

COMINCO LTD.

EXPLORATION

WESTERN DISTRICT

N.T.S.: 92-I-7
49°26'N; 120°53'W

6098

INDUCED POLARIZATION AND RESISTIVITY SURVEY

GUMP PROPERTY

NICOLA M.D., B.C.

92I/7W

Work Performed during July 1-13, 1976

on claims:

ELF 1	8 units	-	tag no: 18083
ELF 2	12 units	-	tag no: 18084
ELF 3	12 units	-	tag no: 18087
ELF 4	10 units	-	tag no: 18088

SEPTEMBER, 1976

JAN KLEIN

MINERAL RESOURCES BRANCH
ASSESSMENT REPORT

NO. 6098

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Figure 1 Time Domain Decay Curve

Plate 103-A Location and grid plan on a scale of 1 : 50,000

Dwg. No. 103-1 IP, resistivity and metal factor data of line 250S
103-2 IP, resistivity and metal factor data of line 500S
103-3 IP, resistivity and metal factor data of line 730S
103-4 IP, resistivity and metal factor data of line 970S
103-5 IP, resistivity and metal factor data of line 1250S
103-6 IP, resistivity and metal factor data of line 1500S
103-7 IP, resistivity and metal factor data of line 1750S
103-8 IP, resistivity and metal factor data of line 2000S
103-9 IP, resistivity and metal factor data of line 2250S
103-10 IP, resistivity and metal factor data of line 2500S

Don't number

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SUMMARY

An Induced Polarization and resistivity survey was executed along 19.0 km of line on the Gump property during July 1976.

The time domain survey used a Hunttec IP system and a pole-dipole array with basic spacing of $a = 75\text{m}$ and separations $n = 1, 2, 3$ and 4 . The results suggest one rock type to be present underneath the grid area. Resistivities range from 400 to 1500 ohm meters and chargeabilities from five to eight milliseconds.

Minor vertical discontinuities are visible in the resistivity data and some layering is discernable in the chargeability values. Economic amounts of Cu-Mo porphyry type mineralization is suggested absent to a depth of 100m below the grid based on this geophysical data.

INTRODUCTION

The Gump property, a copper and molybdenum porphyry type prospect, is located about 50 km southeast of Kamloops and 10 km east of Lornex Mines. Access to the property is by four wheel drive over reasonable roads. Gump Lake is located in the northern part of the property. The relief is moderate and average elevation approximately 5000' a.s.l.

The claim block consists of four claims designated ELF 1-4. The area is for 90 percent drift covered. This cover might be relatively thin; five to ten meters. The area is interpreted to occur within the eastern margin of the Guichon batholith and supposedly underlain by a hornblende granodiorite (Witches Brook phase).

The geophysical survey consisting of time domain Induced Polarization (IP) and resistivity measurements was executed over the centre part of the claim block (mainly claims ELF 3 and 4). A base line was established in a north-south direction and ten traverse lines approximately 250m apart were cut in an east-west direction. These lines were approximately two kilometers long each except lines 730S and 97S which are shorter. The survey was executed by Eagle Geophysics Limited of Vancouver during the period July 1 - 13 inclusive, 1976.

INDUCED POLARIZATION AND RESISTIVITY SURVEY

I. Method

The survey was performed using a Hunttec 7.5KW Time Domain transmitter and two Hunttec Mark-3 Time Domain receivers.

In all, approximately 19.0 km of line were surveyed, on ten parallel lines spaced 250m apart. A pole-dipole array with a basic spacing, $a = 75m$ and separations $n = 1-4$ was used, providing an effective search depth of 100-150m. The potential dipole was to the east of the near current electrode.

Figure 1 shows the instrument parameters of the equipment used. The duty ratio between current on and off times is two, with the current on time being two seconds. The chargeabilities shown on the drawings (see below) were computed as follows: $M_a = (M_1 + 2M_2 + 4M_3 + 8M_4) \times t_p$.

II. Data Presentation

The following data is included with this report:

Plate 103-A Claim map on grid plan on a scale of 1 : 50,000

The drawings on a scale of 1 : 3,000 show the results in standard pseudo-section format. From top to bottom are shown the calculated apparent resistivity ρ_a in ohm-meters, the chargeability, M_a , in milli-seconds and the apparent metal factor. The resistivity is calculated

employing the formula: $\rho_a = \frac{V_p}{I} \times K$ in which V and I are

the primary voltage and current, and K is a geometrical factor dependent on the electrode configuration. The metal factor is defined as follows $\frac{M_a}{\rho_a} \times 1,000$. The plotting point is midway between the

nearest current and potential electrodes (see figure on the drawings.) This geophysical data is shown on the following drawings:

Dwg. No.	103-1	Line	250S
	-2		500S
	-3		730S
	-4		970S
	-5		1250S
	-6		1500S
	-7		1750S
	-8		2000S
	-9		2250S
	-10		2500S

The chargeability values are contoured at an interval of one milli-second. A logarithmic contour interval is used for the resistivity and metal factor values. The following contours are used: 1.0; 1.5; 2.0; 3.0; 5.0; 7.5; etc.

III. Description of Results

The resistivity values range in general between 400 and 800 ohm meters. Certain areas show a somewhat higher range; up to 1500 ohm meters. Locally lower and higher values have been encountered e.g. 234 ohm meters at L2000S - 487.5W and 2545 ohm meters at L1250S - 300E.

The resistivity pattern does not show any indications of horizontal layering. On a few spots are low readings in the $n=1$ separation measured suggesting a somewhat thicker overburden.

Vertical or sub-vertical discontinuities are numerous but the resistivity contrast along these rarely exceeds a factor of two.

Most of these contrasts are only one measuring point wide and suggest therefor sources narrower than the electrode spacing used. Some of these dike-, or fault-like resistivity features are located at: L250S - 225W; L970S - 225E; L1750S - 300W and L2500S - 675W.

The chargeability values range from five to eight milliseconds. This is considered the local variation in bedrock chargeabilities. It might reflect up to one half of a percent fine grained sulphides and magnetite. Some non-metallic sources, such as platy minerals, cannot be excluded (membrane IP effect). A few higher readings have been measured: 9-10 msec at L730S - 300E; 9.8 msec at L970S - 75E and 9.6 msec at L1500S - 1012W. These values reflect small local increases of polarizable material.

Some vertical or sub-vertical oriented contrasts are discernable but these are fewer than similar changes in the resistivity pattern and they do not coincide.

What is more interesting is the pseudo horizontal layering. Several lines show a through like change in chargeabilities over considerable length but again there is no apparent correlation with the resistivity data.

This layering is clearly shown at: L500S - 675W to end line; line 730S - east and west ends of line; lines 1500S, 1750S, -2000S from BL to east, and lines 2250 and 2500S - west end of lines. The increase in chargeability values with depth at these locations is in general within the range of background values.

CONCLUSIONS

An IP and resistivity survey was executed along ten traverses on the Gump property.


