

40008

REPORT ON THE
INDUCED POLARIZATION
AND RESISTIVITY SURVEY
ON THE ^{92I/10E}
RAG CLAIM GROUP,
GREENSTONE MOUNTAIN AREA
KAMLOOPS MINING DIVISION, B.C.
FOR
MID-NORTH EXPLORATIONS LTD. (N.P.L.)

BY

PHILIP G. HALLOF, Ph. D.

AND

MARION A. GOUDIE, B.Sc.

Department of Mines and Petroleum Resources ASSESSMENT REPORT NO. <u>4008</u> MAP.....

NAME AND LOCATION OF PROPERTY

RAG CLAIM GROUP, GREENSTONE MOUNTAIN AREA
KAMLOOPS MINING DIVISION, B.C. 50°36'N, 120°41'W - SE

DATE STARTED: JUNE 27, 1972

DATE FINISHED: JULY 8, 1972

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McPHAR GEOPHYSICS

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

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

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

in the rock.

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

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

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

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

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

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

anomalies which are suspected of being due to these causes.

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

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

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

In plotting the results, the values of the apparent resistivity, apparent per cent frequency effect, and the apparent metal factor

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

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

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

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

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

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

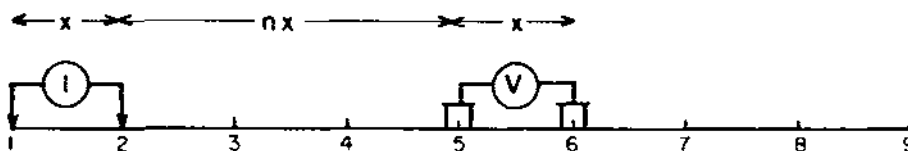
In some situations spurious noise, either man made or natural, will render it impossible to obtain a reading. The symbol "N" on the data plots indicates a station at which it is too noisy to record a reading. If a reading can be obtained, but for reasons of noise there is some doubt as to its accuracy,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

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



Stations on line

x = Electrode spread length
 n = Electrode separation

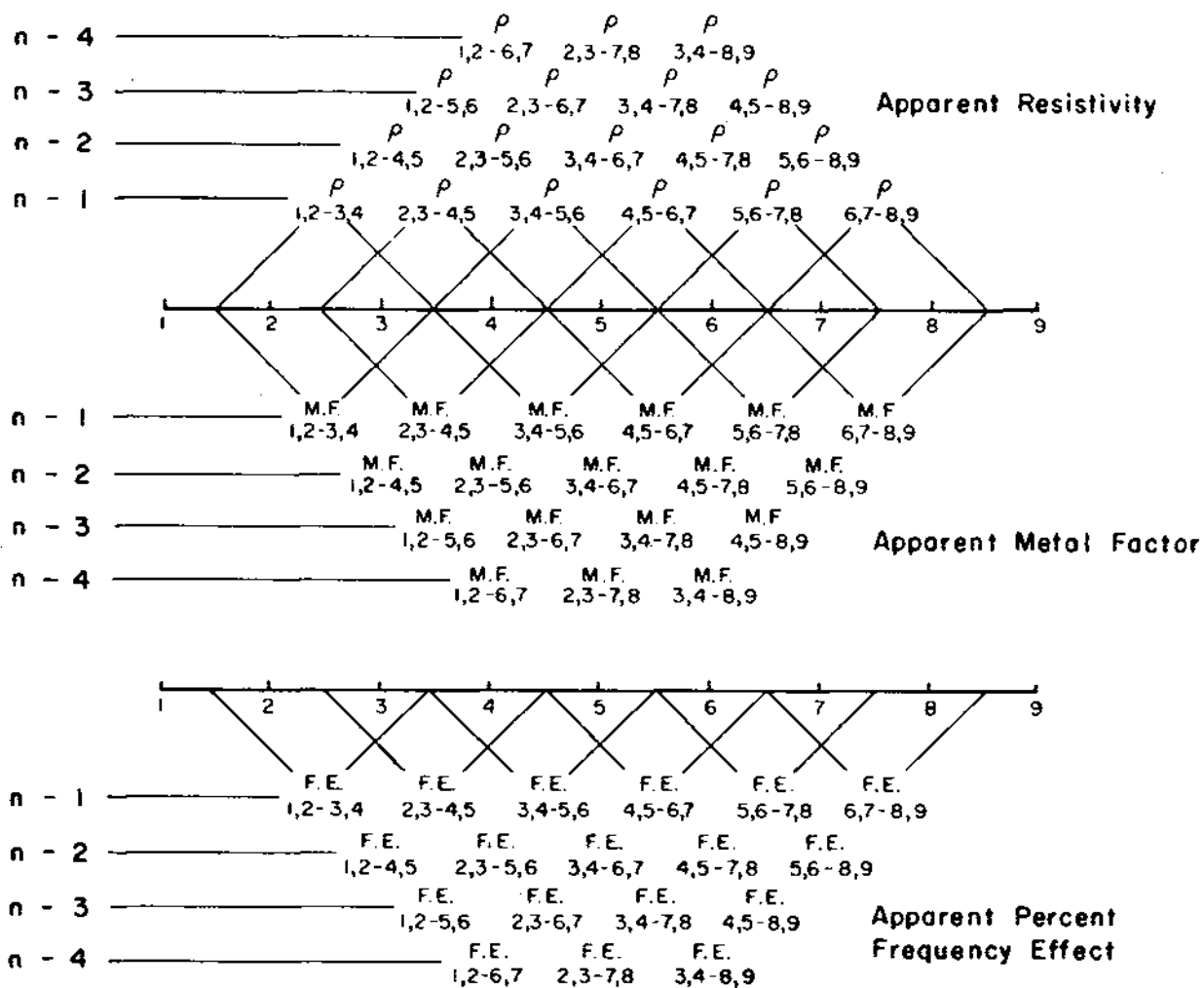


Fig. A

McPHAR GEOPHYSICS LIMITED

**REPORT ON THE
INDUCED POLARIZATION
AND RESISTIVITY SURVEY
ON THE**

**RAG CLAIM GROUP,
GREENSTONE MOUNTAIN AREA
KAMLOOPS MINING DIVISION, B. C.**

FOR

MID-NORTH EXPLORATIONS LTD. (N. P. L.)

1. INTRODUCTION

At the request of Mr. Edmund Sonnenberg, President of the Company, an Induced Polarization and Resistivity survey has been completed on the Rag Claim Group in the Greenstone Mountain Area, Kamloops Mining Division, B. C. The southeast corner of the claim group is situated at 50°36' north latitude and 120°41' west longitude, 16 air miles southwest of Kamloops, B. C. Access is by road, 18 miles south of Cherry Creek on the Trans-Canada Highway.

The country rocks in the grid area are Upper Triassic rocks of the Nicola Group, consisting mainly of intermediate volcanic flows and fragmentals intruded by a diorite-monzonite stock of possible Jurassic age. The main sulphide of economic interest found on the Rag claims is chalcopyrite, which occurs in all the rock units in association with various amounts of magnetite and pyrite. Around the intrusive contact pyrite is uniformly abundant as

disseminations and fracture fillings. Pyrrhotite occurs in the same environment in less abundance.

Previous work done by other companies consists of geological sampling, soil sampling, magnetometer, self-potential and IP surveys and diamond drilling. A total of 5,365 feet of percussion drilling was completed in 18 holes in some part of the Rag claims and cuttings of volcanic rocks containing pyrite and chalcopyrite mineralization were recovered. None of these results were available at the time this report was written.

The IP survey was carried out to a) define the eastern portion of an anomalous zone indicated on Grid I by a previous IP survey; b) evaluate the area between Grid I and Grid II and c) to define drill targets at the intrusive contact on the southern and southeastern margins of Grid II.

The work was done in late June and early July, 1972, using a McPhar P660 high power variable frequency IP unit, operating at 0.3 and 5.0 cps over the following claims:

Rag 1 to 20 inclusive, 21 to 44, 46 to 52, 57 to 65, 71 to 78,
81, 83, 85 to 89, Rag "B" fraction, Rag "C" fraction,
Rag "E" fraction, Rag "F" fraction, Rag 95 and 96.

These claims are assumed to be owned or held under option by Mid-North Explorations Ltd. (N. P. L.).

2. PRESENTATION OF RESULTS

The Induced Polarization and Resistivity results are shown on the following data plots in the manner described in the notes preceding this report.

<u>Line</u>	<u>Electrode Interval</u>	<u>Dwg. No.</u>
<u>Grid I</u>		
1500N	300 feet	IP 5964-1
500N	300 feet	IP 5964-2
Base Line N	300 feet	IP 5964-3
2000N	300 feet	IP 5964-4
1500N	300 feet	IP 5964-5
1000N	300 feet	IP 5964-6
500N	300 feet	IP 5964-7
0	300 feet	IP 5964-8
500S	300 feet	IP 5964-9
1000S	300 feet	IP 5964-10
<u>Grid II</u>		
2000S	300 feet	IP 5965-1
2500S	300 feet	IP 5965-2
3000S	300 feet	IP 5965-3
3500S	300 feet	IP 5965-4
4000S	300 feet	IP 5965-5
4500S	300 feet	IP 5965-6
<u>Grid III</u>		
Base Line E	300 feet	IP 5966-1
1000W	300 feet	IP 5966-2
2000W	300 feet	IP 5966-3

<u>Line</u>	<u>Electrode Intervals</u>	<u>Dwg. No.</u>
<u>Grid III (contd.)</u>		
3000W	300 feet	IP 5966-4
3500W	300 feet	IP 5966-5
5000W	300 feet	IP 5966-6
6000W	300 feet	IP 5966-7

Also enclosed with this report is Dwg. I. P. P. 4852, a plan map of the Rag Claim Group at a scale of 1" = 400'. 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 300' electrode intervals the position of a narrow sulphide body can only be determined to lie between two stations 300' 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.

3. DISCUSSION OF RESULTS

In order to facilitate a discussion of the separate areas, the Base Line North, Line 500N and Line 1500N of Grid II have been placed in Grid I where these lines more logically belong. The west lines are discussed separately from Grid II as Grid III.

It is unfortunate that the results of previous work in the area and on the claim group are not available for a better interpretation of the total picture of the claim group.

Grid I

The resistivity data on the survey lines in Grid I appear to have defined the contact between the Nicola group and the intrusive, where a rather sharp increase in resistivities occurs (see Dwg. I.P.P. 4852). The IP anomalies are weak near the contact but increase in magnitude to the west, especially to the northwest. The survey lines have not defined the western limit of the anomalous zone, which must extend beyond the western and northwestern limit of the present survey.

The anomalies decrease in magnitude and size from Line 6 to the south.

The area between Line 500N, north of Base Line N, and Line 2000N appears to be anomalous to the west from 27E on Line 500N and from 37E on Line 2000N. If no previous information is available, a series of percussion

holes drilled to a depth of 200' to 300' should identify the source of the anomalies. If the results are encouraging, the IP survey should be extended to the north and west to better locate and delineate the source.

Grid II

The resistivities on the survey lines in Grid II are relatively high and suggest that the intrusive extends to the east beyond the grid. The few IP anomalies from Line 2000S to Line 4000S are quite weak with no strike length, and do not indicate the presence of a substantial volume of metallic mineralization.

Line 4500S does not fit into the above pattern. The line is anomalous throughout; the resistivities are moderately high but the frequency effects are much higher than background. Because of the high resistivities, the metal factors are moderate, but they are significant (see Appendix). Because of this, an attempt should be made to locate the northern and southern extent of the anomaly by surveying lines parallel to Line 4500S then the source should be tested by percussion holes drilled to a depth of between 200' and 300'.

Grid III

The anomalies in Grid III are also in the high resistivity environment, as in the case of those of Grid II, with the source of the anomalies within the intrusive rather than in the Nicola rocks. The anomalies are all incomplete to the south and the lines should be extended to the south.

The source of these anomalies is probably the same type of mineralization as the source on Line 4500S, Grid II. However, percussion holes to test

the anomalous area would be advisable, if no other information is available from previous work.

4. CONCLUSIONS

The IP survey located a zone of anomalies on Grid I which lies in the Nicola volcanics near the contact between the Nicola rocks and the intrusive. Percussion drilling on this grid recovered cuttings containing pyrite and chalcopyrite mineralization. If these percussion holes test these anomalies, no further drilling to identify the source would be necessary, but if they do not then the source should be checked by percussion drilling in the vicinity of Line 2000N, as recommended in the discussion. The survey should be extended to the west to complete information over the anomalous zone.

Grid II and Grid III appear to lie within the intrusive. An anomalous zone of some interest was identified in the central and eastern part of Grid III and on the most southern line of Grid II. If no other information is available, the source of this zone should be checked by percussion drilling. If the results are encouraging, the survey should be extended to the south and southeast to delimit the zone.

McPHAIL GEOPHYSICS LIMITED

Philip G. McPhail
Geophysicist

Marion A. Goudie,
Geologist.

Dated: August 11, 1972

ASSESSMENT DETAILS

PROPERTY: Rag Claim Group

MINING DIVISION: Kamloops

SPONSOR: Mid-North Explorations
Ltd. (N.P.L.)

PROVINCE: British Columbia

LOCATION: Greenstone Mountain Area

TYPE OF SURVEY: Induced Polarization

OPERATING MAN DAYS: 44

DATE STARTED: June 27, 1972

EQUIVALENT 8 HR. MAN DAYS: 66

DATE FINISHED: July 8, 1972

CONSULTING MAN DAYS: 4

NUMBER OF STATIONS: 302

DRAUGHTING MAN DAYS: 7

NUMBER OF READINGS: 1647

TOTAL MAN DAYS: 77

MILES OF LINE SURVEYED: 15.97

CONSULTANTS:

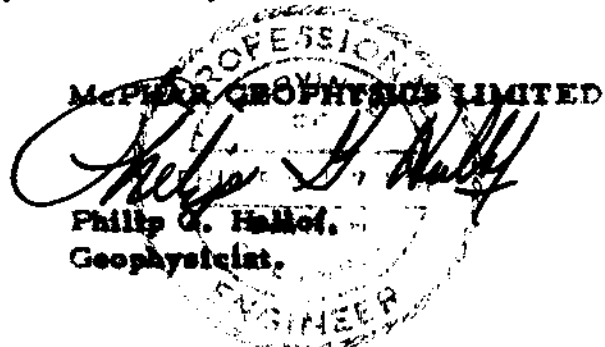
Philip G. Haller, 15 Barnwood Court, Don Mills, Ontario.
Marion A. Goudie, 739 Military Trail, West Hill, Ontario.

FIELD TECHNICIANS:

J. Sains, 317 Sage Street, Nogales, Arizona, U.S.A.
J. Wowchuck, 4238 Winifred Street, Burnaby, B.C.
Plus 2 Helpers:
J. Melyneux, 2311 Glenview Avenue, Kamloops, B.C.
M. Barron, 152 Greenstone Drive, Kamloops, B.C.

