5002

92I/6E

COMINCO LTD.

Exploration

Western District

N.T.S. 92-I-6
50°, 121°, NE

I.P. AND MAGNETOMETER SURVEYS

TOKETIC PROPERTY

VALLEY COPPER MINES LTD.

KAMLOOPS M.D., B.C.

June 7, 1974

J.M. Hamilton, P. Eng.

Work Performed During May, 1974

TABLE OF CONTENTS

SUMMARY

About nine line-miles of I.P. and magnetic surveying on the Toketic Property of Valley Copper Mines Ltd. failed to locate responses deemed significant at this time. Accordingly no work can be recommended on the basis of geophysical data acquired during this programme.

INTRODUCTION

The Toketic Property is located about eight miles northeast of Spences Bridge and about 18 miles south of Ashcroft, in south-central B.C. Access is by truck, preferably 4-wheel drive, along 14 miles of road which runs north on the east side of the Thompson River north of its junction with the Nicola River for about ten miles and then turns easterly and southerly to the property. Private property and an Indian Reservation are traversed by the road and prior permission to use it is required.

The property comprises 21 mineral claims and is owned by Valley Copper Mines Ltd., which is 69.79% owned by Cominco Ltd. The present work was paid for by Cominco Ltd. under an interim financing agreement.

The present geophysical surveys were carried out over about three quarters of the property, with protions in the northeast and southwest not covered.

GEOLOGY

The property straddles part of the western contact of the Guichon Batholith, and is underlain by "Hybrid Phase" intrusives to the northeast and Cache Creek metasediments to the southwest. A chalcopryrite-hematite zone located in the surveyed area is known from previous underground workings and drilling to be about 200 feet long and 80 feet wide assaying about 0.3% Cu. It is hosted by the Hybrid Phase intrusives.

I.P. AND MAGNETOMETER SURVEYS

(a) Methods

The magnetic survey was done with a Scintrex MF-2 fluxgate magnetometer. This instrument measures relative changes in the strength of the Earth's vertical magnetic field with a maximum readability of 5 gammas. Instrument drift and diurnal variation were monitored using a standard looping procedure, returning to a base station every hour.

The I.P. survey was done using Cominco's McPhar P654 frequency domain system employing the dipole-dipole array and measuring four separations. Dipole lengths of 200 or 400 feet were employed, as noted on the plans and profiles. This I.P. system measures applied current in amperes and resultant received potential in volts, from which resistivity can be calculated from Ohm's Law. This is done at two frequencies (0.31 and 5.0 htz in the present case) and difference in resistivity, if present, is plotted as frequency effect. It is a measure of I.P. response. In addition to frequency effect and (high) frequency resistivity, the profiles also show metal factor, a parameter derived by dividing frequency effect by the corresponding resistivity and multiplying by a scaling factor of 1000.

Work was under the direction of T.G. Kauppinen whose assistants were J. Turner, B. Clause, B. Ansley and E. Ford, and work was supervised by the writer, who visited the property twice during the survey.

(b) Data Presentation

The following plans are included with the report, in pocket at rear:

Plate 1, Magnetometer Survey, 1" = 400'

Plate 2, Second Separation Resistivity, 1" = 400'

Plate 3, Second Separation Frequency Effect, 1" = 400'

The following profiles are bound in this report:

Line No.	Dipole Length	Plate No.
44N	200 feet	I.P.-84-1
40N	200 feet	I.P.-84-2
36N	200 feet	I.P.-84-3
32N	200 feet	I.P.-84-4
28N	200 feet	I.P.-84-5
24N	200 feet	I.P.-84-6
20N	200 feet	I.P.-84-7
16N	200 feet	I.P.-84-8
12N	200 feet	I.P.-84-9
8N	200 feet	I.P.-84-10
4N	200 feet	I.P.-84-11
0N	200 feet	I.P.-84-12
16E	400 feet	I.P.-84-13
20E	400 feet	I.P.-84-14
24E	400 feet	I.P.-84-15
28E	400 feet	I.P.-84-16
32E	400 feet	I.P.-84-17
36E	400 feet	I.P.-84-18
40E	400 feet	I.P.-84-19
44E	400 feet	I.P.-84-20
48E	400 feet	I.P.-84-21

(c) Results

Magnetic data are contoured on Plate 1 with a contour interval of 500 gammas. In general, magnetic values in areas underlain by Hybrid Phase intrusives are about 500 to 1000 gammas greater than those in areas underlain by Cacke Creek metasediments. However, this relationship is not valid enough to warrant additional magnetic surveying to help map the contact in overburden covered areas should additional geophysical work in the area be contemplated. About 2000 gammas of magnetic relief are present on the grid, but no distinctive trends or patterns are apparent. In general, known mineralized areas occur in areas of intermediate to high magnetic values.

Second separation resistivity values are contoured on Plate 2, and values are generally lower over metasediments than over intrusives. There is little or no distinctive resistivity response correlative with known mineralized areas.

Second separation frequency effects, plotted on Plate 3, are relatively featureless. One weak response is located at 2E on Line 32N. Profile number I.P.-84-4 shows a weak frequency effect response from 0 to 2E on that line, which gives rise to a corresponding weak metal factor response. The results of drill-hole DH-3, drilled previously and located nearby as shown on the plans, are not known to the writer. No I.P. responses of significance are located coincident with or along strike from mineralized zones as shown on the plans.

CONCLUSIONS

Magnetic work on the Toketic property indicates Hybrid Phase intrusive rocks are somewhat more magnetic than Cache Creek metasediments in this area, but the relationship is not good enough to use it for mapping the contact in overburden covered areas. I.P. measurements are virtually featureless. No additional work can be recommended on the basis of geophysical results obtained during this project.

