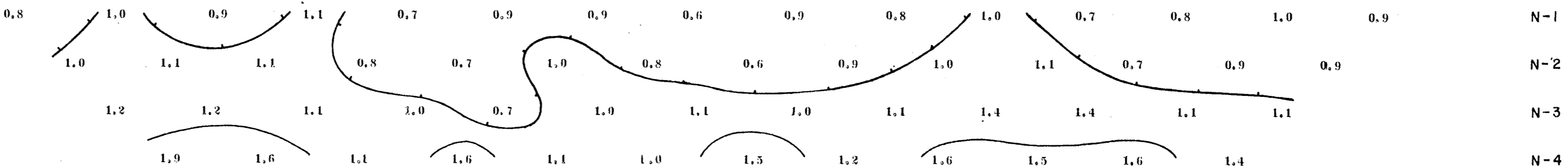
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METAL FACTOR (APP.)



100.3N 100.4N 100.5N 100.6N 100.7N 100.8N 100.9N 101.0N 101.1N 101.2N 101.3N 101.4N 101.5N 101.6N 101.7N 101.8N 101.9N 102.0N

FREQUENCY EFFECT (APP.) IN %



DWG. NO.- I.P. - 5155-6

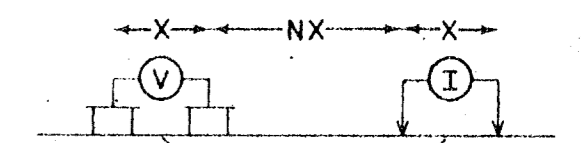
**BETHLEHEM COPPER CORP. LTD.**

LOG CLAIMS, MISSEZULA LAKE AREA

NICOLA M.D., BRITISH COLUMBIA

LINE NO.- 100,150E

ELECTRODE CONFIGURATION



PLOTTING POINT X=100m.

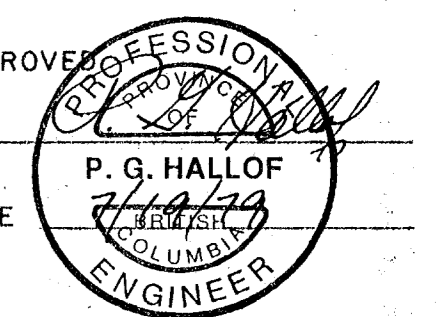
SURFACE PROJECTION OF ANOMALOUS ZONE

DEFINITE PROBABLE POSSIBLE

FREQUENCIES 0.3-5.0HZ.

DATE SURVEYED MAY 1979

APPROVED



DATE 7/19/79

Expiry Date: February 25, 1980

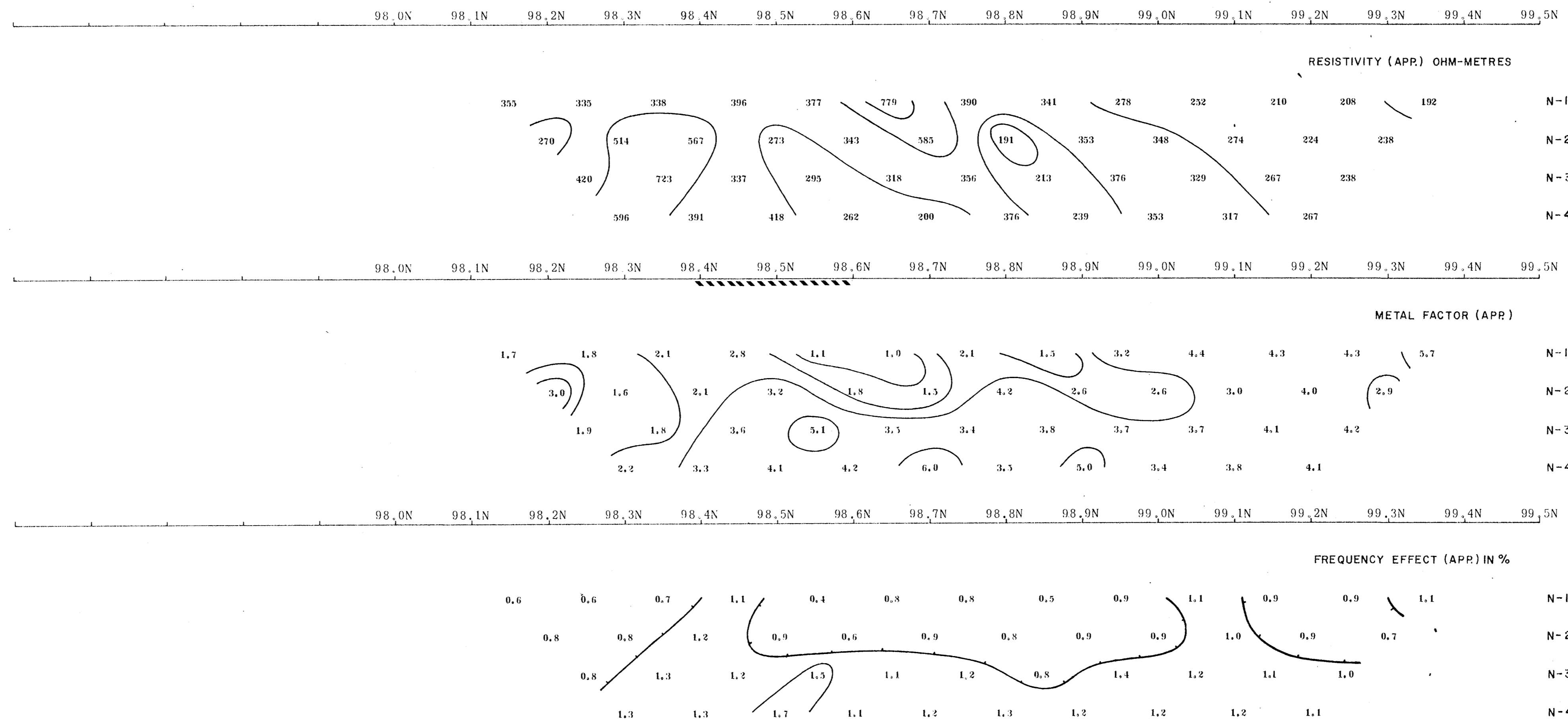
NOTE - CONTOURS AT LOGARITHMIC INTERVALS 1, -1.5, -2, -3, -5, -7.5, -10

**7543**

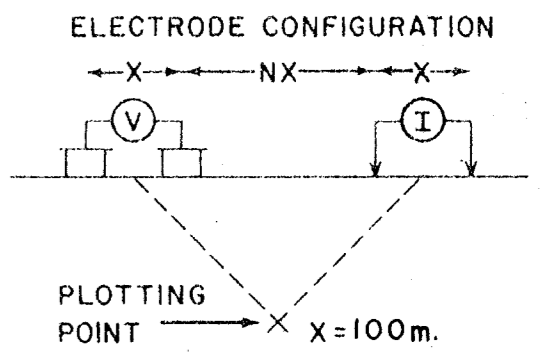
**PHOENIX GEOPHYSICS LIMITED**

INDUCED POLARIZATION AND RESISTIVITY SURVEY

**BETHLEHEM COPPER CORP. LTD.**  
 LOG CLAIMS, MISSEZULA LAKE AREA  
 NICOLA M.D., BRITISH COLUMBIA



LINE NO. - 100,150E



SURFACE PROJECTION OF ANOMALOUS ZONE  
 DEFINITE [Solid line]  
 PROBABLE [Dashed line]  
 POSSIBLE [Hatched line]

FREQUENCIES 0.3-5.0 HZ.