The resistivities show a narrow range of values between 400 and 1500 ohm meters. Some vertical discontinuities are recognizable. The chargeability values range from five to eight milliseconds throughout the grid with ten milliseconds being the highest value measured. Some horizontal or through like layering is visible in the data. No direct correlation between resistivity and chargeability values is recognizable. On the other hand both sets of data suggest that only one rock type is present on the grid with minor variations in the background sulphide distribution and some faulting, change in composition, change in grain size, some overburden, etc. accountable for the difference in IP and resistivity values and patterns.

No direct evidence of the presence of a Cu-Mo porphyry zone are interpretable from this data.

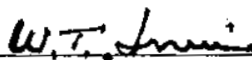
RECOMMENDATIONS

It is recommended to correlate detail geology and geochemical data with the present geophysical results prior to any further exploration work on this property.

Submitted by: _____


Jan Klein, P.Eng.
Chief Geophysicist

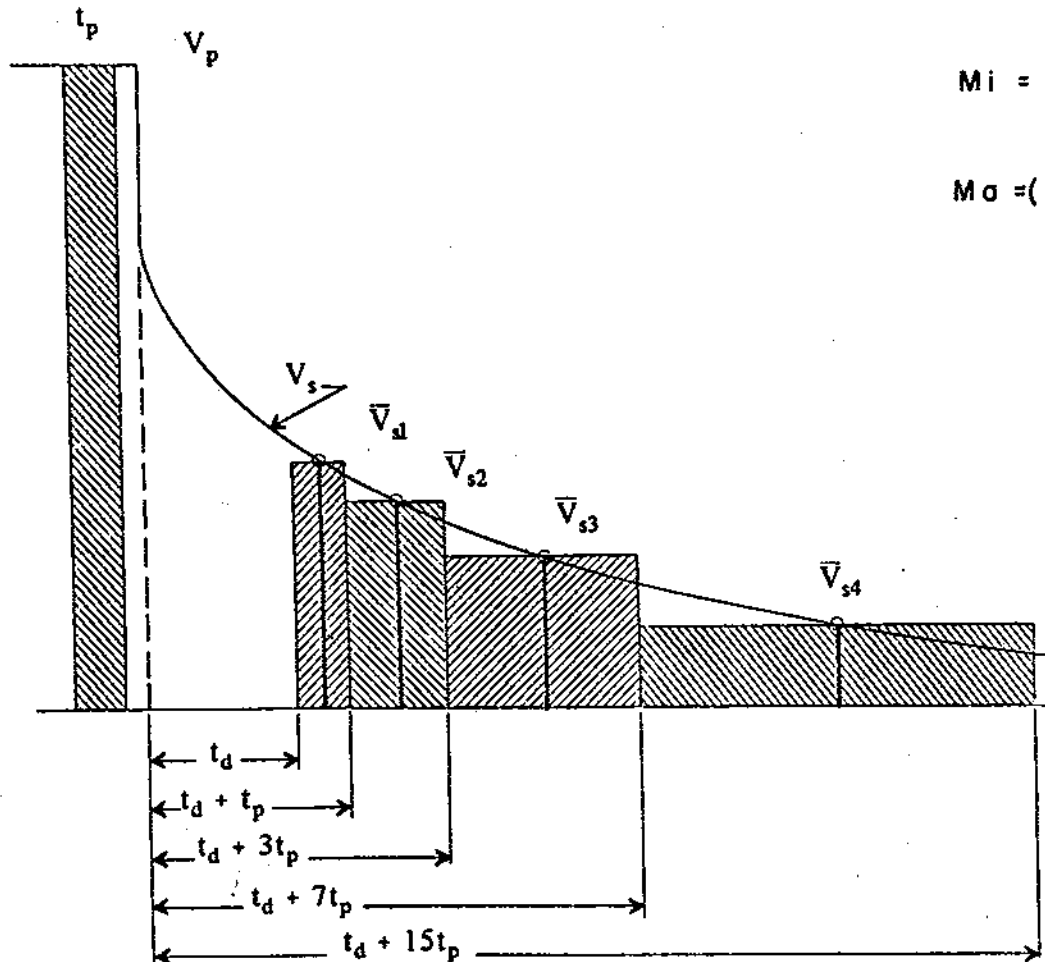
Endorsed by: _____


W.T. Irvine, P.Eng.
Manager, Exploration
Western District

JK/der

Distribution:

- Mining Recorder (2)
- W. D. Files (1)
- Admin. Files (1)



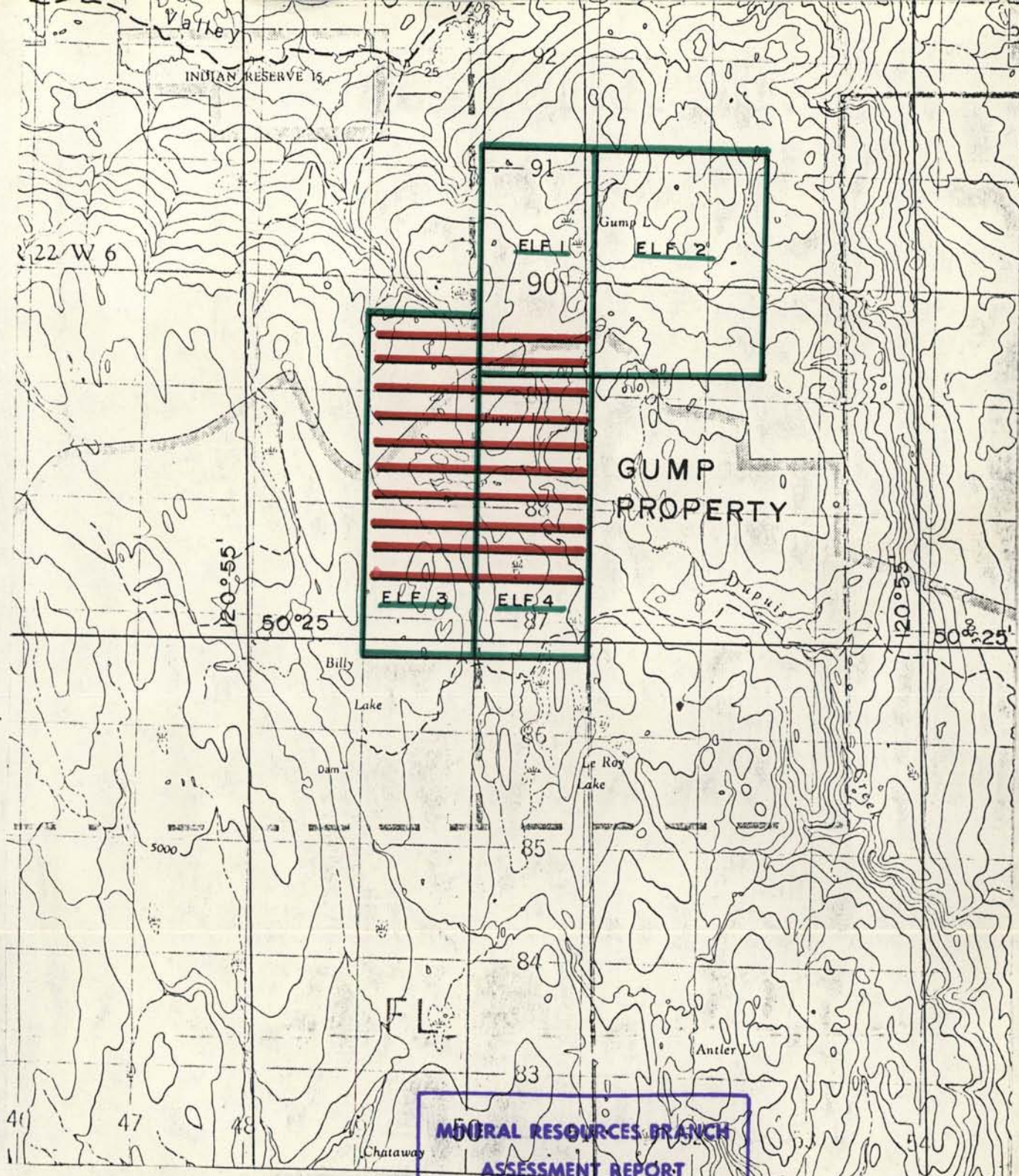
$$M_i = \frac{V_{si}}{V_p} = \frac{\text{secondary voltage}}{\text{primary voltage}}$$