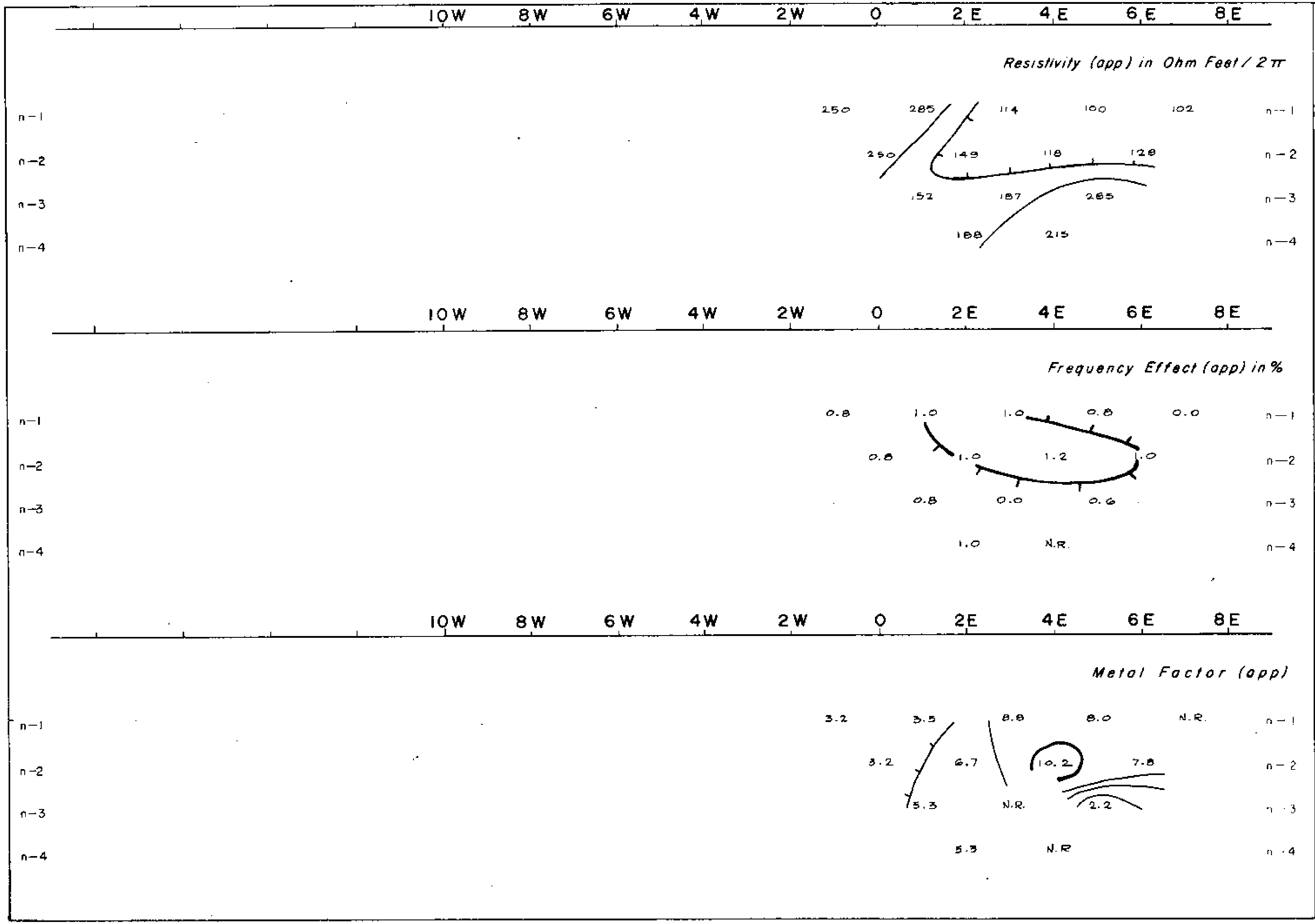
Submitted by [signature]

J.M. Hamilton, P. Eng.
Supervising Geophysicist

Endorsed for Release by W.T. Irvine

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

Distribution:
- Exploration Administration
- Western District
- Mining Recorder, Vancouver (2)
- Geophysics File



N.T.S. 92-I-6

DWG. NO. I.P.-84-1

COMINCO LTD.

VALLEY COPPER (TOKETIC PROPERTY)

SPENCES BRIDGE AREA

KAMLOOPS MINING DIVISION B. C.

LINE NO. 44 N

DIPOLE - DIPOLE
ELECTRODE CONFIGURATION

x nx x

V I

x = 200'

