2389

REPORT ON 92H/16W, 9W
INDUCED POLARIZATION
AND RESISTIVITY SURVEY
ON THE
SPA MINES PROPERTY
PRINCETON AREA, SIMILKAMEEN M.D. B.C.
FOR
QUALITY EXPLORATION CORPORATION

BY

R. A. BELL, Ph.D.

DAVID K. FOUNTAIN, P.ENG.

NAME AND LOCATION OF PROPERTY:

SPA MINES PROPERTY, PRINCETON AREA

SIMILKAMEEN MINING DIVISION, B.C. 49°N, 120°W - NE

DATE STARTED: NOVEMBER 2, 1969

DATE FINISHED: NOVEMBER 21, 1969

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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 inter-
section 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 investi-
gations. 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 frequen-

cies. The voltage is the product of the current through the ground and

the apparent resistivity of the ground. Therefore in field situations

where the current is very low due to poor electrode contact, or the

apparent resistivity is very low, or a combination of the two effects; the

value of (ΔV) the change in potential will be too small to be measurable.

The symbol "TL" on the data plots indicates this situation.

In some situations spurious noise, either man made or natural,

will render it impossible to obtain a reading. The symbol "N" on the

data plots indicates a station at which it is too noisey to record a reading.

If a reading can be obtained, but for reasons of noise there is some doubt

as to its accuracy, the reading is bracketed in the data plot ( ).

In certain situations negative values of Apparent Frequency

Effect are recorded. This may be due to the geologic environment or

spurious electrical effects. The actual negative frequency effect value

recorded is indicated on the data plot, however the symbol "NEG" is

indicated for the corresponding value of Apparent Metal Factor. In contouring negative values the contour lines are indicated to the nearest positive value in the immediate vicinity of the negative value.

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

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

Fig. A

McPHAR GEOPHYSICS LIMITED

REPORT ON

INDUCED POLARIZATION

AND RESISTIVITY SURVEY

ON THE

SPA MINES PROPERTY

PRINCETON AREA, SIMILKAMEEN M.D. B.C.

FOR

QUALITY EXPLORATION CORPORATION

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1. <u>INTRODUCTION</u>

At the request of Quality Exploration Corporation, we have carried out a combined induced polarization and resistivity survey of a portion of the Spa Mines Project claims in the Princeton Area of British Columbia. The property is located 25 miles northeast of Princeton and 6 miles north of Bankier. Access is via a logging road 26 miles from Princeton on the Osprey Lake road, the total road distance being about 35 miles. The centre of the property is situated in the northeast quadrant of the one degree quadrilateral whose southeast corner is at 49° north latitude and 120° west longitude, in the Similkameen Mining Division.

A detailed geologic report prepared for the Company by Alrae Engineering Limited has been made available to us. According to this information, the western section of the property and part of the eastern section, is underlain by volcanic rocks of the Nicola Group. These consist

of acid to intermediate flows and pyroclastics. The north-central claims
are underlain by a granodiorite stock of probable Jurassic age. A younger
alkaline granite occupies the remainder of the property.

Interest in the property is related to two mineral occurrences
known as the Dillard Zone and the Mabel Zone. The Mabel Zone occurs
in the east part of the property and has a north-south trend. It consists of
chalcopyrite and specularite in a wide irregular zone within the altered
granite. Previous trenching and diamond drilling showed the presence of
copper, lead, zinc and silver.

The Dillard Zone occurs in the north-central part of the property
at the contact between the acid volcanics and granodiorite; it also has a
north-south trend. Mineralization exposed in the trenches consists of
chalcopyrite, pyrite and tetrahedrite.

The IP survey consisted of three small grids to test areas of
particular interest and was carried out with a McPhar Variable Frequency
IP unit operating at 0.3 and 5.0 cps. Field work was performed in November
1969 on the following claims:

Fix:	048, 049, 050, 051, 053, 50, 51, 53, 161, 163, 192, 192A, 193, & 193A
San:	9, 10, 11, 12 & 14
San Fraction:	2
Duke:	3
Meg:	2
P.I.	7

These claims are all located in the Similkameen Mining Division

and are assumed to be owned or held under option by Quality Exploration Corporation.

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.

a) <u>South Grid</u>

Line 176E	200 foot spreads	Dwg. IP 5371-1
Line 180E	200 foot spreads	Dwg. IP 5371-2
Line 180E	100 foot spreads	Dwg. IP 5371-3
Line 184E	200 foot spreads	Dwg. IP 5371-4

b) <u>East Grid</u>

Line 246E	200 foot spreads	Dwg. IP 5371-5
Line 248E	200 foot spreads	Dwg. IP 5371-6
Line 264E	200 foot spreads	Dwg. IP 5371-7
Line 268E	200 foot spreads	Dwg. IP 5371-8
Line 116N	200 foot spreads	Dwg. IP 5371-9

c) <u>North Grid</u>

Line 148N	200 foot spreads	Dwg. IP 5371-10
Line 152N	200 foot spreads	Dwg. IP 5371-11
Line 156N	200 foot spreads	Dwg. IP 5371-12
Line 160N	200 foot spreads	Dwg. IP 5371-13
Line 164N	200 foot spreads	Dwg. IP 5371-14

North Grid contd.

Line 164N	100 foot spreads	Dwg. IP 5371-15
Line 168N	100 foot spreads	Dwg. IP 5371-16
Line 172N	100 foot spreads	Dwg. IP 5371-17
Line 180N	200 foot spreads	Dwg. IP 5371-18
Line 184N	200 foot spreads	Dwg. IP 5371-19
Line 186N	200 foot spreads	Dwg. IP 5371-20
Line 186N	100 foot spreads	Dwg. IP 5371-21
Line 172N	200 foot spreads	Dwg. IP 5371-22

Enclosed with this report are Dwgs. I. P. P. 2839-1 to -3 of the South Grid, East Grid, North Grid and location maps of the survey area at a scale of 1" = 2000' and 1" = 4 miles. The definite and possible induced polarization anomalies are indicated by solid and broken bars respectively on this plan map as well as the data plots. These bars represent the surface projection of the anomalous zones as interpreted from the location of the transmitter and receiver electrodes when the anomalous values were measured.

Since the induced polarization measurement is essentially an averaging process, as are all potential methods, it is frequently difficult to exactly pinpoint the source of an anomaly. Certainly, no anomaly can be located with more accuracy than the spread length; i.e. when using 200' spreads the position of a narrow sulphide body can only be determined to lie between two stations 200' apart. In order to locate sources at some depth, larger spreads must be used, with a corresponding increase in the uncertainties of location. Therefore, while the centre of the indicated anomaly probably corresponds fairly well with source, the length of the indicated anomaly along

NORTH   GRID
I.P.P.   2839-3

B/L – 172 E

EAST   GRID
I.P.P.   2839-2

B/L – 256 E

B/L – 85 N

SOUTH   GRID
I.P.P.   2839-1

GRID LOCATION

QUALITY   EXPLORATION   CORPORATION

SPA MINES PROJECT, PRINCETON AREA, SIMILKAMEEN M.D., B.C.

SCALE

1" = 2,000'

D N H 1970

4a

LOCATION MAP

QUALITY EXPLORATION CORPORATION

SPA MINES PROJECT, PRINCETON AREA, SIMILKAMEEN M.D., B.C.

SCALE

ONE INCH EQUALS FOUR MILES

D N H 1970

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the line should not be taken to represent the exact edges of the anomalous material.

The location of survey lines relative to claim boundaries, the names and relative position of the claims, and the geologic data indicated on the maps and discussed in the report, is based upon maps prepared by Alrae Engineering Limited.

3. DISCUSSION OF RESULTS

a) South Grid

Three lines were surveyed in the south-central part of the property, on the Fix claims. According to the geological report prepared by Alrae Engineering Limited, this area is underlain by alkaline granite.

Line 176E

Above background IP effects were measured on three sections of this line. The anomalies are quite weak but they could represent minor disseminated mineralization of possible interest as illustrated in the Appendix.

Line 180E

Similar results were obtained on this traverse but detailing with 100 foot electrode intervals indicates that most of the features are narrow and weak. A possible exception is the anomaly at 88N; the pattern is incomplete and the data would have to be extended to permit a more complete evaluation.

Line 184E

Shallow weak anomalies occur at 76N to 78N and 84N to 86N.

b) <u>East Grid</u>

Five lines were surveyed on the northeast part of the property, covering the northern extension of the Mabel Zone. This section is underlain by a north-south trending zone of altered granite.

<u>Line 246E</u>

A low magnitude, but fairly definite anomaly, was found at 118N. The source is shallow relative to the 200 foot electrode interval and therefore detailing with shorter spreads would be warranted.

<u>Line 248E</u>

Above background IP effects were measured on the wide separations (i.e. n = 3) from at least 113N to 117N, indicating either a deep source or an "off the end" effect.

<u>Line 264E</u>

A single anomalous reading was obtained at station 118N on this line.

<u>Line 268E</u>

Shallow weak anomalies were found at 109N and 117N. Detailing with shorter spreads is indicated in both cases.

<u>Line 116N</u>

Here there is a shallow definite anomaly at 246E to 248E which would appear to correlate with the feature on Line 246E.

A stronger anomaly, with some depth to the top of the source, occurs at 252E to 254E. Additional lines are needed to delimit this anomaly.

c) <u>North Grid</u>

An extensive grid was surveyed in the vicinity of the Dillard Zone, which occurs at the contact between a granodiorite stock and acid volcanics of the Nicola Group.

<u>Line 148N</u>

A definite anomaly, with some depth to the top, occurs at 170E to 172E. This appears to correlate with anomalies on Line 152N and Line 172E.

There is also a definite anomaly at the east end of the line that may represent the southern continuation of the Dillard Zone, but the data does not extend far enough east to complete the pattern.

<u>Line 152N</u>

Here there is a probable deep source centred at 172E to 174E, correlating with a more definite anomaly on the preceding line. Again the effective survey coverage does not extend far enough to the east.

<u>Line 156N</u>

On this line there is a definite deep anomaly at 178E to 180E, with a weaker extension to the east.

<u>Line 160N</u>

This traverse is at the south end of the area of trenching and was surveyed using 100 foot electrode intervals. The results indicate a broad zone of weak mineralization from at least 180E to 185E, with a stronger section at the eastern edge from 182E to 185E.

Line 164N

The 200 foot data shows a strong shallow anomaly at 180E to 182E, coincident with the showing, within a wide zone of weaker effects. The results of the detail traverse, using 100 foot spreads, indicate two sources within this zone, a deeper one at 180E to 181E and a shallow one at 184E to 185E.

Line 168N

A complex anomalous response was obtained throughout the length of this short traverse, with stronger sections at 179E at depth, from 181E to 182E and from 184E to 185E.

Line 172N

Similar results were found here, including a shallow definite anomaly centred at 179E.

Line 180N

Anomalous effects at the east end of the line indicate that the Dillard Zone is still continuing but the data does not extend far enough east to complete the pattern.

Line 184N

This traverse was extended farther east than the other lines and the results indicate that the complex mineralized zone extends from 178E to 196E. The magnitude of the Metal Factor values is quite variable, with stronger sections at 178E to 180E and from 184E to 196E.

Line 186N

On this short line the results obtained with 200 foot dipoles

indicate a possible weak anomaly at 172E and a more definite anomaly at 178E to 180E.

Subsequently the data was extended to the east using 100 foot dipoles. Anomalous effects were obtained on the wide separations from about 188E to at least 195E, indicating a wide deep zone of weak mineralization. The near-surface resistivities are higher here than on the lines to the south, suggesting a change in rock type.

Line 172E

A definite anomaly occurs at 150N to 152N, with a deeper extension to the south. This feature correlates with anomalies on Line 148N and Line 152N. Several weak anomalies were found on other parts of the line but these do not appear to be of prime interest.

4. SUMMARY AND RECOMMENDATIONS

No strong anomalies were found on the South Grid but there are weak IP effects on all three lines. Their importance is difficult to assess in view of the limited amount of work in this area. If the geology indicates the possible presence of disseminated copper mineralization, with little or no pyrite, the grid should be expanded in order to delimit the anomalies.

On the East Grid there appears to be a northwest-trending zone crossing Line 246E, Line 116N and Line 248E. There is also a definite anomaly on the central part of Line 116N. A more extensive grid of east-west lines should be surveyed to trace out these features.

Definite anomalies were found on almost every line on the North Grid and most of these can be correlated into a broad north-south zone

extending through the Dillard workings. Several of the traverses should be extended farther east as the anomaly patterns are incomplete. Drilling seems to be warranted on either Line 164N or Line 168N and should consist of a cross-section of two or three inclined holes.

A drill hole may also be warranted to test the definite anomaly at 170E to 172E on Line 148N, but additional traverses are required to trace out the southern extension of this subsidiary zone. The geophysical results in this area should be compared closely with the geology. Experience in the area has indicated that anomalous IP responses are often obtained in the Nicola Volcanics due to finely disseminated pyrite and magnetite of no economic significance.

McPHAR GEOPHYSICS LIMITED

Robert A. Bell,
Geologist.

David K. Fountain,
Geophysicist.

D. K. FOUNTAIN
BRITISH
COLUMBIA

Expiry Date: April 25, 1970

Dated: January 15, 1970

ASSESSMENT DETAILS

PROPERTY: Spa Mines

MINING DIVISION: Similkameen

SPONSOR: Quality Exploration Corporation

PROVINCE: British Columbia

LOCATION: Princeton Area

TYPE OF SURVEY: Induced Polarization

OPERATING MAN DAYS: 40

DATE STARTED: Nov. 2, 1969

EQUIVALENT 8 HR. MAN DAYS: 60

DATE FINISHED: Nov. 21, 1969

CONSULTING MAN DAYS: 3

NUMBER OF STATIONS: 251

DRAUGHTING MAN DAYS: 7

NUMBER OF READINGS: 1840

TOTAL MAN DAYS: 70

MILES OF LINE SURVEYED: 7.25

CONSULTANTS
Robert A. Bell, 50 Hemford Crescent, Don Mills, Ontario.
David K. Fountain, 44 Highgate Road, Toronto 18, Ontario.

FIELD TECHNICIANS
P. Mark, 26 Columbine Avenue, Toronto 8, Ontario.
Plus 4 helpers:
Herbert Langlais, 6105 S.E. Marine Drive, Burnaby, B.C.
William Murray, General Delivery, Kamloops, B.C.
Raymond Janvier, Box 235, Rutland, B.C.
Paul Hanson, 354 Sherbrook Street, New Westminster, B.C.

DRAUGHTSMEN:
P. Coulson, 77 Peter Street, Markham, Ontario.
D. Holmes, 42 Langborne Place, Don Mills, Ontario.
B. Marr, 19 Kenewen Court, Toronto 16, Ontario.

McPHAR GEOPHYSICS LIMITED

Robert A. Bell

Robert A. Bell,
Geologist.

Dated: January 19, 1970

STATEMENT OF COST

Quality Exploration Corporation

Spa Mines

Crew (1 man)

10 days Operating	@ $220.00/day	$2,100.00
4 days Travel)		
1 day Bad Weather) 6 days	@ $85.00/day	510.00
1 day Standby)		
3 days Breakdown		N. C.

Extra Labour — 1,253.00

Service Charge - 20% — 250.60

Expenses

Rented Vehicles	$ 866.00
Taxis	14.80
Meals and Accommodation	233.50
Telephone and Telegraph	8.25
Supplies	17.05
	1,139.60
Service Charge - 10%	113.96

1,253.56

$5,367.16

McPHAR GEOPHYSICS LIMITED

Robert A. Bell,

Robert A. Bell,
Geologist.

Dated: January 19, 1970

see reverse for declaration →

CERTIFICATE

I, Robert Alan Bell, of the City of Toronto, Province of Ontario, do hereby certify that:

1.   I am a geologist residing at 50 Hemford Crescent, Don Mills, (Toronto) Ontario.

2.   I am a graduate of the University of Toronto in Physics and Geology with the degree of Bachelor of Arts (1949); and a graduate of the University of Wisconsin in Economic Geology with the degree of Ph. D. (1953).

3.   I am a member of the Society of Economic Geologists and a fellow of the Geological Association of Canada.

4.   I have been practising my profession for over fifteen 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 Quality Exploration Corporation 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 15th day of January, 1970

Robert A. Bell, Ph. D.

CERTIFICATE

I, David Kirkman Fountain, of the City of Toronto, Province of Ontario, do certify that:

1.   I am a geophysicist residing at 44 Highgate Road, Toronto 18, Ontario.

2.   I am a graduate of the University of Toronto with a Bachelor of Applied Science Degree in Engineering Physics (Geophysics).

3.   I am a member of the Society of Exploration Geophysicists, the European Association of Exploration Geophysicists and the Canadian Institute of Mining and Metallurgy.

4.   I am a registered Professional Engineer in the Province of British Columbia and Ontario, and have been practising my profession for eight 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 Quality Exploration Corporation 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 15th day of January, 1970

David Kirkman Fountain B.A.Sc. P.Eng.

Expiry Date: April 20, 19

McPHAR GEOPHYSICS

APPENDIX

EXPECTED IP ANOMALIES FROM "PORPHYRY COPPER" TYPE
ZONES OF DISSEMINATED SULPHIDE MINERALIZATION

Our experience in other areas has shown that the induced polarization method can be successfully used to locate, and outline, zones of disseminated sulphide mineralization of the "porphyry copper" type. In most cases the interpretation of the IP results is simple and straightforward. The results shown in Figure 1 and Figure 2 are typical.

INDUCED POLARIZATION
AND
DRILLING RESULTS
FROM
COPPER MOUNTAIN AREA
GASPE, QUEBEC

LINE - 31 N

FREQUENCIES - 0.31 & 2.5 CPS.

X EQUALS 300 FEET

FIG. I

The source of the moderate magnitude IP anomaly shown in Figure 1 contains approximately 4% metallic mineralization. The zone is of limited lateral extent and enough copper is present to make the minerali- zation "ore grade". The presence of the surface oxidation can be seen in the fact that the apparent IP effects increase for n = 2.

INDUCED POLARIZATION AND DRILLING RESULTS FROM WESTERN NEW MEXICO U.S.A.

LINE - 40 W

FREQUENCIES - 0.31 & 2.5 CPS.