DATE SURVEYED MAY 1979

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

APPROVED [Signature]  
 P. G. HALLOF  
 ENGINEER  
 DATE [Signature]  
 Expiry Date: February 25, 1980

**7543**  
 PHOENIX GEOPHYSICS LIMITED  
 INDUCED POLARIZATION AND RESISTIVITY SURVEY

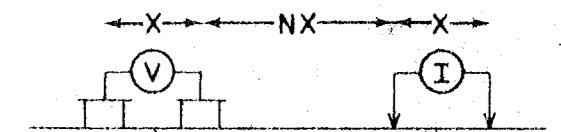
**BETHLEHEM COPPER CORP. LTD.**

LOG CLAIMS, MISSEZULA LAKE AREA

NICOLA M.D., BRITISH COLUMBIA

LINE NO. - 100,400E

ELECTRODE CONFIGURATION



PLOTTING POINT X=100m.

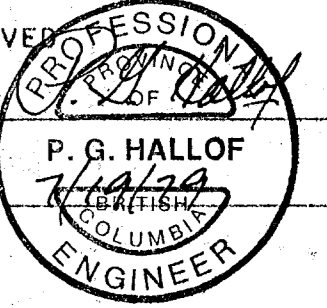
SURFACE PROJECTION OF ANOMALOUS ZONE

DEFINITE   
 PROBABLE   
 POSSIBLE

FREQUENCIES 0.3-5.0 HZ.

DATE SURVEYED MAY 1979

APPROVED



DATE 7/19/79

Expiry Date: February 25, 1980

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

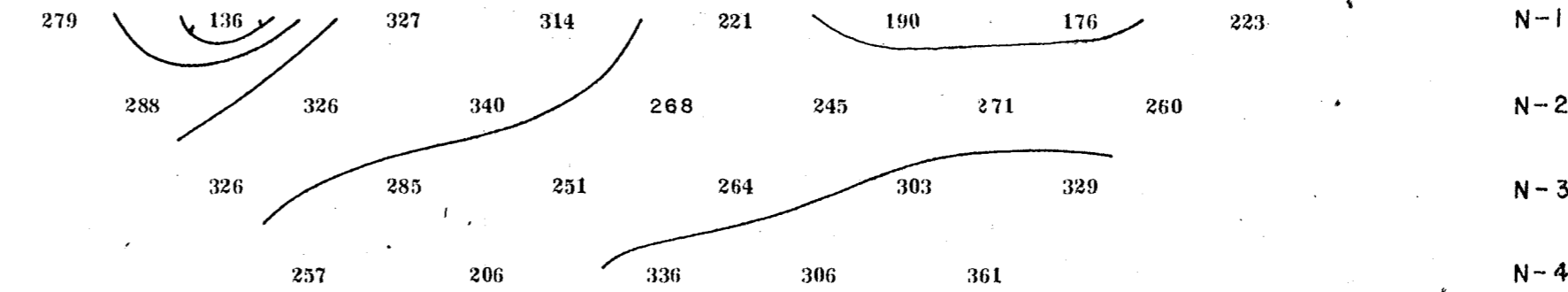
**7543**

**PHOENIX GEOPHYSICS LIMITED**

INDUCED POLARIZATION AND RESISTIVITY SURVEY

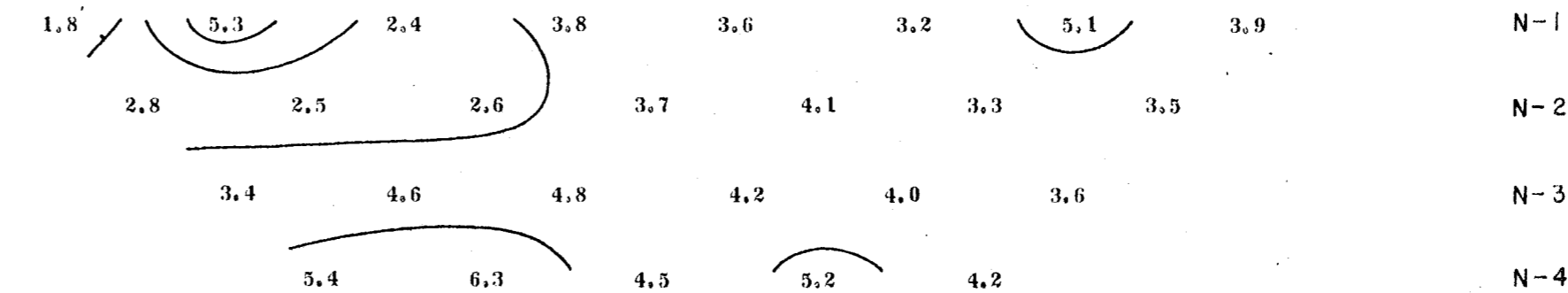
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RESISTIVITY (APP.) OHM-METRES



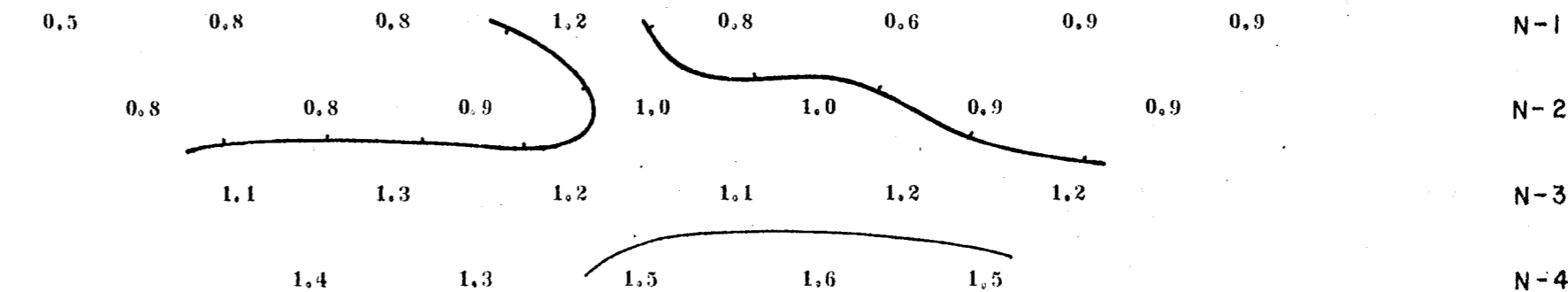
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METAL FACTOR (APP.)