PLOTTING POINT
n = 1, 2, 3 & 4

SURFACE PROJECTION
OF ANOMALOUS ZONES

DEFINITE
PROBABLE
POSSIBLE

FREQUENCIES 0.31 & 5.0 cps

DATE SURVEYED MAY, 1974

APPROVED

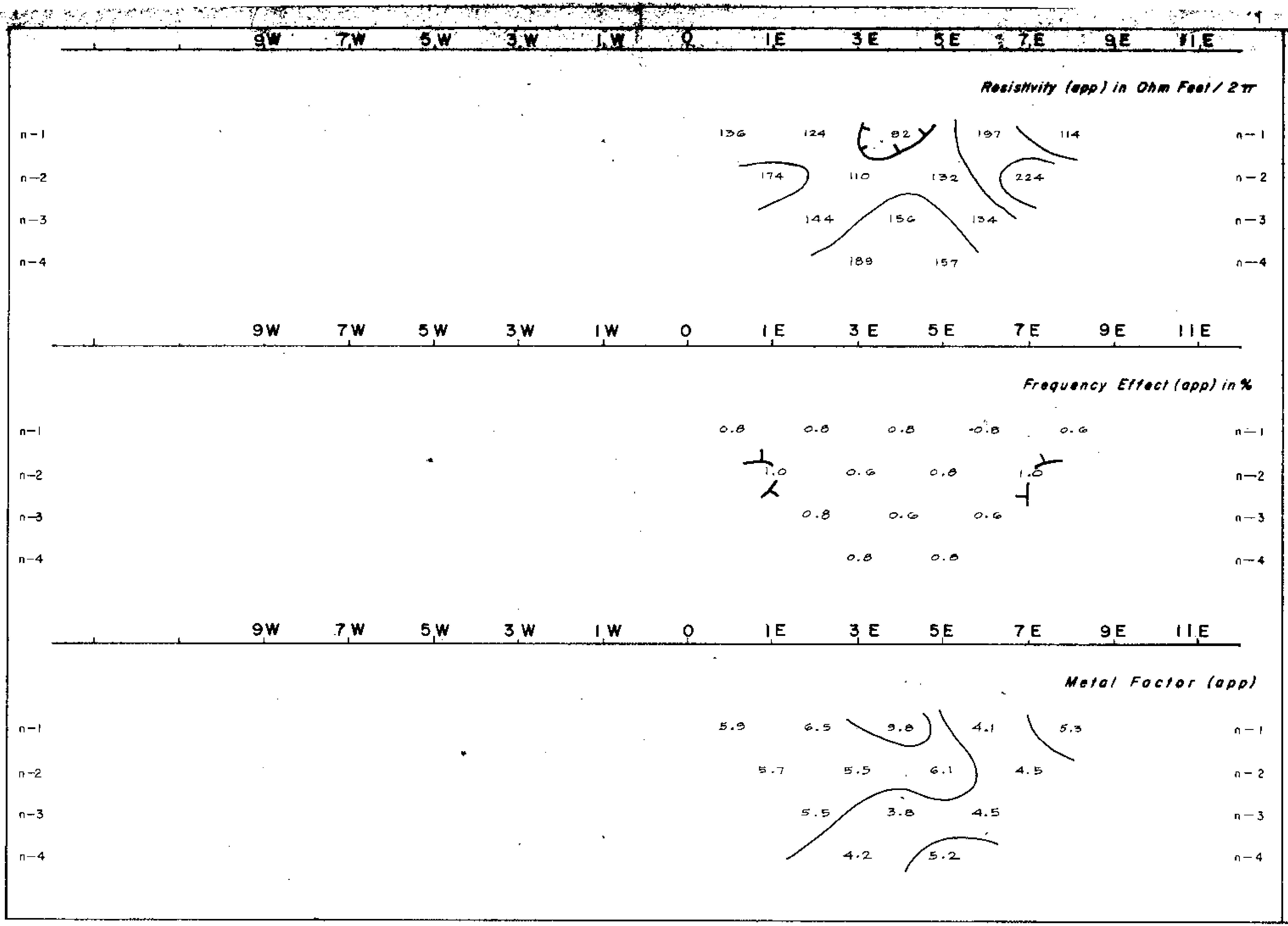
NOTE: CONTOURS AT
LOGARITHMIC INTERVALS
1-1.5-2-3-5-7.5-10

DATE JUNE 18, 1974

INDUCED POLARIZATION AND RESISTIVITY SURVEY

SURVEYED BY COMINCO LTD. EXPLORATION DIVISION

LINE No 44 N



N.T.S. 92-I-6

DWG. NO. I.P.-84-2

COMINCO LTD.

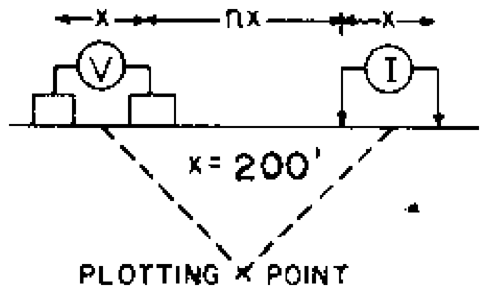
VALLEY COPPER (TOKETIC PROPERTY)

SPENCES BRIDGE AREA

KAMLOOPS MINING DIVISION B.C.