X EQUALS 200 FEET

FIG. 2

The IP anomaly shown in Figure 2 has about the same magnitude as that described above. It should be noted that appreciably greater con- centrations of metallic mineralization are present; further, there is little or no copper present. These results illustrate the fact that IP results can not be used to determine the exact amount of metallic mineralization present or to determine the economic importance of a mineralized zone. In some geologic situations zoning is present; the zones of mineralization of greatest economic value may contain less total metallic mineralization than other zones in the same general area.

In the proper geologic environment, the method will detect even very low concentrations of metallic mineralization. The IP results shown in Figure 3 located the ore zone at the Brenda Property near Peachland, B.C. The zone contains 1.0 to 1.5 per cent metallic mineralization; however, the mineralization is "ore grade" because only molybdenite and chalcopyrite are present.

FIG.3

QUALITY EXPLORATION CORPORATION

SPA MINES PROJECT

PRINCETON AREA, SIMILKAMEEN, M.D., B.C.

LINE NO.- 176E

RESISTIVITY (APP.) IN OHM FEET / 2π

	N-5	N-4	N-3	N-2	N-1

Row N-3: 127 187 233 247 158 214

Row N-2: 194 152 256 258 230 205 260

Row N-1: 152 180 178 205 247 258 190 380

RESISTIVITY (APP.) IN OHM FEET / 2π

70N 72N 74N 76N 78N 80N 82N 84N 86N 88N 90N

? //////// //////////// //////// ?

METAL FACTOR (APP.)

Row N-1: 5.9 5.6 10 14 9.8 7.7 3.2 1.6

Row N-2: 13 7.9 7.0 0.4 12 9.8 10

Row N-3: 9.5 8.6 0.4 2.4 10 16

METAL FACTOR (APP.)

70N 72N 74N 76N 78N 80N 82N 84N 86N 88N 90N

ELECTRODE CONFIGURATION

←X→←—NX—→←X→

Ⓥ   Ⓘ

PLOTTING POINT → X   X = 200'

SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE ━━━━━
PROBABLE ⅲⅲⅲⅲⅲ
POSSIBLE / / / / /

FREQUENCY EFFECT (APP.) IN %

70N 72N 74N 76N 78N 80N 82N 84N 86N 88N 90N

Row N-1: 0.9 1.0 1.8 2.8 2.4 2.0 0.8 0.6

Row N-2: 1.8 1.2 1.8 0.1 2.7 0.2 2.8

Row N-3: 1.2 1.6 0.1 0.8 1.6 3.4

FREQUENCY EFFECT (APP.) IN %

FREQUENCIES: 0.31-5.0 CPS

DATE SURVEYED: NOV 1969

APPROVED

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

DATE:

2389

Expiry Date: April 25, 1970

B.K. FOUNTAIN — PROFESSIONAL ENGINEER, PROVINCE OF BRITISH COLUMBIA

McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

RESISTIVITY (APP.) IN OHM FEET / 2π

N - 5										
N - 4										
N - 3		329	72	172	237	150	235			
N - 2	174	73	172	155	582	370	272			
N - 1	250	31	190	225	417	311	259	245		

RESISTIVITY (APP.) IN OHM FEET / 2π

| 70N | 72N | 74N | 76N | 78N | 80N | 82N | 84N | 86N | 88N | 90N |

METAL FACTOR (APP.)

METAL FACTOR (APP.)

N - 1	6.4	19	1.1	3.6	4.3	12	7.0	12		
N - 2	10	22	2.9	2.6	NEG	1.4	2.2			
N - 3	5.3	5.6	3.5	0.4	5.3	3.4				

| 70N | 72N | 74N | 76N | 78N | 80N | 82N | 84N | 86N | 88N | 90N |

FREQUENCY EFFECT (APP.) IN %

FREQUENCY EFFECT (APP.) IN %

N - 1	1.6	0.6	0.2	0.8	1.6	3.6	1.6	3.0		
N - 2	1.6	1.6	0.5	0.4	-5.6	0.5	0.6			
N - 3	1.7	0.4	0.6	0.1	0.6	0.6				

DWG. NO.- I.P.-5371-2

QUALITY EXPLORATION CORPORATION

SPA MINES PROJECT

PRINCETON AREA, SIMILKAMEEN, M.D., B.C.

LINE NO.- __180E__

ELECTRODE CONFIGURATION

←X→ ←NX→ ←X→

PLOTTING POINT → X   X = 200'

SURFACE PROJECTION
OF ANOMALOUS ZONES

DEFINITE ▬▬▬
PROBABLE ::::::::::::::
POSSIBLE /////

FREQUENCIES: __0.31-5.0 CPS__

DATE SURVEYED: NOV. 1969

APPROVED

DATE:

2389

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

Expiry Date: April 25, 1970

McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

NOTE: THIS PLOT WAS PRODUCED WITH AN IBM 360/75 COMPUTER AND A CALCOMP PLOTTER

N - 5   N - 5

QUALITY EXPLORATION CORPORATION

SPA MINES PROJECT
PRINCETON AREA, SIMILKAMEEN, M.D., B.C.

RESISTIVITY (APP.) IN OHM FEET / 2π

N-4	294	143	79	162	144	179	192	167	380	495	454	250	242	217	286
N-3	191	128	80	77	168	208	-245	178	382	390	375	395	230	290	265	320
N-2	253	75	70	90	55	176	-271	240	398	393	297	311	364	229	263	268	204
N-1	228	91	34	84	82	78	-230	230	580	421	304	241	273	345	262	227	153	164

RESISTIVITY (APP.) IN OHM FEET / 2π

LINE NO.- 180E

70N 71N 72N 73N 74N 75N 76N 77N 78N 79N 80N 81N 82N 83N 84N 85N 86N 87N 88N 89N 90N

METAL FACTOR (APP.)

ELECTRODE CONFIGURATION

PLOTTING POINT ⟶ X = 100'

N-1	6.7	8.8	23	7.2	13	6.4	-1.3	3.5	1.2	2.6	4.3	6.6	8.8	7.3	0.8	1.8	24	22
N-2	5.2	13	8.6	3.5	13	1.7	-1.1	3.7	2.0	3.1	4.7	10	4.7	10	13	5.2	12
N-3	4.2	2.3	3.8	10	4.2	3.4	-1.6	6.2	1.8	4.6	6.7	5.3	8.7	9.6	11	6.9
N-4	2.0	3.5	6.9	5.8	2.1	1.7	12	3.0	4.0	5.1	4.6	14	7.4	6.9	15

METAL FACTOR (APP.)

SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE ▬▬▬
PROBABLE ⸽⸽⸽⸽⸽⸽⸽⸽
POSSIBLE ⁄⁄⁄⁄⁄

FREQUENCIES: 0.31-5.0 CPS   DATE SURVEYED: NOV. 1969

APPROVED:

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

DATE:

FREQUENCY EFFECT (APP.) IN %

70N 71N 72N 73N 74N 75N 76N 77N 78N 79N 80N 81N 82N 83N 84N 85N 86N 87N 88N 89N 90N

N-1	1.5	0.8	0.8	0.6	0.8	0.5	-0.3	0.8	0.7	1.1	1.3	1.6	2.4	2.5	0.2	0.4	3.6	3.4
N-2	1.3	1.0	0.6	0.3	0.7	0.3	-0.3	0.9	0.8	1.2	1.4	3.1	1.7	2.3	3.4	1.4	2.8
N-3	0.8	0.3	0.3	0.8	0.7	0.7	-0.4	1.1	0.6	1.8	2.5	2.1	2.0	2.2	2.9	2.2
N-4	0.5	0.5	0.5	0.9	0.3	0.3	2.3	0.5	2.5	2.1	3.5	1.8	1.5	4.2

FREQUENCY EFFECT (APP.) IN %

2389

McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

RESISTIVITY (APP.) IN OHM FEET / 2π

N-5									N-5
N-4									N-4
N-3	152	154	265	294	192	357			N-3
N-2	200	96	227	253	173	160	445		N-2
N-1	220	160	124	288	176	225	306	384	N-1

RESISTIVITY (APP.) IN OHM FEET / 2π

	70N	72N	74N	76N	78N	80N	82N	84N	86N	88N	90N

METAL FACTOR (APP.)

METAL FACTOR (APP.)

N-1	(V)	(I)	9.1	9.4	24	4.5	6.8	4.9	14	8.9	N-1
N-2			6.0	8.3	2.2	9.1	3.5	9.4	5.6		N-2
N-3			5.3	2.8	3.0	6.4	3.7	5.9			N-3
N-4											N-4
N-5											N-5

	70N	72N	74N	76N	78N	80N	82N	84N	86N	88N	90N

FREQUENCY EFFECT (APP.) IN %

FREQUENCY EFFECT (APP.) IN %

N-1	2.0	1.5	3.0	1.3	1.2	1.1	4.2	2.5	N-1
N-2	1.2	0.8	0.5	2.3	0.6	1.5	2.5		N-2
N-3	0.8	0.4	0.8	1.5	0.7	2.1			N-3
N-4									N-4
N-5									N-5

DWG. NO.- I.P.-5371-4

QUALITY EXPLORATION CORPORATION

SPA MINES PROJECT

PRINCETON AREA, SIMILKAMEEN, M.D., B.C.

LINE NO.- 184E

ELECTRODE CONFIGURATION

PLOTTING POINT → X   X = 200'

SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE ▬▬▬
PROBABLE ıııııııııııı
POSSIBLE /////

FREQUENCIES: 0.31-5.0 CPS

DATE SURVEYED: NOV 1969

APPROVED

D.K. FOUNTAIN

DATE:

2389

Expiry Date April 25, 1970

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

McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

NOTE: THIS PLOT WAS PRODUCED WITH AN IBM 360/75 COMPUTER AND A CALCOMP PLOTTER

QUALITY EXPLORATION CORPORATION

SPA MINES PROJECT
PRINCETON AREA, SIMILKAMEEN, M.D., B.C.

LINE NO.- 246E

RESISTIVITY (APP.) IN OHM FEET / 2π

N - 5			N - 5
N - 4			N - 4
N - 3	129 95 186		N - 3
N - 2	261 77 156 318		N - 2
N - 1	282 143 113 215 279		N - 1

RESISTIVITY (APP.) IN OHM FEET / 2π

106N 108N 110N 112N 114N 116N 118N 120N 122N 124N

METAL FACTOR (APP.)   METAL FACTOR (APP.)

N - 1	2.8 11 25 25 0.7	N - 1
N - 2	1.9 23 18 0.3	N - 2
N - 3	6.2 35 52	N - 3
N - 4		N - 4
N - 5		N - 5

108N 108N 110N 112N 114N 116N 118N 120N 122N 124N

FREQUENCY EFFECT (APP.) IN %   FREQUENCY EFFECT (APP.) IN %

N - 1	0.8 1.6 2.8 5.4 0.2	N - 1
N - 2	0.5 1.8 2.8 0.1	N - 2
N - 3	0.8 3.3 9.6	N - 3
N - 4		N - 4
N - 5		N - 5

ELECTRODE CONFIGURATION

←X→←—NX—→←X→

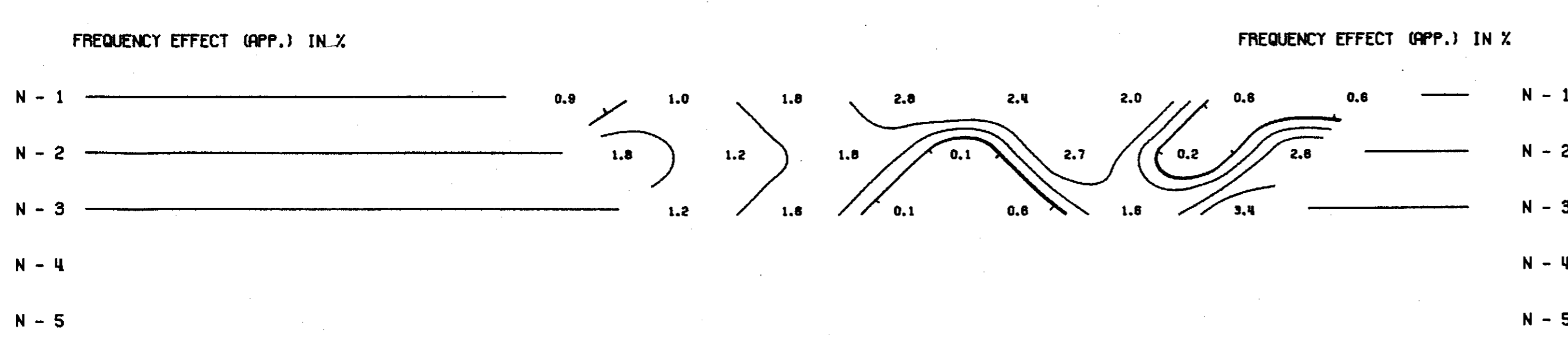PLOTTING POINT ⟶ X   X = 200'

SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE ▬▬▬▬
PROBABLE ⅢⅢⅢⅢⅢ
POSSIBLE / / / / /

FREQUENCIES: 0.31-5.0 CPS   DATE SURVEYED: NOV 1969

APPROVED:

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

DATE:

D. K. FOUNTAIN
PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
Expiry Date: April 25, 1970

2389

McPHAR GEOPHYSICS
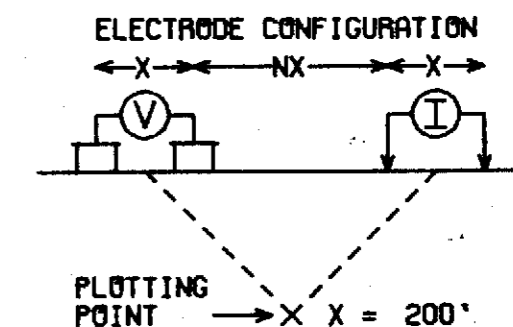
INDUCED POLARIZATION AND RESISTIVITY SURVEY

NOTE: THIS PLOT WAS PRODUCED WITH AN IBM 360/75 COMPUTER AND A CALCOMP PLOTTER

QUALITY EXPLORATION CORPORATION

SPA MINES PROJECT
PRINCETON AREA, SIMILKAMEEN, M.D., B.C.

LINE NO.- ___248E___

RESISTIVITY (APP.) IN OHM FEET / 2π

N-5												N-5
N-4												N-4
N-3							170	194	225			N-3
N-2						168	168	295	182			N-2
N-1					260	156	182	168	205			N-1

RESISTIVITY (APP.) IN OHM FEET / 2π

106N 108N 110N 112N 114N 116N 118N 120N 122N 124N

?

METAL FACTOR (APP.)

METAL FACTOR (APP.)

N-1			2.7	3.2	7.7	14	2.9			N-1
N-2			3.5	4.8	1.5	NEG			N-2
N-3				16	10	8.9			N-3
N-4									N-4
N-5									N-5

ELECTRODE CONFIGURATION

←X→←──NX──→←X→

V ... I

PLOTTING POINT ──→ X   X = 200'

SURFACE PROJECTION
OF ANOMALOUS ZONES

DEFINITE ▬▬▬
PROBABLE ::::::::::::
POSSIBLE /////

FREQUENCY EFFECT (APP.) IN %

106N 108N 110N 112N 114N 116N 118N 120N 122N 124N

FREQUENCY EFFECT (APP.) IN %

N-1		0.7	0.5	1.4	2.4	0.6			N-1
N-2		0.6	0.8	0.3	NEG			N-2
N-3			2.7	2.0	2.0			N-3
N-4								N-4
N-5								N-5

FREQUENCIES: 0.31-5.0 CPS   DATE SURVEYED: NOV 1969

APPROVED

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

DATE:

D.K. FOUNTAIN
PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
Expiry Date: April 25, 1970

2389
McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

NOTE: THIS PLOT WAS PRODUCED WITH AN IBM 360/75 COMPUTER AND A CALCOMP PLOTTER

QUALITY EXPLORATION CORPORATION

SPA MINES PROJECT
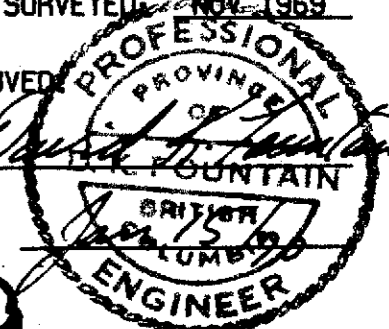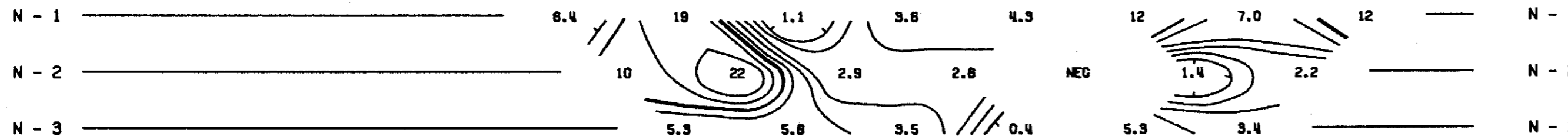
PRINCETON AREA, SIMILKAMEEN, M.D., B.C.

LINE NO.- 264E

RESISTIVITY (APP.) IN OHM FEET / 2π

N - 5										N - 5
N - 4										N - 4
N - 3				366	279	263	525	268		N - 3
N - 2		311	330	310	249	127	241			N - 2
N - 1	351	800	365	320	242	190	210			N - 1

RESISTIVITY (APP.) IN OHM FEET / 2π

| | 106N | 108N | 110N | 112N | 114N | 116N | 118N | 120N | 122N | 124N |

METAL FACTOR (APP.)

N - 1	6.0	2.5	3.8	3.8	5.4	2.6	3.3			N - 1
N - 2		5.1	2.7	5.8	7.8	18	5.4			N - 2
N - 3		4.8	6.2	9.9	0.6	3.0				N - 3
N - 4										N - 4
N - 5										N - 5

METAL FACTOR (APP.)