DRAUGHTSMEN:

N. Lade, 299 Jasper Avenue, Oshawa, Ontario.
B. Marr, 58 Glencrest Blvd, Toronto 16, Ontario.
F. Hurst, 230 Weburn Avenue, Toronto 12, Ontario.



Dated: August 11, 1972

STATEMENT OF COST

Declared before me at this

**Mid-North Explorations Ltd. (M.P.L.) Rag Claim Group - IP Survey
Greenstone Mountain Area, Kamloops Mining Division, B.C.**

Crew: J. Sains & J. Wewchuck

Total Survey Cost:

15.97 Line Miles @ \$425.00 per mile

66,757.25

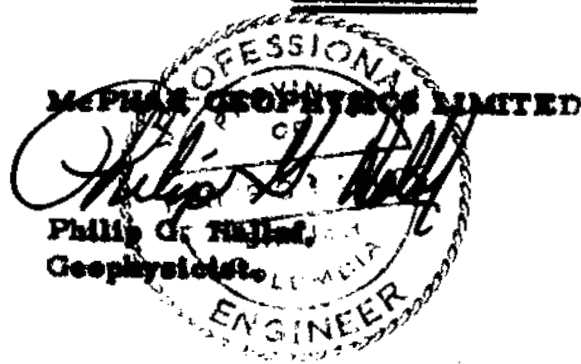
Breakdown of Cost

11 days Operating @ \$443.00 per day	\$4,873.00
1 day Travel @ \$100.00 per day	<u>100.00</u>
	4,973.00

Crew Expenses

Air Fare (1 man)	\$ 46.00	
Vehicle Expense (Truck Rent)	438.06	
Meals and Accommodation	549.88	
Telephone and Telegraph	<u>20.89</u>	
	1,054.83	
Plus 10%	<u>105.48</u>	
	1,160.31	1,160.31

Extra Labour	\$ 550.00	
Plus 20%	<u>110.00</u>	
	660.00	<u>660.00</u>
		\$6,793.31



Dated: August 11, 1972

Declared before me at the

City

Vancouver, in the

Police

Province of British Columbia, this

2

day of

Nov

1972

AD

Jim Jones

A Commissioner for taking Affidavits within British Columbia and
A Notary Public in and for the Province of British Columbia.

SUB-MINING RECORDER

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Jim Jones

AD

CERTIFICATE

I, Philip George Haller, 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 Mid-North Explorations Ltd. (N.P.L.) 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 11th day of August 1972.


Philip G. Haller, B.Sc., Ph.D.


CERTIFICATE

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

1. I am a Geologist residing at 739 Military Trail, West Hill, Ontario.
2. I am a graduate of the University of Western Ontario with a B.Sc. Degree (1950) in Honours Geology.
3. I am a member of the Geological Society of America.
4. I have been practising my profession for 20 years.
5. I have no direct or indirect interest, nor do I expect to receive any interest directly or indirectly, in the property or securities of Mid-North Explorations Ltd. (N.P.L.) 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 11th day of August 1972.

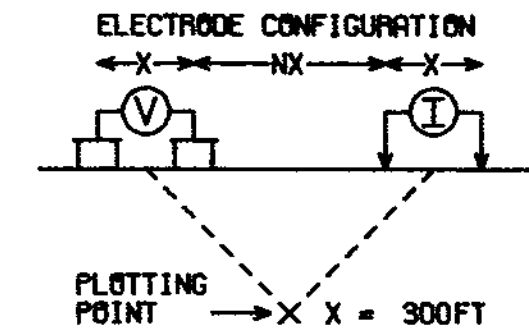


Marion A. Goudie, B.Sc.

MID-NORTH EXPLS., LTD.
(N.P.L.)

RAG CLAIM GROUP, GREENSTONE MTN., AREA,
KAMLOOPS M.D., B.C.

LINE NO.- 3000S



SURFACE PROJECTION
OF ANOMALOUS ZONES

DEFINITE
PROBABLE
POSSIBLE

FREQUENCIES: 0.31-5.0 HZ

DATE SURVEYED: 1972

APPROVED:
DATE: _____

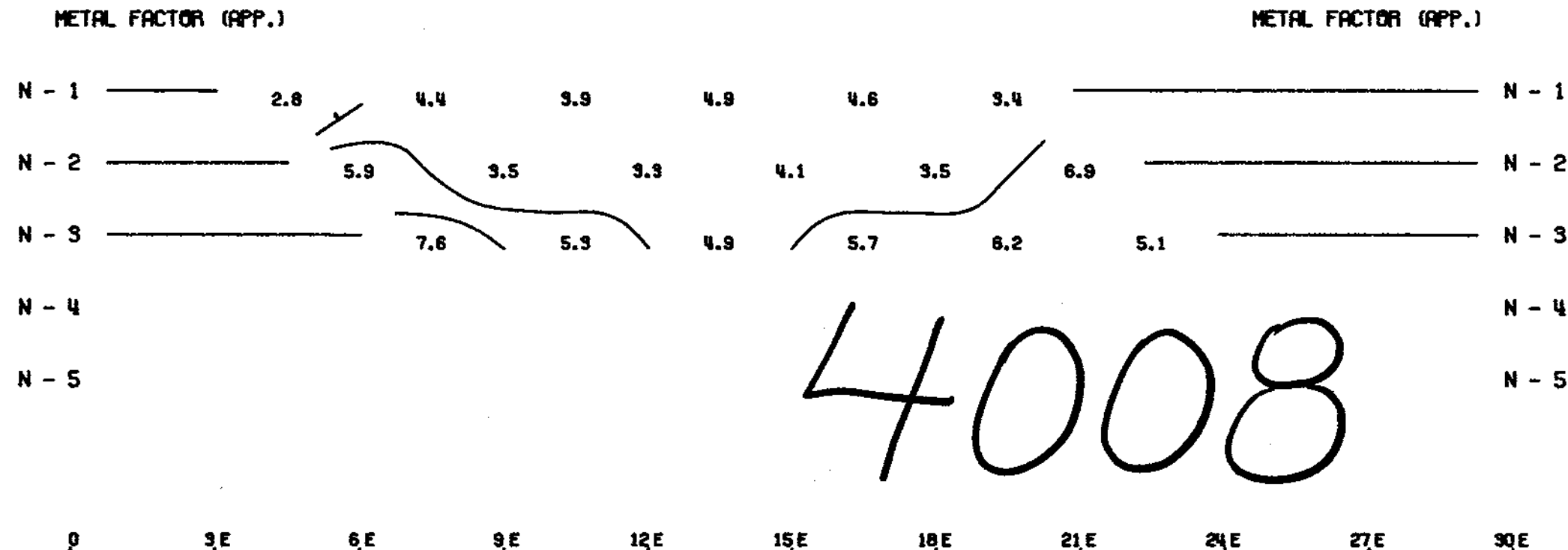
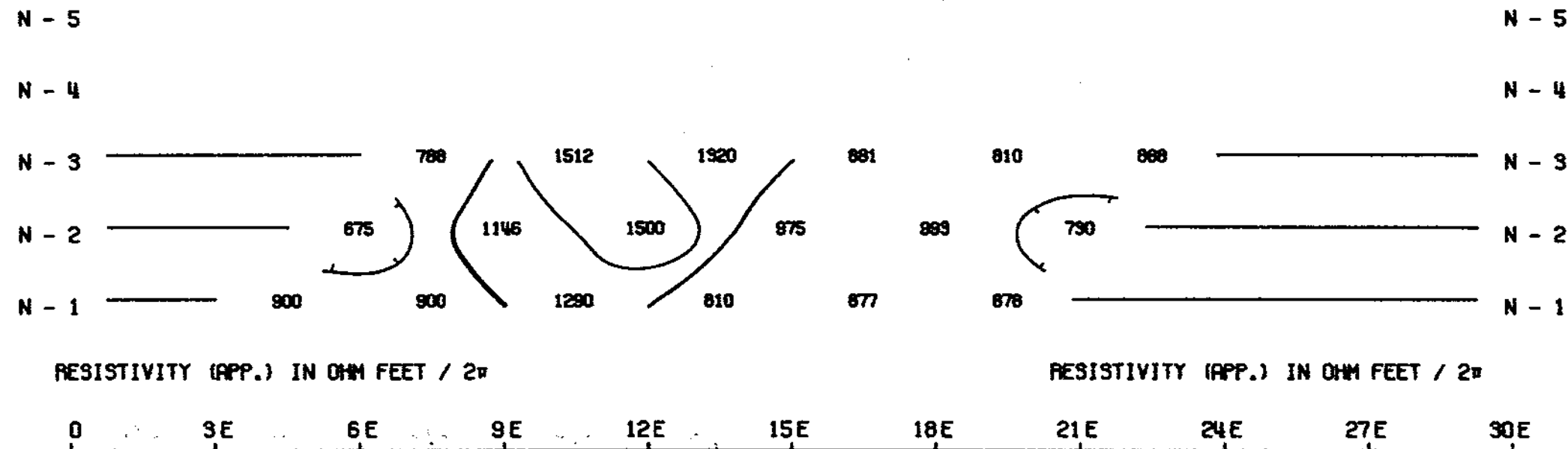
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1.-1.5-2.-3.-5.-7.5-10

Expiry Date: February 25, 1973

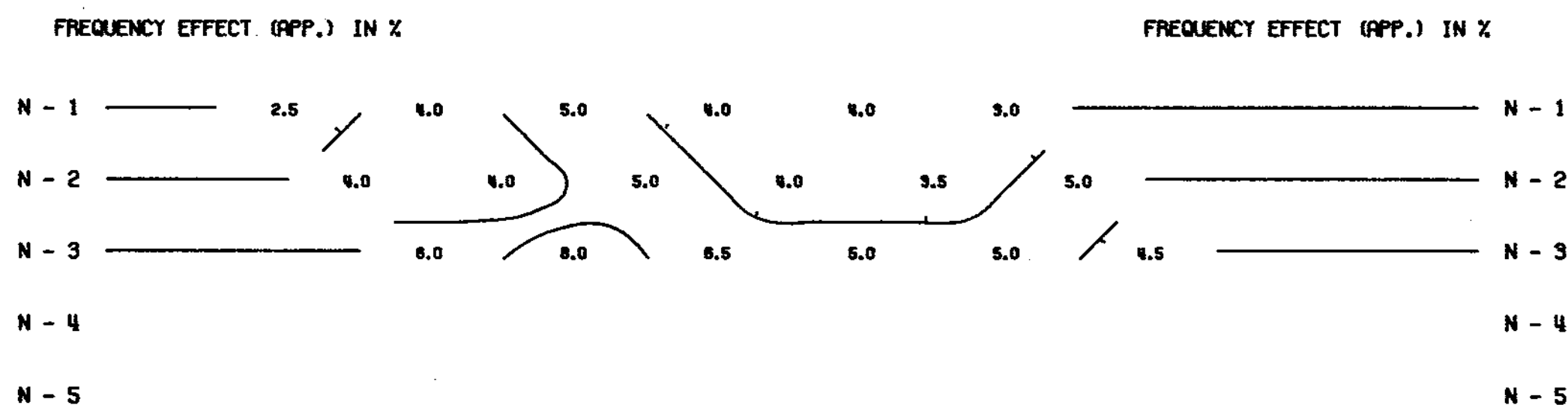
McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

NOTE: THIS PLOT WAS PRODUCED BY McPHAR COMPUTER DIVISION



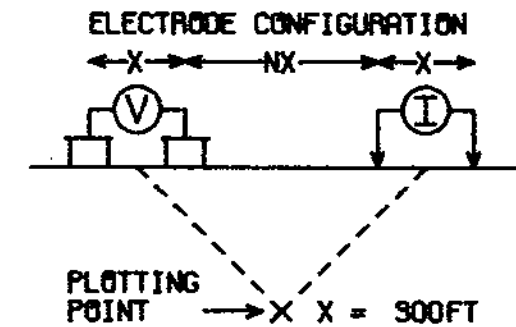
4008



MID-NORTH EXPLS., LTD.
(N.P.L.)

RAG CLAIM GROUP, GREENSTONE MTN., AREA,
KAMLOOPS M.D., B.C.

LINE NO. - 3500S



SURFACE PROJECTION
OF ANOMALOUS ZONES

DEFINITE **————**
PROBABLE **|||||**
POSSIBLE **////**

FREQUENCIES: 0.31-5.0 HZ

DATE SURVEYED: 11-1972

APPROVED: *[Signature]*
PROFESSIONAL ENGINEER
DATE: *[Signature]*

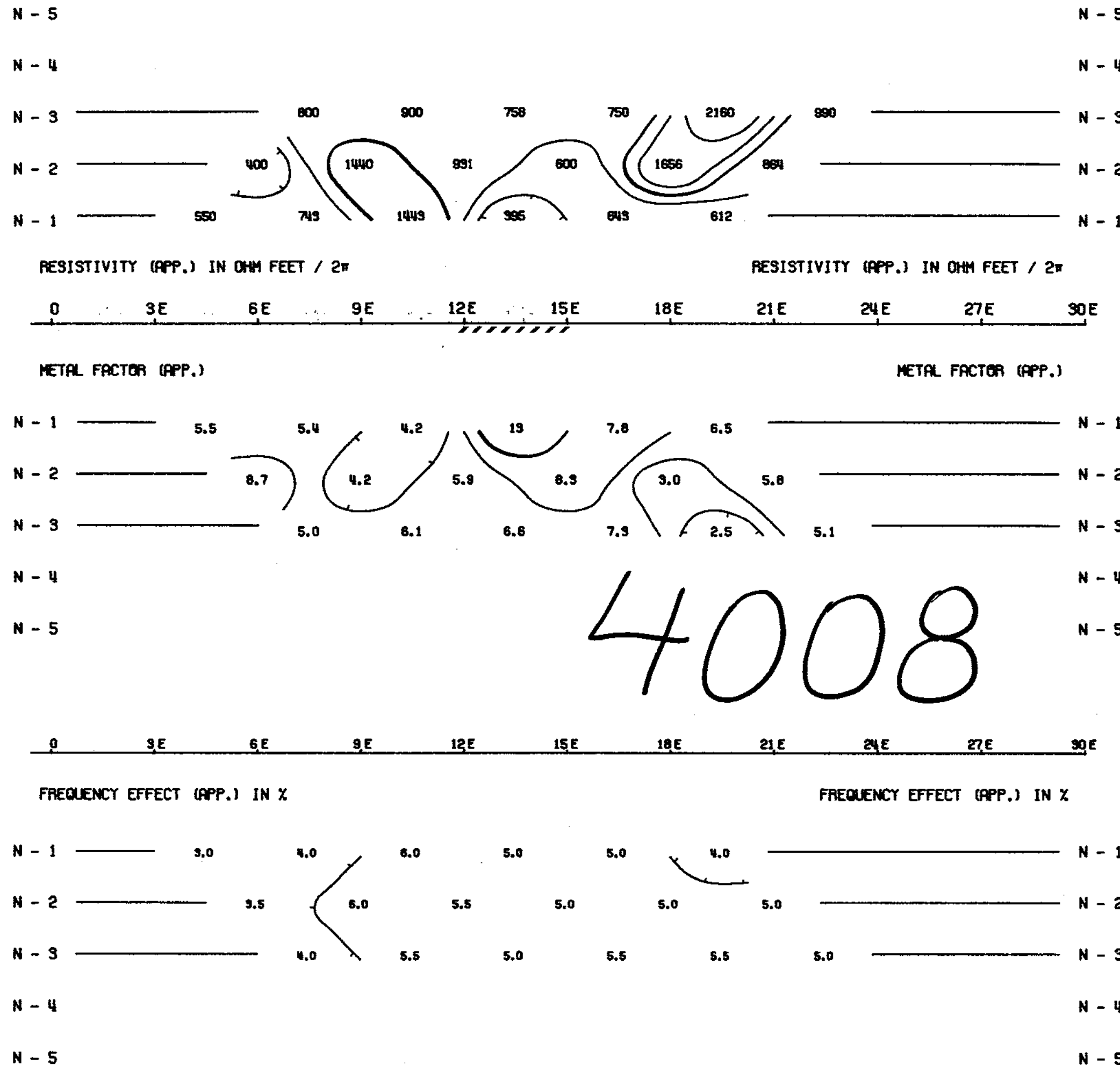
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McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

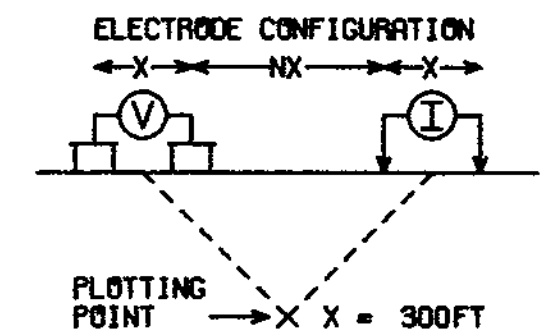
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MID-NORTH EXPLS., LTD.
(N.P.L.)