LINE NO. 40 N

DIPOLE - DIPOLE ELECTRODE CONFIGURATION



PLOTTING POINT
n= 1, 2, 3 & 4

SURFACE PROJECTION OF ANOMALOUS ZONES
DEFINITE
PROBABLE
POSSIBLE

FREQUENCIES 0.31 & 5.0 cps

DATE SURVEYED MAY, 1974

APPROVED

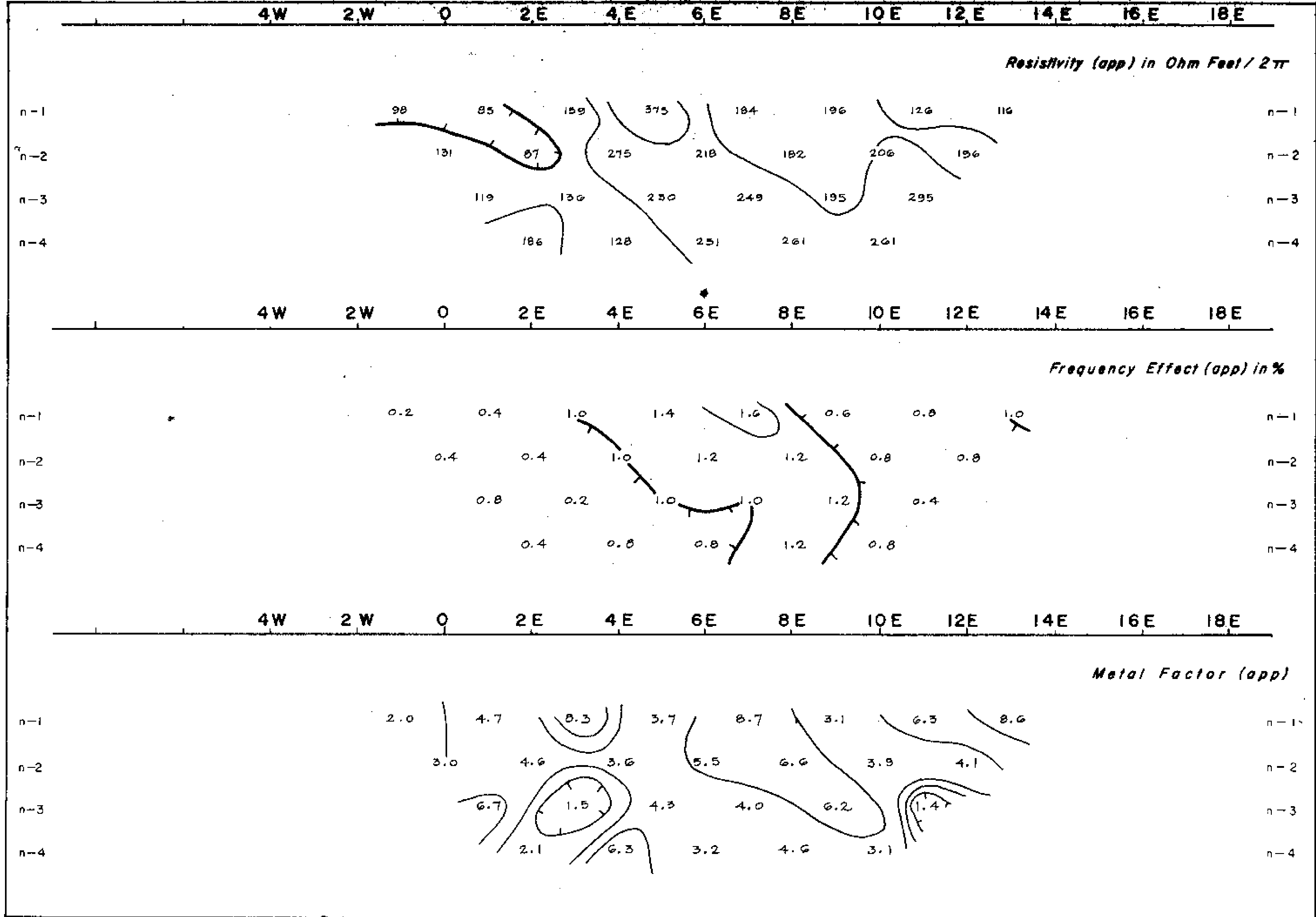
NOTE: CONTOURS AT LOGARITHMIC INTERVALS 1-1.5-2-3-5-7.5-10

DATE JUNE 18, 1974

INDUCED POLARIZATION AND RESISTIVITY SURVEY

SURVEYED BY COMINCO LTD. EXPLORATION DIVISION

LINE NO. 40N



N.T.S. 92-I-6

DWG. NO. I.P.-84-3

COMINCO LTD.

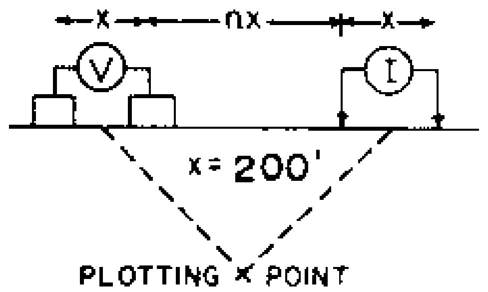
VALLEY COPPER (TOKETIC PROPERTY)

SPENCES BRIDGE AREA

KAMLOOPS MINING DIVISION B.C.