ELECTRODE CONFIGURATION

PLOTTING POINT → X   X = 200'

SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE ▬▬▬
PROBABLE ▥▥▥▥
POSSIBLE /////

| | 108N | 108N | 110N | 112N | 114N | 116N | 118N | 120N | 122N | 124N |

FREQUENCY EFFECT (APP.) IN %

N - 1	2.1	2.0	1.4	1.2	1.3	0.5	0.7			N - 1
N - 2		1.6	0.9	1.8	1.9	2.3	1.3			N - 2
N - 3		1.8	1.7	2.6	0.3	0.8				N - 3
N - 4										N - 4
N - 5										N - 5

FREQUENCY EFFECT (APP.) IN %

FREQUENCIES: 0.31-5.0 CPS   DATE SURVEYED: NOV. 1969
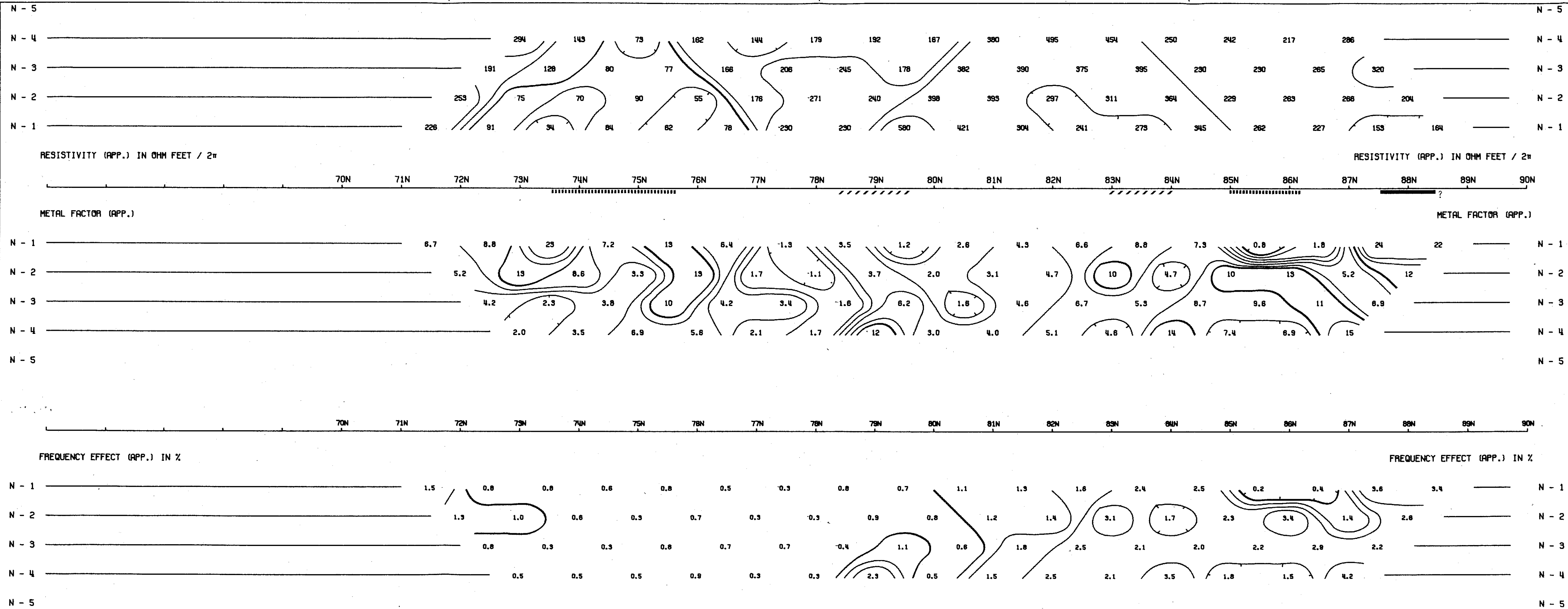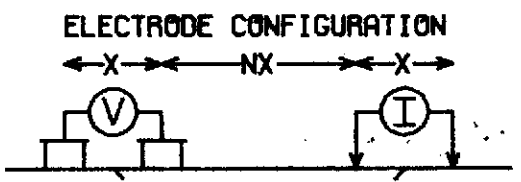
APPROVED:

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

DATE:

2389

McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

NOTE: THIS PLOT WAS PRODUCED WITH AN IBM 360/75 COMPUTER AND A CALCOMP PLOTTER

Expiry Date: April 25, 1970

N - 5 .... N - 5
N - 4 .... N - 4

RESISTIVITY (APP.) IN OHM FEET / 2π

N - 3		158	420	200	225	136		N - 3
N - 2	204	204	340	160	138	257		N - 2
N - 1	168	320	162	191	88	295	200	N - 1

RESISTIVITY (APP.) IN OHM FEET / 2π

| 106N | 108N | 110N | 112N | 114N | 116N | 118N | 120N | 122N | 124N |

? ▪▪▪▪▪▪▪▪▪▪▪▪▪   ▪▪▪▪▪▪▪▪▪▪▪▪▪▪ ?

METAL FACTOR (APP.)

METAL FACTOR (APP.)

N - 1	11	1.9	3.7	3.1	16	4.1	7.0	N - 1
N - 2	9.3	4.9	2.9	6.3	8.7	1.6		N - 2
N - 3	4.5	2.9	3.0	6.2	4.4		N - 3
N - 4							N - 4
N - 5							N - 5

| 108N | 108N | 110N | 112N | 114N | 116N | 118N | 120N | 122N | 124N |

FREQUENCY EFFECT (APP.) IN %

FREQUENCY EFFECT (APP.) IN %

N - 1	1.6	0.6	0.8	0.8	1.4	1.2	1.4	N - 1
N - 2	1.9	1.0	1.0	1.0	1.2	0.4		N - 2
N - 3	0.7	1.2	0.6	1.4	0.6		N - 3
N - 4							N - 4
N - 5							N - 5

DWG. NØ.- I.P.- 5371-8

QUALITY EXPLØRATIØN CØRPØRATIØN

SPA MINES PRØJECT

PRINCETØN AREA, SIMILKAMEEN, M.D., B.C.

LINE NØ.- 268E

ELECTRØDE CONFIGURATION

←X→ ←—NX—→ ←X→
(V)   (I)

PLØTTING POINT ——→ X   X = 200'

SURFACE PRØJECTIØN OF ANØMALØUS ZØNES

DEFINITE ▬▬▬▬
PRØBABLE ▪▪▪▪▪▪▪▪▪▪▪
PØSSIBLE /////

FREQUENCIES: 0.31-5.0 CPS   DATE SURVEYED: NOV 1969

APPROVED:

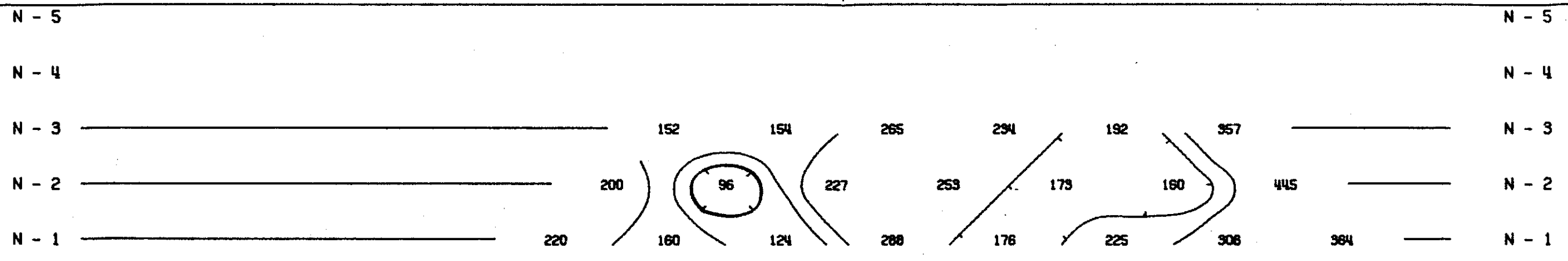NØTE: CONTOURS AT LØGARITHMIC INTERVALS 1.-1.5-2.-3.-5.-7.5-10

DATE:

2389

Expiry Date: April 25, 1970

D. K. FOUNTAIN
PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA

McPHAR GEØPHYSICS

INDUCED PØLARIZATIØN AND RESISTIVITY SURVEY

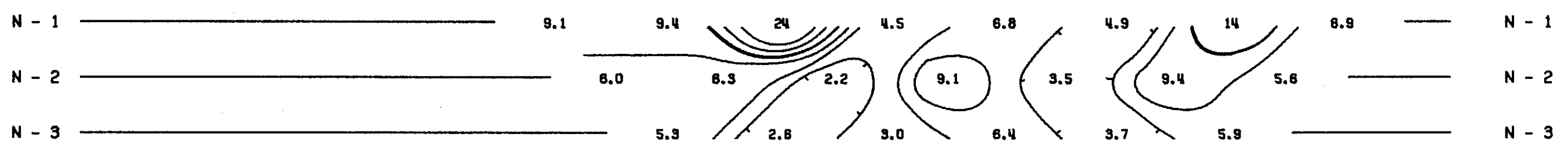NØTE: THIS PLØT WAS PRODUCED WITH AN IBM 360/75 COMPUTER AND A CALCOMP PLOTTER

N - 5   N - 5
N - 4   N - 4
N - 3   230 253 136 109 188 285 345 432 200 188   N - 3
N - 2   94 232 265 76 182 244 260 490 300 213 240   N - 2
N - 1   210 128 288 123 142 287 183 433 279 180 258 245   N - 1

RESISTIVITY (APP.) IN OHM FEET / 2π

RESISTIVITY (APP.) IN OHM FEET / 2π

242E 244E 246E 248E 250E 252E 254E 256E 258E 260E 262E 264E 266E 268E 270E

METAL FACTOR (APP.)

METAL FACTOR (APP.)

N - 1   1.9 32 6.8 13 22 8.3 1.1 2.5 9.7 5.6 8.2 1.6   N - 1
N - 2   17 14 11 80 20 9.8 4.2 2.0 1.3 3.8 3.3   N - 2
N - 3   1.7 14 44 29 17 33 7.8 3.2 5.0 5.9   N - 3
N - 4   N - 4
N - 5   N - 5

242E 244E 246E 248E 250E 252E 254E 256E 258E 260E 262E 264E 266E 268E 270E

FREQUENCY EFFECT (APP.) IN %

FREQUENCY EFFECT (APP.) IN %

N - 1   0.4 4.1 1.8 3.2 2.2 0.2 1.1 2.7 1.0 2.1 0.4   N - 1
N - 2   1.6 3.2 3.0 4.6 3.7 2.4 1.1 1.0 0.4 0.8 0.8   N - 2
N - 3   0.4 3.8 6.0 3.0 2.8 3.3 2.7 1.4 1.0 1.1   N - 3
N - 4   N - 4
N - 5   N - 5

QUALITY EXPLORATION CORPORATION

SPA MINES PROJECT
PRINCETON AREA, SIMILKAMEEN, M.D., B.C.

LINE NO.- 148N

RESISTIVITY (APP.) IN OHM FEET / 2π

	N-5	N-4	N-3	N-2	N-1
			265	207	182
			184	215	150
			150	215	410
			396	192	381
			260	402	187
			164	162	230
			268	170	211
			200	400	198
				83	202
					122

RESISTIVITY (APP.) IN OHM FEET / 2π

156E 158E 160E 162E 164E 166E 168E 170E 172E 174E 176E 178E 180E

METAL FACTOR (APP.)

N-1	N-2	N-3
5.5	5.8	9.1
12	4.1	5.4
2.4	27	15
4.5	5.2	6.6
7.5	8.2	13
9.1	28	40
19	24	15
19	7.9	29
19	90	
NEG		

METAL FACTOR (APP.)

156E 158E 160E 162E 164E 166E 168E 170E 172E 174E 176E 178E 180E

FREQUENCY EFFECT (APP.) IN %

N-1	N-2	N-3
1.0	1.2	2.4
1.8	0.8	1.0
1.0	5.8	2.2
1.7	1.0	2.6
1.4	2.5	3.3
2.1	4.6	6.5
4.2	4.0	3.9
3.7	2.9	5.8
2.6	7.5	
-2.0		

FREQUENCY EFFECT (APP.) IN %

ELECTRODE CONFIGURATION

PLOTTING POINT → X   X = 200'

SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE ▬▬▬▬
PROBABLE ▥▥▥▥
POSSIBLE /////

FREQUENCIES: 0.31-5.0 CPS

DATE SURVEYED: NOV 1969

APPROVED
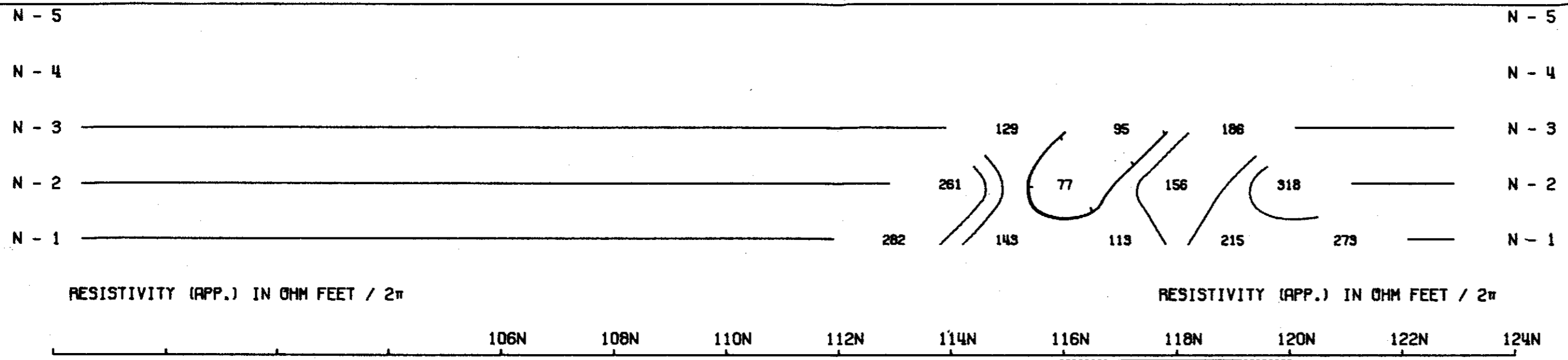
D.K. FOUNTAIN

DATE:

Expiry Date: April 25, 1970

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

2389

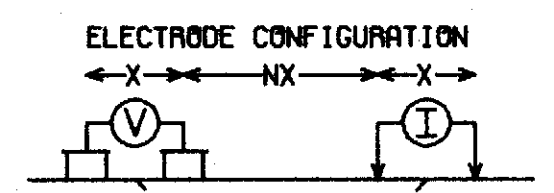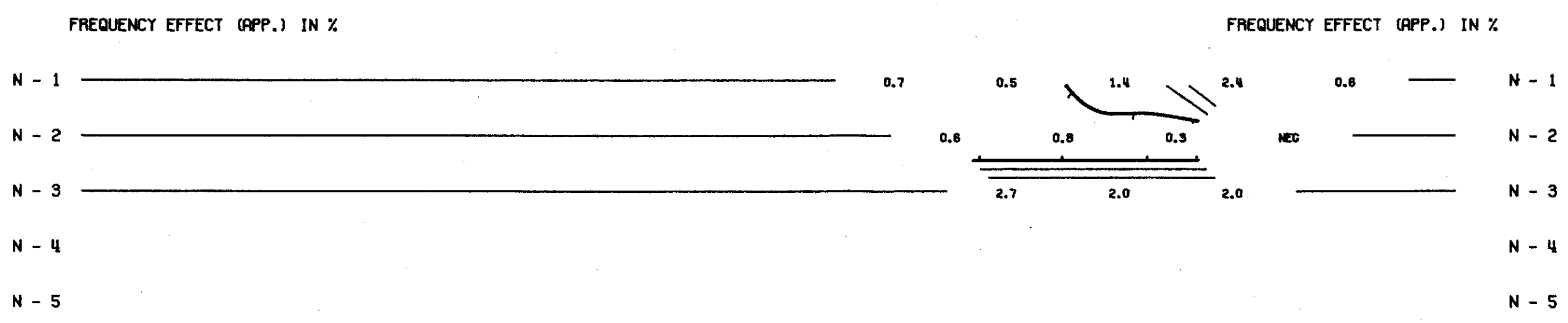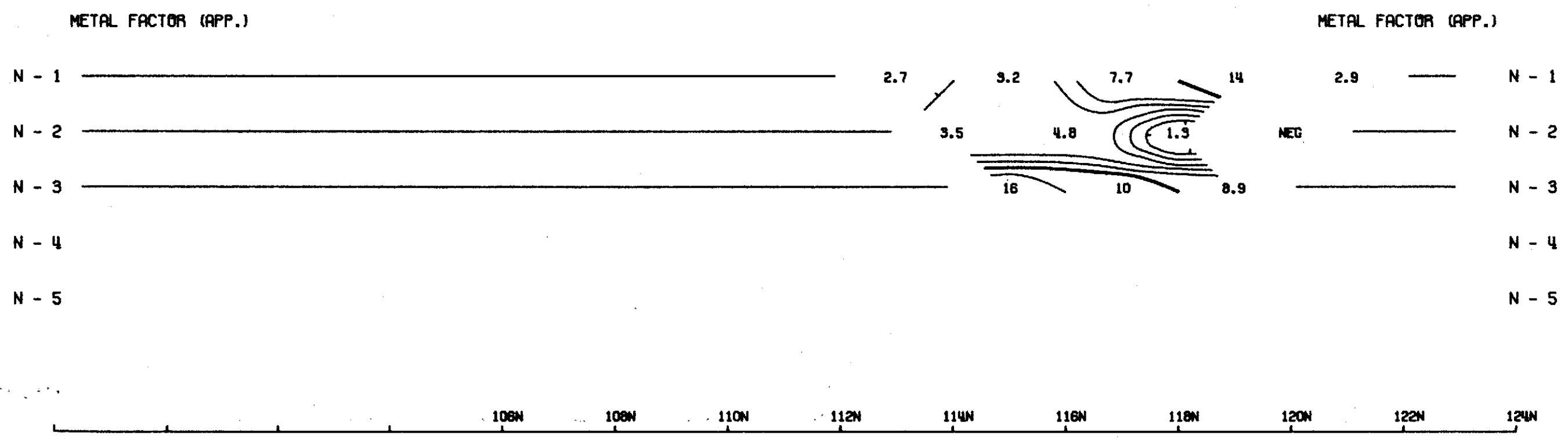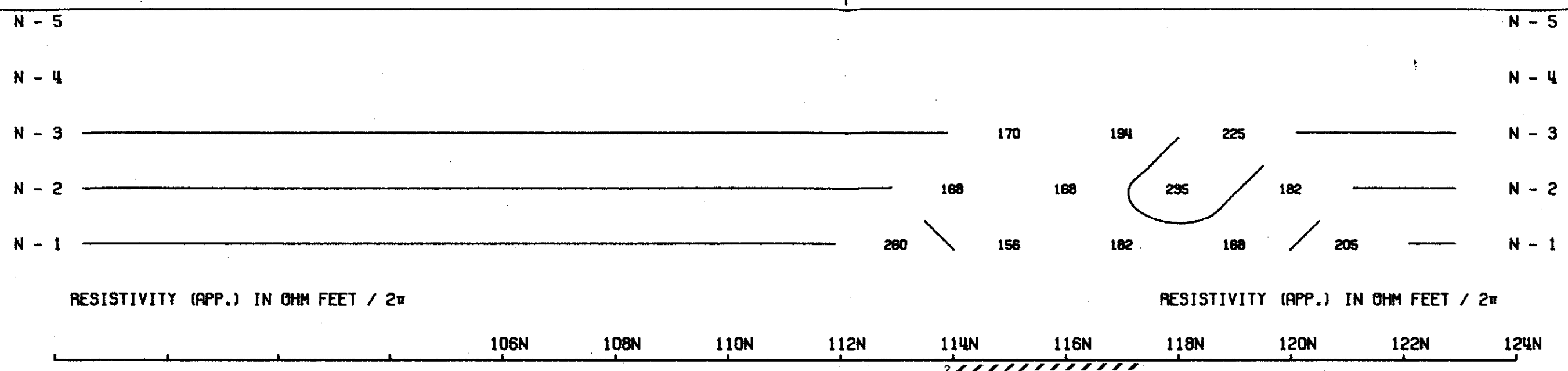# McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

NOTE: THIS PLOT WAS PRODUCED WITH AN IBM 360/75 COMPUTER AND A CALCOMP PLOTTER

RESISTIVITY (APP.) IN OHM FEET / 2π

N-5		N-5
N-4		N-4
N-3	440 219 245	N-3
N-2	270 280 176 268	N-2
N-1	1200 140 260 390 295	N-1

RESISTIVITY (APP.) IN OHM FEET / 2π

164E   166E   168E   170E   172E   174E   176E   178E

METAL FACTOR (APP.)