RAG CLAIM GROUP, GREENSTONE MTN., AREA,
KAMLOOPS M.D., B.C.

LINE NO.- B/L E

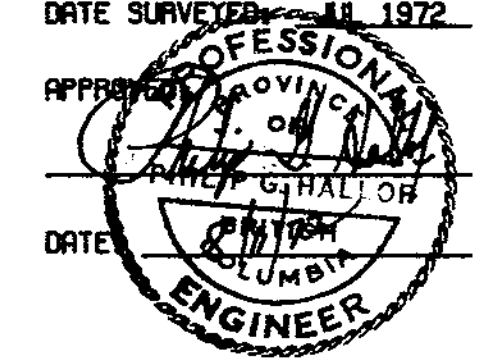


SURFACE PROJECTION
OF ANOMALOUS ZONES
DEFINITE
PROBABLE
POSSIBLE

FREQUENCIES: 0.31-5.0 HZ

DATE SURVEYED: 11 1972

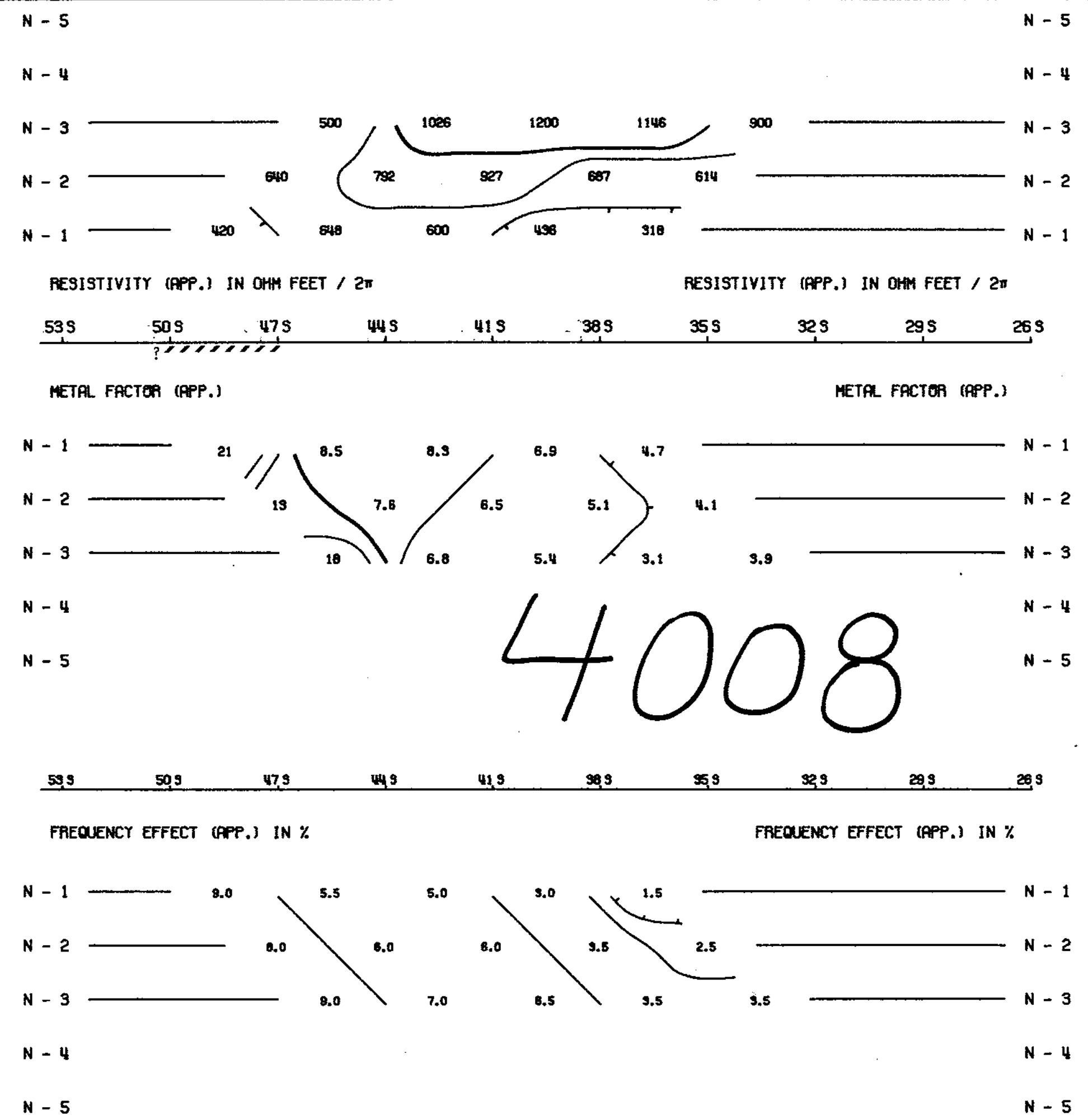
NOTE: CONTOURS AT
LOGARITHMIC INTERVALS
1.-1.5-2.-3.-5.-7.5-10



McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

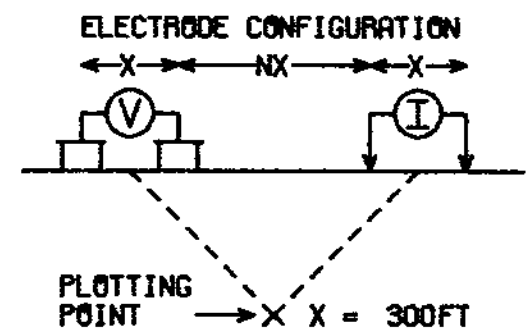
NOTE: THIS PLOT WAS PRODUCED BY MCPHAR COMPUTER DIVISION



MID-NORTH EXPLS., LTD.
(N.P.L.)

RAG CLAIM GROUP, GREENSTONE MTN., AREA,
KAMLOOPS M.D., B.C.

LINE NO. - 1000W



SURFACE PROJECTION
OF ANOMALOUS ZONES

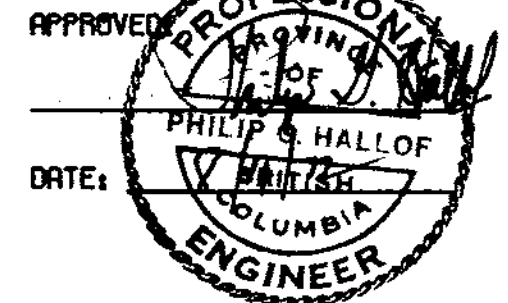
DEFINITE

PROBABLE

POSSIBLE

FREQUENCIES: 0.31-5.0 HZ

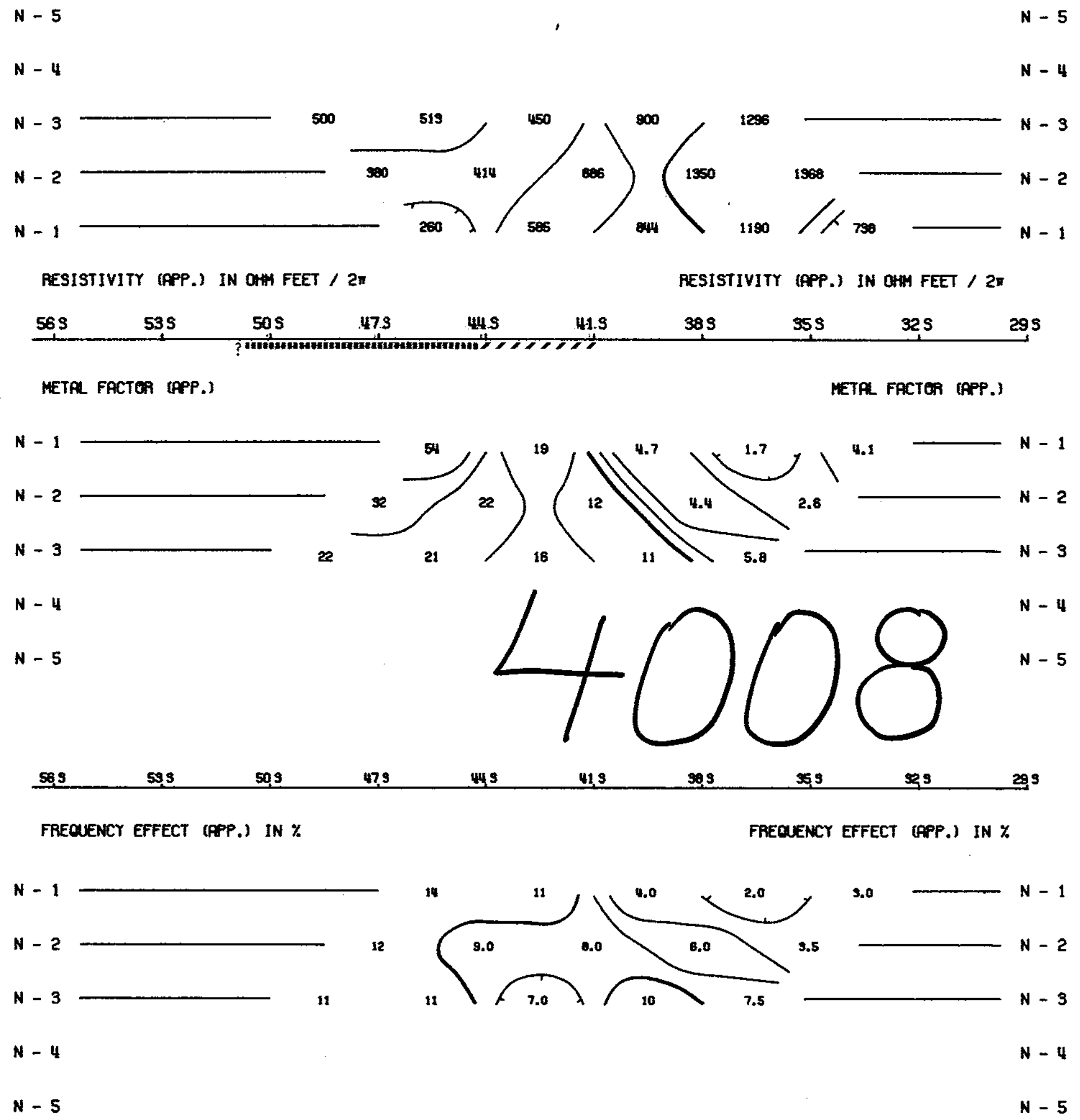
DATE SURVEYED: 11 1972



Expiry Date: February 25, 1973

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

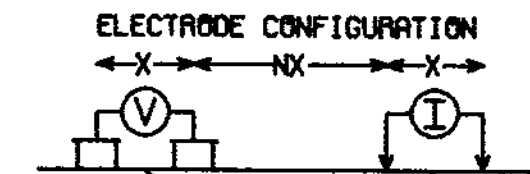
McPHAR GEOPHYSICS
INDUCED POLARIZATION AND RESISTIVITY SURVEY
NOTE: THIS PLOT WAS PRODUCED BY McPHAR COMPUTER DIVISION



MID-NORTH EXPLS., LTD. (N.P.L.)

RAG CLAIM GROUP, GREENSTONE MTN., AREA,
KAMLOOPS M.O., B.C.