LINE NO. 36 N

DIPOLE - DIPOLE ELECTRODE CONFIGURATION



PLOTTING × POINT
n = 1, 2, 3 & 4

SURFACE PROJECTION OF ANOMALOUS ZONES
DEFINITE
PROBABLE
POSSIBLE

FREQUENCIES 0.31 & 5.0 cps

DATE SURVEYED MAY, 1974

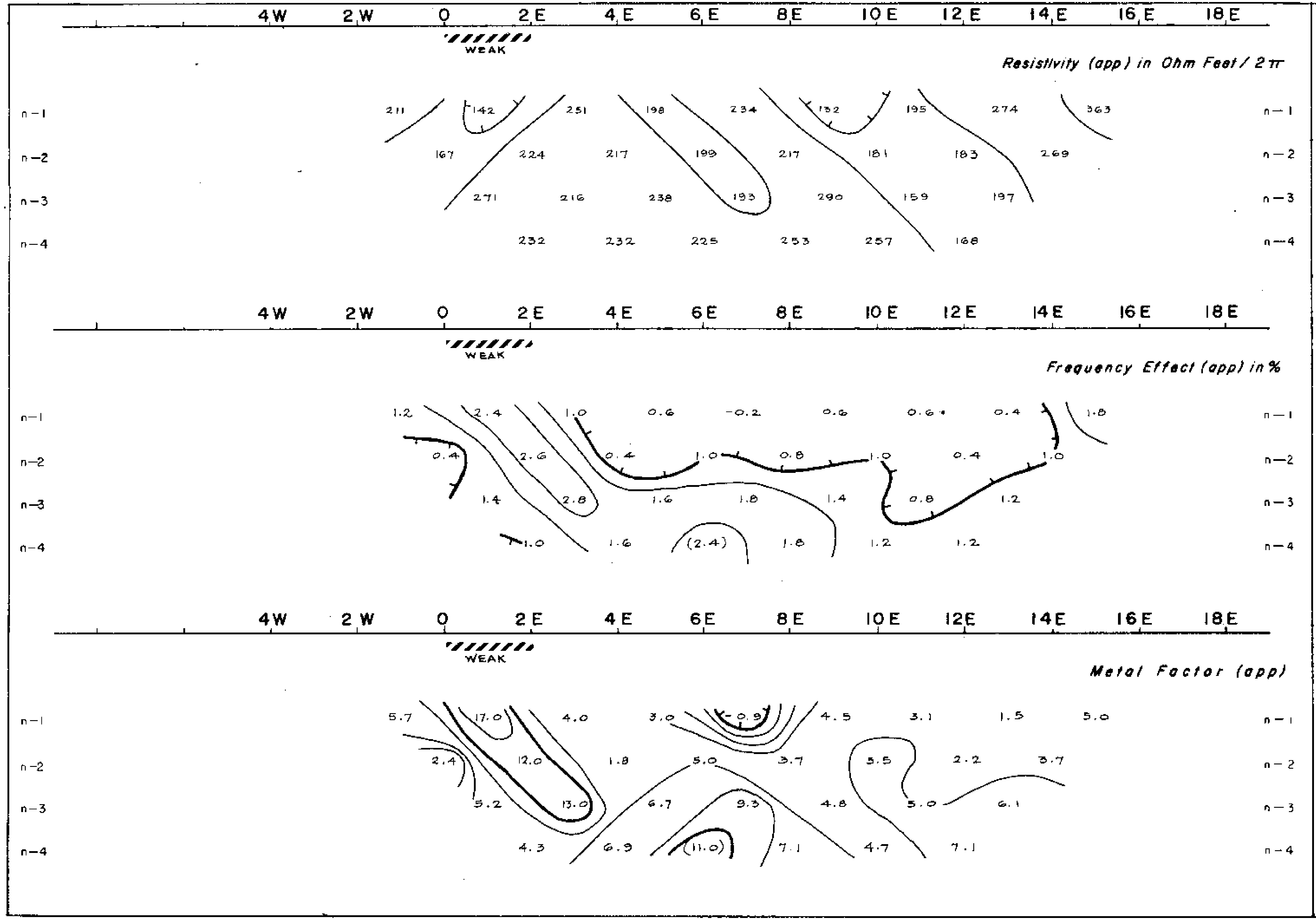
APPROVED

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

DATE JUNE 18, 1974

INDUCED POLARIZATION AND RESISTIVITY SURVEY
SURVEYED BY COMINCO LTD. EXPLORATION DIVISION

LINE NO. 36 N



N.T.S. 92-I-6

DWG. NO. I.P.-84-4

COMINCO LTD.

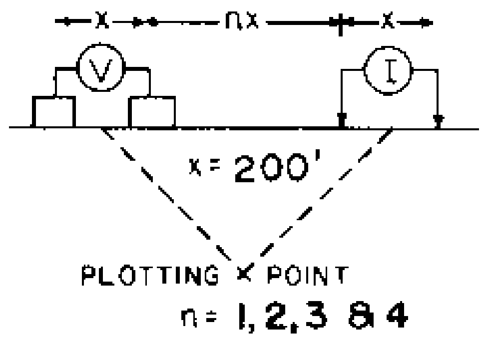
VALLEY COPPER (TOKETIC PROPERTY)

SPENCES BRIDGE AREA

KAMLOOPS MINING DIVISION B. C.

LINE NO. 32 N

DIPOLE - DIPOLE ELECTRODE CONFIGURATION



SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE

PROBABLE

POSSIBLE

FREQUENCIES 0.31 & 5.0 cps

DATE SURVEYED MAY, 1974

APPROVED

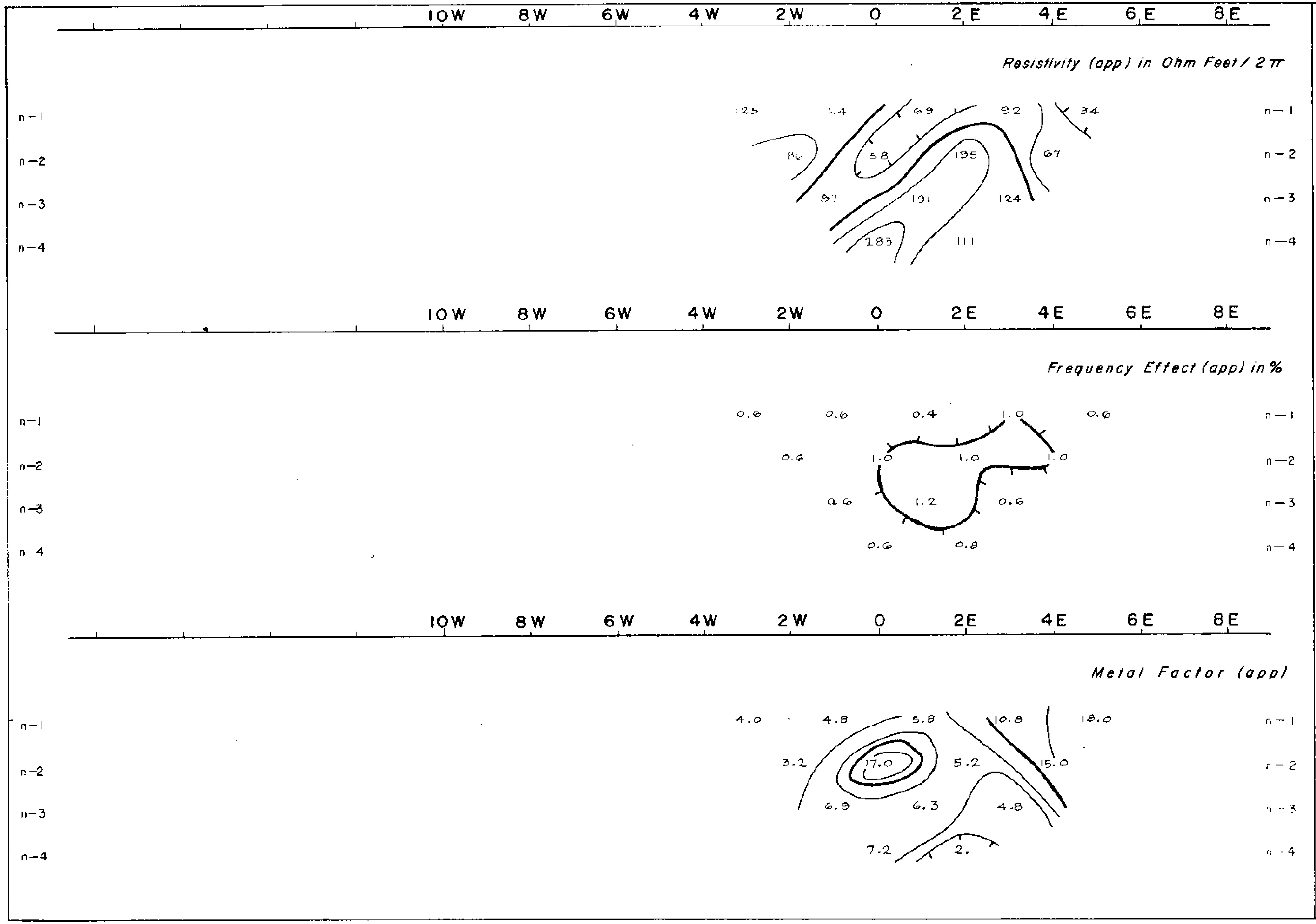
NOTE CONTOURS AT LOGARITHMIC INTERVALS
1 - 1.5 - 2 - 3 - 5 - 7.5 - 10