N-1	4.3 10 8.9 10 8.8	N-1
N-2	13 14 17 22	N-2
N-3	NEG 16 19	N-3
N-4		N-4
N-5		N-5

METAL FACTOR (APP.)

164E   166E   168E   170E   172E   174E   176E   178E

FREQUENCY EFFECT (APP.) IN %

N-1	5.2 1.4 1.8 4.0 2.6	N-1
N-2	3.6 3.9 3.0 8.0	N-2
N-3	-0.9 3.4 4.6	N-3
N-4		N-4
N-5		N-5

FREQUENCY EFFECT (APP.) IN %

QUALITY EXPLORATION CORPORATION

SPA MINES PROJECT
PRINCETON AREA, SIMILKAMEEN, M.D., B.C.

LINE NO.- 152N

ELECTRODE CONFIGURATION

←X→ ←NX→ ←X→

PLOTTING POINT → X   X = 200'

SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE ▬▬▬▬
PROBABLE ▪▪▪▪▪▪▪▪
POSSIBLE /////

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

2389

McPHAR GEOPHYSICS

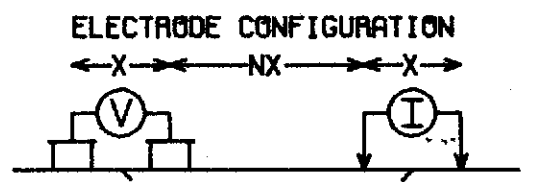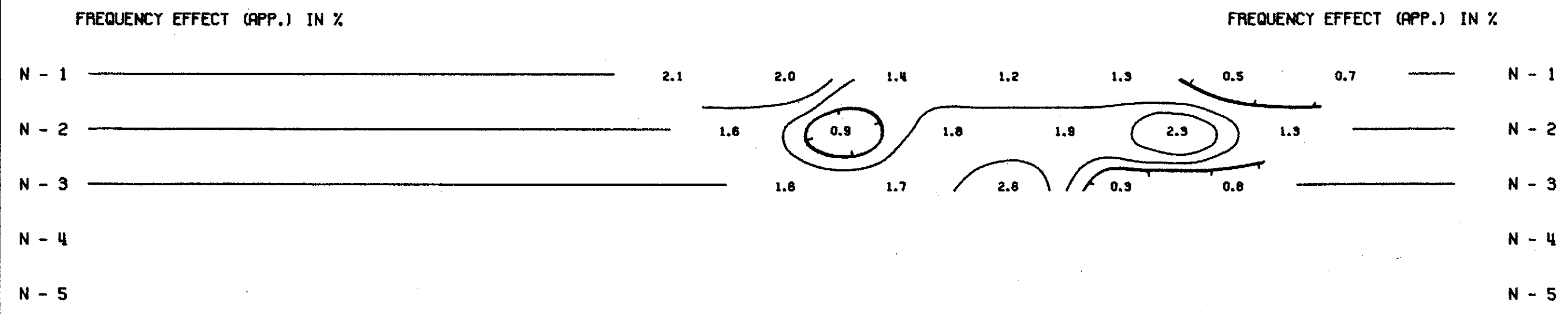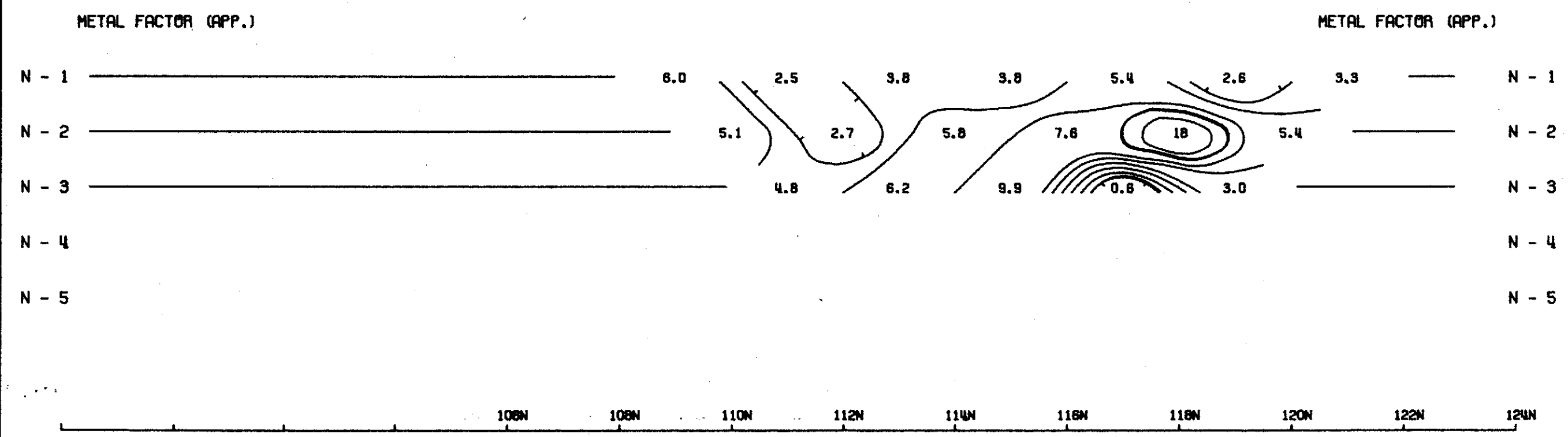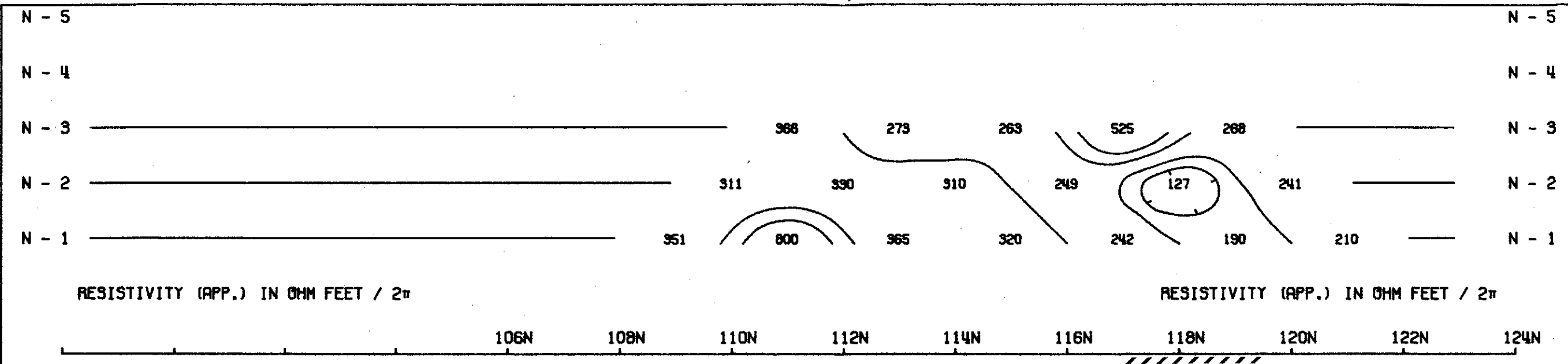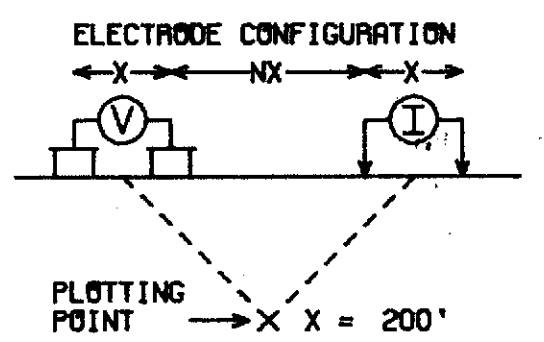## INDUCED POLARIZATION AND RESISTIVITY SURVEY

NOTE: THIS PLOT WAS PRODUCED WITH AN IBM 360/75 COMPUTER AND A CALCOMP PLOTTER

QUALITY EXPLORATION CORPORATION

SPA MINES PROJECT
PRINCETON AREA, SIMILKAMEEN, M.D., B.C.

LINE NO.- 156N

RESISTIVITY (APP.) IN OHM FEET / 2π

	N-5	N-4	N-3	N-2	N-1
168E			417	272	330
170E			365	333	261
172E			205	250	225
174E			81	142	175
176E			205	215	390
178E			220	198	177
180E			100	158	142
182E				102	168
184E					96

RESISTIVITY (APP.) IN OHM FEET / 2π

168E 170E 172E 174E 176E 178E 180E 182E 184E 186E 188E 190E

METAL FACTOR (APP.)

	N-1	N-2	N-3
	7.8	7.4	9.8
	6.5	4.8	6.9
	14	6.8	32
	29	46	84
	11	31	29
	24	30	18
	41	40	48
	38	29	
	17		

METAL FACTOR (APP.)

ELECTRODE CONFIGURATION

←X→ ←—NX—→ ←X→

V   I

PLOTTING POINT → X   X = 200'

SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE ▬▬▬
PROBABLE ▐▐▐▐▐▐
POSSIBLE /////

FREQUENCIES: 0.31-5.0 CPS   DATE SURVEYED: NOV. 1969

APPROVED:

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

DATE:

FREQUENCY EFFECT (APP.) IN %

168E 170E 172E 174E 176E 178E 180E 182E 184E 186E 188E 190E

	N-1	N-2	N-3
	2.5	2.0	4.0
	1.7	1.6	2.5
	3.1	1.7	8.5
	5.0	6.6	8.7
	4.3	8.8	6.0
	4.2	6.0	3.6
	5.8	6.3	4.8
	6.5	3.0	
	1.8		

FREQUENCY EFFECT (APP.) IN %
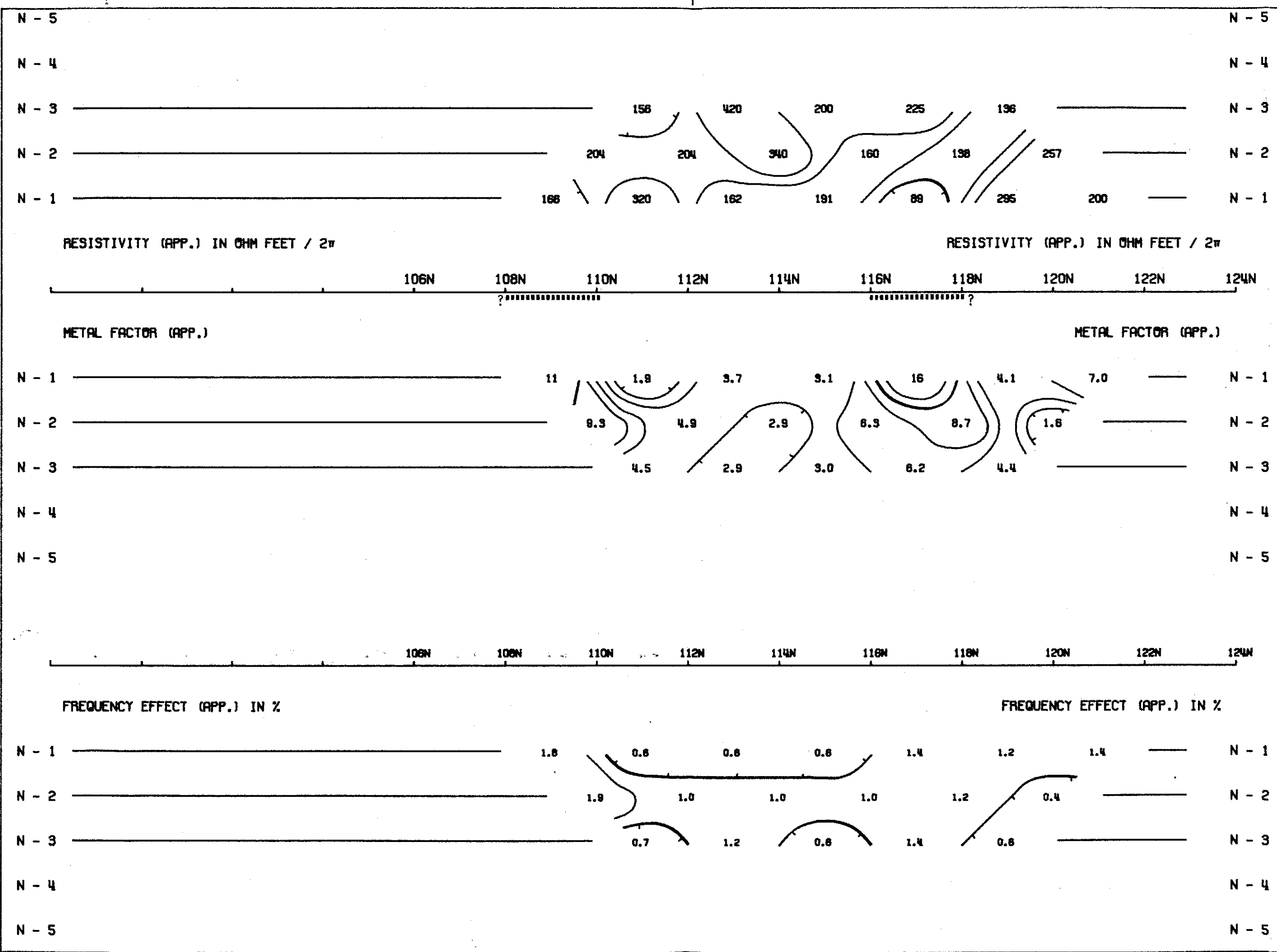
2389

McPHAR GEOPHYSICS

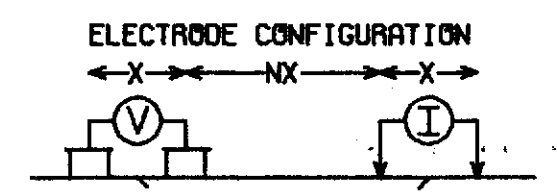INDUCED POLARIZATION AND RESISTIVITY SURVEY

NOTE: THIS PLOT WAS PRODUCED WITH AN IBM 360/75 COMPUTER AND A CALCOMP PLOTTER

QUALITY EXPLORATION CORPORATION

SPA MINES PROJECT
PRINCETON AREA, SIMILKAMEEN, M.D., B.C.