LINE NO. - 2000W



PLOTTING POINT → X X = 300FT

SURFACE PROJECTION
OF ANOMALOUS ZONES

DEFINITE
PROBABLE
POSSIBLE

FREQUENCIES: 0.31-5.0 HZ

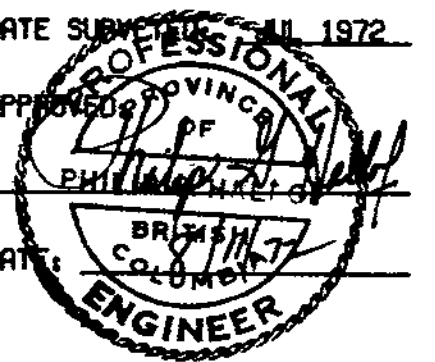
DATE SURVEYED: JUL 1972

APPROVED BY:

DATE:

Expiry Date: February 25, 1973

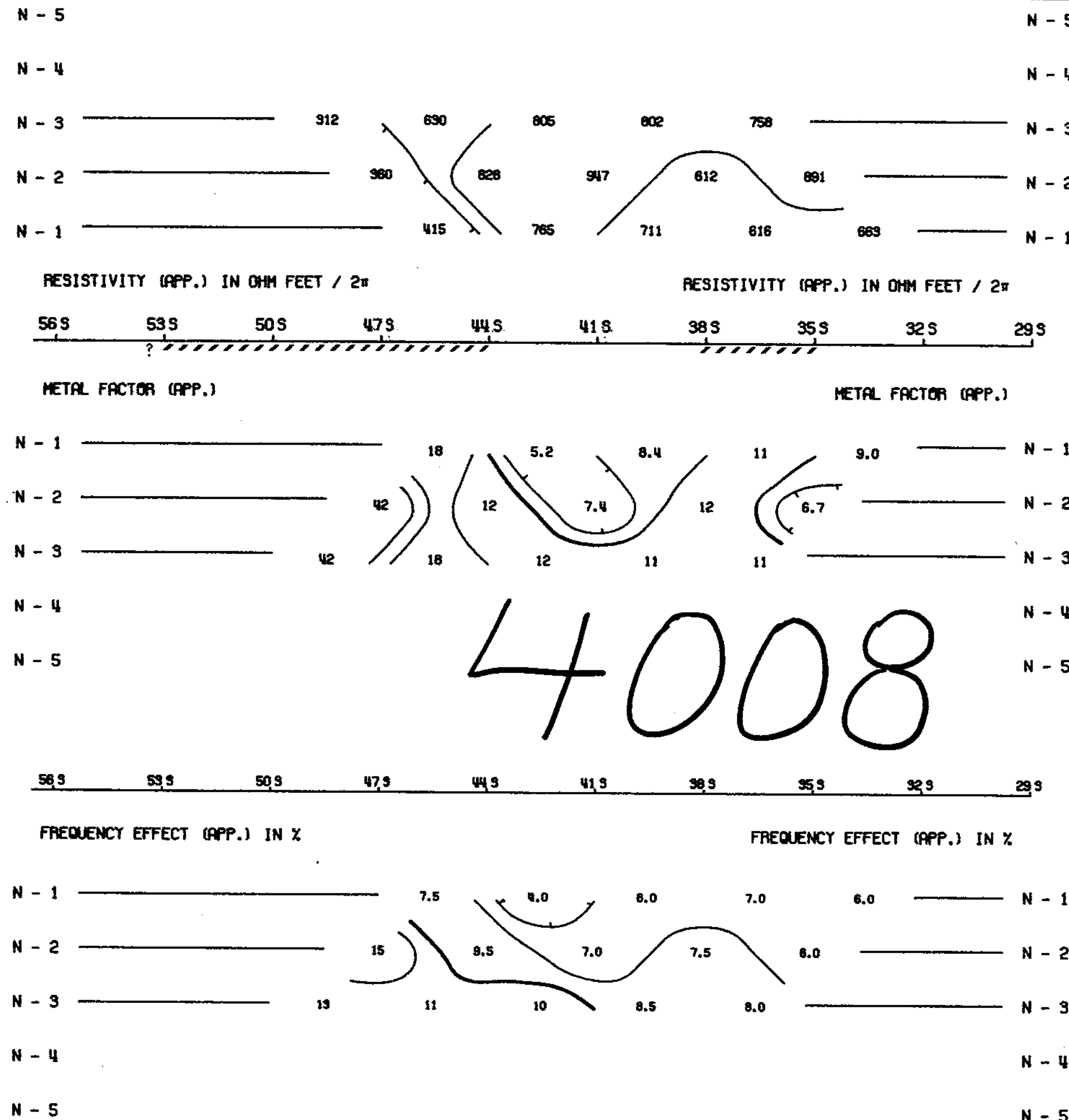
NOTE: CONTOURS AT
LOGARITHMIC INTERVALS
1.-1.5-2.-3.-5.-7.5-10



McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

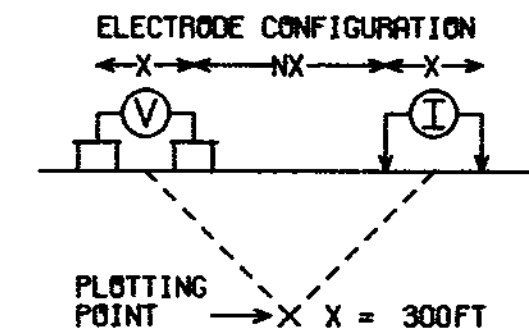
NOTE: THIS PLOT WAS PRODUCED BY McPHAR COMPUTER DIVISION



MID-NORTH EXPLS., LTD.
(N.P.L.)

RAG CLAIM GROUP, GREENSTONE MTN., AREA,
KAMLOOPS M.D., B.C.

LINE NO. - 3000W

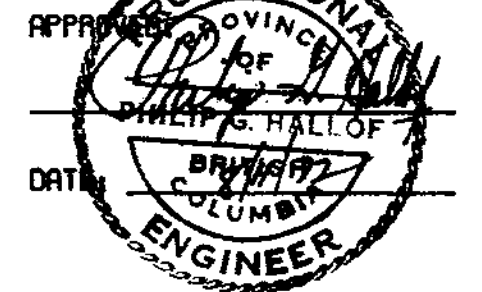


SURFACE PROJECTION
OF ANOMALOUS ZONES

DEFINITE
PROBABLE
POSSIBLE

FREQUENCIES: 0.31-5.0 HZ

DATE SURVEYED: JUL 1972



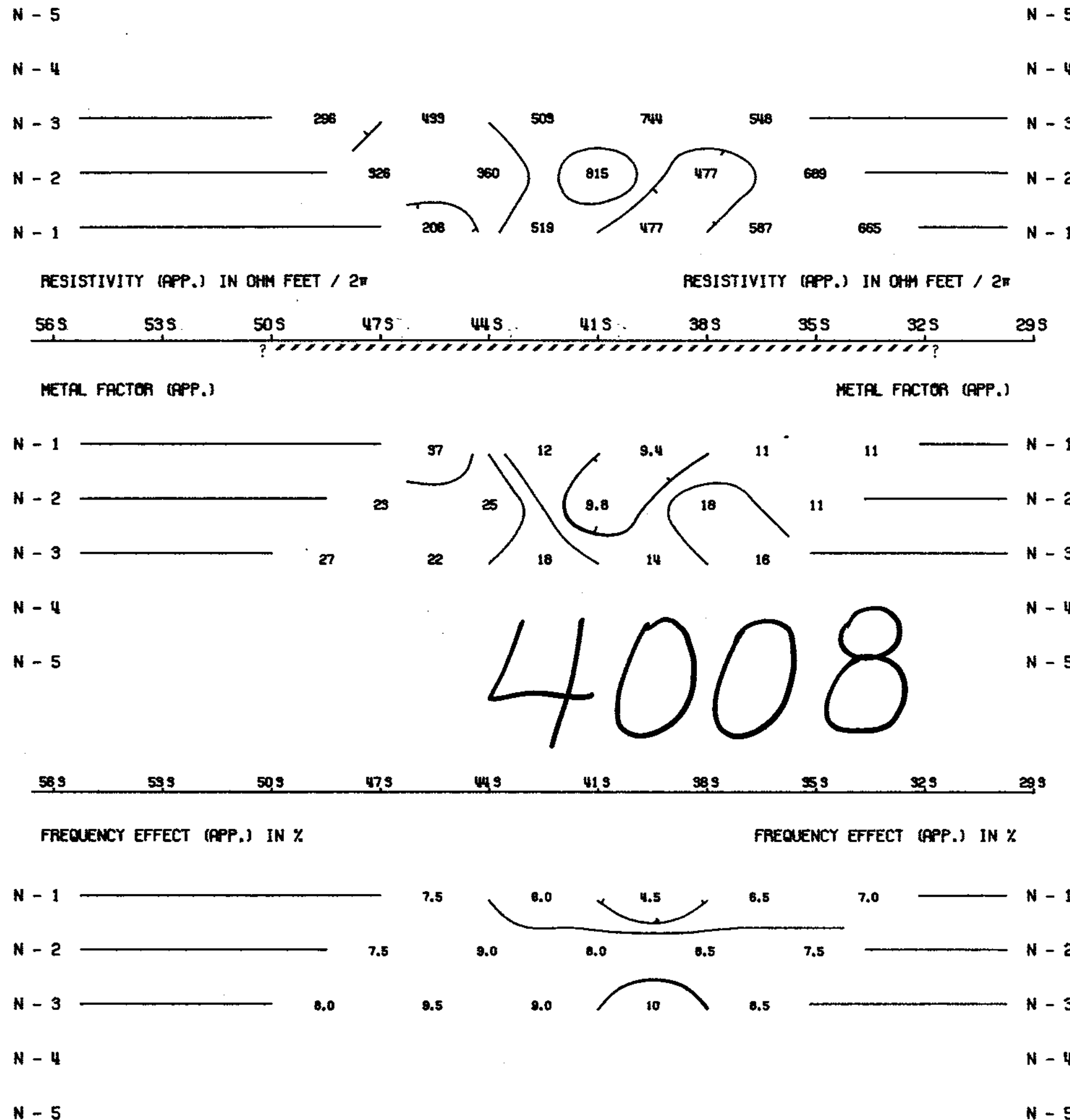
Expiry Date: February 2, 1973

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

McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

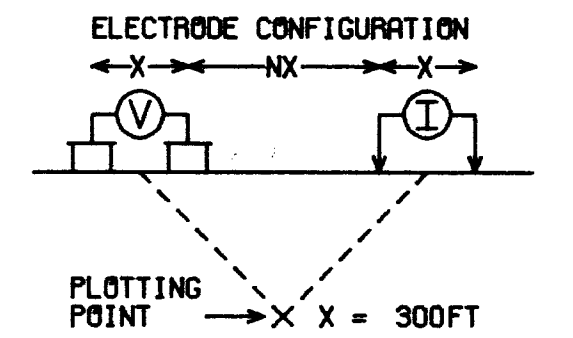
NOTE: THIS PLOT WAS PRODUCED BY McPHAR COMPUTER DIVISION



MID-NORTH EXPLS., LTD. (N.P.L.)

RAG CLAIM GROUP, GREENSTONE MTN., AREA,
KAMLOOPS M.D., B.C.

LINE NO. - 3500H



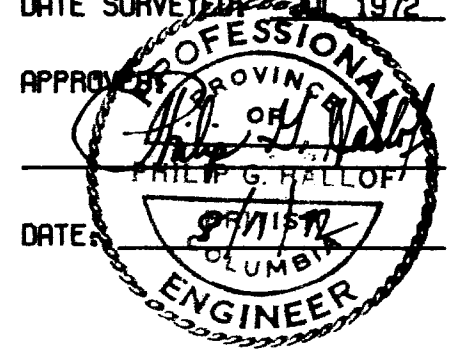
SURFACE PROJECTION
OF ANOMALOUS ZONES

DEFINITE **————**
 PROBABLE **|||||**
 POSSIBLE **////**

FREQUENCIES: 0.31-5.0 HZ

DATE SURVEYED: JUL 1972

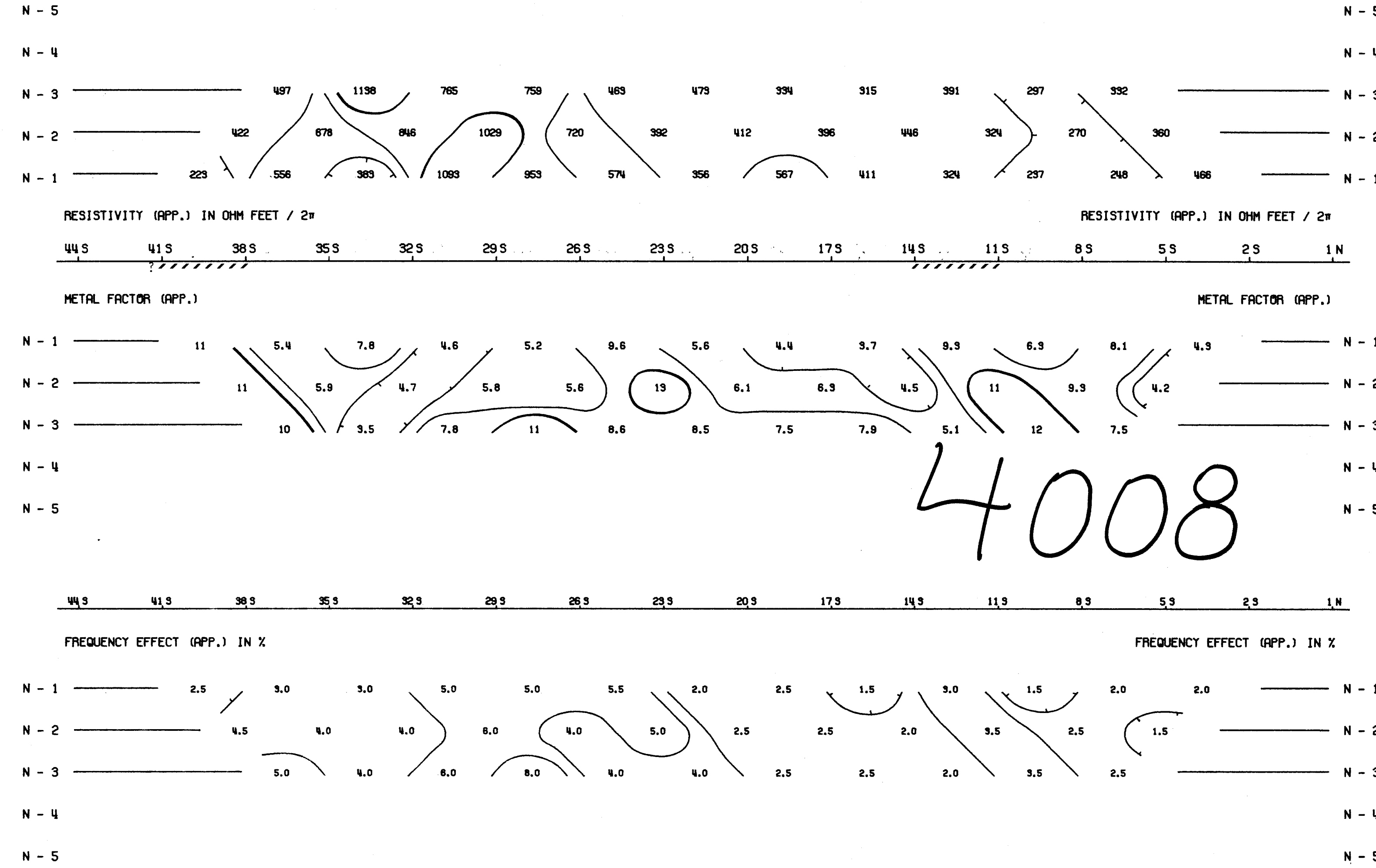
NOTE: CONTOURS AT
LOGARITHMIC INTERVALS
1.-1.5-2.-3.-5.-7.5-10



McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

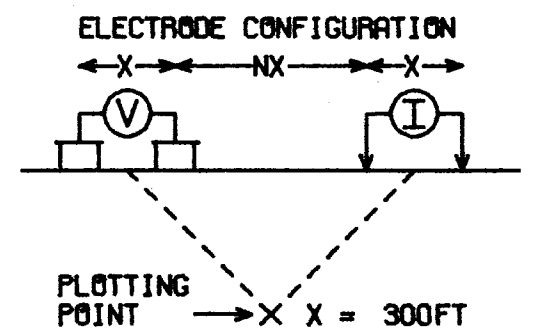
NOTE: THIS PLOT WAS PRODUCED BY MCPHAR COMPUTER DIVISION



MID-NORTH EXPLS., LTD. (N.P.L.)