$$M_a = (M_1 + 2 M_2 + 4 M_3 + 8 M_4) \times t_p$$

MINERAL RESOURCES BRANCH
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delaytime, $t_d = 60 \text{ ms}$
 integrating interval, $t_p = 40 \text{ ms}$
 total integrating time = 600 ms

FIGURE : I Time domain decay curve showing sampling with the Huntec MK III receiver



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MAMIT LAKE
 KAMLOOPS DIVISION OF YALE DISTRICT
 BRITISH COLUMBIA

SCALE 1:50,000 ÉCHELLE



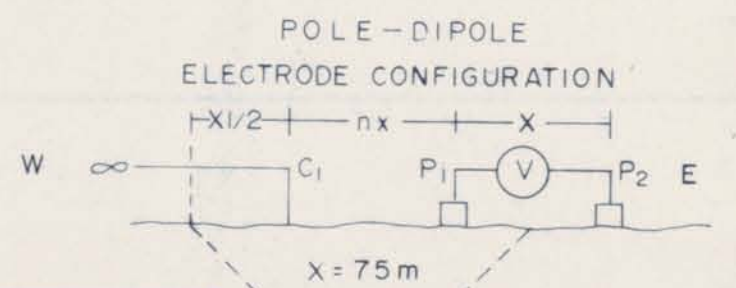
NTS
 92-1-7

Drawn by		Traced by:	
Revised by	Date	Revised by	Date

GUMP PROPERTY LOCATION MAP

COMINCO LTD. GUMP PROPERTY HIGHLAND VALLEY AREA, NICOLA M.D., B.C.

LINE NO. 250 S



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PLOTTING POINT
n = 1, 2, 3 & 4

SURFACE PROJECTION
OF ANOMALOUS ZONES

CONTOURS OF CHARGEABILITY
IN 1.0 MILLISECOND

CONTOURS OF RESISTIVITY &
METAL FACTOR AT
LOGARITHMIC INTERVALS
1, 10,
1.5, 2, 3, 5, 7.5

DATE SURVEYED _____

APPROVED _____

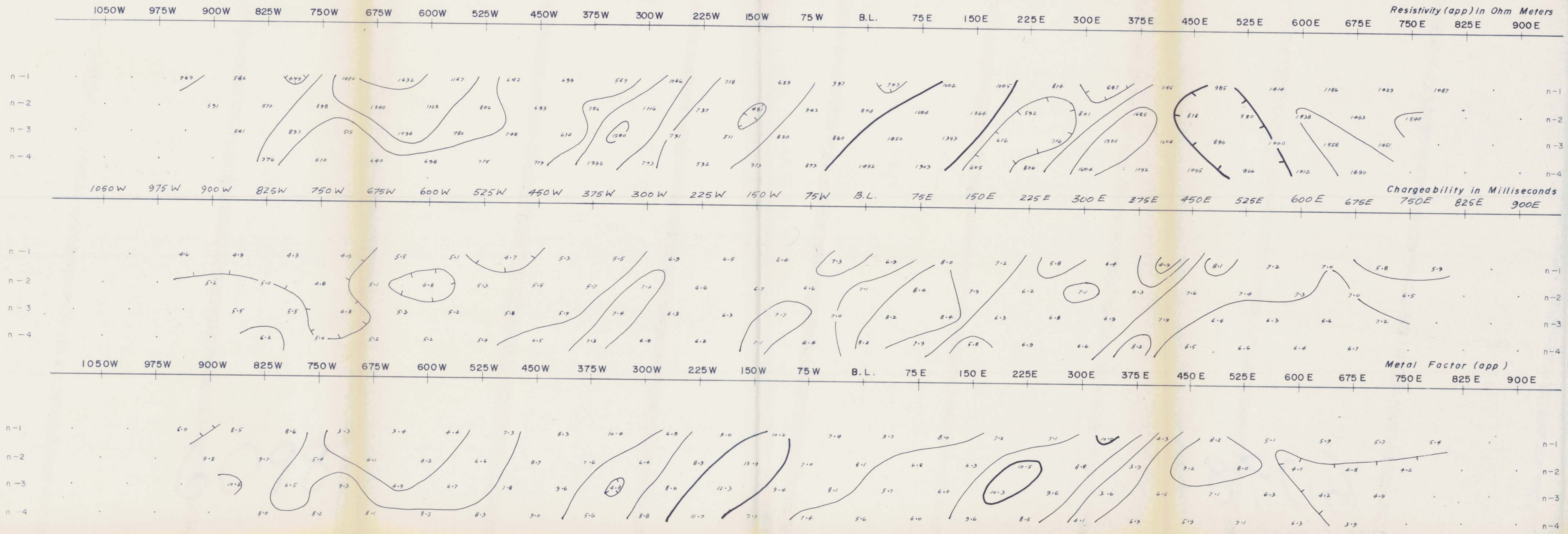
DATE _____



TRANSMITTER 7.5 KW TIME DOMAIN
RECEIVER HUNTEC MK III TYPE

6098

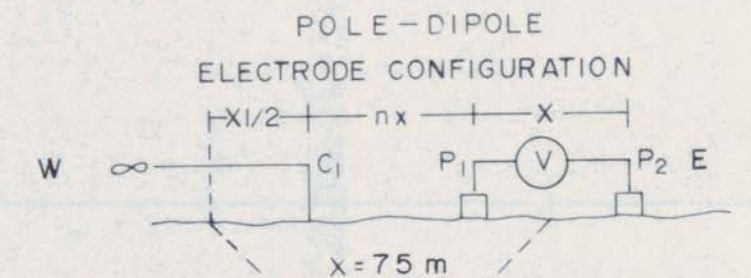
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SURVEYED BY EAGLE GEOPHYSICS LTD., (JOHN LLOYD M.Sc. P. Eng.)



LINE 250 S

COMINCO LTD. GUMP PROPERTY HIGHLAND VALLEY AREA, NICOLA M.D., B. C.