LINE NO.- 160N

ELECTRODE CONFIGURATION

← X → ← NX → ← X →

PLOTTING POINT → X   X = 100'

SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE ▬▬▬▬
PROBABLE ||||||||||||
POSSIBLE /////

FREQUENCIES: 0.31-5.0 CPS   DATE SURVEYED: NOV 1969

APPROVED:

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

DATE:

D. K. FOUNTAIN

Expiry Date: April 28, 1970
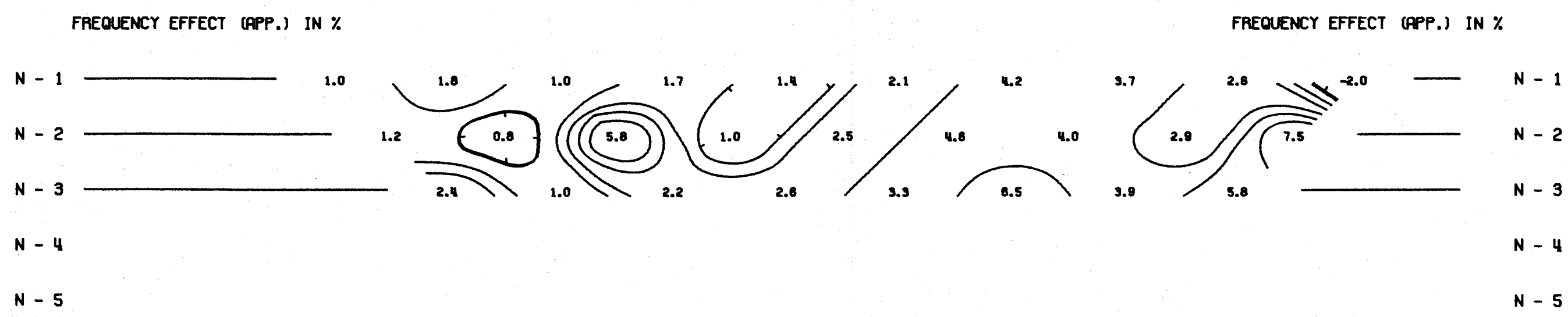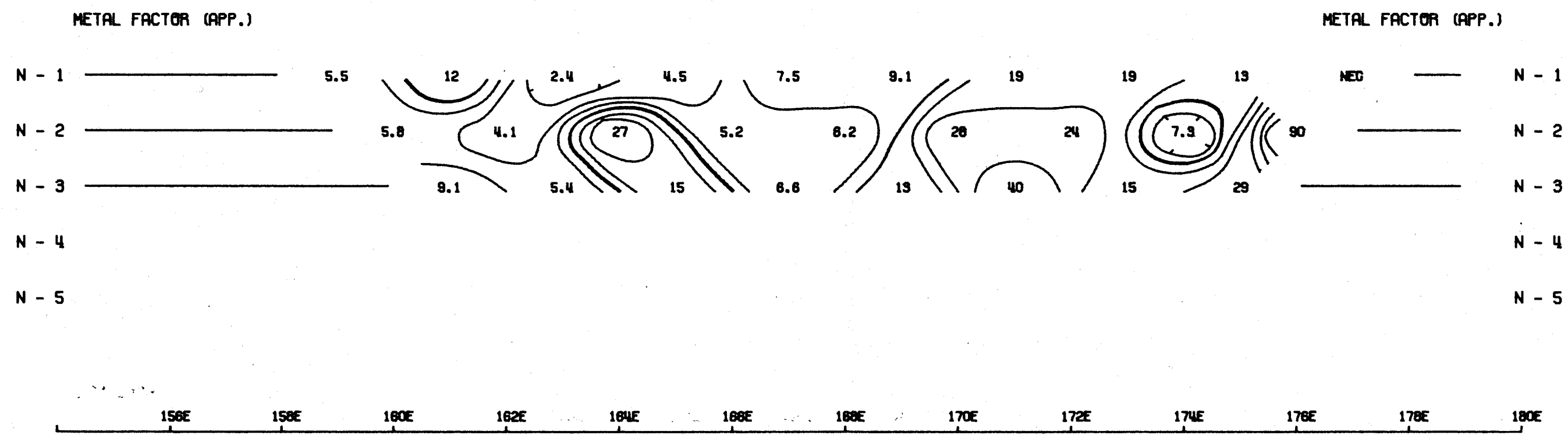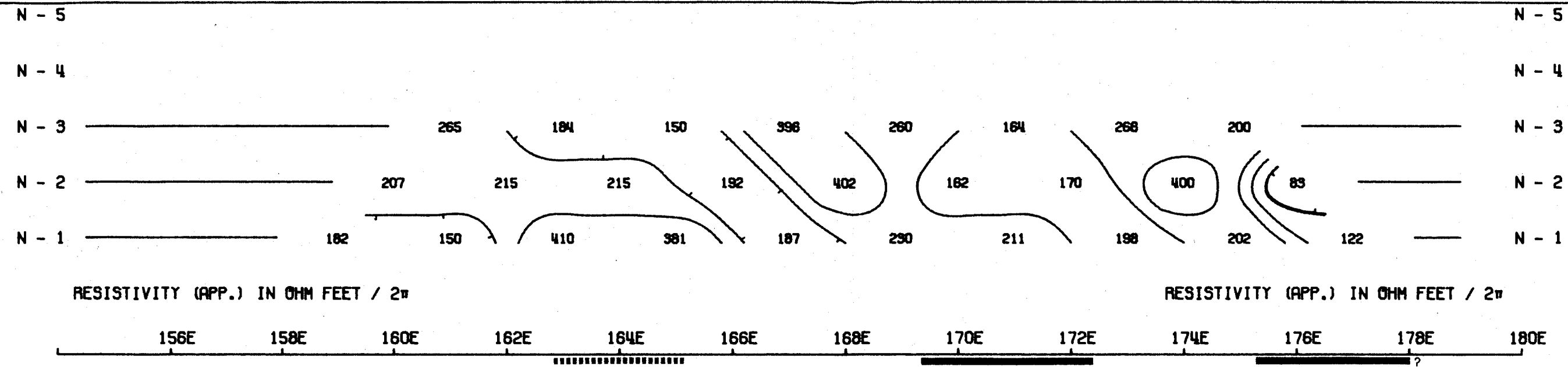
2389

McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

NOTE: THIS PLOT WAS PRODUCED WITH AN IBM 360/75 COMPUTER AND A CALCOMP PLOTTER

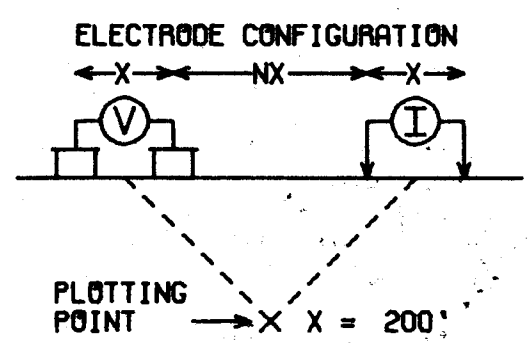**RESISTIVITY (APP.) IN OHM FEET / 2π**   **RESISTIVITY (APP.) IN OHM FEET / 2π**

Station	N-5	N-4	N-3	N-2	N-1
		164	131	270	288
		89	116	93	240
		191	158	180	126
		92	137	97	115
		65	73	87	74
		95	72	78	100
			88	66	67
				163	112
					138

177E 178E 179E 180E 181E 182E 183E 184E 185E 186E 187E 188E

METAL FACTOR (APP.)   **METAL FACTOR (APP.)**

N-1   28 22 25 37 92 71 91 25 15
N-2   30 41 36 39 69 76 150 22
N-3   38 28 44 28 66 83 76
N-4   33 73 28 62 68 68
N-5

177E 178E 179E 180E 181E 182E 183E 184E 185E 186E 187E 188E

FREQUENCY EFFECT (APP.) IN %   **FREQUENCY EFFECT (APP.) IN %**

N-1   8.0 5.2 3.2 4.3 6.8 7.1 6.1 2.8 2.0
N-2   8.0 3.8 6.5 3.8 6.0 5.9 8.6 3.6
N-3   5.0 3.2 7.0 3.8 4.8 6.0 6.7
N-4   5.5 6.5 5.4 5.7 4.4 6.3
N-5

QUALITY EXPLORATION CORPORATION

SPA MINES PROJECT
PRINCETON AREA, SIMILKAMEEN, M.D., B.C.

LINE NO.- 164N

ELECTRODE CONFIGURATION

PLOTTING POINT → X   X = 200'

SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE ▬▬▬
PROBABLE ▪▪▪▪▪▪▪
POSSIBLE ////

FREQUENCIES: 0.31-5.0 CPS

DATE SURVEYED:

APPROVED:

DATE:

2389

McPHAR GEOPHYSICS
INDUCED POLARIZATION AND RESISTIVITY SURVEY

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

NOTE: THIS PLOT WAS PRODUCED WITH AN IBM 360/75 COMPUTER AND A CALCOMP PLOTTER

RESISTIVITY (APP.) IN OHM FEET / 2π

N - 3 ... 418 325 238 141 80 67
N - 2 ... 1790 415 165 172 104 57 110
N - 1 ... 284 540 445 243 123 61 78 115

168E 170E 172E 174E 176E 178E 180E 182E 184E 186E 188E

METAL FACTOR (APP.)

N - 1 ... 5.7 6.1 7.4 12 45 196 49 48
N - 2 ... 0.8 6.5 33 22 56 107 37
N - 3 ... 6.5 8.8 34 28 75 143

FREQUENCY EFFECT (APP.) IN %

168E 170E 172E 174E 176E 178E 180E 182E 184E 186E 188E

N - 1 ... 1.5 3.3 3.3 3.0 5.5 8.3 3.8 5.3
N - 2 ... 1.5 2.7 5.5 3.8 5.8 6.1 4.2
N - 3 ... 2.7 2.8 8.0 3.9 6.0 9.6

QUALITY EXPLORATION CORPORATION

SPA MINES PROJECT
PRINCETON AREA, SIMILKAMEEN, M.D., B.C.

LINE NO.- 164N

RESISTIVITY (APP.) IN OHM FEET / 2π

N-5												N-5
N-4				95	60	60	82	132	138			N-4
N-3			117	57	59	85	83	116	192			N-3
N-2		143	73	52	87	90	90	80	112			N-2
N-1		224	104	72	73	105	84	74	130	104		N-1

RESISTIVITY (APP.) IN OHM FEET / 2π

| 177E | 178E | 179E | 180E | 181E | 182E | 183E | 184E | 185E | 186E | 187E | 188E |

METAL FACTOR (APP.)

N-1		22	62	78	93	84	72	78	28	37		N-1
N-2		48	110	129	78	54	78	86	52			N-2
N-3		56	135	152	61	34	54	28				N-3
N-4		67	160	90	66	52	51					N-4
N-5												N-5

METAL FACTOR (APP.)

| 177E | 178E | 179E | 180E | 181E | 182E | 183E | 184E | 185E | 186E | 187E | 188E |

FREQUENCY EFFECT (APP.) IN %

N-1		5.0	8.4	5.8	6.8	8.8	6.0	5.8	3.8	3.8		N-1
N-2		6.9	8.0	6.7	6.8	4.8	7.2	6.9	5.8			N-2
N-3		6.6	7.7	9.0	5.2	2.8	6.2	5.0				N-3
N-4		6.4	9.6	5.4	5.4	6.9	7.0					N-4
N-5												N-5

FREQUENCY EFFECT (APP.) IN %

ELECTRODE CONFIGURATION

X — NX — X

PLOTTING POINT → X   X = 100'

SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE ▬▬▬
PROBABLE ||||||||||||
POSSIBLE / / / / /

FREQUENCIES: 0.31-5.0 CPS   DATE SURVEYED: NOV 1969

APPROVED:

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

DATE:

Expiry Date: April 25, 1970

2389

PROFESSIONAL ENGINEER — BRITISH COLUMBIA

McPHAR GEOPHYSICS
INDUCED POLARIZATION AND RESISTIVITY SURVEY

NOTE: THIS PLOT WAS PRODUCED WITH AN IBM 360/75 COMPUTER AND A CALCOMP PLOTTER

QUALITY EXPLORATION CORPORATION

SPA MINES PROJECT

PRINCETON AREA, SIMILKAMEEN, M.D., B.C.

LINE NO.- 168N

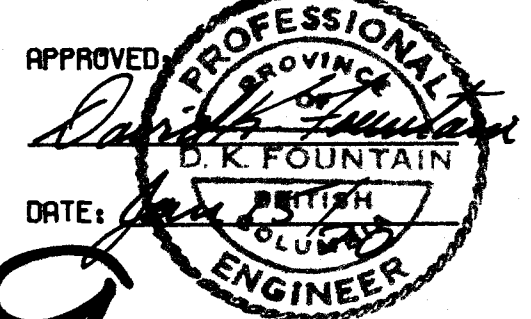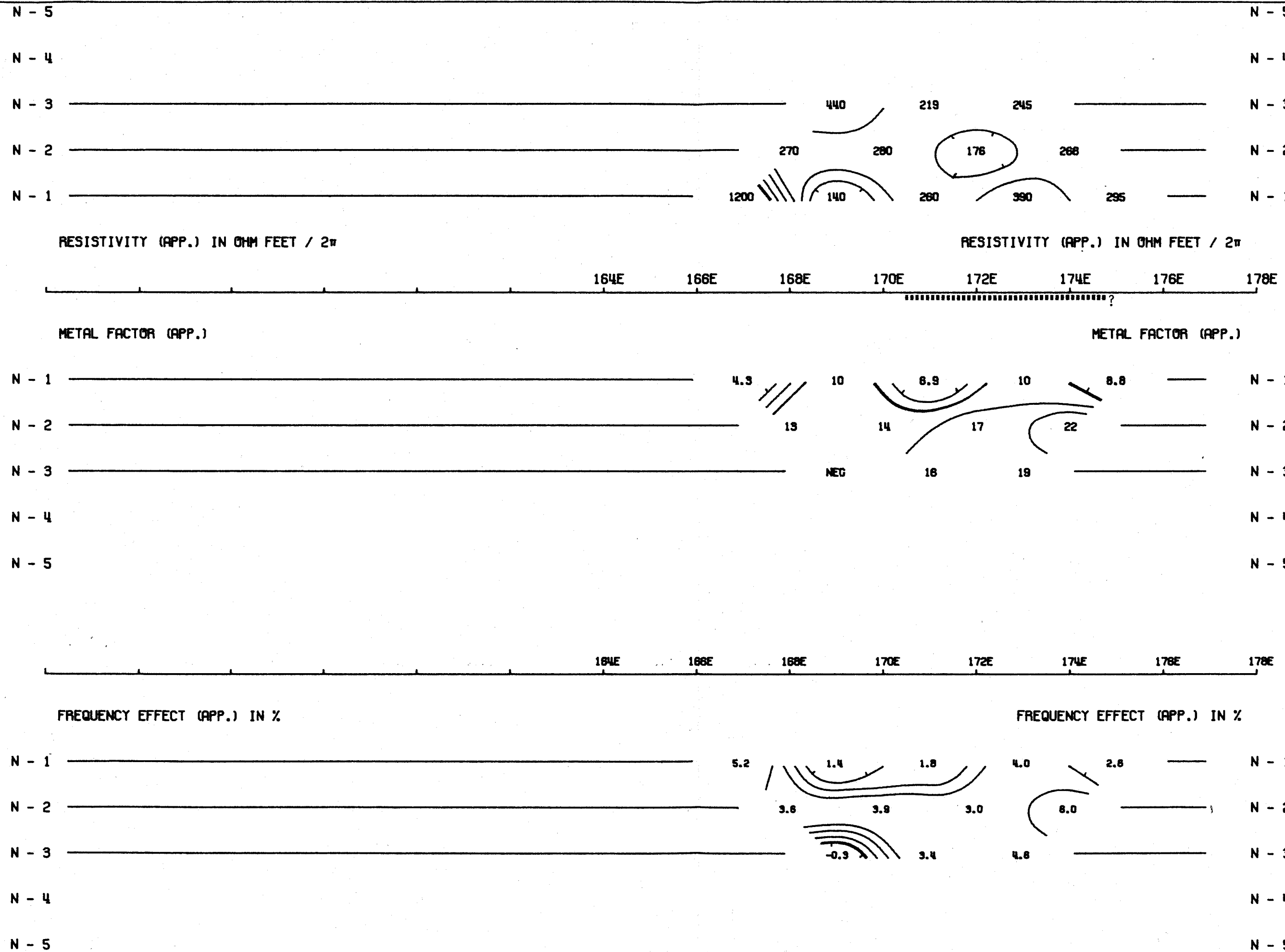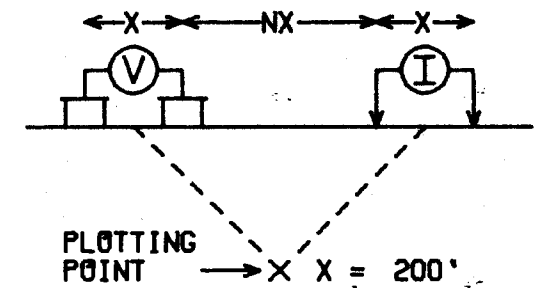**ELECTRODE CONFIGURATION**

PLOTTING POINT → X   X = 100'

SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE ▬▬▬
PROBABLE ▪▪▪▪▪▪
POSSIBLE /////

FREQUENCIES: 0.31-5.0 CPS   DATE SURVEYED: NOV 1969

APPROVED:

D. K. FOUNTAIN

DATE:

Expiry Date: April 25, 1970

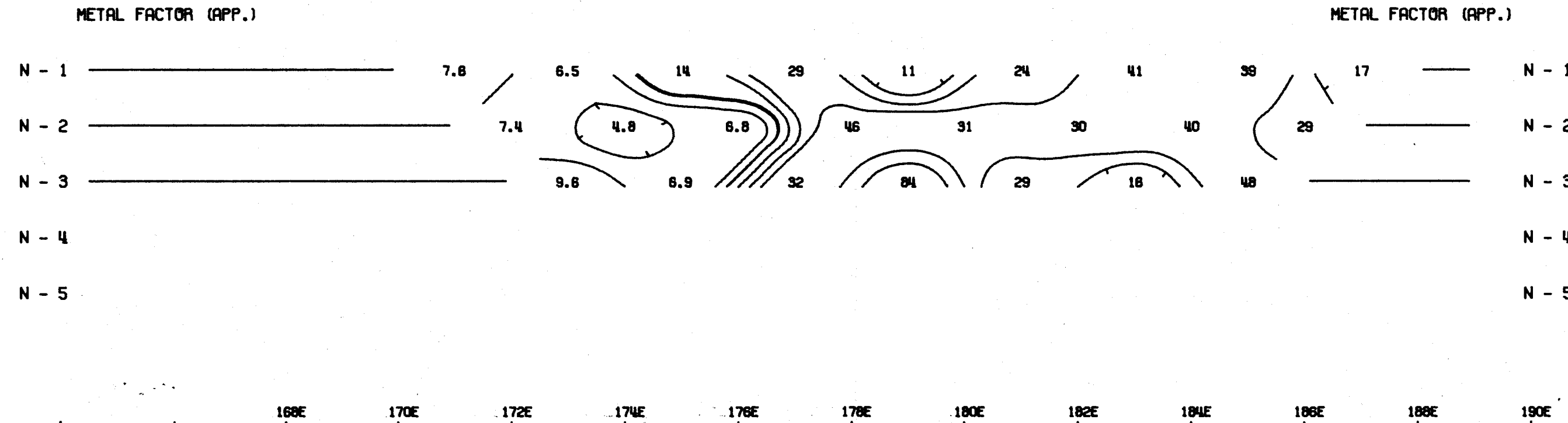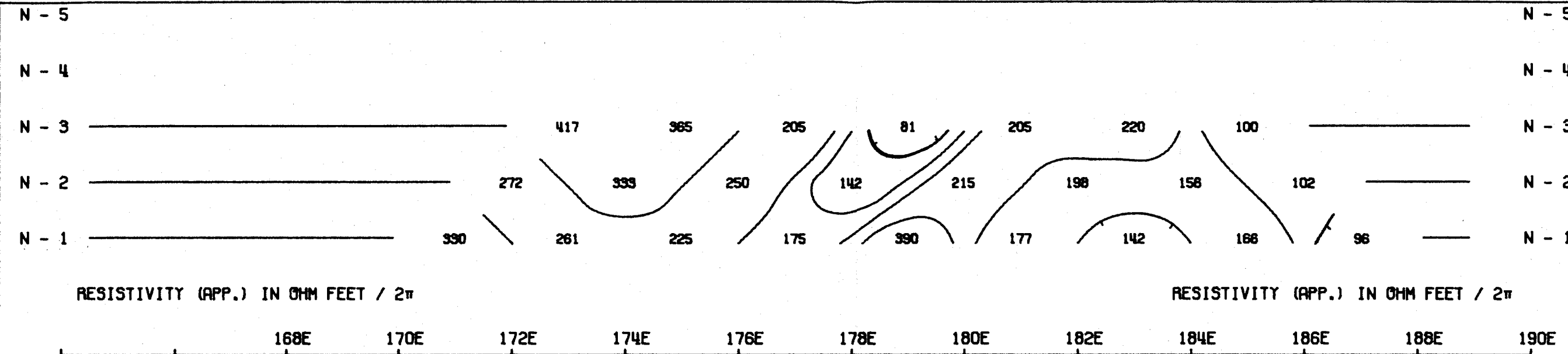NOTE: CONTOURS AT LOGARITHMIC INTERVALS
1.-1.5-2.-3.-5.-7.5-10