101.0N 101.1N 101.2N 101.3N 101.4N 101.5N 101.6N 101.7N 101.8N 101.9N 102.0N

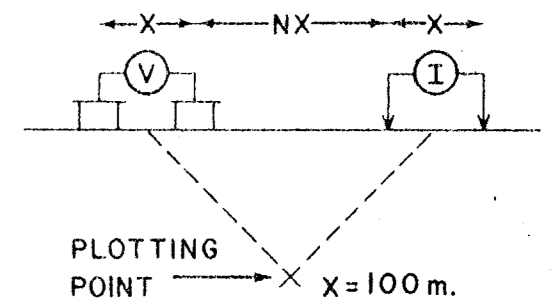
FREQUENCY EFFECT (APP.) IN %



**BETHLEHEM COPPER CORP. LTD.**  
 LOG CLAIMS, MISSEZULA LAKE AREA  
 NICOLA M.D., BRITISH COLUMBIA.

LINE NO.- 100,400E

ELECTRODE CONFIGURATION



SURFACE PROJECTION OF ANOMALOUS ZONE  
 DEFINITE   
 PROBABLE   
 POSSIBLE

FREQUENCIES 0.3-5.0 HZ.

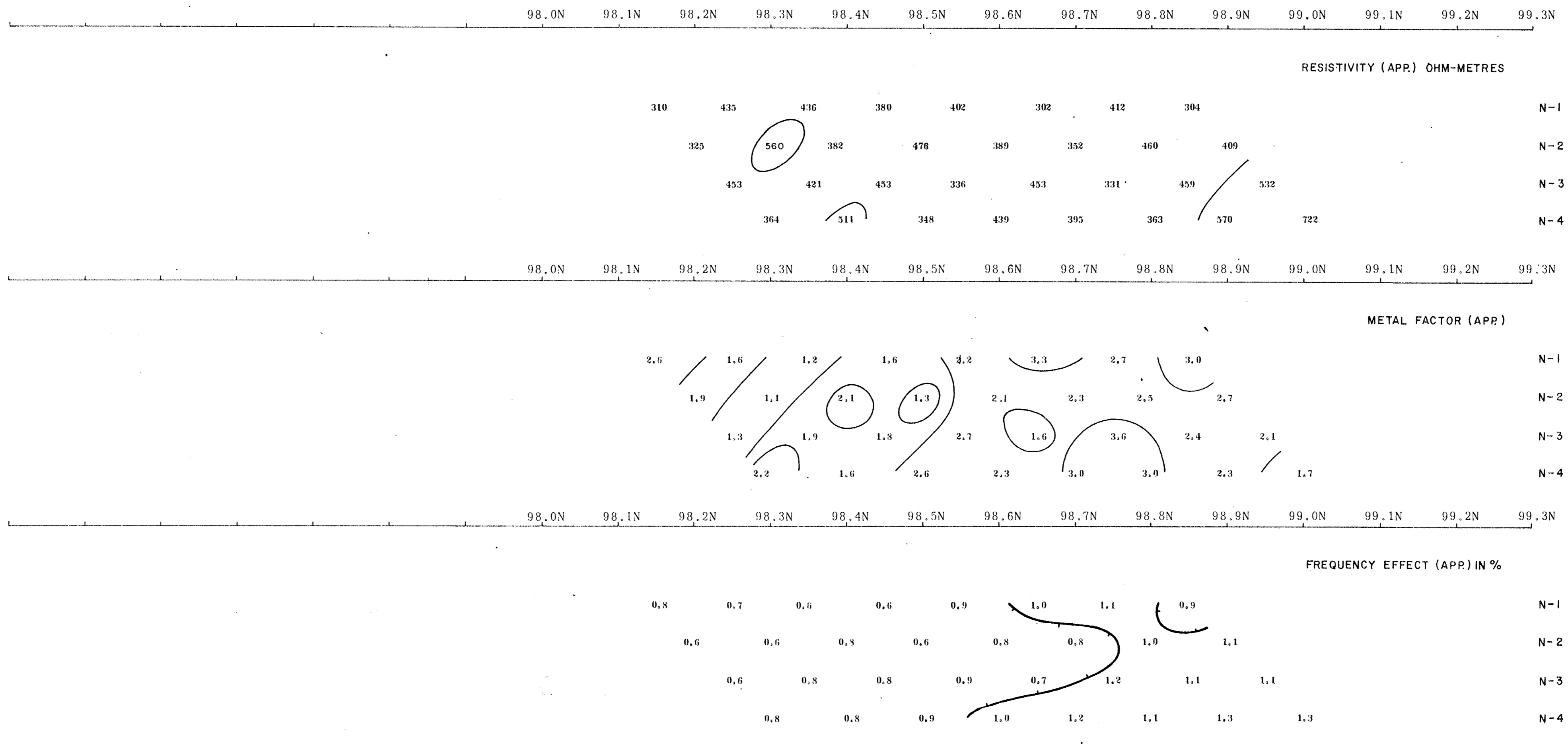
DATE SURVEYED MAY 1979

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

APPROVED   
 DATE 7/12/79   
 Expiry Date: February 25, 1980

**7543**

**PHOENIX GEOPHYSICS LIMITED**  
 INDUCED POLARIZATION AND RESISTIVITY SURVEY

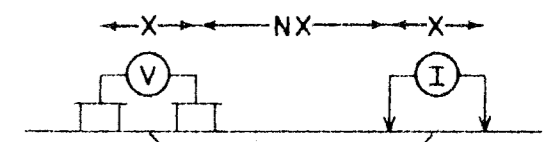


**BETHLEHEM COPPER CORP. LTD.**

LOG CLAIMS, MISSEZULA LAKE AREA  
NICOLA M.D., BRITISH COLUMBIA

LINE NO.- 100,650E

ELECTRODE CONFIGURATION



PLOTTING POINT X=150m.

SURFACE PROJECTION OF ANOMALOUS ZONE

DEFINITE   
PROBABLE   
POSSIBLE

FREQUENCIES 0.3-5.0HZ.