LINE NO. 500 S



MINERAL RESOURCES BRANCH
ASSESSMENT REPORT
NO. **6098**

PLOTTING POINT
n = 1, 2, 3 & 4

SURFACE PROJECTION
OF ANOMALOUS ZONES

CONTOURS OF CHARGEABILITY
IN 1.0 MILLISECOND
CONTOURS OF RESISTIVITY &
METAL FACTOR AT
LOGARITHMIC INTERVALS
1, 10,
1.5, 2, 3, 5, 7.5

DATE SURVEYED JULY 1976

APPROVED

John Klein
ENGINEER

DATE

TRANSMITTER 7.5KW TIME DOMAIN
RECEIVER HUNTEC MK III TYPE

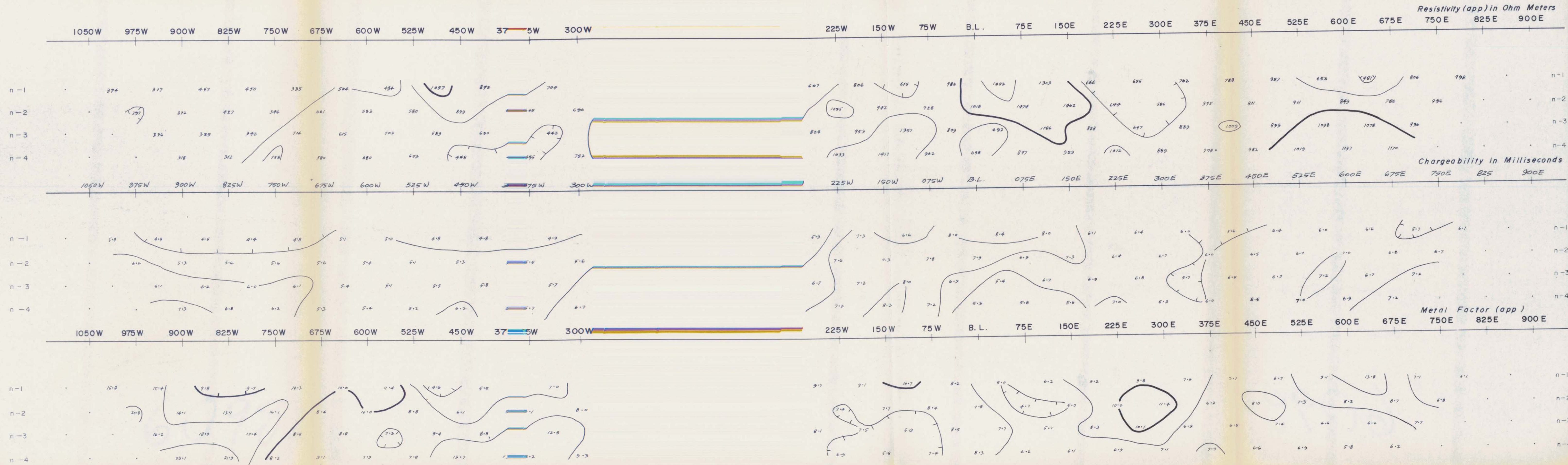
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INDUCED POLARIZATION AND RESISTIVITY SURVEY
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Resistivity (app) in Ohm Meters

Chargeability in Milliseconds

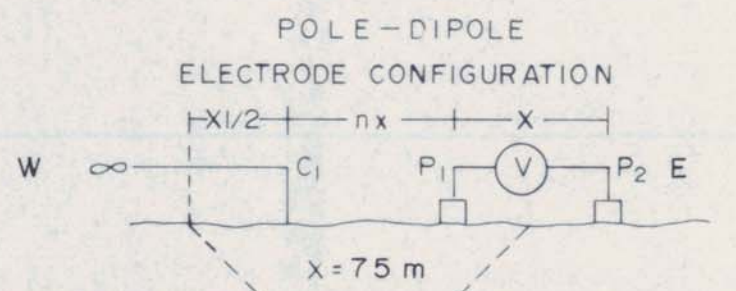
Metal Factor (app)



LINE 500 S

COMINCO LTD. GUMP PROPERTY HIGHLAND VALLEY AREA, NICOLA M.D., B. C.

LINE NO. 500 S



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PLOTTING POINT
n=1, 2, 3 & 4

SURFACE PROJECTION
OF ANOMALOUS ZONES

CONTOURS OF CHARGEABILITY
IN 1.0 MILLISECONDS
CONTOURS OF RESISTIVITY &
METAL FACTOR AT
LOGARITHMIC INTERVALS
1, 10,
1.5, 2, 3, 5, 7.5

DATE SURVEYED JULY 1976

APPROVED

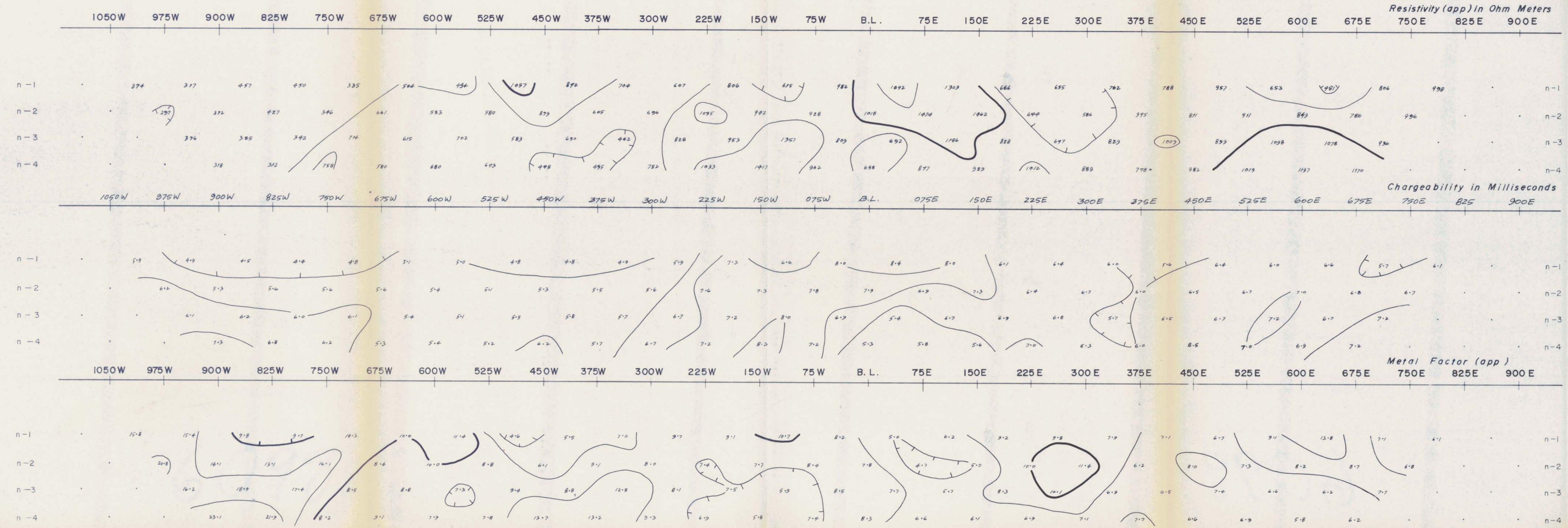
Jan Klein
ENGINEER

DATE

TRANSMITTER 7.5KW TIME DOMAIN
RECEIVER HUNTEC MK III TYPE

6098

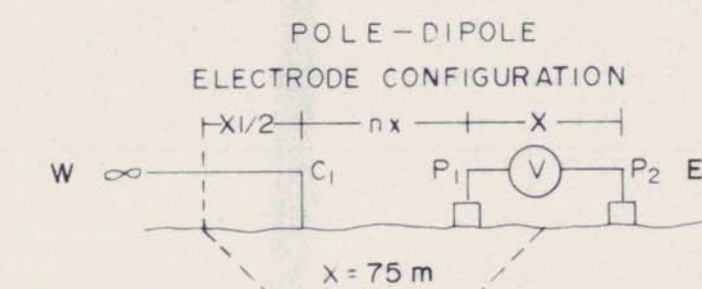
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LINE 500 S