2389

McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

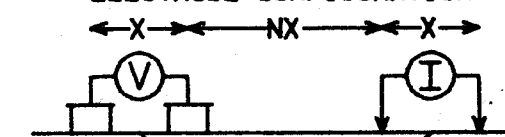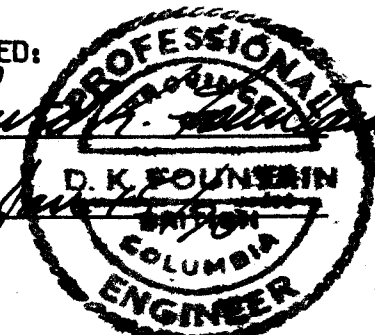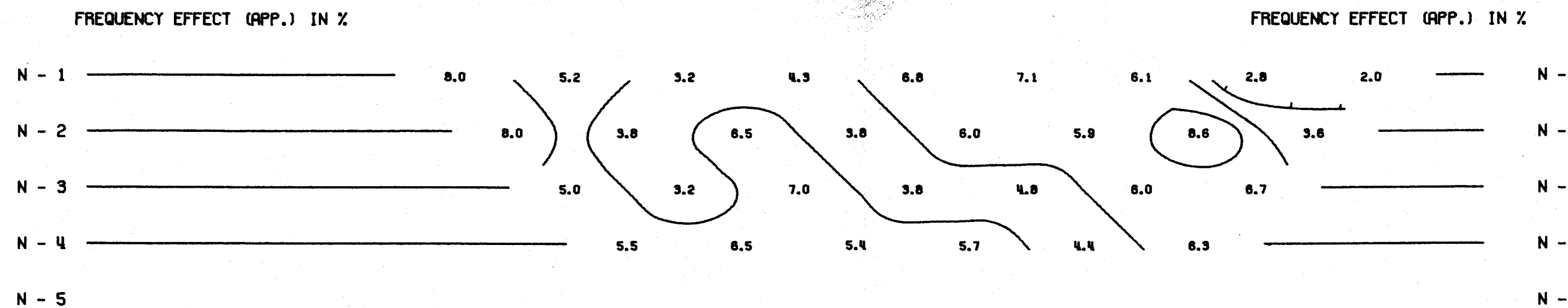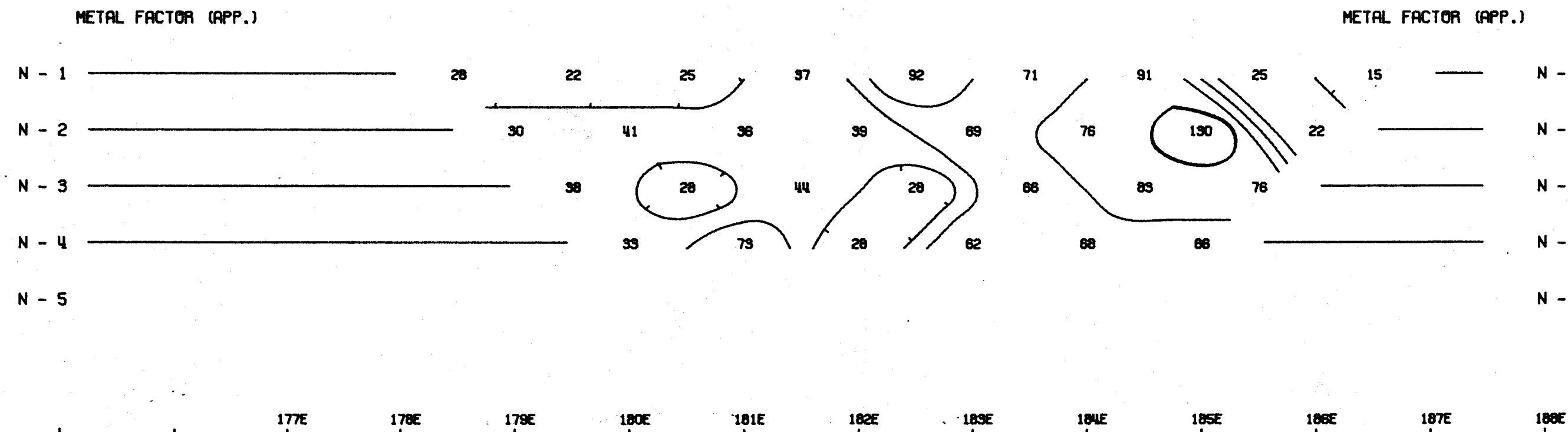NOTE: THIS PLOT WAS PRODUCED WITH AN IBM 360/75 COMPUTER AND A CALCOMP PLOTTER

RESISTIVITY (APP.) IN OHM FEET / 2π

	N-5	N-4	N-3	N-2	N-1
		101		106	138
		126	205	176	110
		79	92	91	195
		172	110	101	63
		102	69	146	240
		87	279	150	96
			62	140	335
			175	96	83
					143

177E	178E	179E	180E	181E	182E	183E	184E	185E	186E	187E	188E

METAL FACTOR (APP.)

	N-1	N-2	N-3	N-4	N-5
	49	60	21	47	
	43	28	65	56	
	3.1	22	29	52	
	22	28	87	30	
	12	22	23	27	
	21	29	81	74	
	6.6	31	34		
	NEG	43			
	15				

177E	178E	179E	180E	181E	182E	183E	184E	185E	186E	187E	188E

FREQUENCY EFFECT (APP.) IN %

	N-1	N-2	N-3	N-4	N-5
	6.7	6.4			
	4.7	5.0	4.3	4.8	
	0.6	2.0	6.0	7.2	
	1.4	2.8	3.2	3.8	
	2.9	3.2	4.6	5.1	
	2.0	4.3	6.4	2.8	
	2.2	4.4	5.0	6.4	
	-2.2	4.1	5.9		
	2.2				

QUALITY EXPLORATION CORPORATION

SPA MINES PROJECT
PRINCETON AREA, SIMILKAMEEN, M.D., B.C.

LINE NO.- 172N

RESISTIVITY (APP.) IN OHM FEET / 2π (left)   **RESISTIVITY (APP.) IN OHM FEET / 2π** (right)

| | N-5 | | | | | | | | | | | N-5 |

N-4				167	144	112	158	158	179			N-4
N-3			154	144	134	124	185	144	214			N-3
N-2			140	115	122	145	143	172	175	156		N-2
N-1		197	89	104	168	152	134	205	165	219		N-1

| | 176E | 177E | 178E | 179E | 180E | 181E | 182E | 183E | 184E | 185E | 186E | 187E |

METAL FACTOR (APP.) (left)   **METAL FACTOR (APP.)** (right)

N-1		15	86	56	15	24	16	6.4	12	21		N-1
N-2		26	28	32	25	9.1	23	17	16		N-2
N-3		31	37	19	21	18	21	17		N-3
N-4		25	24	41	20	20	31		N-4
N-5												N-5

| | 176E | 177E | 178E | 179E | 180E | 181E | 182E | 183E | 184E | 185E | 186E | 187E |

FREQUENCY EFFECT (APP.) IN % (left)   **FREQUENCY EFFECT (APP.) IN %** (right)

N-1		3.0	7.8	5.8	2.5	3.6	2.1	1.3	2.0	4.7		N-1
N-2		3.6	3.2	3.9	3.8	1.3	3.9	2.9	2.5		N-2
N-3		4.8	5.3	2.6	2.6	3.4	3.0	3.7		N-3
N-4		4.2	3.4	4.6	3.2	3.2	5.4		N-4
N-5												N-5

DWG. NO.- I.P.-5371-17

LINE NO.- 172N

ELECTRODE CONFIGURATION

PLOTTING POINT → X   X = 100'

SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE ▬▬▬
PROBABLE ⋯⋯⋯
POSSIBLE ////

FREQUENCIES: 0.31-5.0 CPS   DATE SURVEYED: NOV 1969
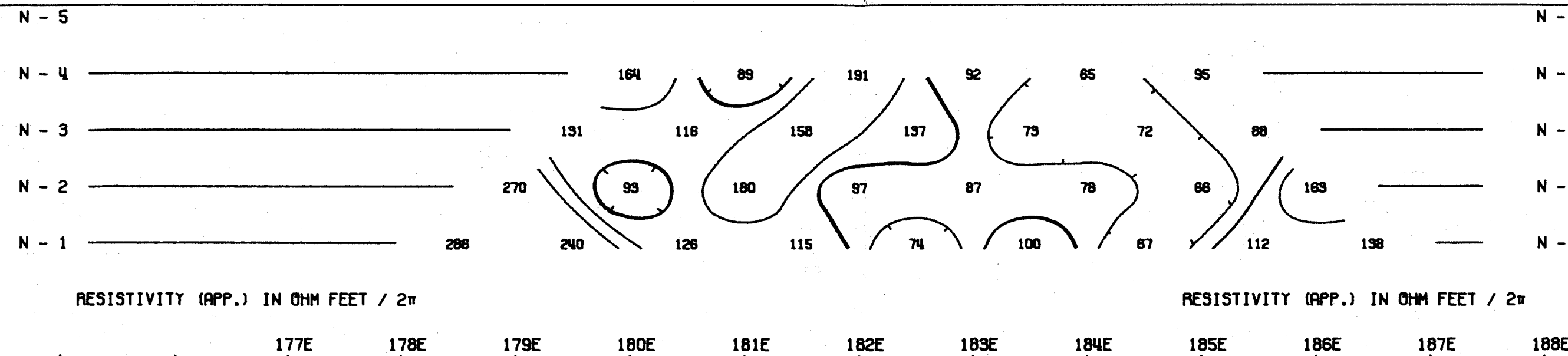
APPROVED: D. K. FOUNTAIN

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

DATE:

2389

McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

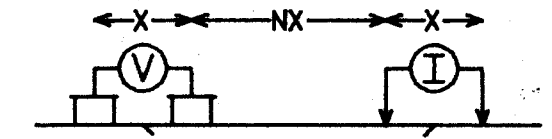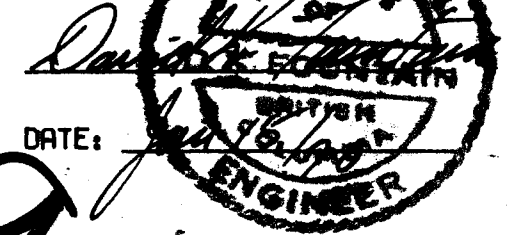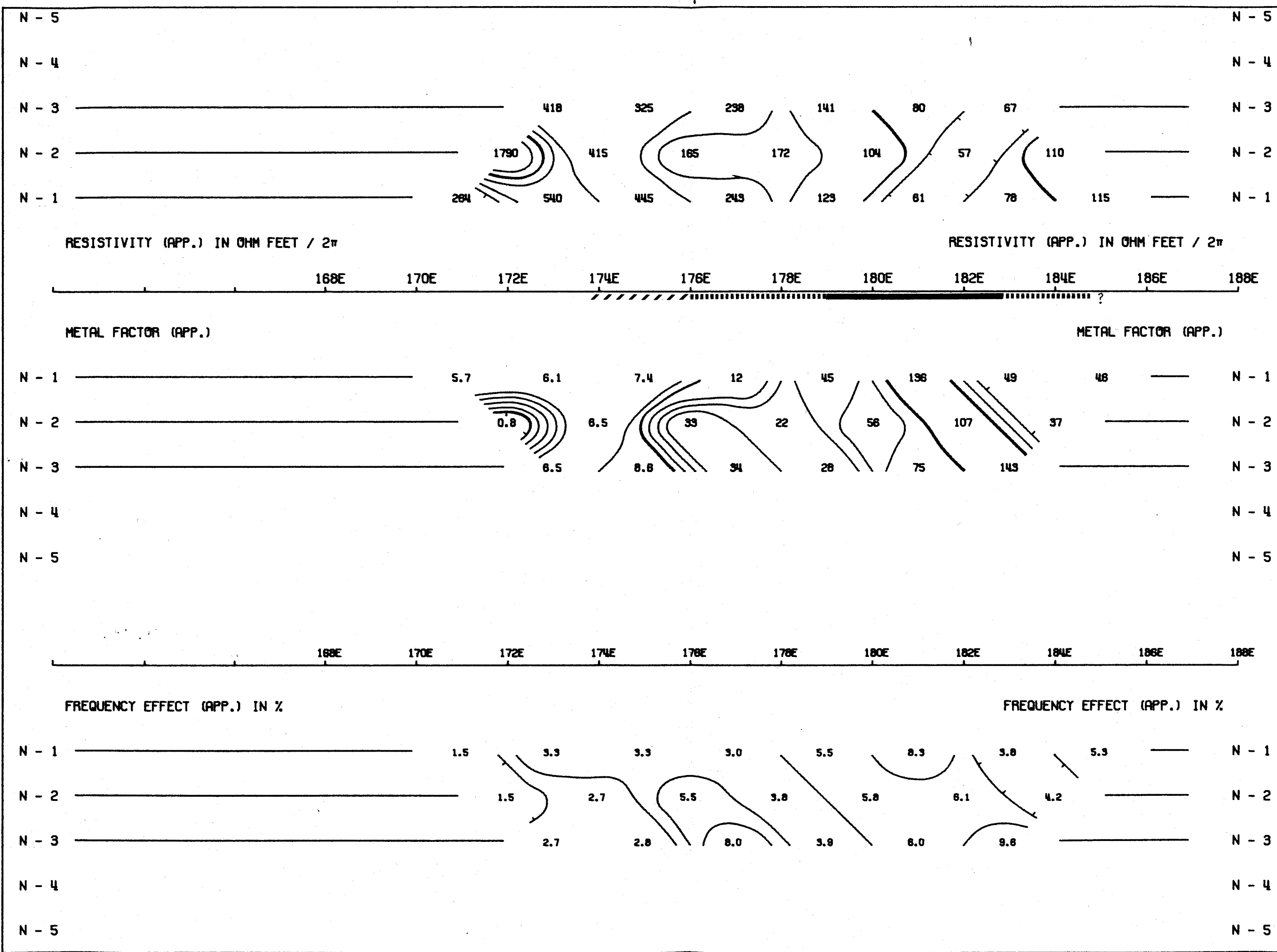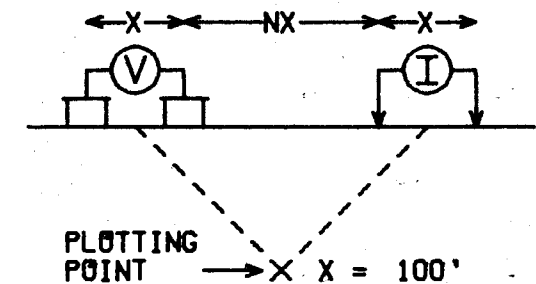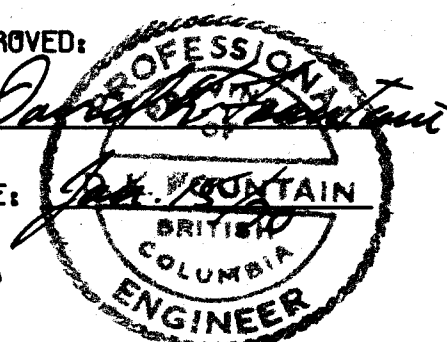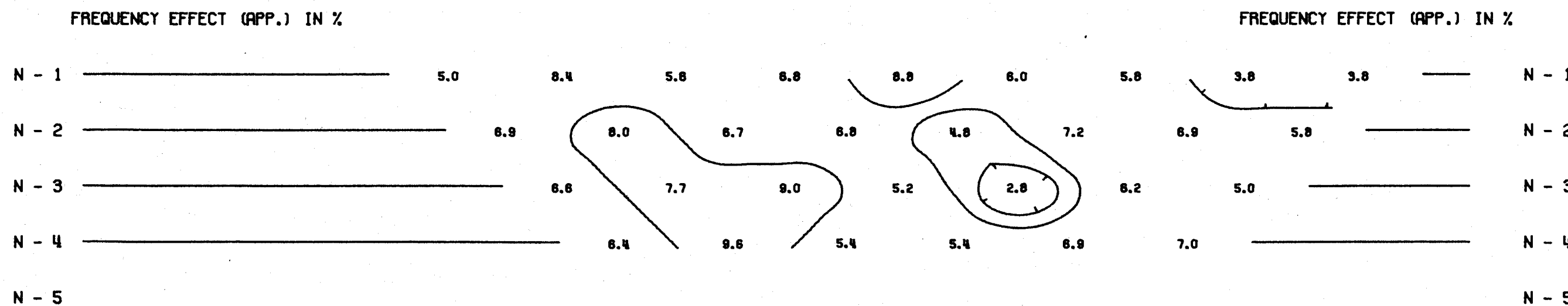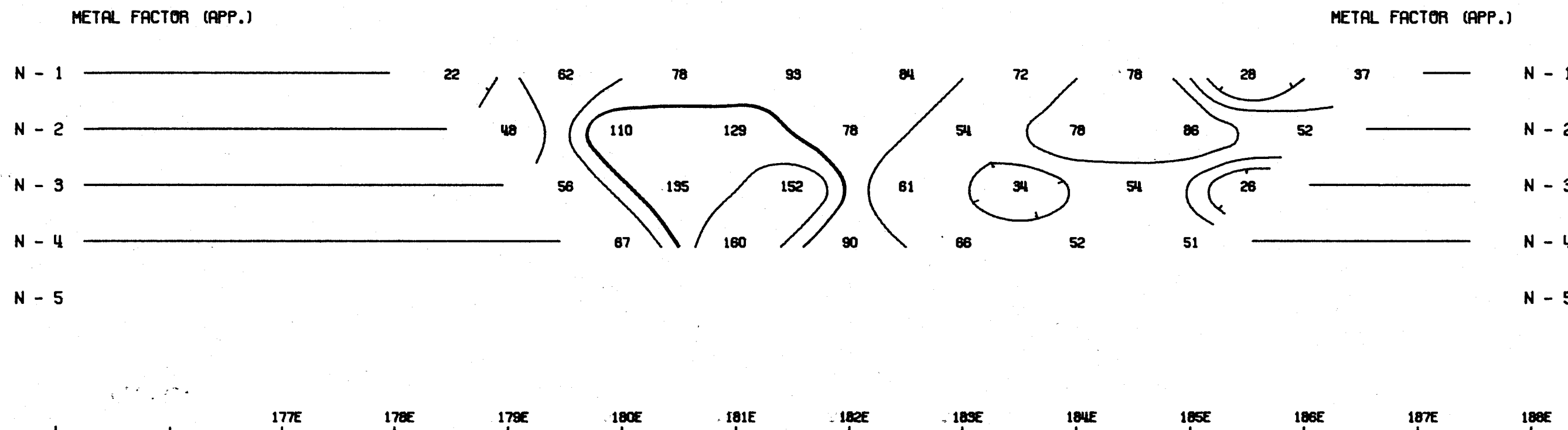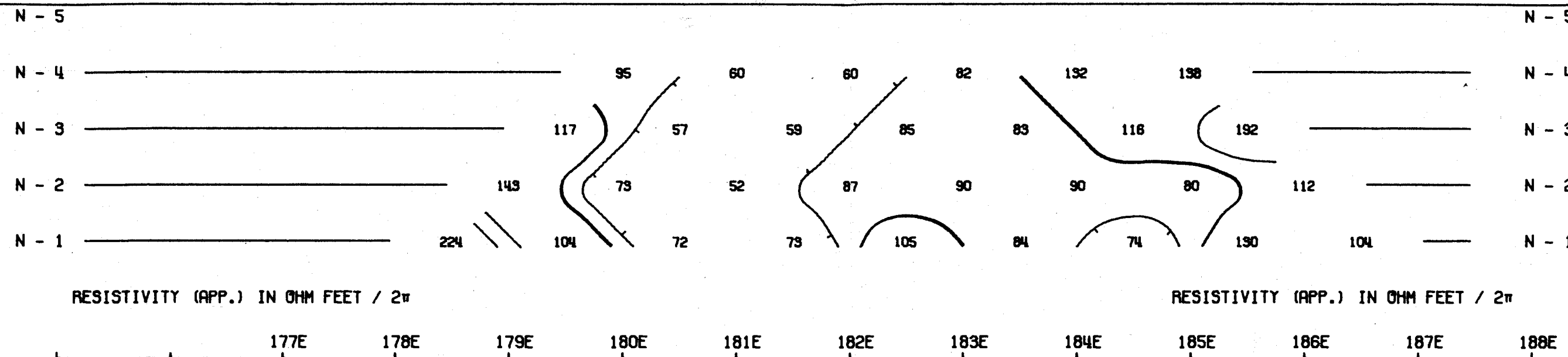NOTE: THIS PLOT WAS PRODUCED WITH AN IBM 360/75 COMPUTER AND A CALCOMP PLOTTER