DATE SURVEYED MAY 1979

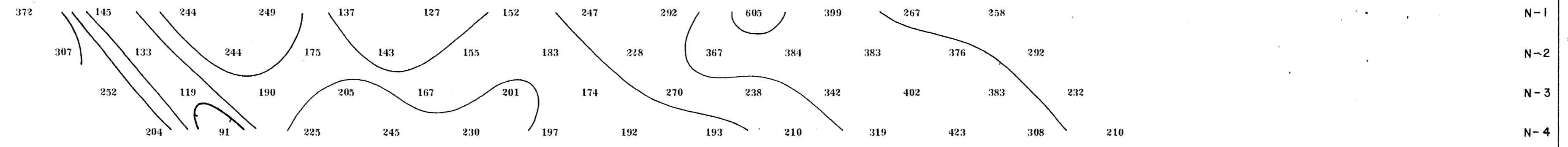
APPROVED   
DATE 7/19/79   
PROFESSIONAL ENGINEER   
BRITISH COLUMBIA   
Expiry Date: February 25, 1980

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

**7543**   
PHOENIX GEOPHYSICS LIMITED   
INDUCED POLARIZATION AND RESISTIVITY SURVEY

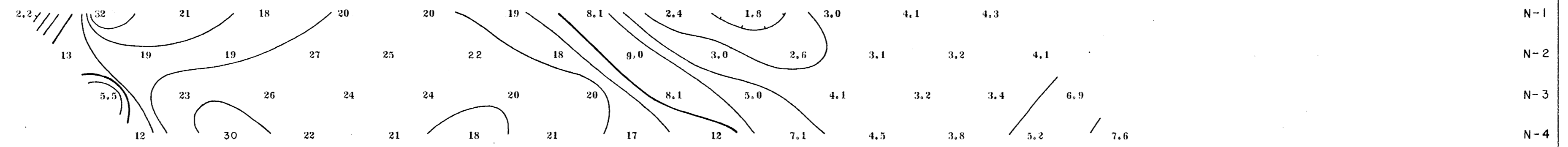
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RESISTIVITY (APP.) OHM-METRES



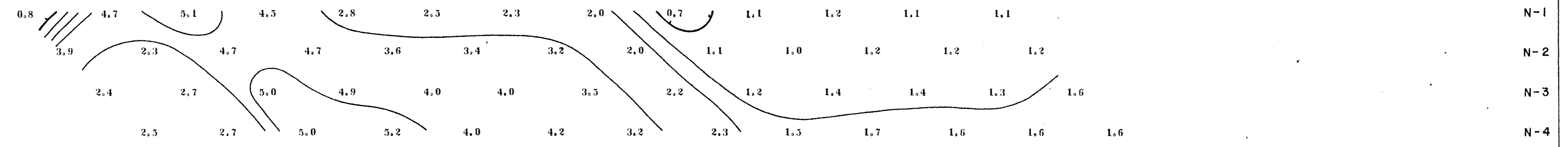
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METAL FACTOR (APP.)



99.0N 99.15N 99.30N 99.45N 99.60N 99.75N 99.90N 100.05N 100.20N 100.35N 100.50N 100.65N 100.80N 100.95N 101.10N 101.25N 101.40N 101.55N 101.70N 101.85N 102.00N

FREQUENCY EFFECT (APP.) IN %

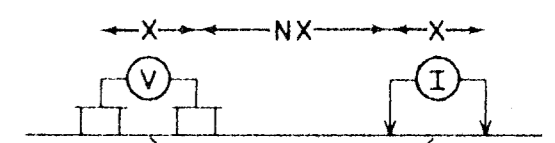


**BETHLEHEM COPPER CORP. LTD.**

LOG CLAIMS, MISSEZULA LAKE AREA  
NICOLA M.D., BRITISH COLUMBIA

LINE NO.- 100,900E

ELECTRODE CONFIGURATION



PLOTTING POINT X=150m.

SURFACE PROJECTION OF ANOMALOUS ZONE

DEFINITE   
PROBABLE   
POSSIBLE

FREQUENCIES 0.3-5.0HZ.

DATE SURVEYED MAY 1979

APPROVED   
DATE 7/12/79   
Expiry Date: February 25, 1980

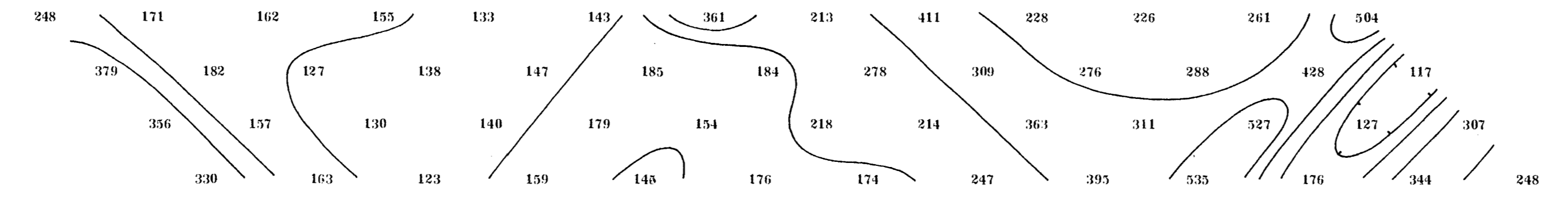
NOTE - CONTOURS AT LOGARITHMIC INTERVALS 1, -1.5, -2, -3, -5, -7.5, -10

**7543**

**PHOENIX GEOPHYSICS LIMITED**  
INDUCED POLARIZATION AND RESISTIVITY SURVEY

99.00N 99.15N 99.30N 99.45N 99.60N 99.75N 99.90N 100.05N 100.20N 100.35N 100.50N 100.65N 100.80N 100.95N 101.10N 101.25N 101.40N 101.55N 101.70N 101.85N 102.00N

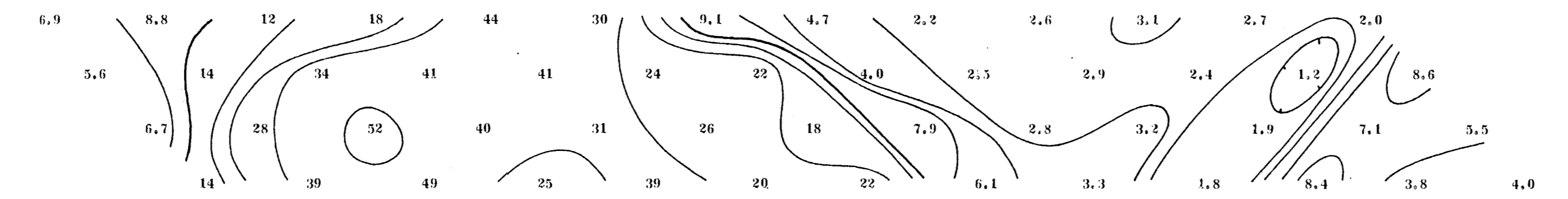
RESISTIVITY (APP.) OHM-METRES



N-1  
N-2  
N-3  
N-4

99.00N 99.15N 99.30N 99.45N 99.60N 99.75N 99.90N 100.05N 100.20N 100.35N 100.50N 100.65N 100.80N 100.95N 101.10N 101.25N 101.40N 101.55N 101.70N 101.85N 102.00N