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LINE NO. 730 S



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PLOTTING POINT
n = 1, 2, 3 & 4

SURFACE PROJECTION
OF ANOMALOUS ZONES

CONTOURS OF CHARGEABILITY
IN 1.0 MILLISECONDS
CONTOURS OF RESISTIVITY &
METAL FACTOR AT
LOGARITHMIC INTERVALS
1, 10,
1.5, 2, 3, 5, 7.5

DATE SURVEYED JULY 1976

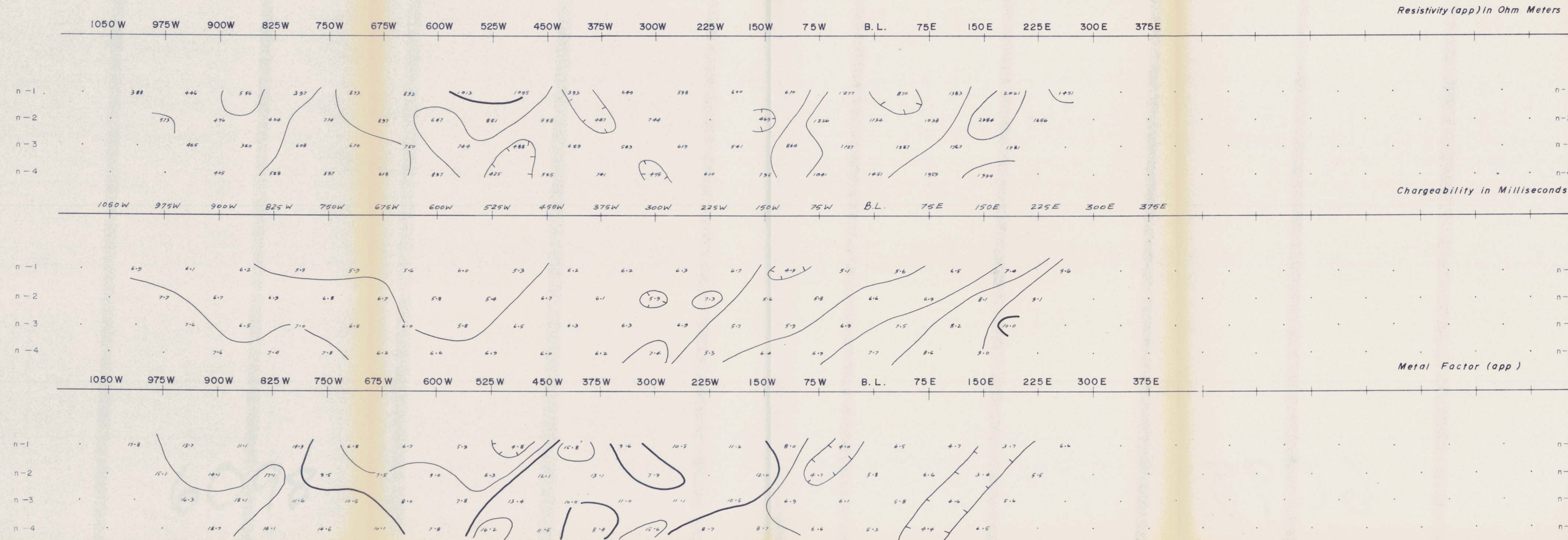
APPROVED *[Signature]*

DATE JAN 1977

TRANSMITTER 7.5 KW TIME DOMAIN
RECEIVER HUNTEC MK III TYPE

6098

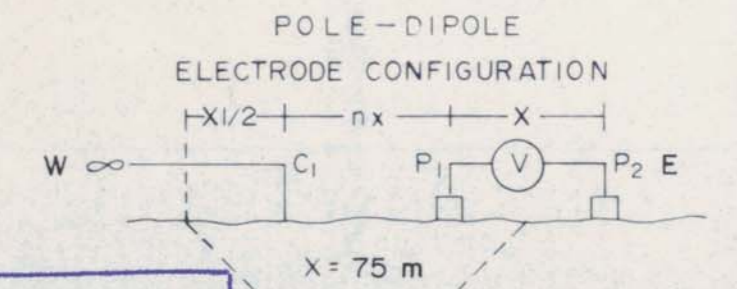
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SURVEYED BY EAGLE GEOPHYSICS LTD. (JOHN LLOYD M.Sc. P. Eng.)



LINE 730 S

COMINCO LTD. GUMP PROPERTY HIGHLAND VALLEY AREA, NICOLA M.D., B.C.

LINE NO. 970 S



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ASSESSMENT REPORT
NO. 6098

SURFACE PROJECTION OF ANOMALOUS ZONES

CONTOURS OF CHARGEABILITY IN 1.0 MILLISECOND
CONTOURS OF RESISTIVITY & METAL FACTOR AT LOGARITHMIC INTERVALS 1, 10, 1.5, 2, 3, 5, 7.5

DATE SURVEYED _____
APPROVED _____
DATE _____

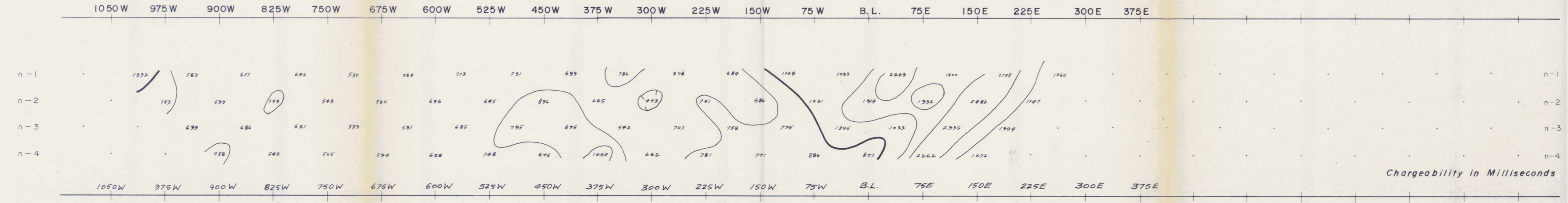


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RECEIVER HUNTEC MK III TYPE

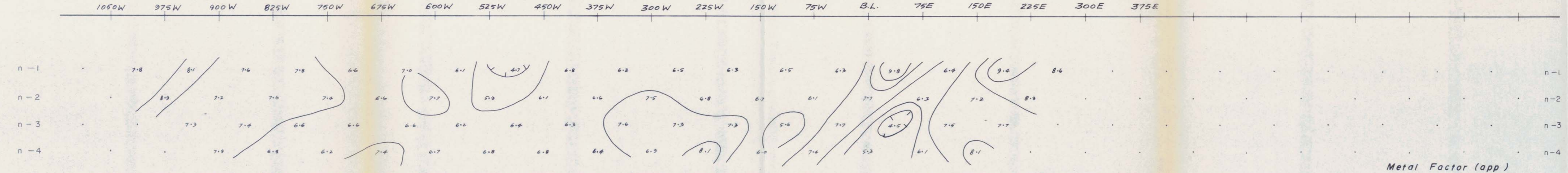
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INDUCED POLARIZATION AND RESISTIVITY SURVEY
SURVEYED BY EAGLE GEOPHYSICS LTD., (JOHN LLOYD M.Sc. P. Eng.)