DATE JUNE 18, 1974

INDUCED POLARIZATION AND RESISTIVITY SURVEY

SURVEYED BY COMINCO LTD. EXPLORATION DIVISION

LINE NO. 32 N



N.T.S. 92-I-6

DWG. NO. I.P.-84-5

COMINCO LTD.
VALLEY COPPER (TOKETIC PROPERTY)
SPENCES BRIDGE AREA
KAMLOOPS MINING DIVISION B.C.

LINE NO. 28 N

DIPOLE - DIPOLE
ELECTRODE CONFIGURATION

x = 200'

PLOTTING × POINT
n = 1,2,3 & 4

SURFACE PROJECTION OF ANOMALOUS ZONES
DEFINITE
PROBABLE
POSSIBLE

FREQUENCIES 0.31 & 5.0 cps

DATE SURVEYED MAY, 1974

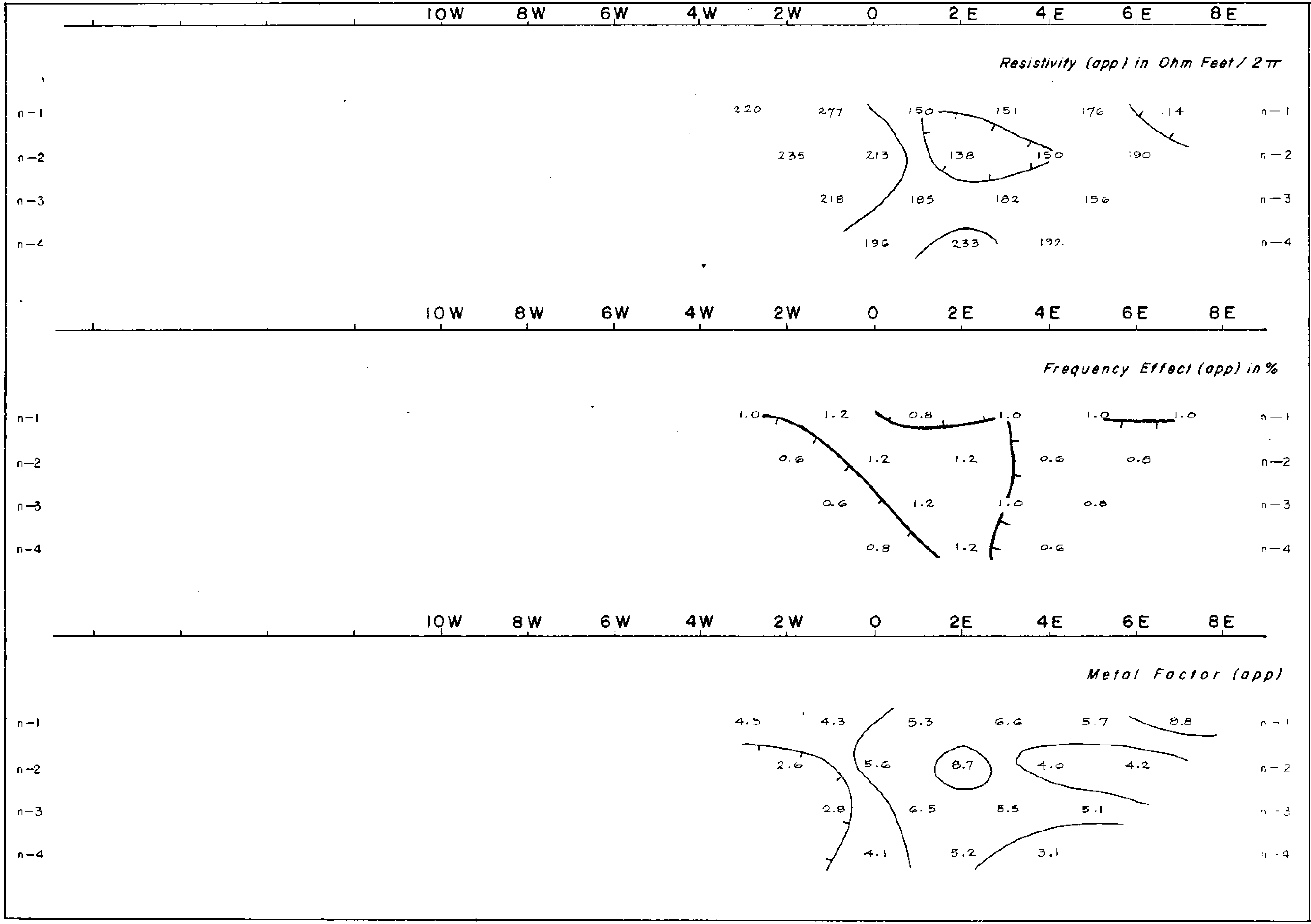
APPROVED

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

DATE JUNE 18, 1974

INDUCED POLARIZATION AND RESISTIVITY SURVEY
SURVEYED BY COMINCO LTD. EXPLORATION DIVISION

LINE NO. 28 N



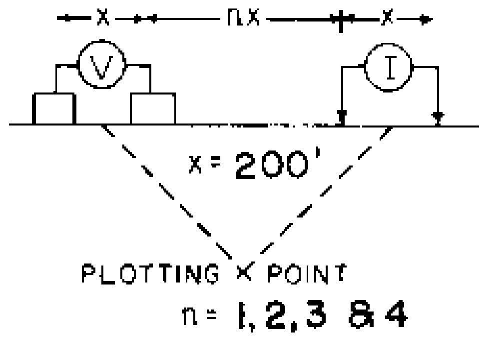