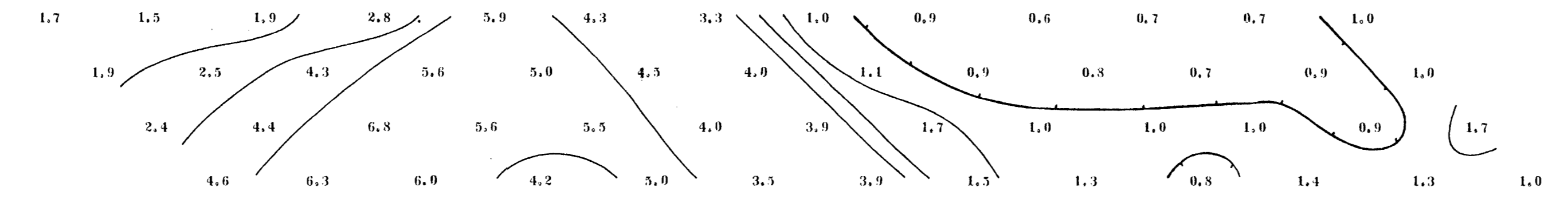
METAL FACTOR (APP.)



N-1  
N-2  
N-3  
N-4

99.00N 99.15N 99.30N 99.45N 99.60N 99.75N 99.90N 100.05N 100.20N 100.35N 100.50N 100.65N 100.80N 100.95N 101.10N 101.25N 101.40N 101.55N 101.70N 101.85N 102.00N

FREQUENCY EFFECT (APP.) IN %

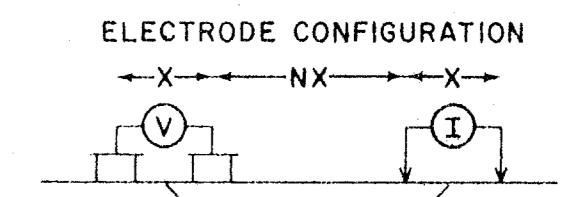


N-1  
N-2  
N-3  
N-4



**BETHLEHEM COPPER CORP. LTD.**  
 LOG CLAIMS, MISSEZULA LAKE AREA  
 NICOLA M.D., BRITISH COLUMBIA

LINE NO. - 101,150E



PLOTTING POINT X=150m.

SURFACE PROJECTION OF ANOMALOUS ZONE  
 DEFINITE   
 PROBABLE   
 POSSIBLE

FREQUENCIES 0.3-5.0HZ.

DATE SURVEYED MAY 1979

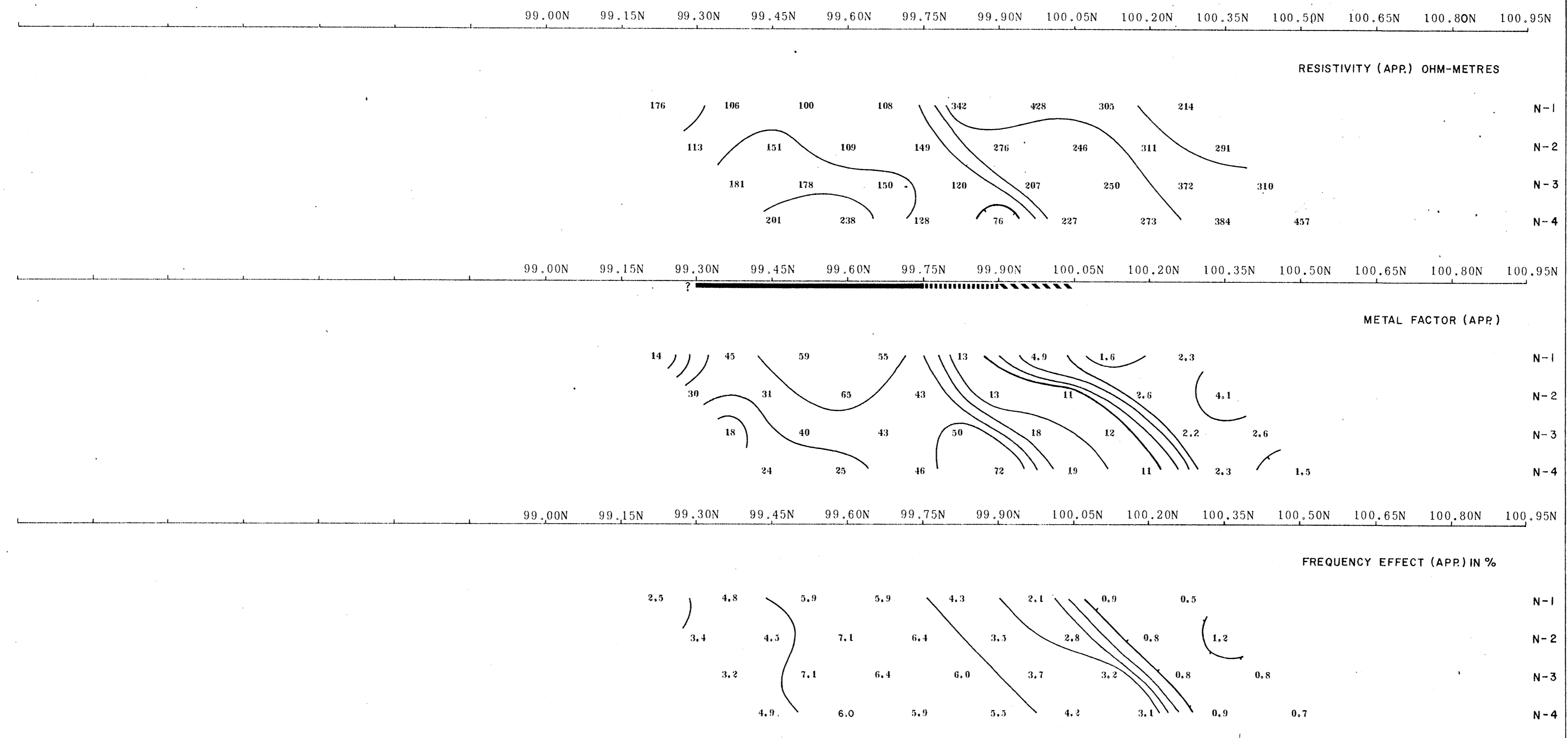
NOTE - CONTOURS AT LOGARITHMIC INTERVALS  
 1,-1.5,-2,-3,-5,-7.5,-10