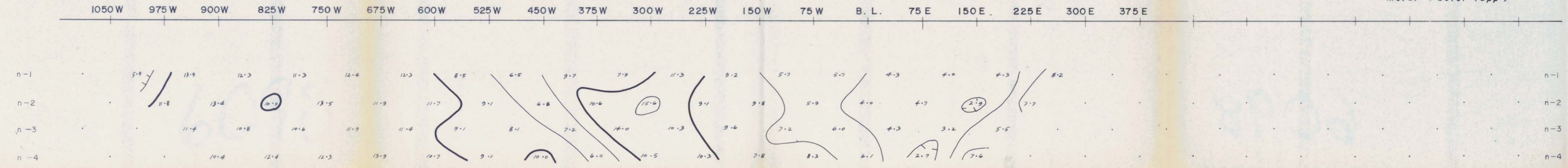
Resistivity (app) in Ohm Meters



Chargeability in Milliseconds



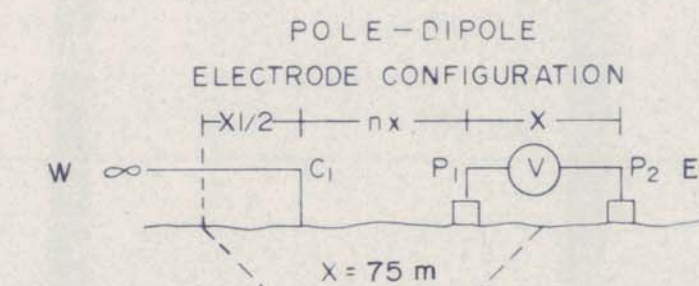
Metal Factor (app)



LINE 970 S

COMINCO LTD. GUMP PROPERTY HIGHLAND VALLEY AREA, NICOLA M.D., B.C.

LINE NO. 1250 S



MINERAL RESOURCES BRANCH
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PLOTTING POINT
n = 1, 2, 3 & 4

SURFACE PROJECTION
OF ANOMALOUS ZONES

CONTOURS OF CHARGEABILITY
IN 1.0 MILLISECONDS
CONTOURS OF RESISTIVITY &
METAL FACTOR AT
LOGARITHMIC INTERVALS
1, 10,
1.5, 2, 3, 5, 7.5

DATE SURVEYED

APPROVED

DATE

TRANSMITTER 7.5 KW TIME DOMAIN
RECEIVER HUNTEC MK III TYPE

INDUCED POLARIZATION AND RESISTIVITY SURVEY
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LINE 1250 S

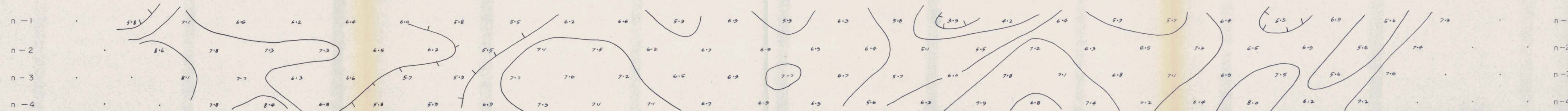
Resistivity (app) in Ohm Meters

1050W 975W 900W 825W 750W 675W 600W 525W 450W 375W 300W 225W 150W 75W B.L. 75E 150E 225E 300E 375E 450E 525E 600E 675E 750E 825E 900E



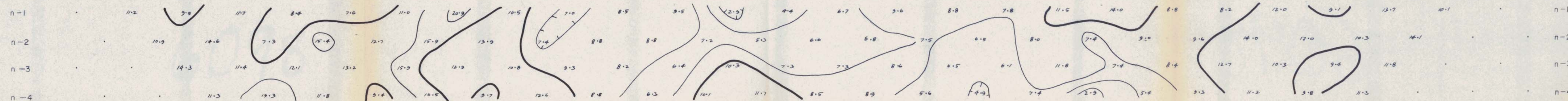
Chargeability in Milliseconds

1050W 975W 900W 825W 750W 675W 600W 525W 450W 375W 300W 225W 150W 75W B.L. 75E 150E 225E 300E 375E 450E 525E 600E 675E 750E 825E 900E



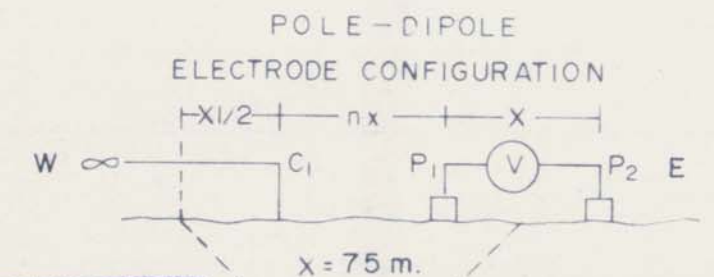
Metal Factor (app)

1050W 975W 900W 825W 750W 675W 600W 525W 450W 375W 300W 225W 150W 75W B.L. 75E 150E 225E 300E 375E 450E 525E 600E 675E 750E 825E 900E



COMINCO LTD. GUMP PROPERTY HIGHLAND VALLEY AREA, NICOLA M.D., B.C.

LINE NO. 1500 S



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PLOTTING POINT
n = 1, 2, 3 & 4

SURFACE PROJECTION
OF ANOMALOUS ZONES

CONTOURS OF CHARGEABILITY
IN 1.0 MILLISECONDS
CONTOURS OF RESISTIVITY &
METAL FACTOR AT
LOGARITHMIC INTERVALS
1, 10,
1.5, 2, 3, 5, 7.5