RAG CLAIM GROUP, GREENSTONE MTN., AREA,
KAMLOOPS M.D., B.C.

LINE NO.- 1500N



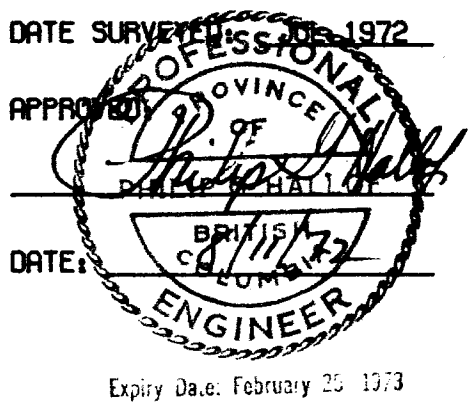
SURFACE PROJECTION
OF ANOMALOUS ZONES

DEFINITE **————**
 PROBABLE **|||||**
 POSSIBLE **////**

FREQUENCIES: 0.31-5.0 HZ

DATE SURVEYED: 1972

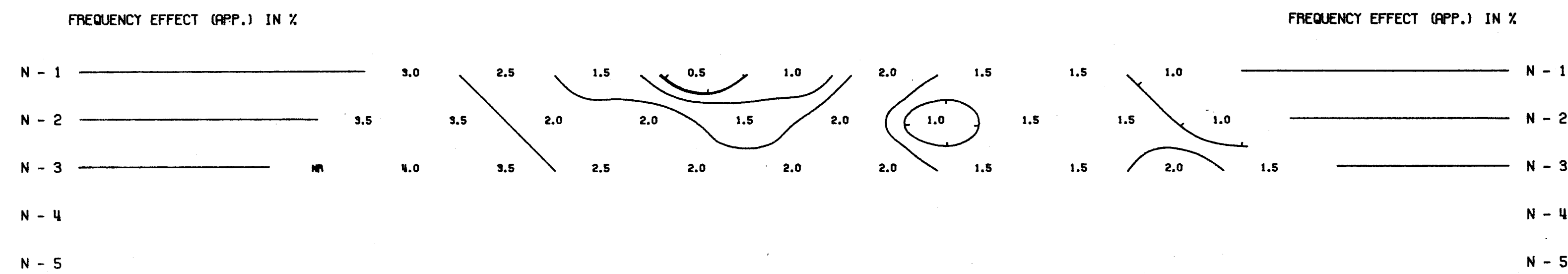
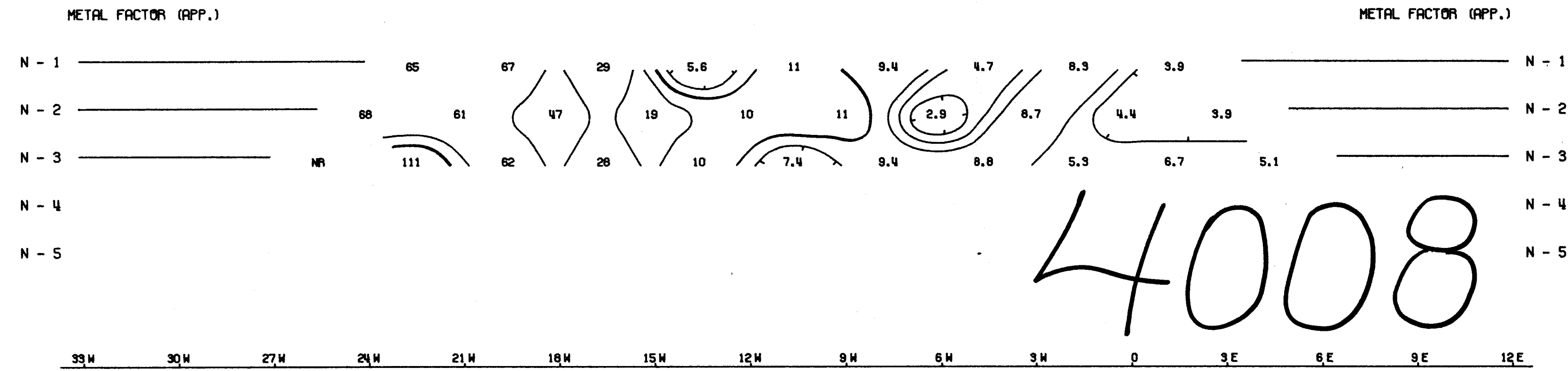
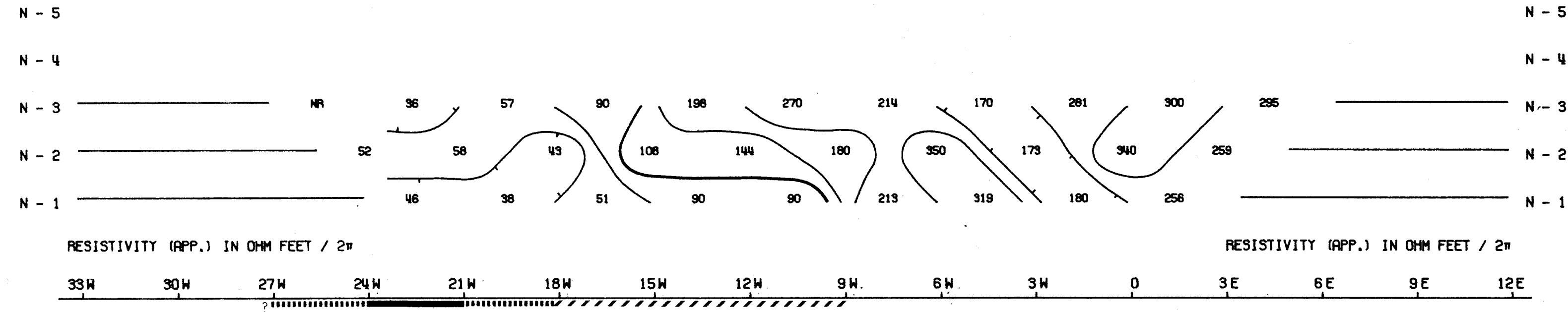
NOTE: CONTOURS AT
LOGARITHMIC INTERVALS
1.-1.5-2.-3.-5.-7.5-10



McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

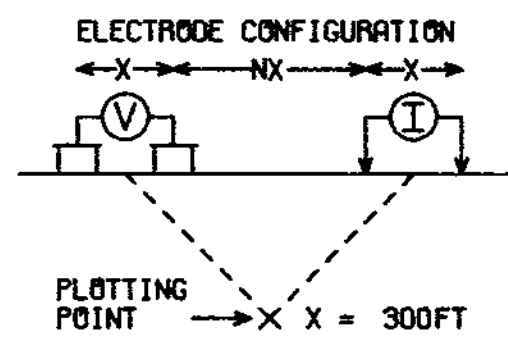
NOTE: THIS PLOT WAS PRODUCED BY McPHAR COMPUTER DIVISION



MID-NORTH EXPLS., LTD. (N.P.L.)

RAG CLAIM GROUP, GREENSTONE MTN., AREA,
KAMLOOPS M.D., B.C.

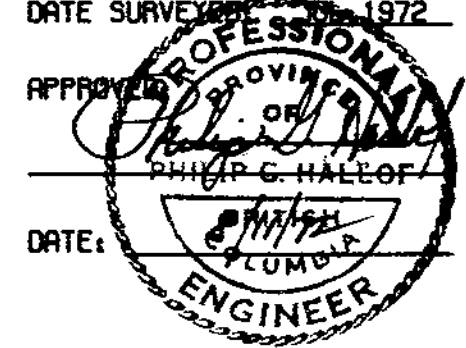
LINE NO. - 6000W



SURFACE PROJECTION
OF ANOMALOUS ZONES
 DEFINITE —————
 PROBABLE |||
 POSSIBLE / / / /

FREQUENCIES: 0.31-5.0 HZ

DATE SURVEYED: 1972

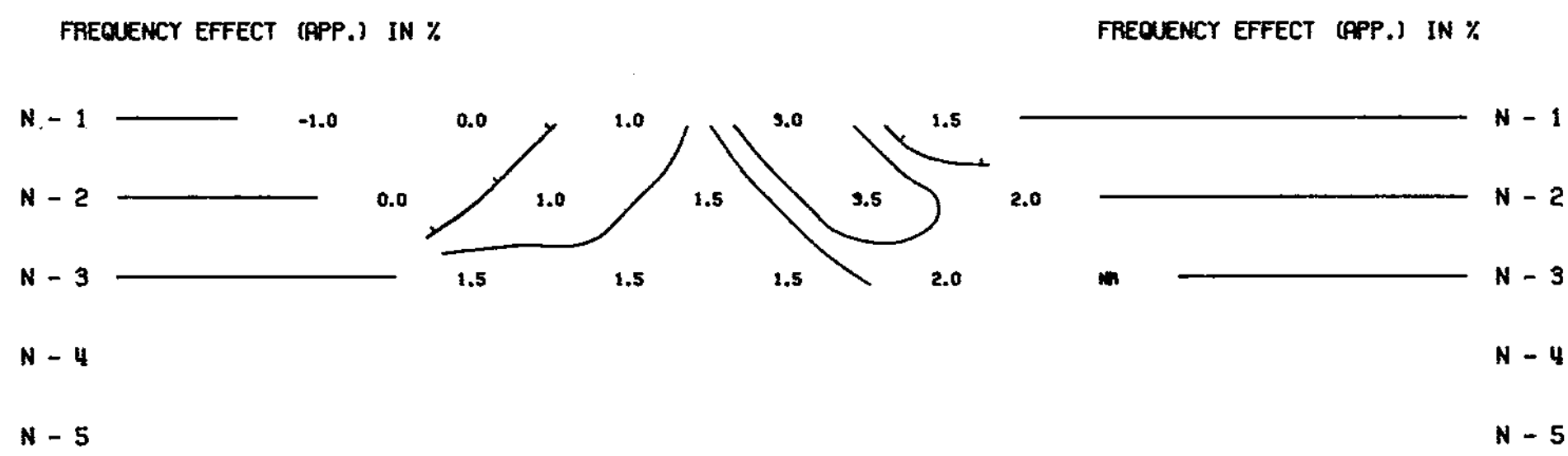
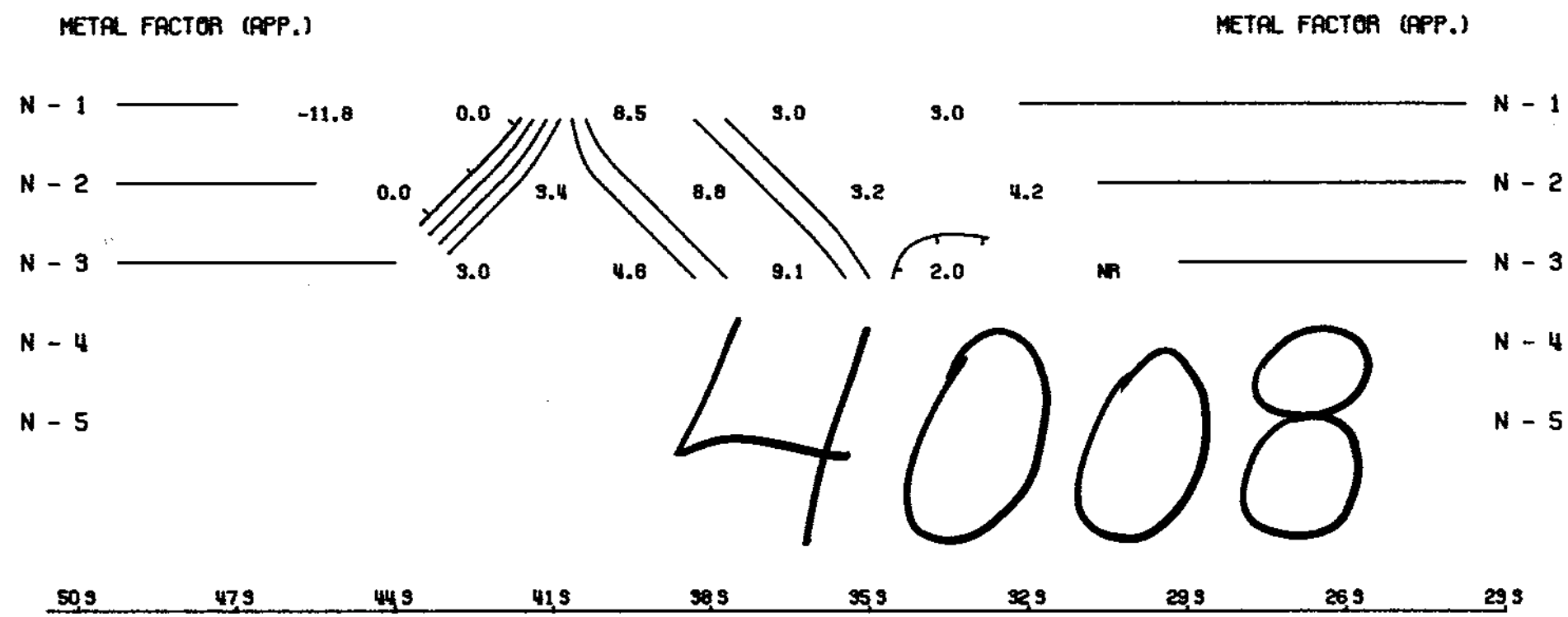
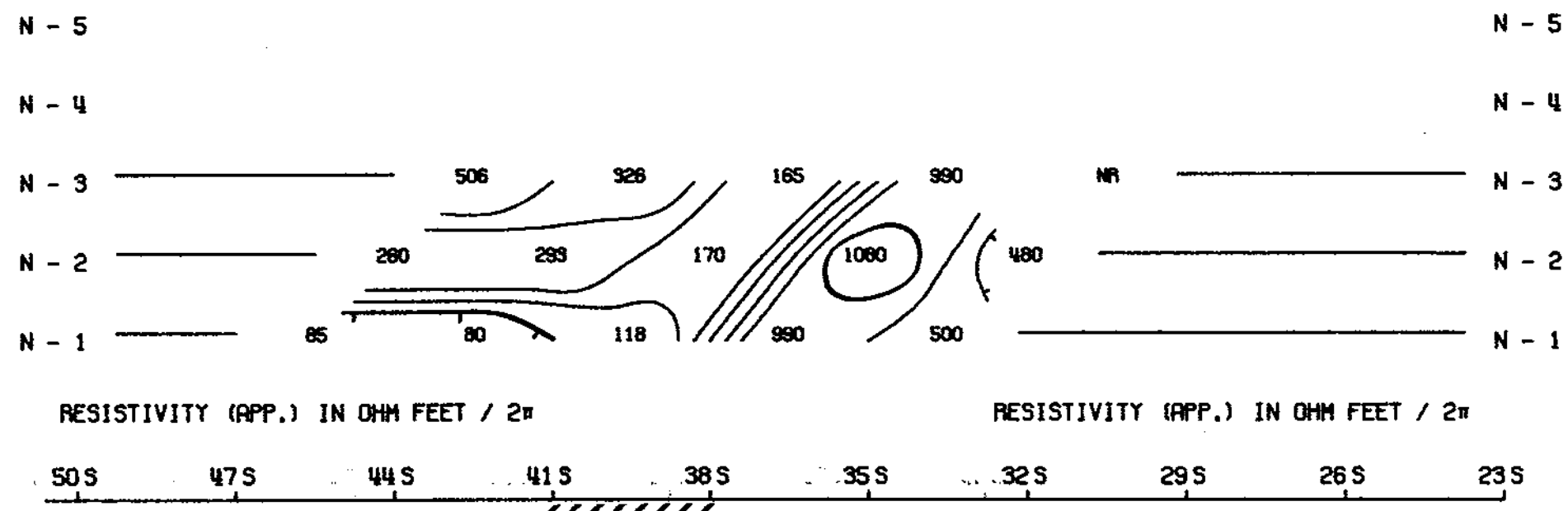


NOTE: CONTOURS AT
LOGARITHMIC INTERVALS
1.-1.5-2.-3.-5.-7.5-10

McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

NOTE: THIS PLOT WAS PRODUCED BY McPHAR COMPUTER DIVISION

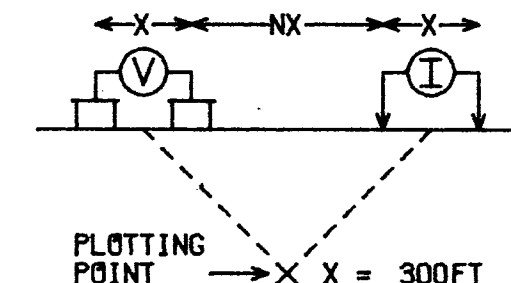


MID-NORTH EXPLS., LTD. (N.P.L.)