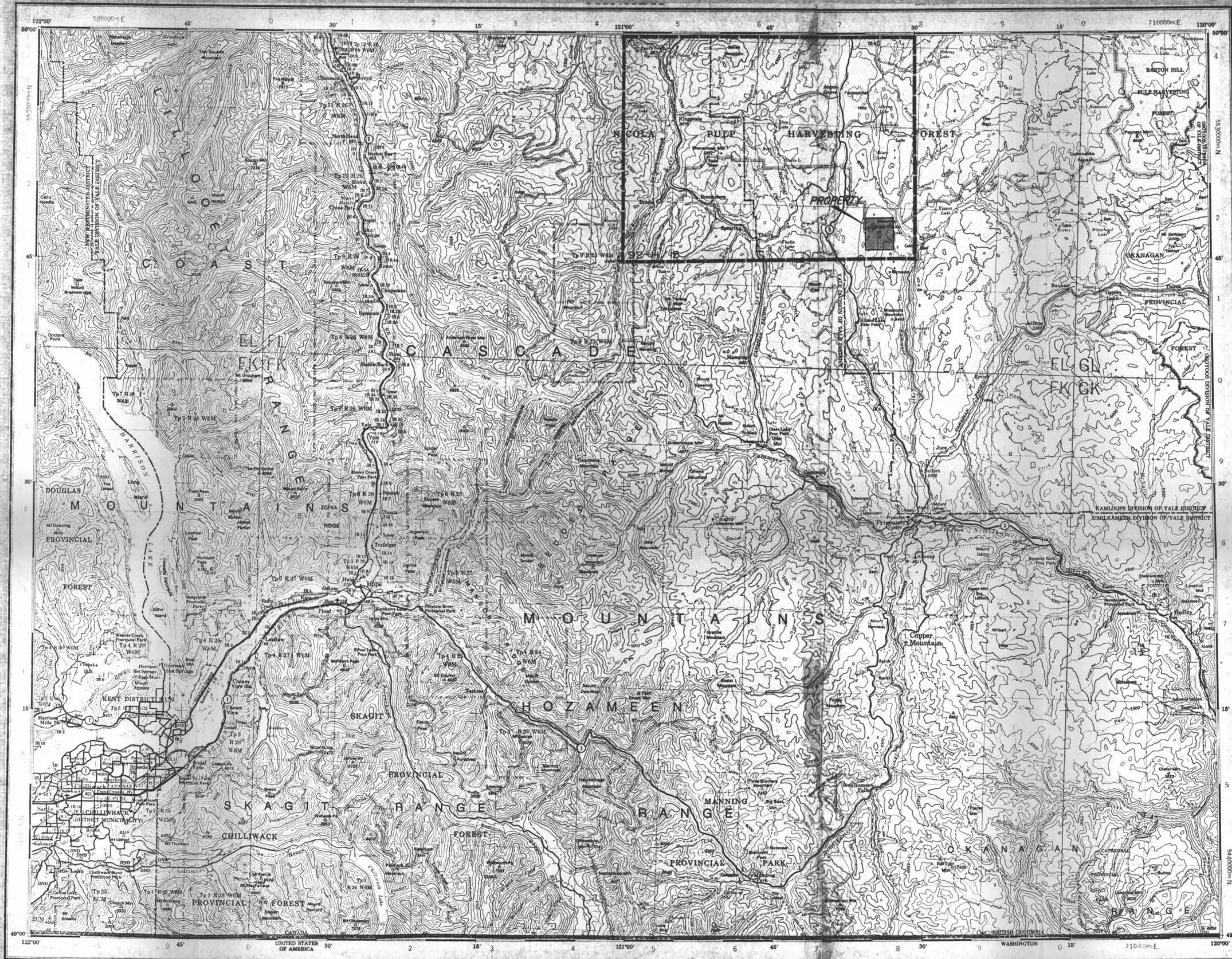
**7543**

**PHOENIX GEOPHYSICS LIMITED**

INDUCED POLARIZATION AND RESISTIVITY SURVEY

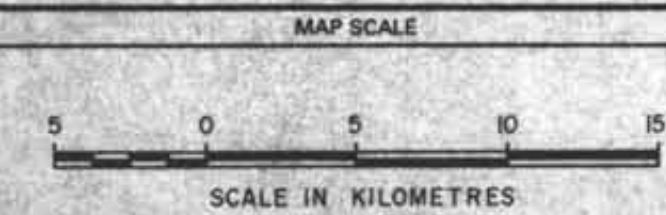
APPROVED PROFESSIONAL ENGINEER  
 P. G. MALLOF  
 BRITISH COLUMBIA  
 ENGINEER  
 DATE 11/21/79  
 Expiry Date: February 25, 1980





MINERAL RESOURCES BRANCH  
ASSESSMENT REPORT  
**7543**  
NO.

NOTE:  
U.T.M. GRID - ZONE 10



| REV. NO. | DATE | MADE BY | DESCRIPTION |
|----------|------|---------|-------------|
| 1        |      |         |             |
| 2        |      |         |             |
| 3        |      |         |             |
| 4        |      |         |             |
| 5        |      |         |             |

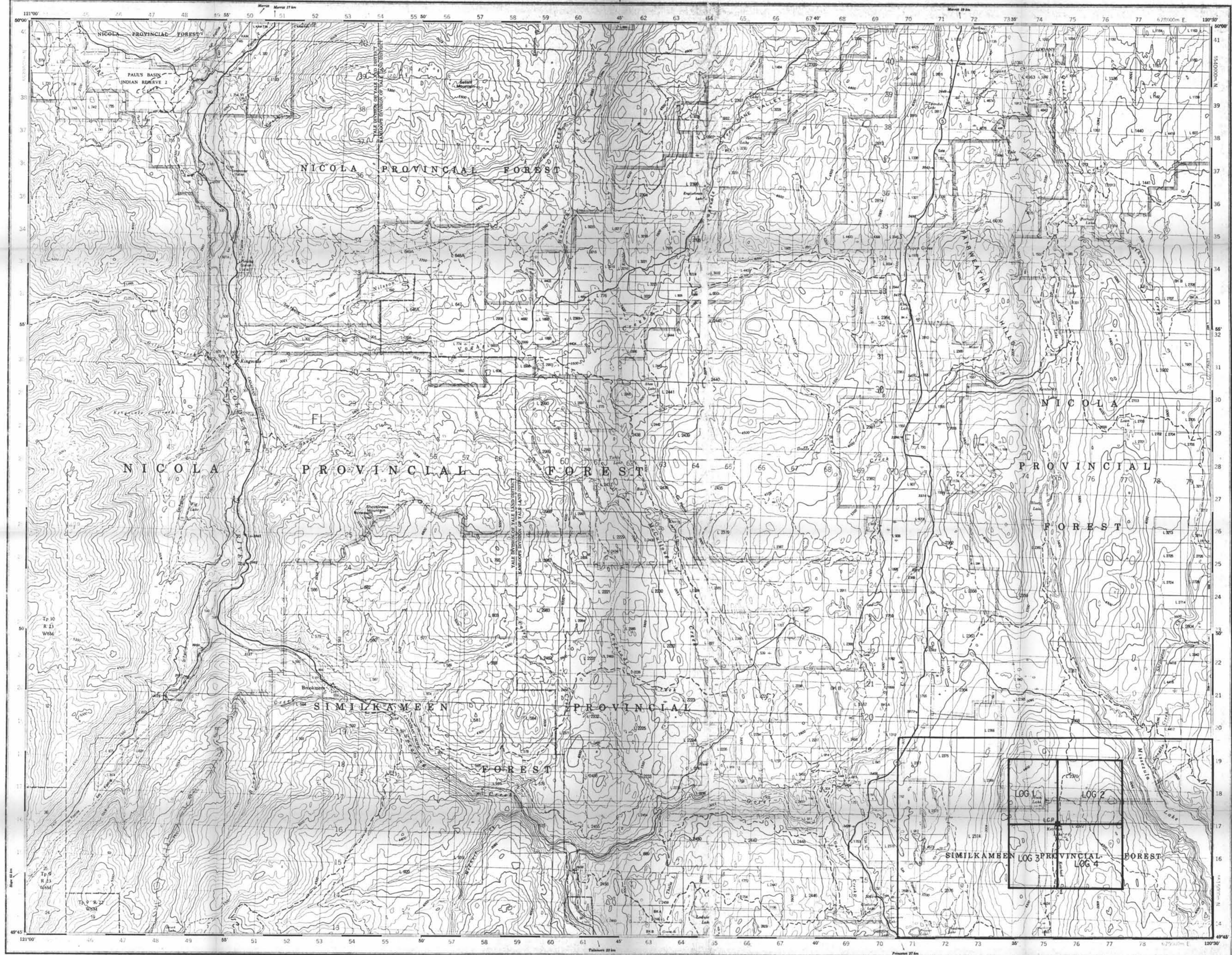
| DATE      | DRAWN BY | CHECKED | APPROVED |
|-----------|----------|---------|----------|
| AUG. 1979 |          | E. A.   |          |