QUALITY EXPLORATION CORPORATION

SPA MINES PROJECT
PRINCETON AREA, SIMILKAMEEN, M.D., B.C.

LINE NO.- 180N

ELECTRODE CONFIGURATION

X — NX — X

PLOTTING POINT → X   X = 200'

SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE ▬▬▬
PROBABLE ııııııııııı
POSSIBLE /////

FREQUENCIES: 0.31-5.0 CPS   DATE SURVEYED: NOV 1969

APPROVED:
D. K. FOUNTAIN
PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA
Expiry Date: April 25, 1970

DATE:

2389

McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

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

NOTE: THIS PLOT WAS PRODUCED WITH AN IBM 360/75 COMPUTER AND A CALCOMP PLOTTER

RESISTIVITY (APP.) IN OHM FEET / 2π

	N-5	N-4	N-3	N-2	N-1
			440 1180 435	540 570 1290 324 126	445 560 805 910 267 186

METAL FACTOR (APP.)

N-1	7.2 5.4 4.0 5.0 8.2 21	
N-2	5.8 4.4 2.8 4.7 38	
N-3	14 2.5 11	

FREQUENCY EFFECT (APP.) IN %

N-1	3.2 3.0 2.4 4.5 2.2 4.0	
N-2	3.1 2.5 3.4 1.5 4.9	
N-3	6.4 2.9 4.6	

Scale markers: 156E 158E 160E 162E 164E 166E 168E 170E 172E 174E 176E 178E 180E

QUALITY EXPLORATION CORPORATION

SPA MINES PROJECT
PRINCETON AREA, SIMILKAMEEN, M.D., B.C.

LINE NO.- 184N

RESISTIVITY (APP.) IN OHM FEET / 2π

	N-5	N-4	N-3	N-2	N-1

N-4: 95 143 160 165 94 135 72 305
N-3: 830 260 312 307 360 90 200 205 174 127 158 55 334 288
N-2: 648 772 259 268 165 140 110 185 305 243 335 112 450 295 128
N-1: 670 518 740 128 111 160 212 181 320 810 670 580 1010 302 114 89

RESISTIVITY (APP.) IN OHM FEET / 2π

168E 170E 172E 174E 176E 178E 180E 182E 184E 186E 188E 190E 192E 194E 196E 198E 200E 202E 204E

METAL FACTOR (APP.)

N-1: 1.2 2.3 2.4 7.9 58 16 26 53 28 15 14 6.8 3.1 4.0 7.9 2.3
N-2: 1.5 1.6 5.8 5.2 45 36 55 33 25 38 34 37 8.1 7.5 19
N-3: 1.2 1.9 0.3 12 3.6 62 29 32 33 47 77 77 13 8.4
N-4: 51 38 26 18 87 64 45 10

METAL FACTOR (APP.)

FREQUENCY EFFECT (APP.) IN %

N-1: 0.8 1.2 1.8 1.0 6.4 2.9 5.5 9.5 8.1 9.0 8.5 3.8 1.2 0.9 0.2
N-2: 1.0 1.2 1.5 1.4 7.5 5.0 8.0 6.0 7.5 8.7 12 4.1 3.8 2.2 1.6
N-3: 1.0 0.5 0.1 3.6 1.1 5.6 5.8 6.5 5.8 6.0 12 4.2 4.2 2.7
N-4: 4.8 5.4 4.2 3.0 8.2 8.6 3.2 3.1

FREQUENCY EFFECT (APP.) IN %

2389

McPHAR GEOPHYSICS
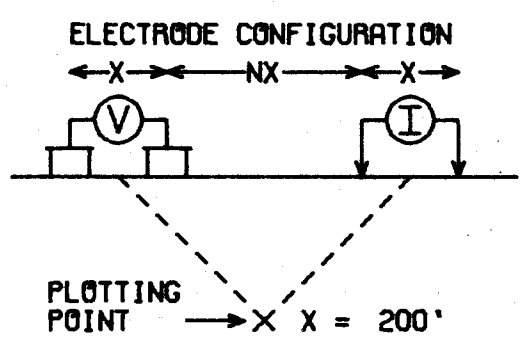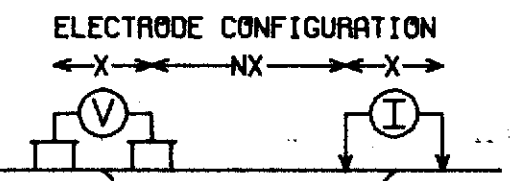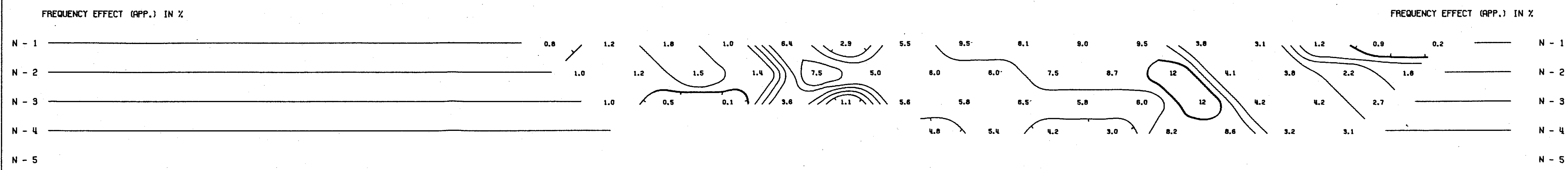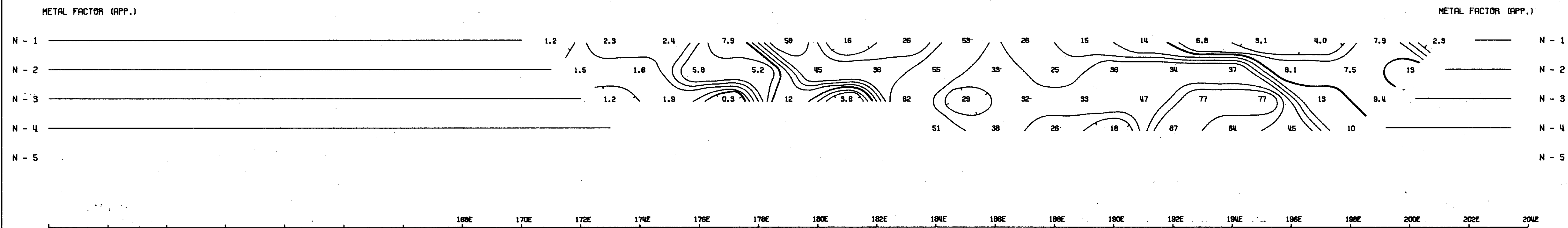### INDUCED POLARIZATION AND RESISTIVITY SURVEY

NOTE: THIS PLOT WAS PRODUCED WITH AN IBM 360/75 COMPUTER AND A CALCOMP PLOTTER

QUALITY EXPLORATION CORPORATION

SPA MINES PROJECT
PRINCETON AREA, SIMILKAMEEN, M.D., B.C.

LINE NO.- _186N_

RESISTIVITY (APP.) IN OHM FEET / 2π

N-5									N-5
N-4									N-4
N-3	324	200	170	242					N-3
N-2	250	780	300	390	215				N-2
N-1	305	550	885	235	287	98			N-1

168E 170E 172E 174E 176E 178E 180E 182E 184E

?

METAL FACTOR (APP.)

N-1	1.3	3.8	1.8	7.2	25	20	N-1
N-2	17	2.4	6.0	8.2	30		N-2
N-3	2.4	1.5	15	33			N-3
N-4							N-4
N-5							N-5

168E 170E 172E 174E 176E 178E 180E 182E 184E

FREQUENCY EFFECT (APP.) IN %

N-1	0.4	2.1	1.1	1.7	6.7	2.0	N-1
N-2	4.3	1.9	1.8	3.2	6.4		N-2
N-3	0.8	0.3	2.5	7.9			N-3
N-4							N-4
N-5							N-5

ELECTRODE CONFIGURATION

←X→ ←NX→ ←X→

PLOTTING POINT → X   X = 200'

SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE ▬▬▬
PROBABLE ||||||||||||
POSSIBLE /////

FREQUENCIES: _0.31-5.0 CPS_   DATE SURVEYED: NOV. 1969

APPROVED

DATE:

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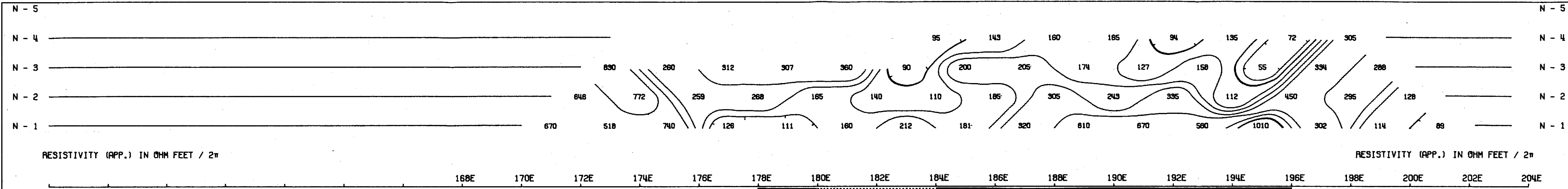1.-1.5-2.-3.-5.-7.5-10

2389

McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

NOTE: THIS PLOT WAS PRODUCED WITH AN IBM 360/75 COMPUTER AND A CALCOMP PLOTTER
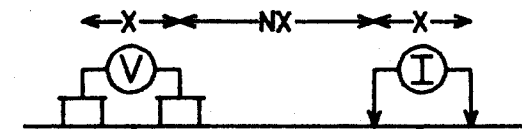
Expiry Date: April 25, 1970

QUALITY EXPLORATION CORPORATION

SPA MINES PROJECT

PRINCETON AREA, SIMILKAMEEN, M.D., B.C.

LINE NO.- 186N

RESISTIVITY (APP.) IN OHM FEET / 2π

	N-5									N-5
N-4		320	307	220	372	340	290			N-4
N-3		255	225	268	400	479	880	360		N-3
N-2	545	460	207	600	555	830	1010	320		N-2
N-1	360	1020	380	500	1380	910	880	815	500	N-1

RESISTIVITY (APP.) IN OHM FEET / 2π

185E 186E 187E 188E 189E 190E 191E 192E 193E 194E 195E 196E

? /////////////// ?

METAL FACTOR (APP.)

										METAL FACTOR (APP.)
N-1	13	5.0	5.5	6.0	5.1	4.9	5.2	4.0	5.6	N-1
N-2	9.0	10	22	15	12	7.5	7.5	25		N-2
N-3	24	28	28	22	19	15	24			N-3
N-4	16	18	27	19	27	37				N-4
N-5										N-5

185E 186E 187E 188E 189E 190E 191E 192E 193E 194E 195E 196E

FREQUENCY EFFECT (APP.) IN %

										FREQUENCY EFFECT (APP.) IN %
N-1	4.8	5.1	2.1	3.0	7.0	4.5	4.6	3.2	2.8	N-1
N-2	4.9	4.8	4.5	8.8	8.5	6.2	7.5	8.0		N-2
N-3	6.1	5.8	7.5	8.8	8.8	10	8.6			N-3
N-4	5.2	5.8	5.9	7.1	9.2	8.5				N-4
N-5										N-5

ELECTRODE CONFIGURATION

X → NX → X

V ... I
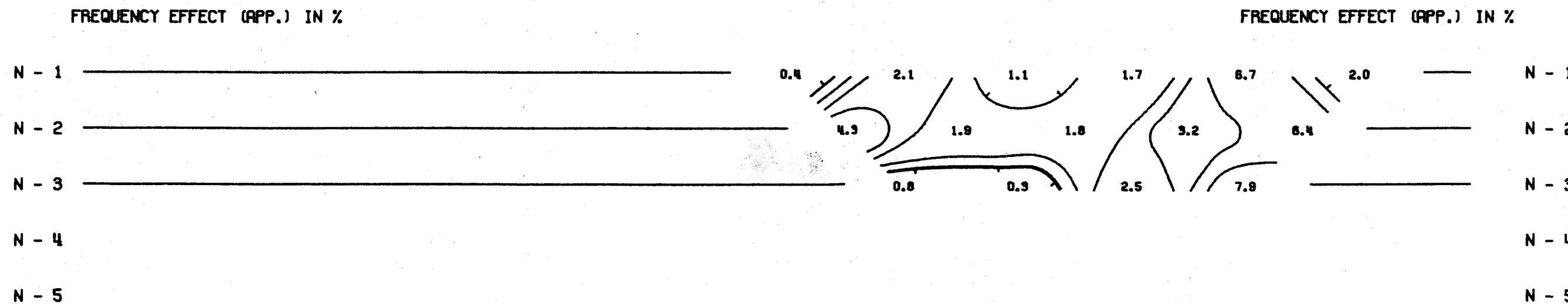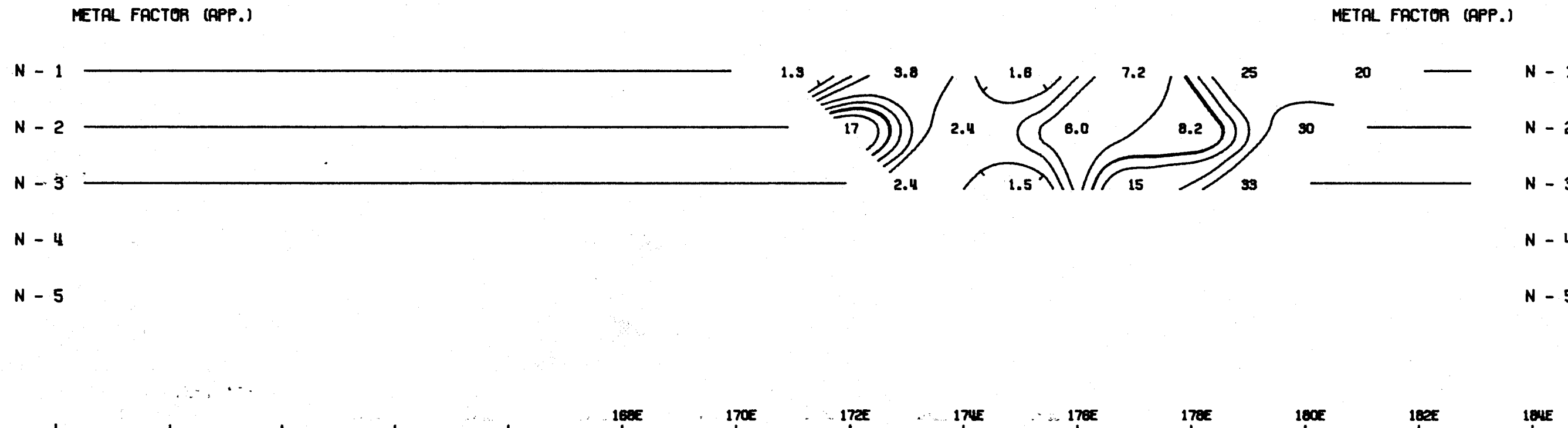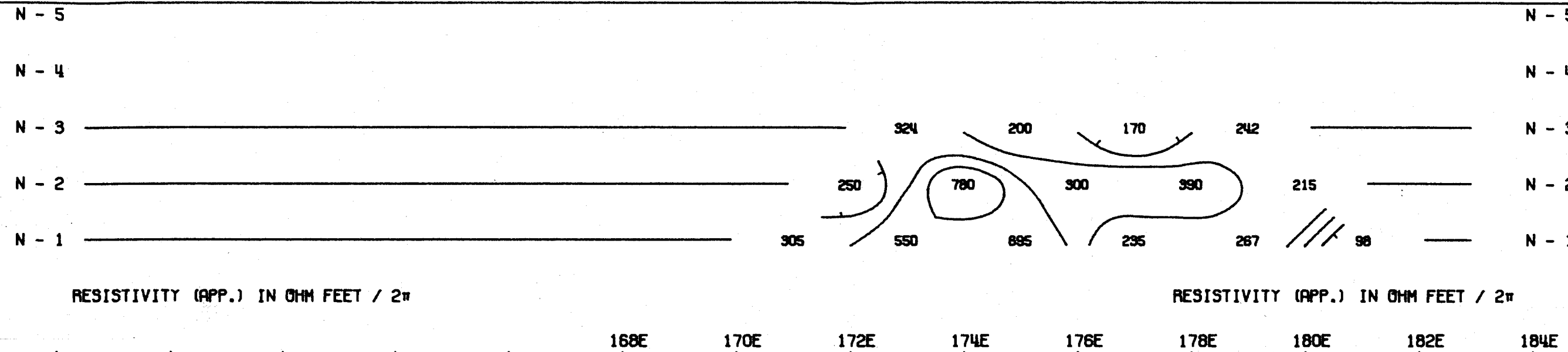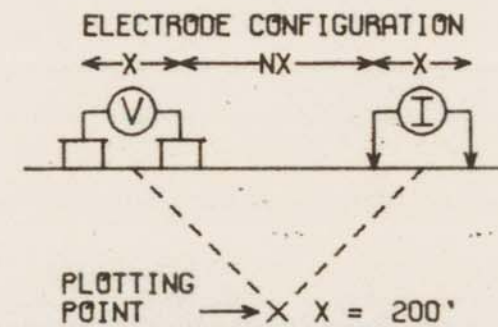
PLOTTING POINT → X   X = 100'

SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE ▬▬▬
PROBABLE ||||||||||||
POSSIBLE /////

FREQUENCIES: 0.31-5.0 CPS   DATE SURVEYED: NOV 1969

APPROVED   D.K. FOUNTAIN

DATE:

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

Expiry Date: April 25, 1970

2389

McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

NOTE: THIS PLOT WAS PRODUCED WITH AN IBM 360/75 COMPUTER AND A CALCOMP PLOTTER

RESISTIVITY (APP.) IN OHM FEET / 2π

	196	300	215	204	233	224	227	475	205	384	396	410	895	530	760	401	270	330	8900	955	870	660	
147	188	218	217	323	240	148	438	230	315	490	397	570	720	424	580	335	225	3150	855	765	800	599
163	106	104	229	300	276	199	291	180	418	340	349	485	625	755	304	350	253	182	780	581	641	722	453

RESISTIVITY (APP.) IN OHM FEET / 2π

136N 138N 140N 142N 144N 146N 148N 150N 152N 154N 156N 158N 160N 162N 164N 166N 168N 170N 172N 174N 176N 178N 180N 182N 184N 186N 180N

METAL FACTOR (APP.)

	8.1	7.8	16	8.8	15	9.8	8.5	3.4	10	6.0	10	1.4	4.1	3.7	1.8	9.5	8.5	12	9.3	2.9	1.7	3.7	3.5	4.4	
8.2	11	9.2	3.7	7.7	13	24	5.4	7.0	10	2.0	3.5	7.0	3.2	5.4	0.7	13	9.8	1.0	1.8	3.4	1.5	2.3
33	10	9.3	25	13	18	32	2.9	18	8.9	4.8	8.5	5.1	4.5	2.9	6.5	9.3	3.8	0.2	1.7	3.0	4.8

METAL FACTOR (APP.)

FREQUENCY EFFECT (APP.) IN %

	1.0	0.8	1.7	2.0	4.4	2.7	1.7	1.0	1.6	2.5	3.5	0.5	2.0	2.5	1.1	3.0	2.8	2.9	1.7	2.2	1.0	2.4	2.5	2.0	
1.2	1.8	2.0	0.8	2.5	3.0	3.5	1.5	1.6	3.2	1.0	1.4	4.0	2.3	2.9	0.4	4.4	2.2	3.1	1.4	1.0	1.4
6.4	1.8	2.0	5.3	5.1	4.1	4.4	1.8	3.7	3.4	1.0	3.5	4.6	2.4	2.2	3.0	2.5	1.2	1.7	1.8	2.8	3.2

FREQUENCY EFFECT (APP.) IN %

2389

sheet nos. 1, 1a, 1b, 1c.

sheet nos. 2, 2a, 2b, 2c.

DILLARD ZONE

MABEL ZONE

3a, 3b

120° 19' W.

49° 47' N

N

NOTE: TO ACCOMPANY GEOPHYSICAL REPORT BY R.G. JURY P. Eng., ON THE SPA MINES LTD. CLAIMS, SIWASH CREEK, SIMILKAMEEN MINING DIVISION, DATED SEPT. 12, 1969.
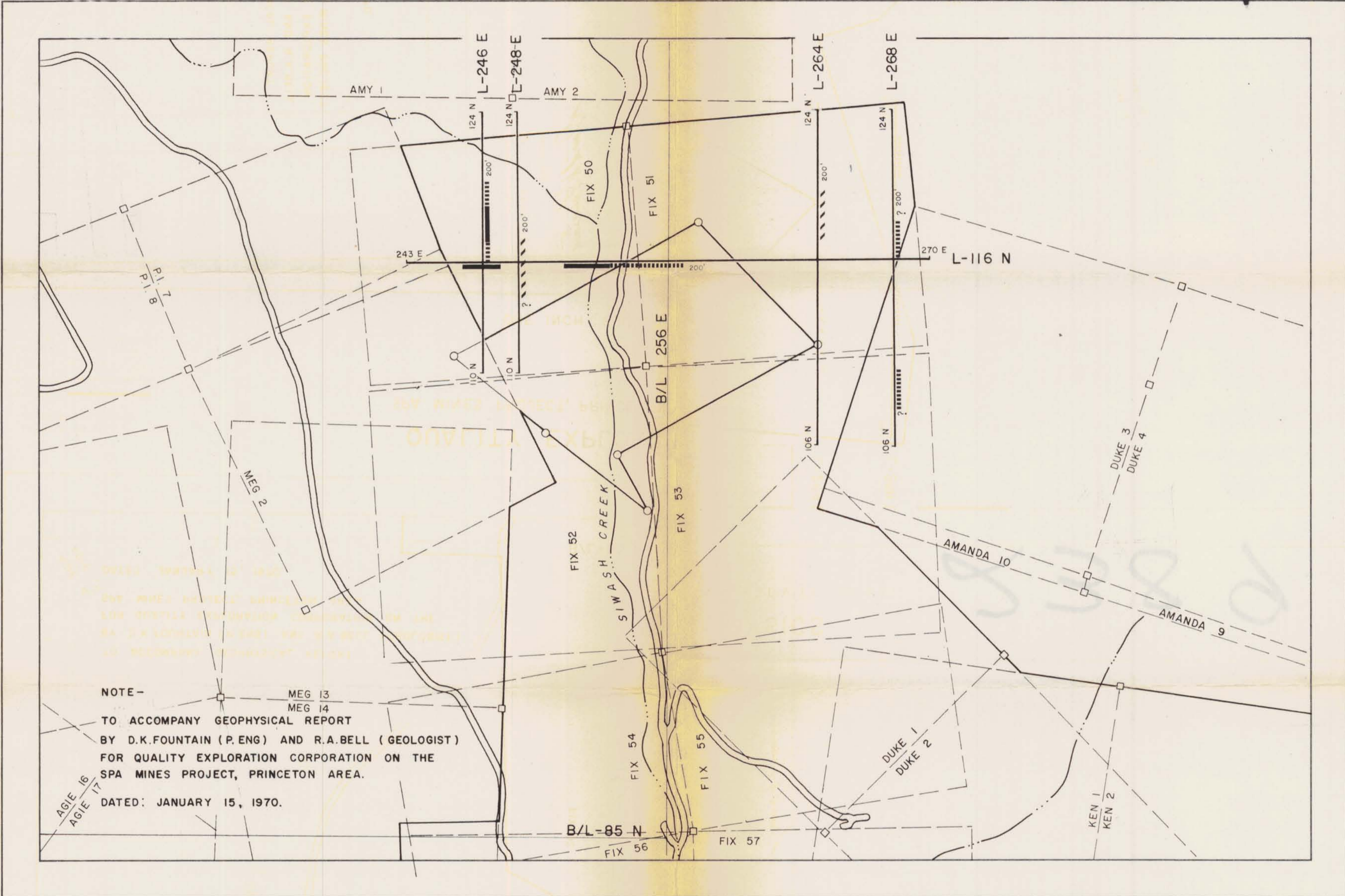
Rae G Jury

QUALITY EXPLORATION CORPORATION
SPA MINES PROJECT
INDEX AND CLAIM LOCATION MAP

ALRAE ENGINEERING LTD.
GEOLOGISTS AND ENGINEERS
VANCOUVER, B.C.

DESIGNED: G.H.	SCALE: HOR. 1" = 1500'
DRAWN: E.R.	VERT.
CHECKED: R.G.J.	
DATE: SEPTEMBER 1969	DWG. No. 5500 — 12

McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

PLAN MAP

2389

AMY 1
AMY 2

L-246 E
L-248-E
L-264 E
L-268 E

124 N
124 N
124 N
124 N

FIX 50
FIX 51

200'
200'
200'

243 E
270 E   L-116 N

200'

P.I. 7
P.I. 8

B/L 256 E

106 N
106 N

MEG 2

FIX 53

FIX 52

SIWASH CREEK

AMANDA 10

DUKE 3
DUKE 4

AMANDA 9

NOTE—

MEG 13
MEG 14

TO ACCOMPANY GEOPHYSICAL REPORT

BY D.K.FOUNTAIN (P. ENG) AND R.A.BELL (GEOLOGIST)

FOR QUALITY EXPLORATION CORPORATION ON THE

SPA MINES PROJECT, PRINCETON AREA.

DATED: JANUARY 15, 1970.

AGIE 16
AGIE 17

FIX 54

FIX 55

DUKE 1
DUKE 2

KEN 1
KEN 2

B/L-85 N

FIX 56
FIX 57

SURFACE PROJECTION
OF ANOMALOUS ZONES

DEFINITE
PROBABLE
POSSIBLE

Numbers at the end of the
anomalies indicate spread used.

N

QUALITY EXPLORATION CORPORATION

SPA MINES PROJECT, PRINCETON AREA, SIMILKAMEEN M.D., B.C.

(EAST GRID)

SCALE

ONE INCH EQUALS FOUR HUNDRED FEET

DRAWN D.N.
DATE   JANUARY 1970
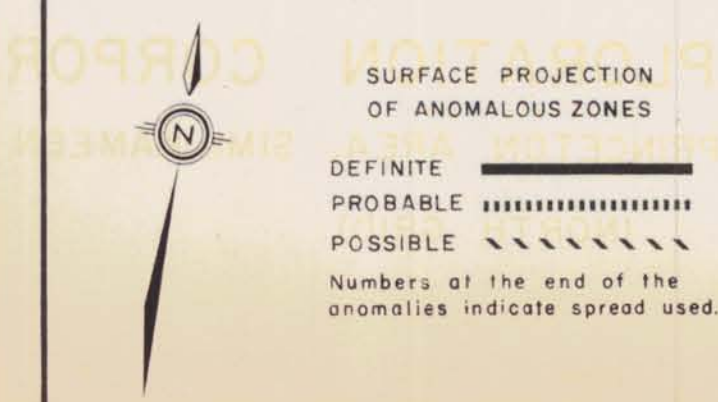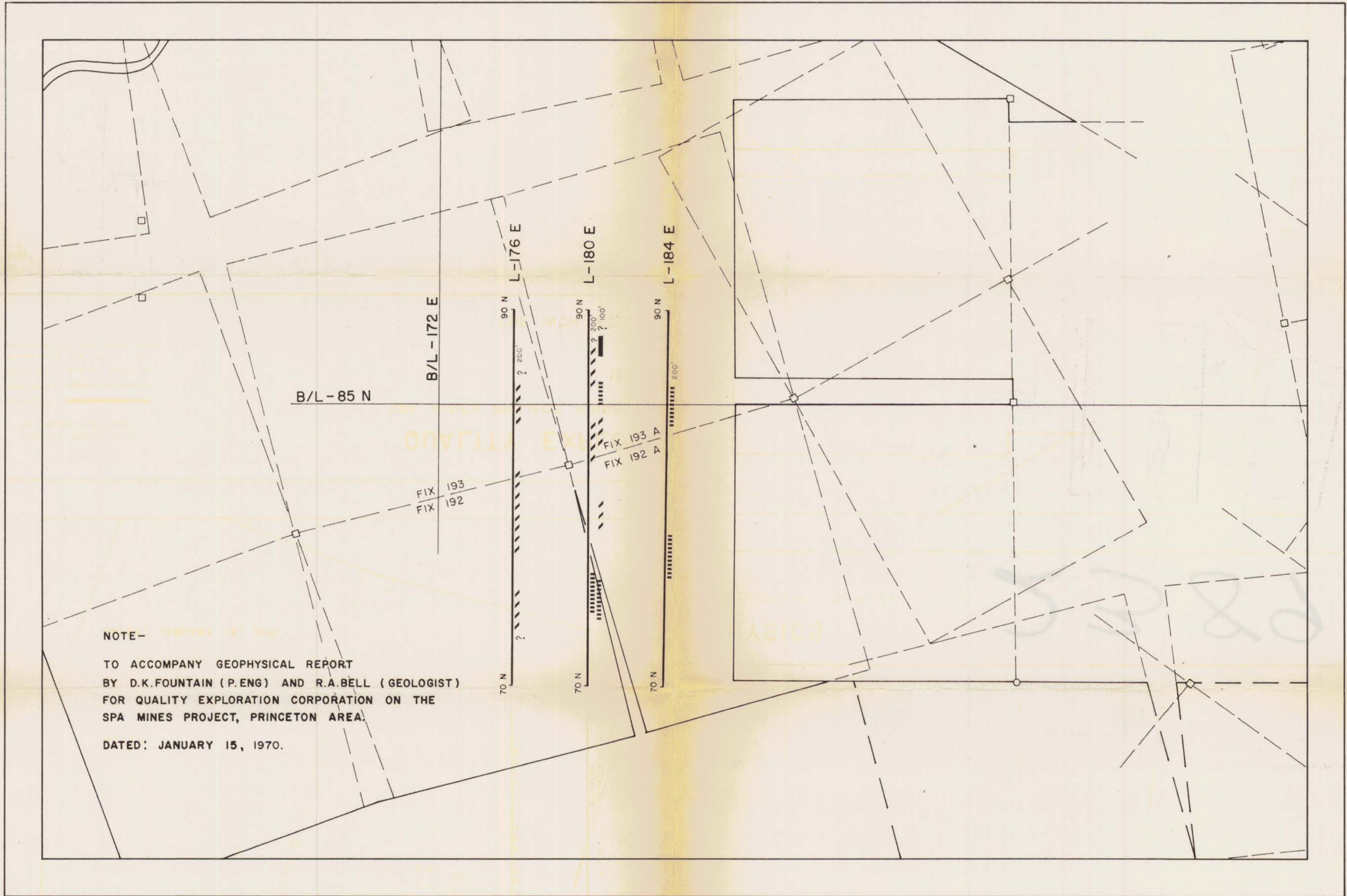APPROVED OF K.F.
DATE
Expiry Date: April 25, 1970

McPhar GEOPHYSICS
INDUCED POLARIZATION AND RESISTIVITY SURVEY
PLAN MAP

2389

NOTE-

TO ACCOMPANY GEOPHYSICAL REPORT
BY D.K. FOUNTAIN (P. ENG) AND R.A. BELL
(GEOLOGIST) FOR QUALITY EXPLORATION
CORPORATION ON THE SPA MINES PROJECT
PRINCETON AREA.

DATED: JANUARY 15, 1970.

SURFACE PROJECTION
OF ANOMALOUS ZONES

DEFINITE ▬▬▬▬
PROBABLE ▪▪▪▪▪▪▪▪
POSSIBLE ✕✕✕✕✕✕

Numbers at the end of the
anomalies indicate spread used.

QUALITY EXPLORATION CORPORATION
SPA MINES PROJECT, PRINCETON AREA, SIMILKAMEEN M.D., B.C.
(NORTH GRID)
SCALE
ONE INCH EQUALS FOUR HUNDRED FEET

McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

PLAN MAP

2389

B/L - 172 E

L - 176 E

L - 180 E

L - 184 E

B/L - 85 N

90 N

90 N

90 N

? 200

? 200
? 100

200

FIX 193 A
FIX 192 A

FIX 193
FIX 192

70 N

70 N

70 N

? 200

?

NOTE-

TO ACCOMPANY GEOPHYSICAL REPORT
BY D.K. FOUNTAIN (P.ENG) AND R.A.BELL (GEOLOGIST)
FOR QUALITY EXPLORATION CORPORATION ON THE
SPA MINES PROJECT, PRINCETON AREA.

DATED : JANUARY 15, 1970.

SURFACE PROJECTION
OF ANOMALOUS ZONES

DEFINITE	▬▬▬▬
PROBABLE	▮▮▮▮▮▮▮
POSSIBLE	⟍⟍⟍⟍⟍

Numbers at the end of the
anomalies indicate spread used.

QUALITY EXPLORATION CORPORATION

SPA MINES PROJECT, PRINCETON AREA, SIMILKAMEEN M.D., B.C.

(SOUTH GRID)

SCALE

ONE INCH EQUALS FOUR HUNDRED FEET

Department of
Mines and Petroleum Resources
ASSESSMENT REPORT

NO. **2389** MAP **#2**