RAG CLAIM GROUP, GREENSTONE MTN., AREA,
KAMLOOPS M.D., B.C.

LINE NO. - B/L N

ELECTRODE CONFIGURATION

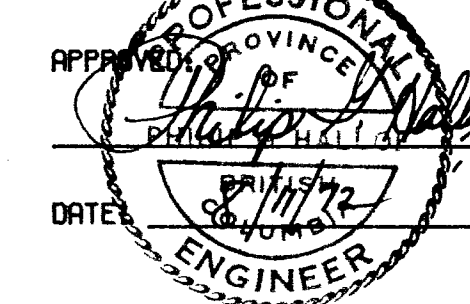


SURFACE PROJECTION
OF ANOMALOUS ZONES

DEFINITE **————**
PROBABLE **|||||**
POSSIBLE **////**

FREQUENCIES: 0.31-5.0 HZ

DATE SURVEYED: 1/11/72



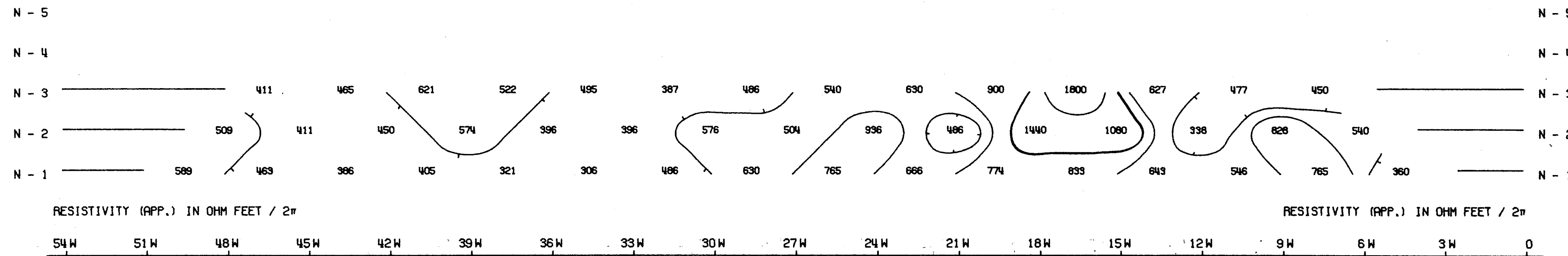
NOTE: CONTOURS AT
LOGARITHMIC INTERVALS
1.-1.5-2.-3.-5.-7.5-10

Expiry Date: February 25, 1973

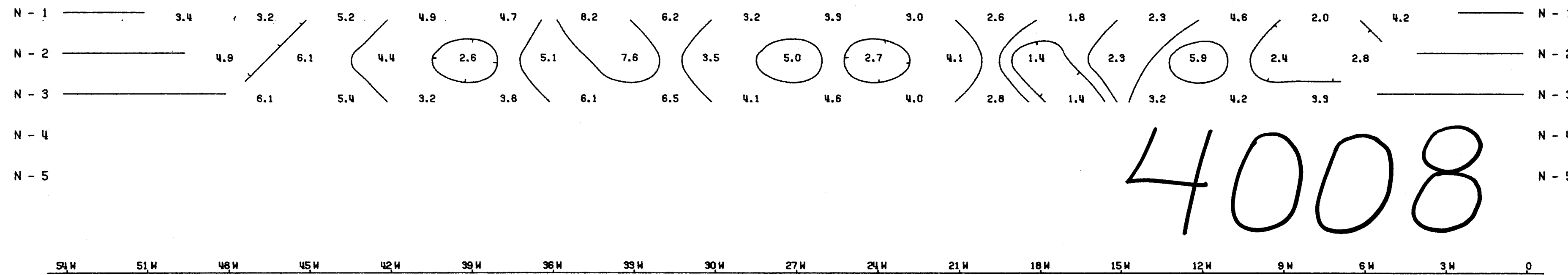
McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

NOTE: THIS PLOT WAS PRODUCED BY MCPHAR COMPUTER DIVISION

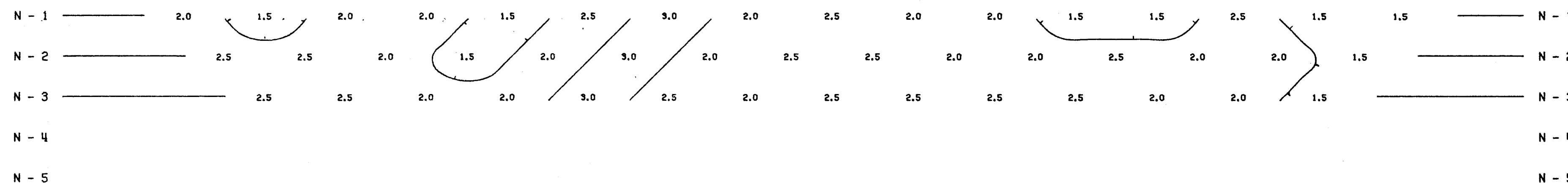


METAL FACTOR (APP.)



4008

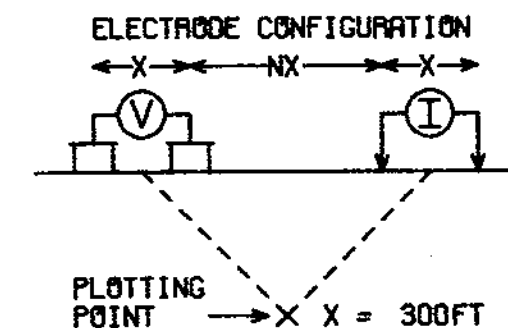
FREQUENCY EFFECT (APP.) IN %



MID-NORTH EXPLS., LTD. (N.P.L.)

RAG CLAIM GROUP, GREENSTONE MTN., AREA,
KAMLOOPS M.D., B.C.

LINE NO.- 2000N

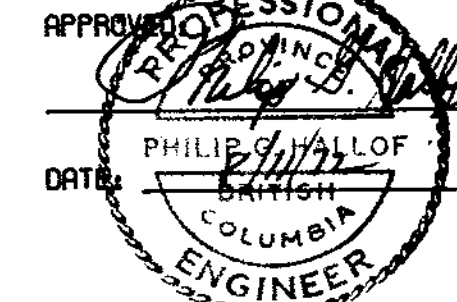


SURFACE PROJECTION
OF ANOMALOUS ZONES

DEFINITE **—————**
PROBABLE **|||||**
POSSIBLE **////**

FREQUENCIES: 0.31-5.0 HZ

DATE SURVEYED: JUL 1972



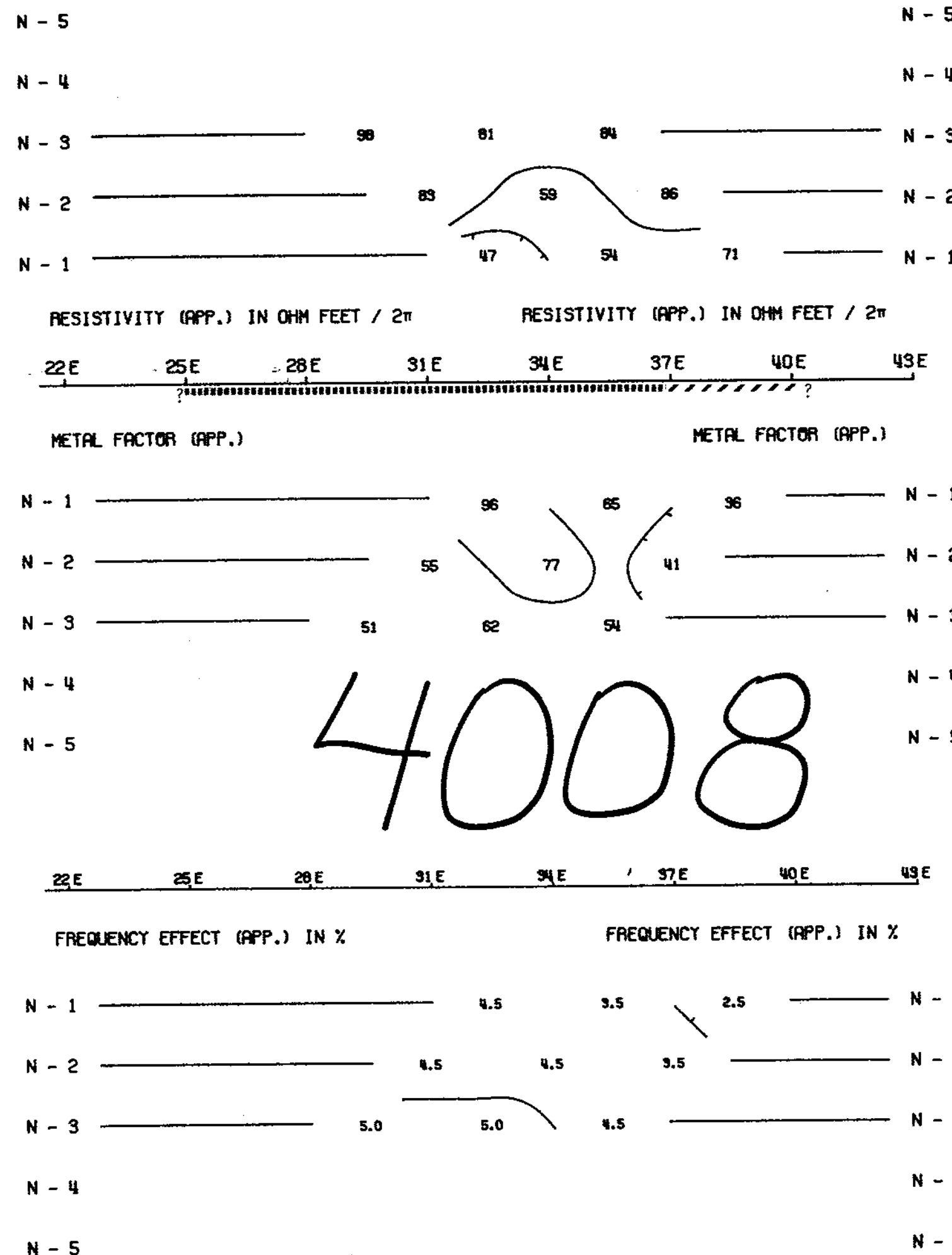
NOTE: CONTOURS AT
LOGARITHMIC INTERVALS
1.-1.5-2.-3.-5.-7.5-10

Exp. Date, February 23, 1973

McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

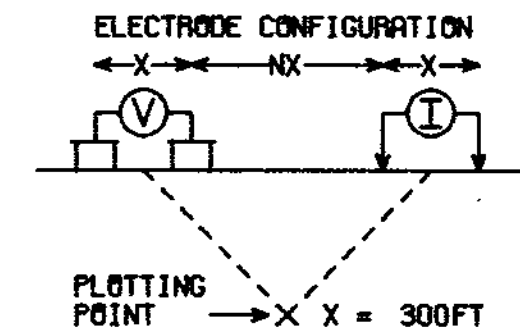
NOTE: THIS PLOT WAS PRODUCED BY McPHAR COMPUTER DIVISION



MID-NORTH EXPLS., LTD. (N.P.L.)

RAG CLAIM GROUP, GREENSTONE MTN., AREA,
KAMLOOPS M.D., B.C.