**B** BETHLEHEM  
COPPER  
CORPORATION

MISSEZULA LAKE PROJECT  
"LOG CLAIMS"  
GENERAL LOCATION PLAN

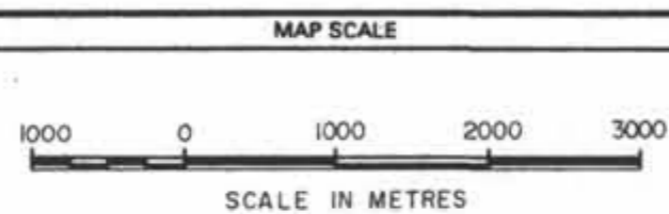
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|-----------|-------------|------------------|-----------|----------------|
| VANCOUVER | EXPLORATION | N.T.S. 92-H      | 1:250,000 | ML-79-1        |

ML-79-1-1



MINERAL RESOURCES BRANCH  
ASSESSMENT REPORT  
**7543**  
NO.

NOTE:  
UTM GRID - ZONE 10

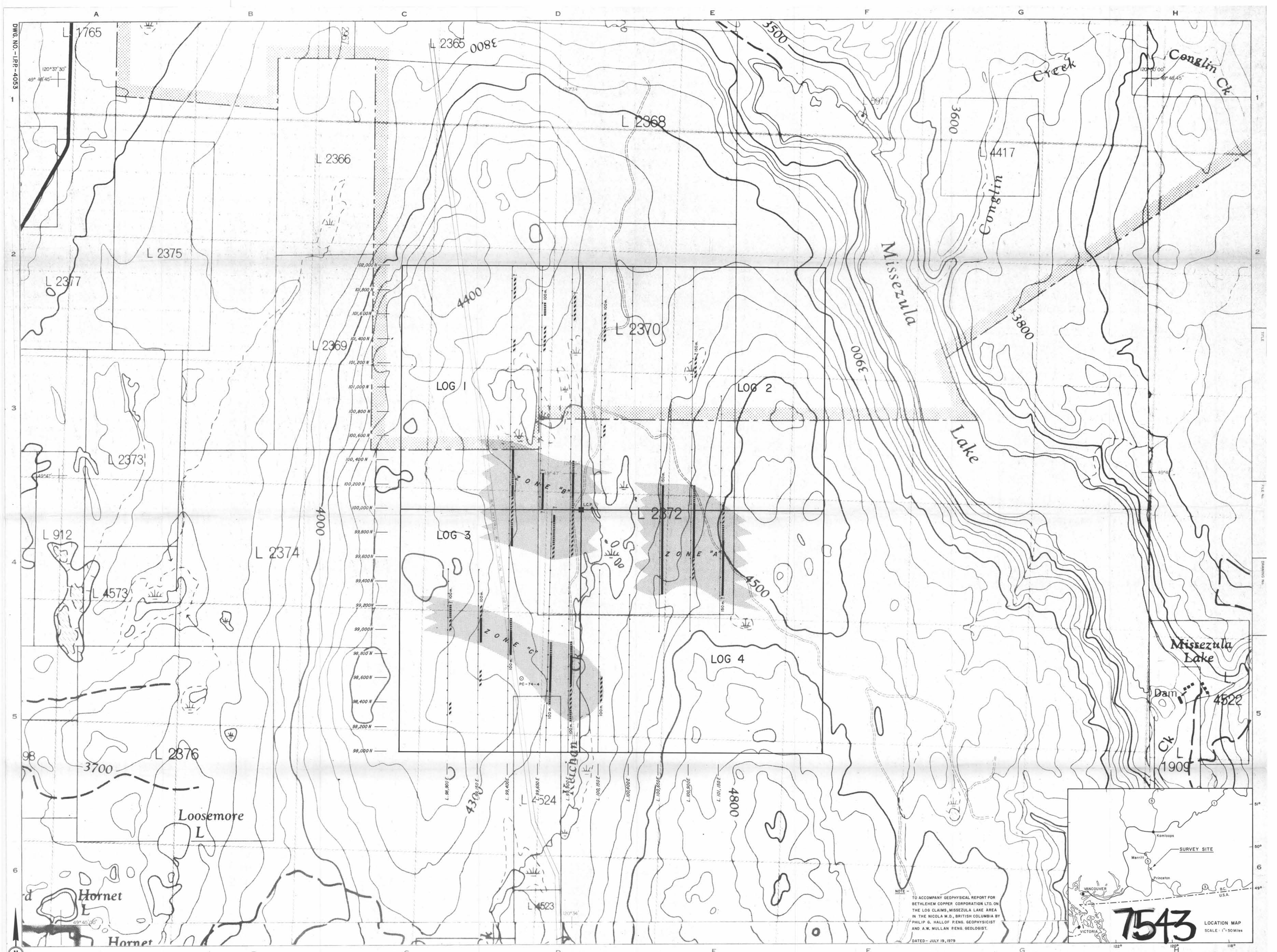


| No. | Date | MADE BY | DESCRIPTION |
|-----|------|---------|-------------|
| 1   |      |         |             |
| 2   |      |         |             |
| 3   |      |         |             |
| 4   |      |         |             |
| 5   |      |         |             |