DATE SURVEYED JULY 1976

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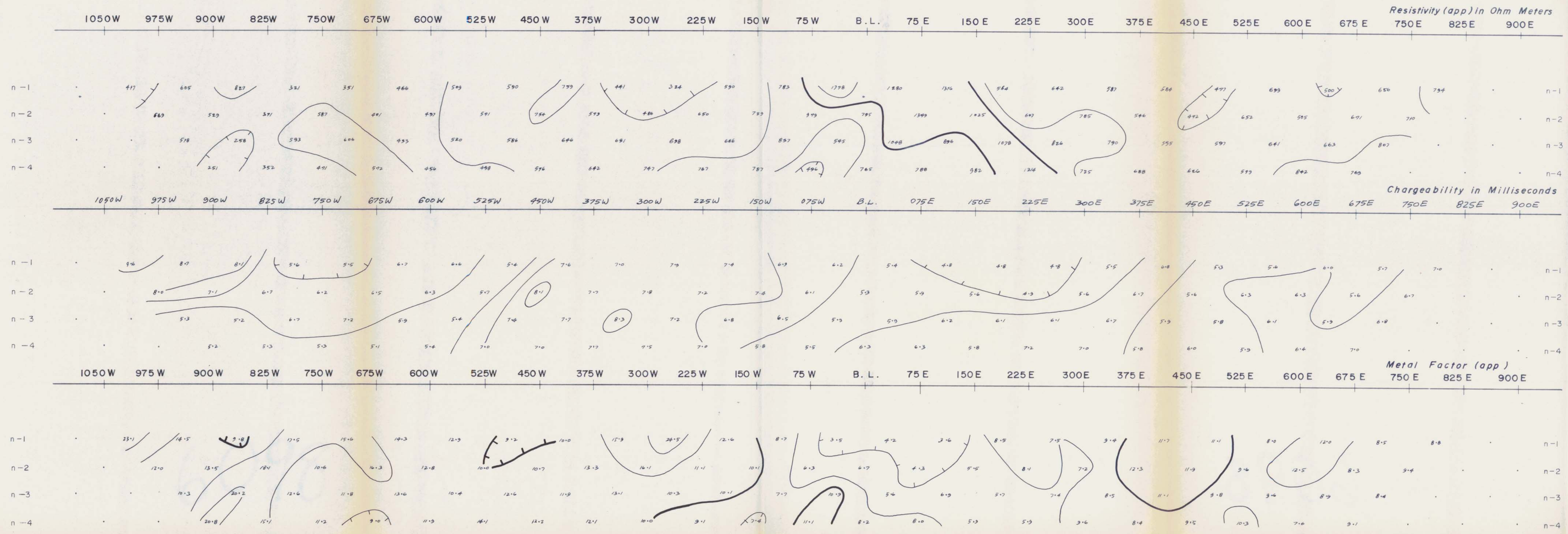
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TRANSMITTER 7.5KW TIME DOMAIN
RECEIVER HUNTEC MK III TYPE

6098

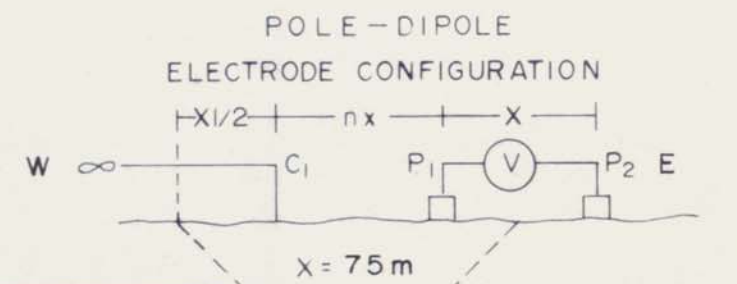
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LINE 1500 S



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LINE NO. 1750 S



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PLOTTING POINT
n = 1, 2, 3 & 4

SURFACE PROJECTION
OF ANOMALOUS ZONES

CONTOURS OF CHARGEABILITY
IN 1.0 MILLISECONDS
CONTOURS OF RESISTIVITY &
METAL FACTOR AT
LOGARITHMIC INTERVALS
1, 10,
1.5, 2, 3, 5, 7.5

DATE SURVEYED

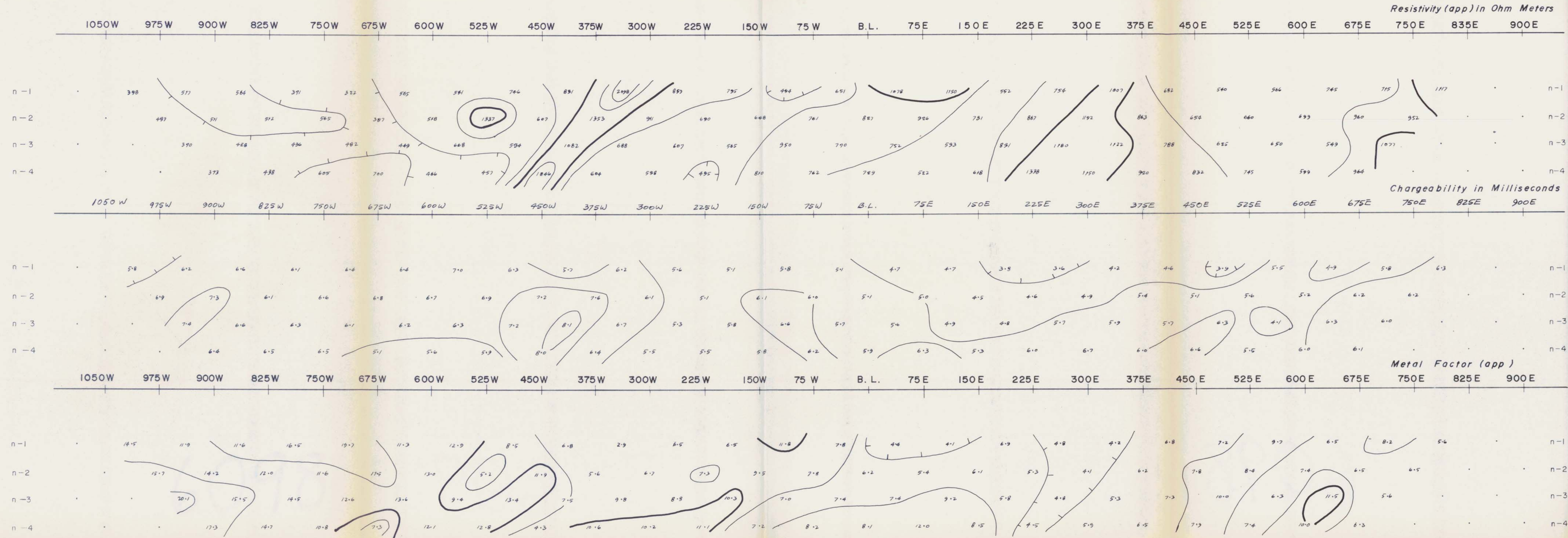
APPROVED

DATE

TRANSMITTER 7.5 KW TIME DOMAIN
RECEIVER HUNTEC MK III TYPE

INDUCED POLARIZATION AND RESISTIVITY SURVEY
SURVEYED BY EAGLE GEOPHYSICS LTD. (JOHN LLOYD M.Sc. P. Eng.)

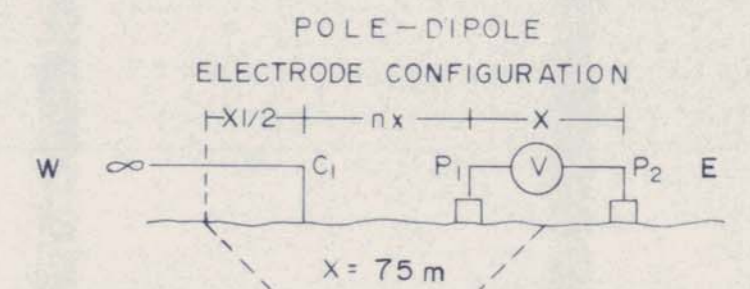
LINE 1750 S



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COMINCO LTD. GUMP PROPERTY HIGHLAND VALLEY AREA, NICOLA M.D., B.C.