LINE NO.- 1500N



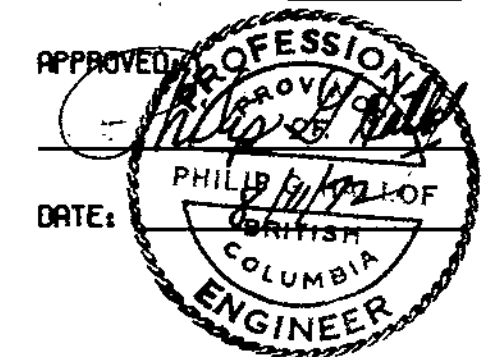
SURFACE PROJECTION
OF ANOMALOUS ZONES

DEFINITE —————
PROBABLE |||
POSSIBLE / / / /

FREQUENCIES: 0.31-5.0 HZ

DATE SURVEYED: JUN 1972

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

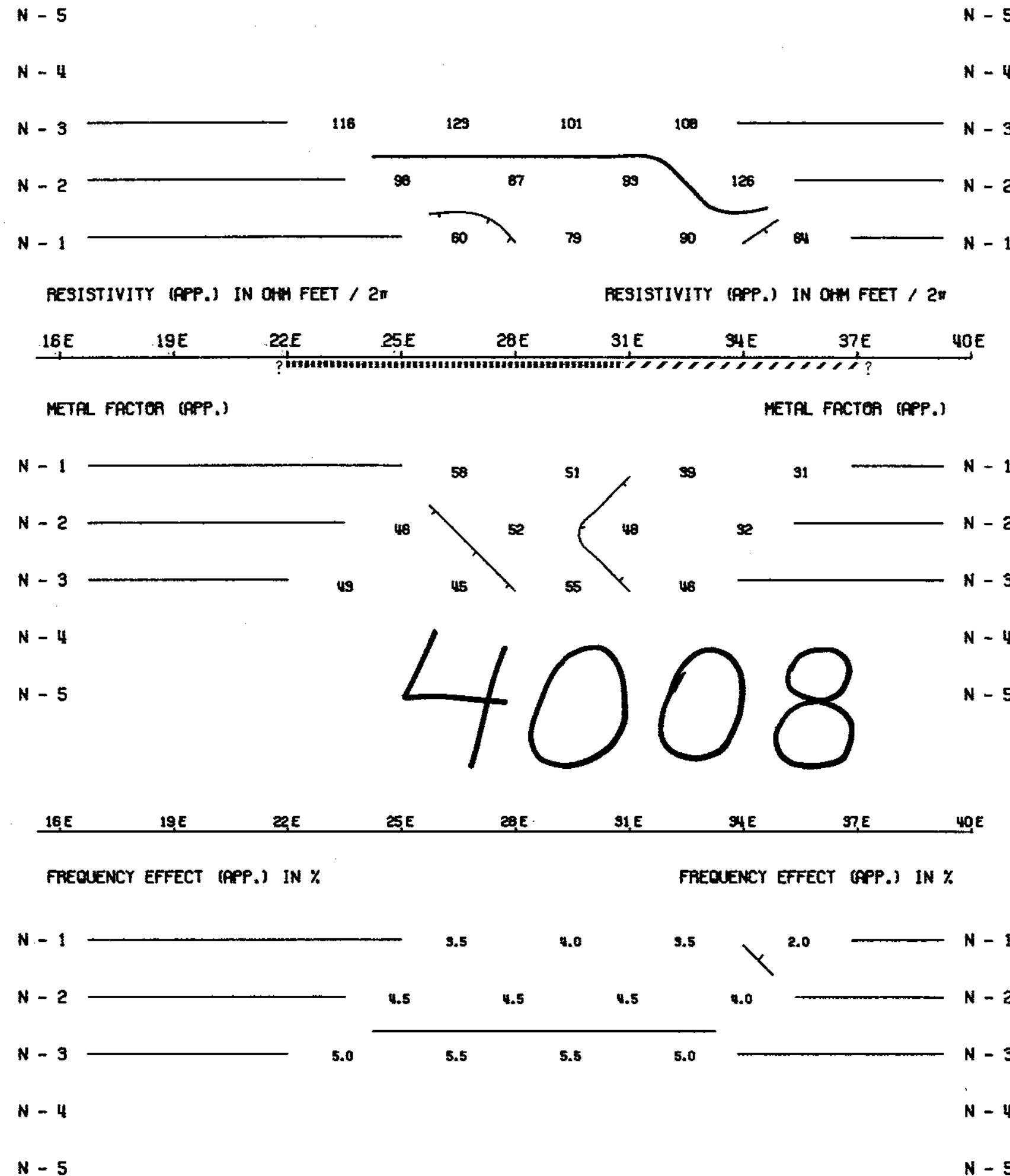


Expiry Date: February 25, 1973

McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

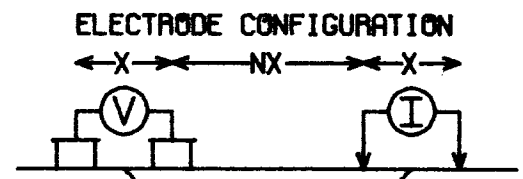
NOTE: THIS PLOT WAS PRODUCED BY McPHAR COMPUTER DIVISION



MID-NORTH EXPLS., LTD.
(N.P.L.)

RAG CLAIM GROUP, GREENSTONE MTN., AREA,
KAMLOOPS M.D., B.C.

LINE NO. - 1000N



PLOTTING POINT X X = 300FT

SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE
PROBABLE
POSSIBLE

FREQUENCIES: 0.31-5.0 HZ

DATE SURVEYED: JAN 1972

APPROVED:

DATE:

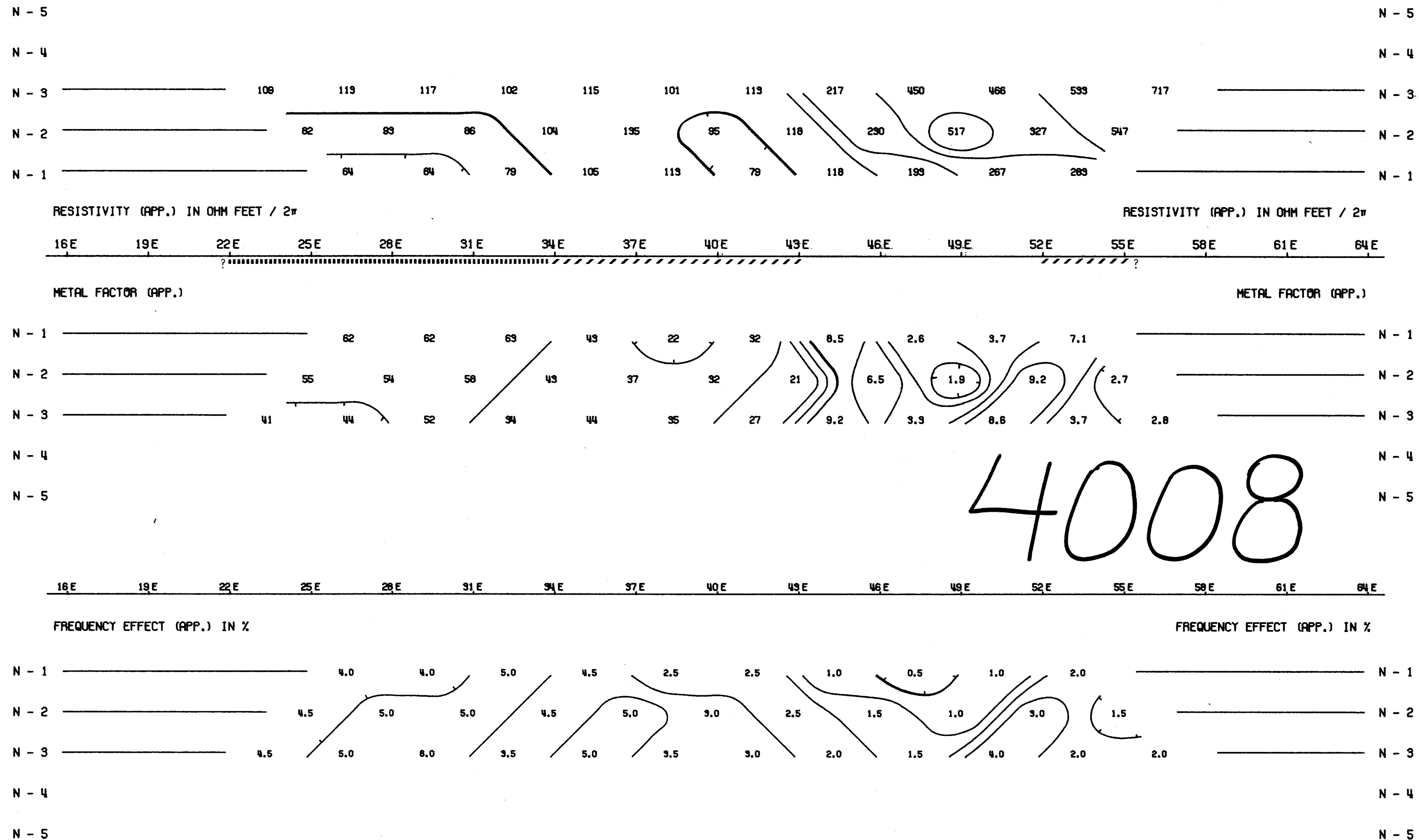
Expiry Date: February 25, 1973

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

McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

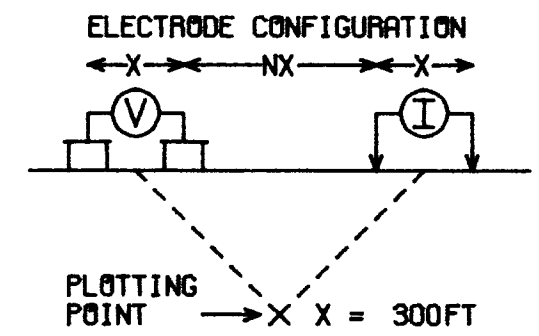
NOTE: THIS PLOT WAS PRODUCED BY McPHAR COMPUTER DIVISION



MID-NORTH EXPLS., LTD. (N.P.L.)

RAG CLAIM GROUP, GREENSTONE MTN., AREA,
KAMLOOPS M.D., B.C.

LINE NO. - 500N

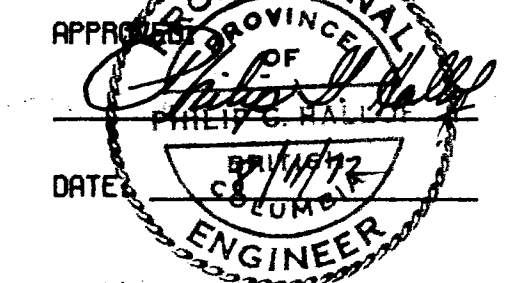


SURFACE PROJECTION
OF ANOMALOUS ZONES

DEFINITE —————
PROBABLE |||||||||
POSSIBLE / / / / /

FREQUENCIES: 0.31-5.0 HZ

DATE SURVEYED: JAN 1972



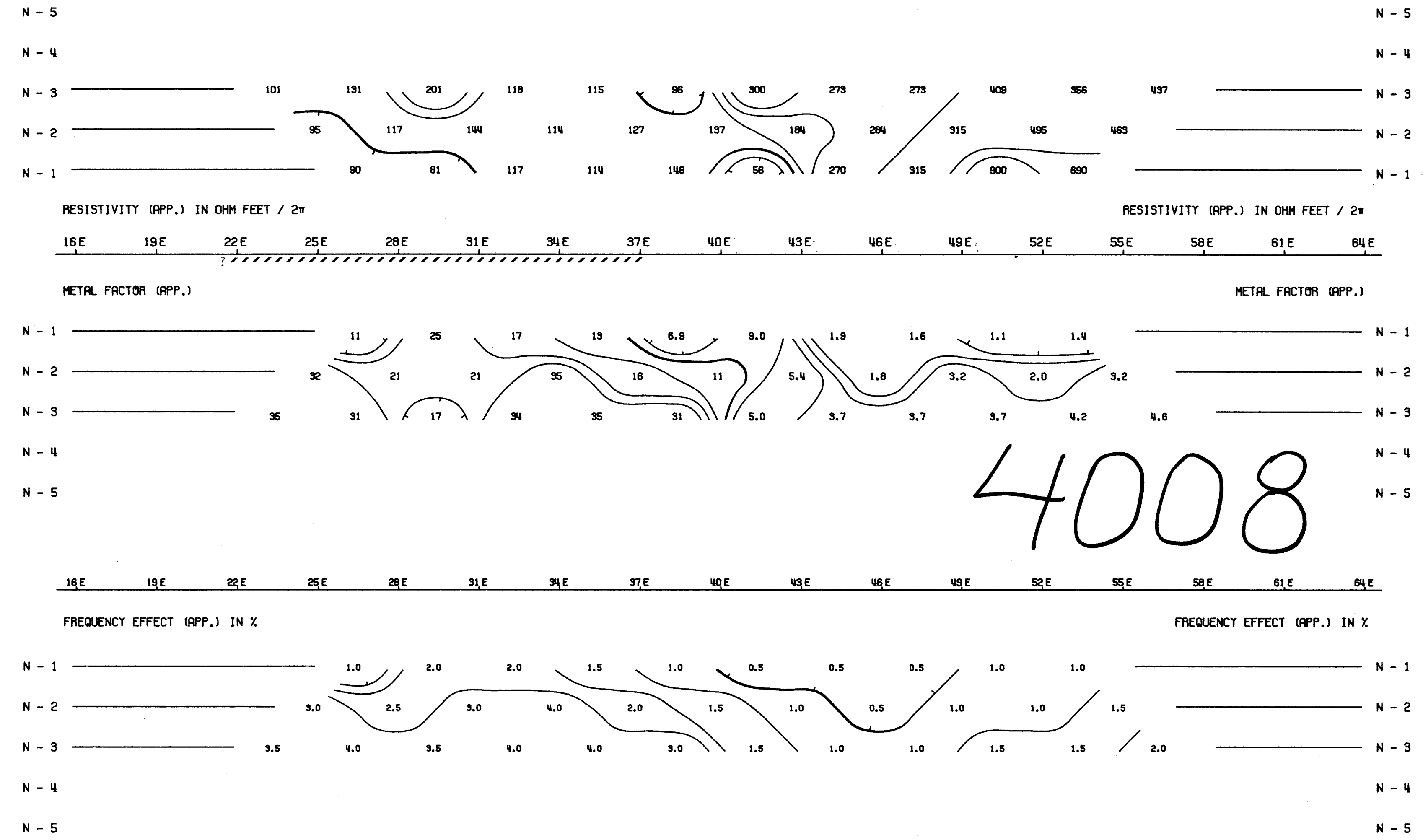
NOTE: CONTOURS AT
LOGARITHMIC INTERVALS
1.-1.5-2.-3.-5.-7.5-10

Expiry Date: February 25, 1973

McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

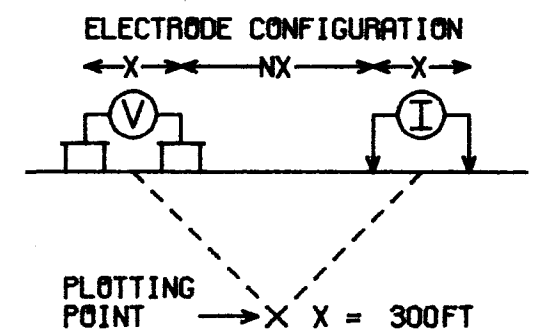
NOTE: THIS PLOT WAS PRODUCED BY McPHAR COMPUTER DIVISION



MID-NORTH EXPLS., LTD. (N.P.L.)

RAG CLAIM GROUP, GREENSTONE MTN., AREA,
KAMLOOPS M.D., B.C.