**B** BETHLEHEM  
COPPER  
CORPORATION

MISSEZULA LAKE PROJECT  
"LOG CLAIMS"  
LOCATION PLAN

| DATE      | DRAWN BY | CHECKED | APPROVED | OFFICE    | DEPARTMENT  | MAP INDEX NUMBER | SCALE    | DRAWING NUMBER |
|-----------|----------|---------|----------|-----------|-------------|------------------|----------|----------------|
| AUG. 1979 |          | E. A.   |          | VANCOUVER | EXPLORATION | N.T.S. 92-H/15   | 1:50,000 | ML-79-2        |

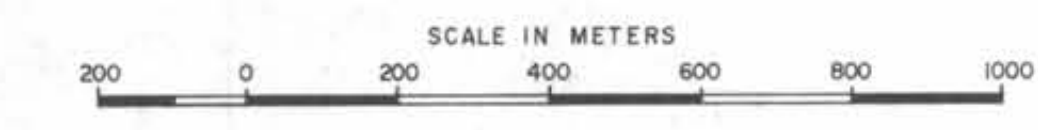


DWG NO. - I.P.P. - 4053

SURFACE PROJECTION OF ANOMALOUS ZONE  
 DEFINITE  
 PROBABLE  
 POSSIBLE  
 NUMBER AT END OF ANOMALIES INDICATE SPREAD USED.

PHOENIX GEOPHYSICS LIMITED  
 INDUCED POLARIZATION AND RESISTIVITY SURVEY  
 PLAN MAP

ANOMALOUS I.P. ZONE



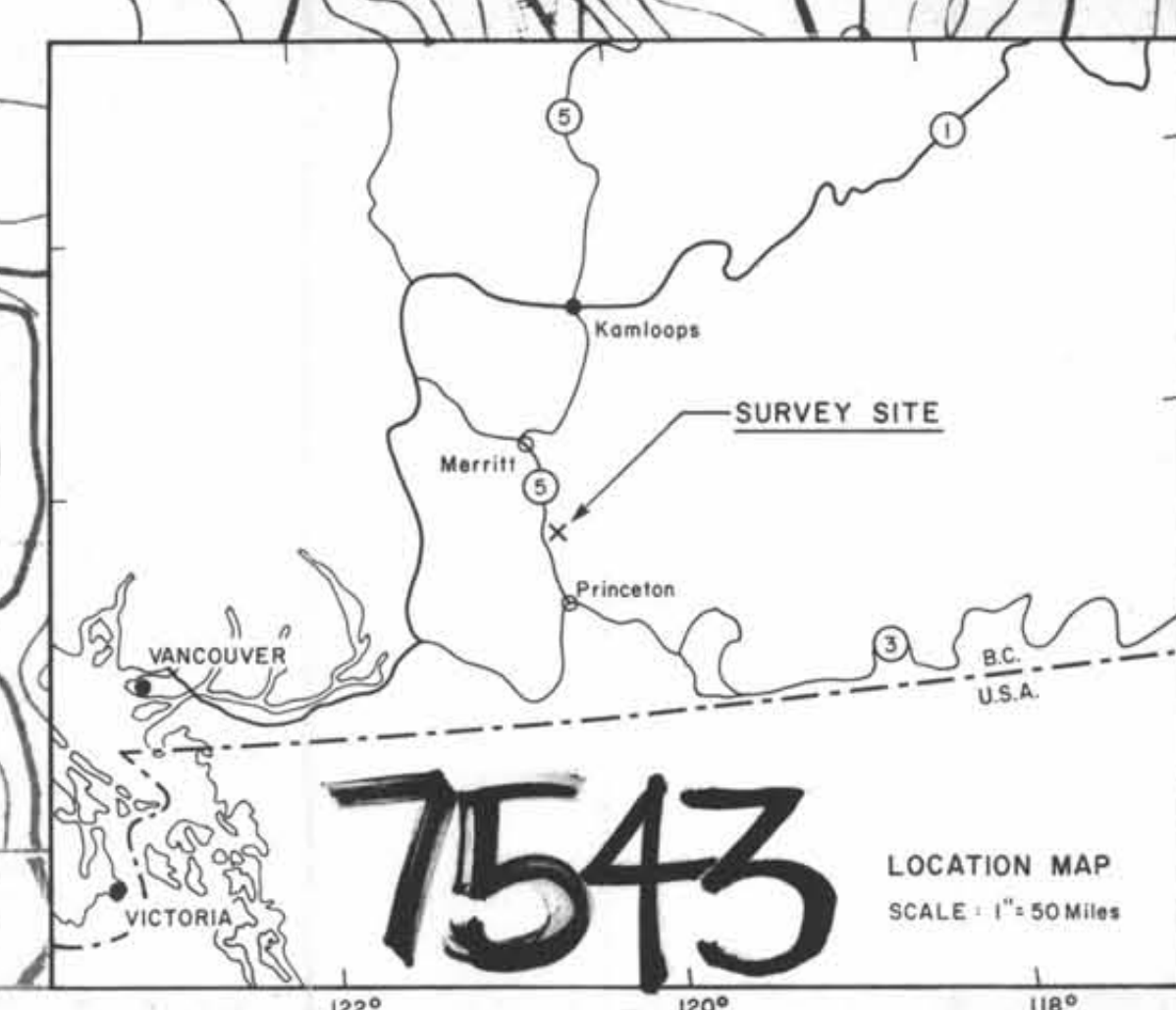
REVISED: R.C.  
 DATE: JUN 1979  
 APPROVED: P. S. HALLOW  
 DATE: FEB 25 1979  
 EXPIRY DATE: FEBRUARY 25, 1980

DEPT. - EXPLORATION  
 DRAWN BY -  
 CHECKED BY -  
 APPROVED BY -  
 DATE -  
 SCALE - 1:10,000



TITLE - LOG CLAIMS, MISSEZULA LAKE AREA  
 NICOLA M.D., BRITISH COLUMBIA  
 FILE NUMBER -  
 DRAWING NUMBER -  
 I.P.P. - 4053

NOTE: TO ACCOMPANY GEOPHYSICAL REPORT FOR BETHLEHEM COPPER CORPORATION LTD. ON THE LOG CLAIMS, MISSEZULA LAKE AREA IN THE NICOLA M.D., BRITISH COLUMBIA BY PHILIP S. HALLOW P.E.G. GEOPHYSICIST AND A.W. MULLAN P.E.G. GEOLOGIST. DATED - JULY 19, 1979



7543