LINE NO. 2000 S



MINERAL RESOURCES BRANCH
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PLOTTING POINT
n=1, 2, 3 & 4

SURFACE PROJECTION
OF ANOMALOUS ZONES

CONTOURS OF CHARGEABILITY
IN 1.0 MILLISECONDS

CONTOURS OF RESISTIVITY &
METAL FACTORS AT
LOGARITHMIC INTERVALS

1, 10,
1.5, 2, 3, 5, 7.5

DATE SURVEYED JULY 1976

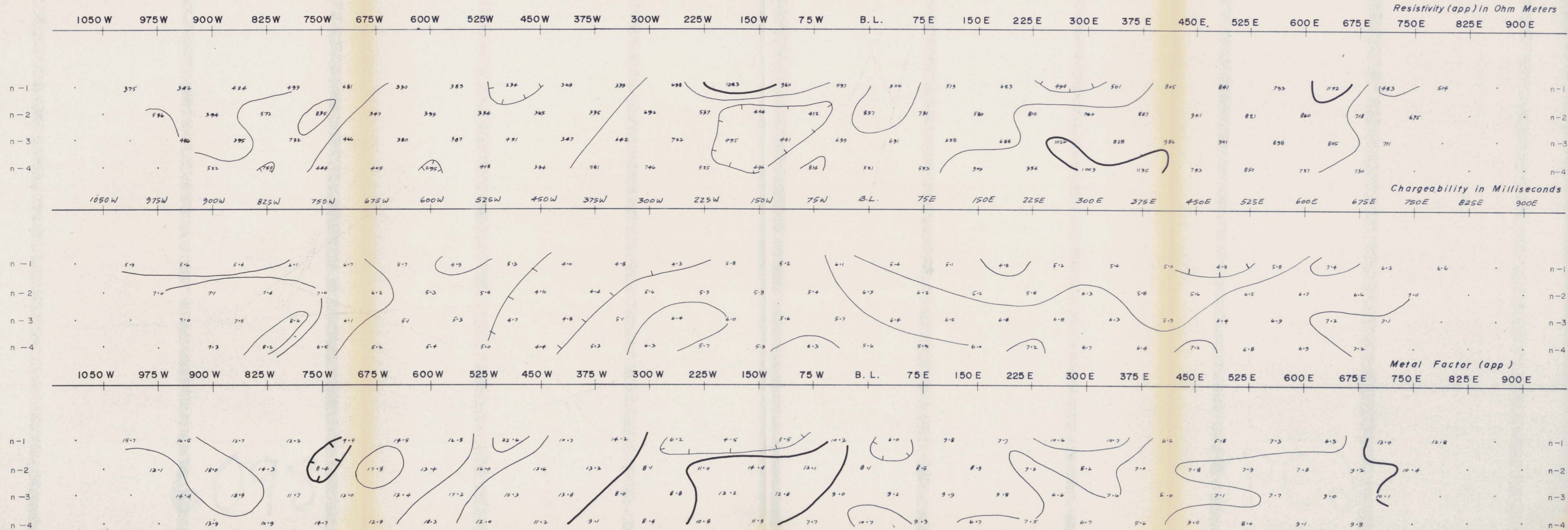
APPROVED

DATE

TRANSMITTER 7.5KW TIME DOMAIN
RECEIVER HUNTEC MK III TYPE

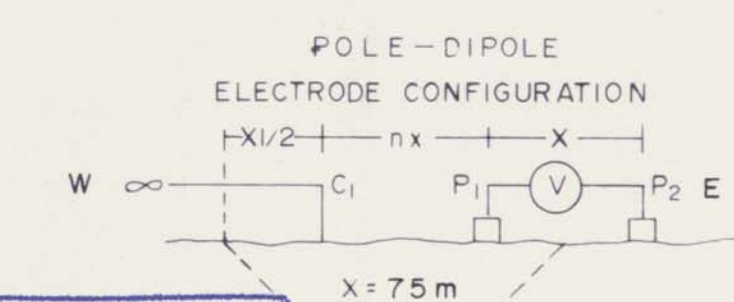
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SURVEYED BY EAGLE GEOPHYSICS LTD., (JOHN LLOYD M.Sc. P. Eng.)

LINE 2000 S



COMINCO LTD. GUMP PROPERTY HIGHLAND VALLEY AREA, NICOLA M.D., B.C.

LINE NO. 2250 S



MINERAL RESOURCES BRANCH
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SURFACE PROJECTION
OF ANOMALOUS ZONES

CONTOUR OF CHARGEABILITY
IN 1.0 MILLISECONDS
CONTOURS OF RESISTIVITY &
METAL FACTOR AT
LOGARITHMIC INTERVALS
1, 10,
1.5, 2, 3, 5, 7.5

DATE SURVEYED JULY 1976

APPROVED *Jan Klein*

DATE Sept 76

TRANSMITTER 7.5 KW TIME DOMAIN
RECEIVER HUNTEC MK III TYPE

6098

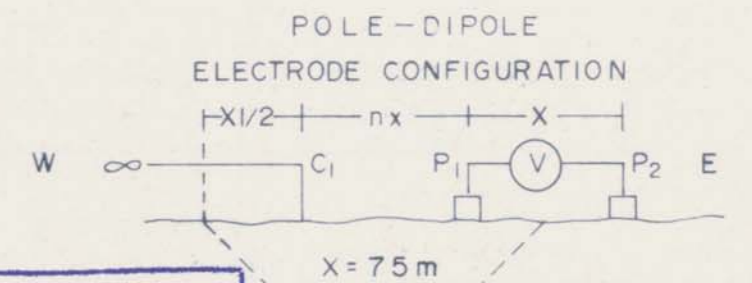
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SURVEYED BY EAGLE GEOPHYSICS LTD., (JOHN LLOYD M.Sc. P. Eng.)



LINE 2250 S

COMINCO LTD. GUMP PROPERTY HIGHLAND VALLEY AREA, NICOLA M.D., B.C.

LINE NO. 2500 S



MINERAL RESOURCES BRANCH
ASSESSMENT REPORT
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PLOTTING POINT
n=1, 2, 3 & 4

SURFACE PROJECTION
OF ANOMALOUS ZONES

CONTOUR OF CHARGEABILITY
IN 1.0 MILLISECOND
CONTOURS OF RESISTIVITY &
METAL FACTOR AT
LOGARITHMIC INTERVALS
1, 10,
1.5, 2, 3, 5, 7.5

DATE SURVEYED JULY 1978

APPROVED

DATE

TRANSMITTER 7.5KW TIME DOMAIN
RECEIVER HUNTEC MK III TYPE

INDUCED POLARIZATION AND RESISTIVITY SURVEY
SURVEYED BY EAGLE GEOPHYSICS LTD. (JOHN LLOYD M.Sc. P. Eng.)

LINE 2500 S