LINE NO.- 5005



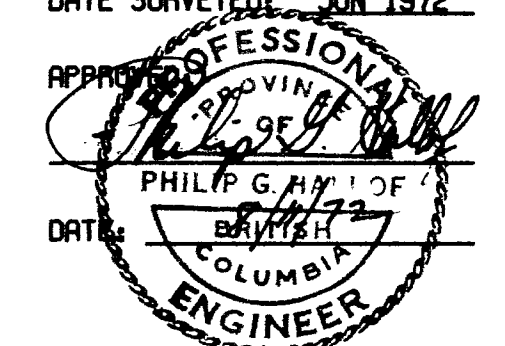
SURFACE PROJECTION
OF ANOMALOUS ZONES

DEFINITE —————
PROBABLE |||
POSSIBLE / / / /

FREQUENCIES: 0.31-5.0 HZ

DATE SURVEYED: JUN 1972

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

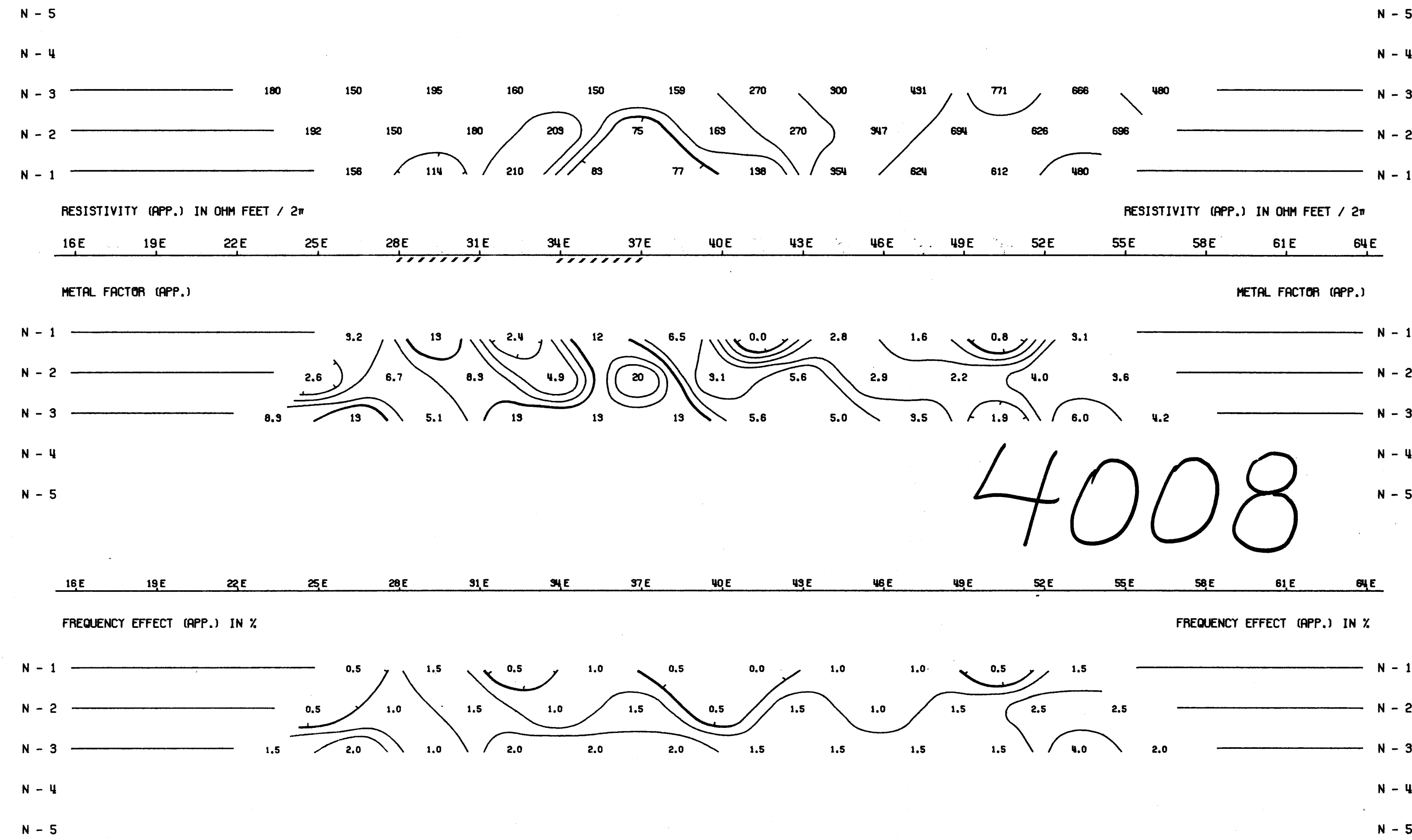


Expiry Date: February 25, 1973

McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

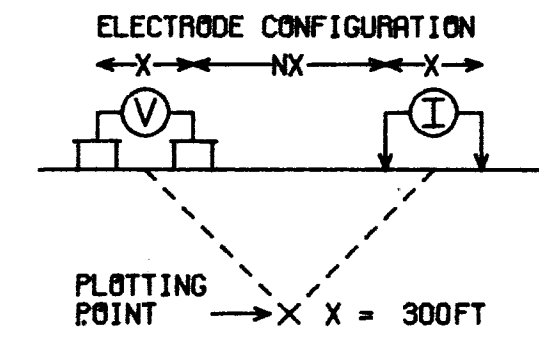
NOTE: THIS PLOT WAS PRODUCED BY McPHAR COMPUTER DIVISION



MID-NORTH EXPLS., LTD. (N.P.L.)

RAG CLAIM GROUP, GREENSTONE MTN., AREA,
KAMLOOPS M.D., B.C.

LINE NO. - 10008



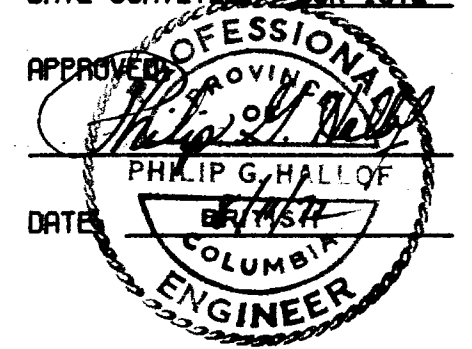
SURFACE PROJECTION
OF ANOMALOUS ZONES

DEFINITE **————**
 PROBABLE **|||||**
 POSSIBLE **////**

FREQUENCIES: 0.31-5.0 HZ

DATE SURVEYED: JUN 1972

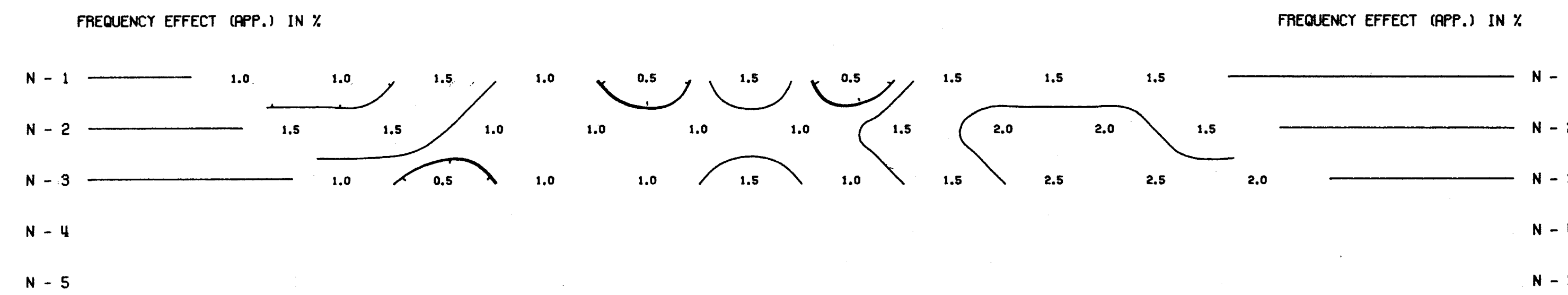
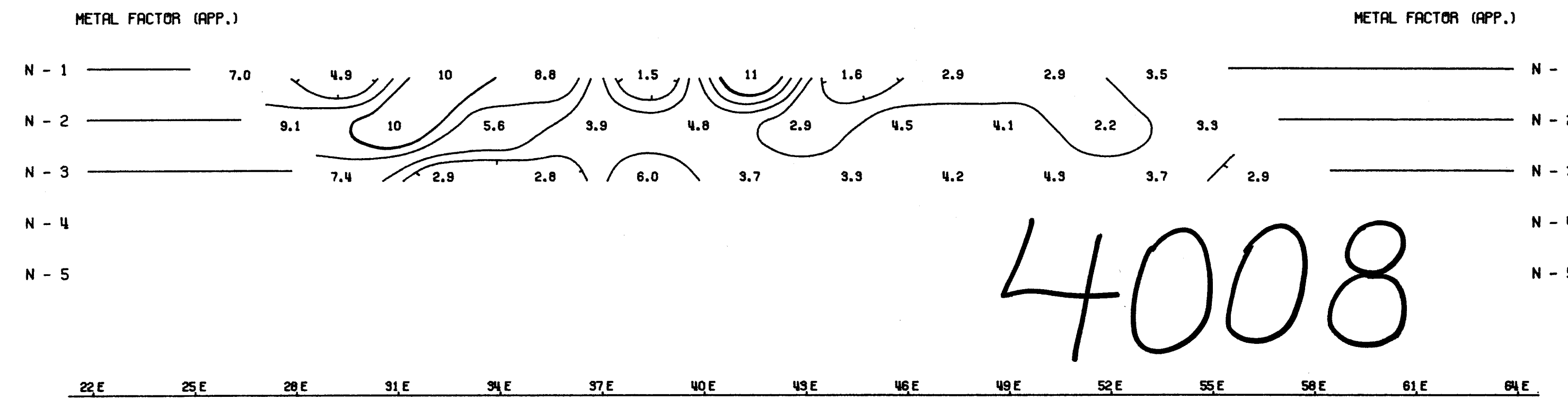
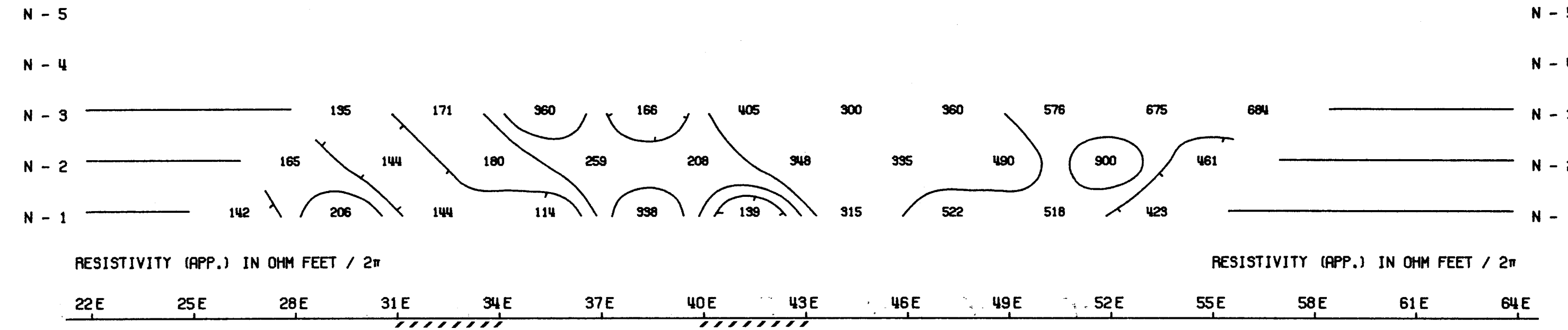
NOTE: CONTOURS AT
 LOGARITHMIC INTERVALS
 1.-1.5-2.-3.-5.-7.5-10



McPHAR GEOPHYSICS

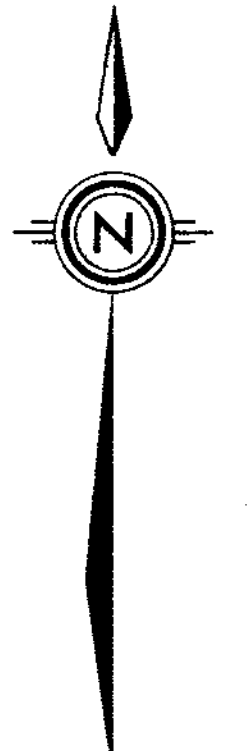
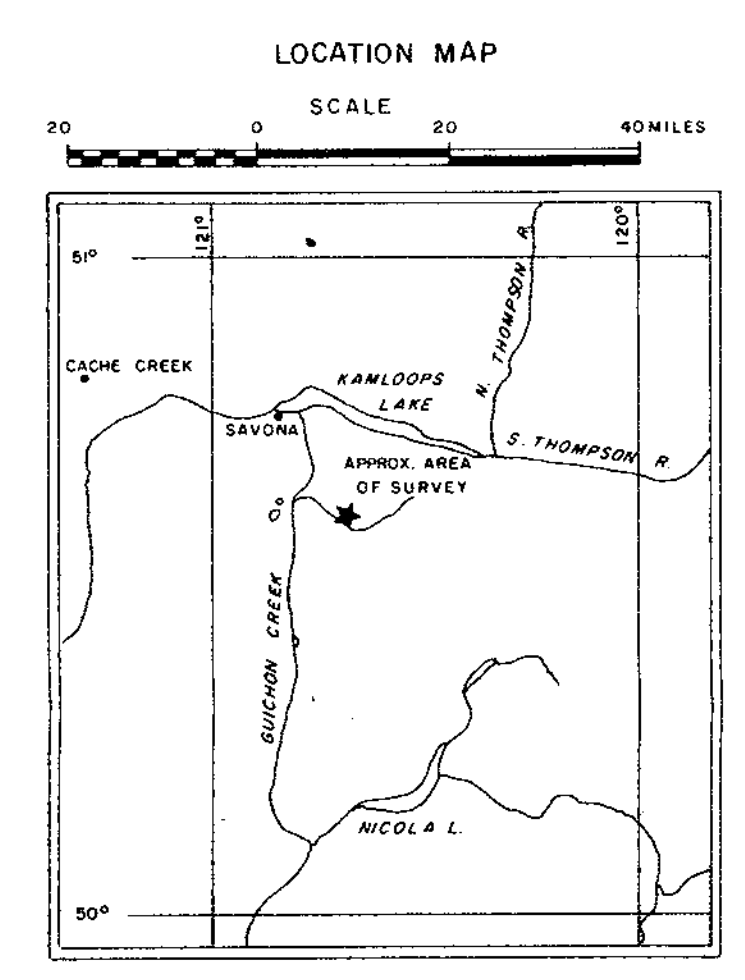
INDUCED POLARIZATION AND RESISTIVITY SURVEY

NOTE: THIS PLOT WAS PRODUCED BY McPHAR COMPUTER DIVISION



DWG. IPP-4852

McPHAR GEOPHYSICS
INDUCED POLARIZATION AND RESISTIVITY SURVEY
PLAN MAP



SURFACE PROJECTION
OF ANOMALOUS ZONES
DEFINITE
PROBABLE
POSSIBLE
Number at the end of anomaly
indicates spread used.

MID-NORTH EXPLORATIONS LTD. (N.P.L.)
RAG CLAIM GROUP, GREENSTONE MTN. AREA
KAMLOOPS M. D., B. C.
SCALE
ONE INCH EQUALS FOUR HUNDRED FEET

4008
M-1

NOTE: TO ACCOMPANY GEOPHYSICAL REPORT FOR
MID-NORTH EXPLORATIONS LTD. (N.P.L.), RAG
CLAIM GROUP, KAMLOOPS M.D. B.C. BY
P.G. HALLOF (P. ENG.) AND M.A. GOUDIE (GEOLOGIST)
DATED: AUG 11, 1972

Department of
Mines and Technical Resources
ASSESSMENT REPORT
NO. 4008 #1



DWG. IPP-4852