N.T.S. 92-I-6

DWG. NO. I.P.-84-6

COMINCO LTD.
VALLEY COPPER (TOKETIC PROPERTY)
SPENCES BRIDGE AREA
KAMLOOPS MINING DIVISION B.C.

LINE NO. 24 N

DIPOLE - DIPOLE
ELECTRODE CONFIGURATION



SURFACE PROJECTION
OF ANOMALOUS ZONES
DEFINITE
PROBABLE
POSSIBLE

FREQUENCIES 0.31 & 5.0 cps

DATE SURVEYED MAY, 1974

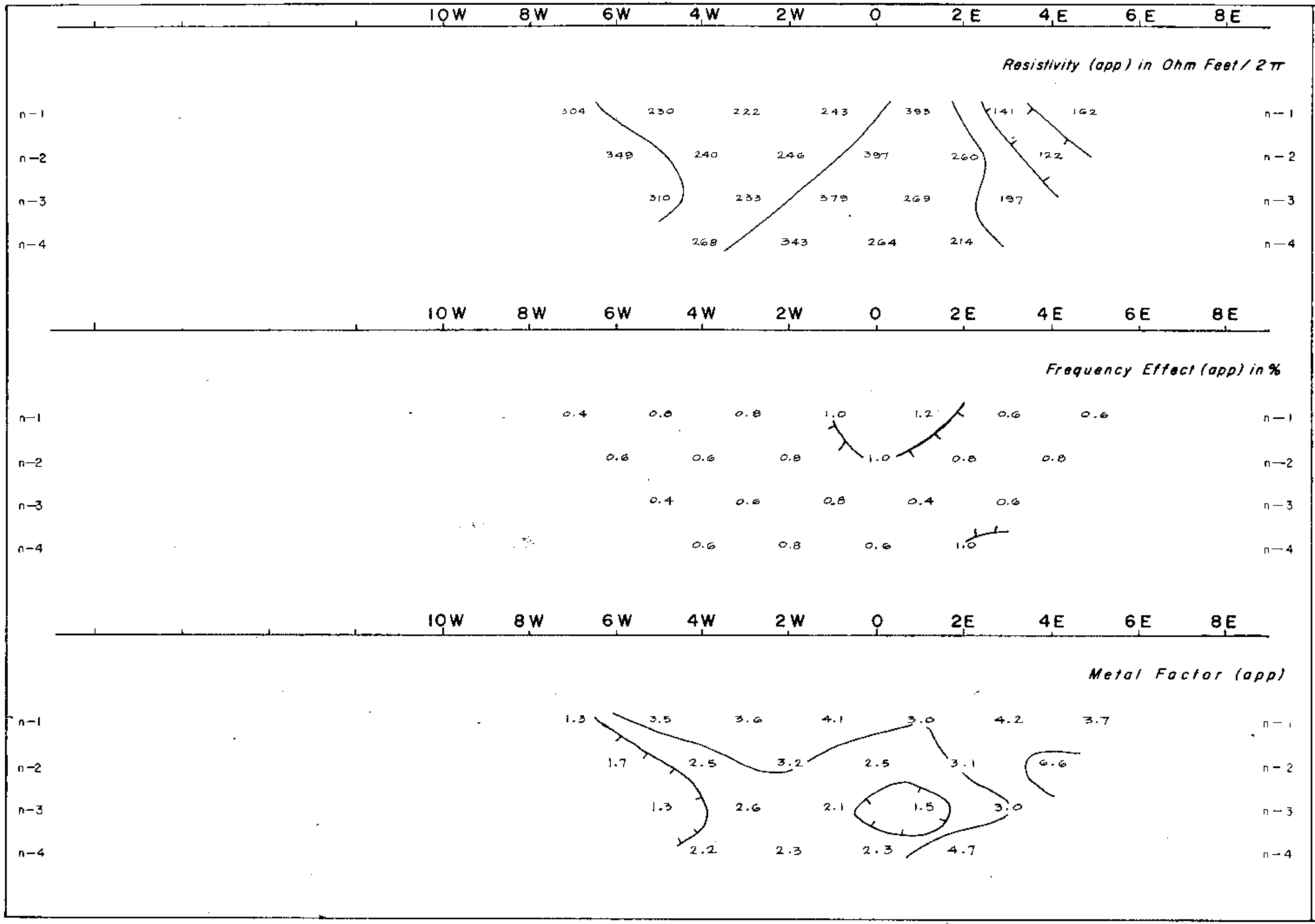
APPROVED

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

DATE JUNE 18, 1974

INDUCED POLARIZATION AND RESISTIVITY SURVEY
SURVEYED BY COMINCO LTD. EXPLORATION DIVISION

LINE NO. 24 N



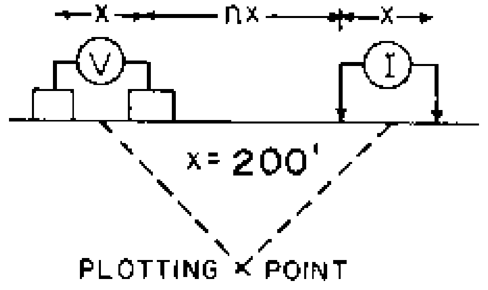
N.T.S. 92-I-6

DWG. NO. I.P.-84-7

COMINCO LTD.
VALLEY COPPER (TOKETIC PROPERTY)
SPENCES BRIDGE AREA
KAMLOOPS MINING DIVISION B. C.

LINE NO. 20N

DIPOLE - DIPOLE
ELECTRODE CONFIGURATION



n = 1,2,3 & 4

SURFACE PROJECTION
OF ANOMALOUS ZONES
DEFINITE
PROBABLE
POSSIBLE

LINE NO. 20N

FREQUENCIES 0.31 & 5.0 cps

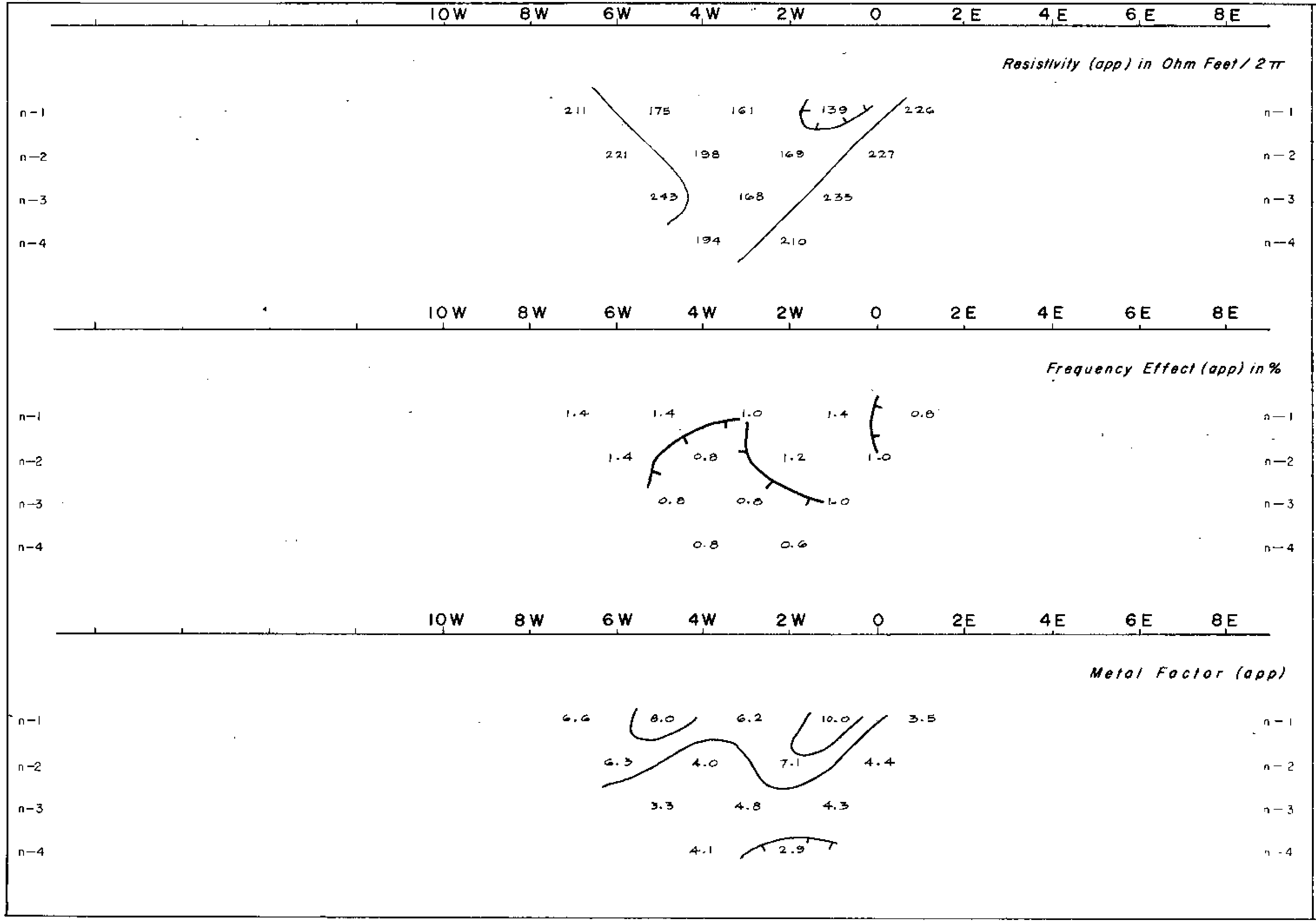
DATE SURVEYED MAY, 1974

APPROVED

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

DATE JUNE 18, 1974

INDUCED POLARIZATION AND RESISTIVITY SURVEY
SURVEYED BY COMINCO LTD. EXPLORATION DIVISION



N.T.S. 92-I-6

DWG. NO. I.P.-84-8

COMINCO LTD.

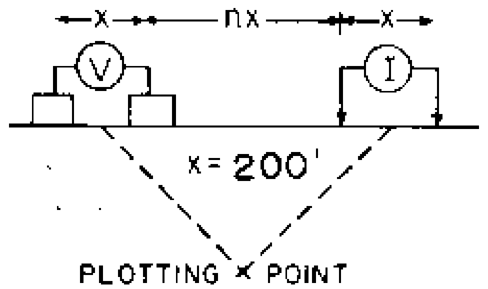
VALLEY COPPER (TOKETIC PROPERTY)

SPENCES BRIDGE AREA

KAMLOOPS MINING DIVISION B.C.

LINE NO. 16 N

DIPOLE - DIPOLE
ELECTRODE CONFIGURATION



n = 1, 2, 3 & 4

SURFACE PROJECTION
OF ANOMALOUS ZONES
DEFINITE
PROBABLE
POSSIBLE

FREQUENCIES 0.31 & 5.0 cps

DATE SURVEYED MAY, 1974

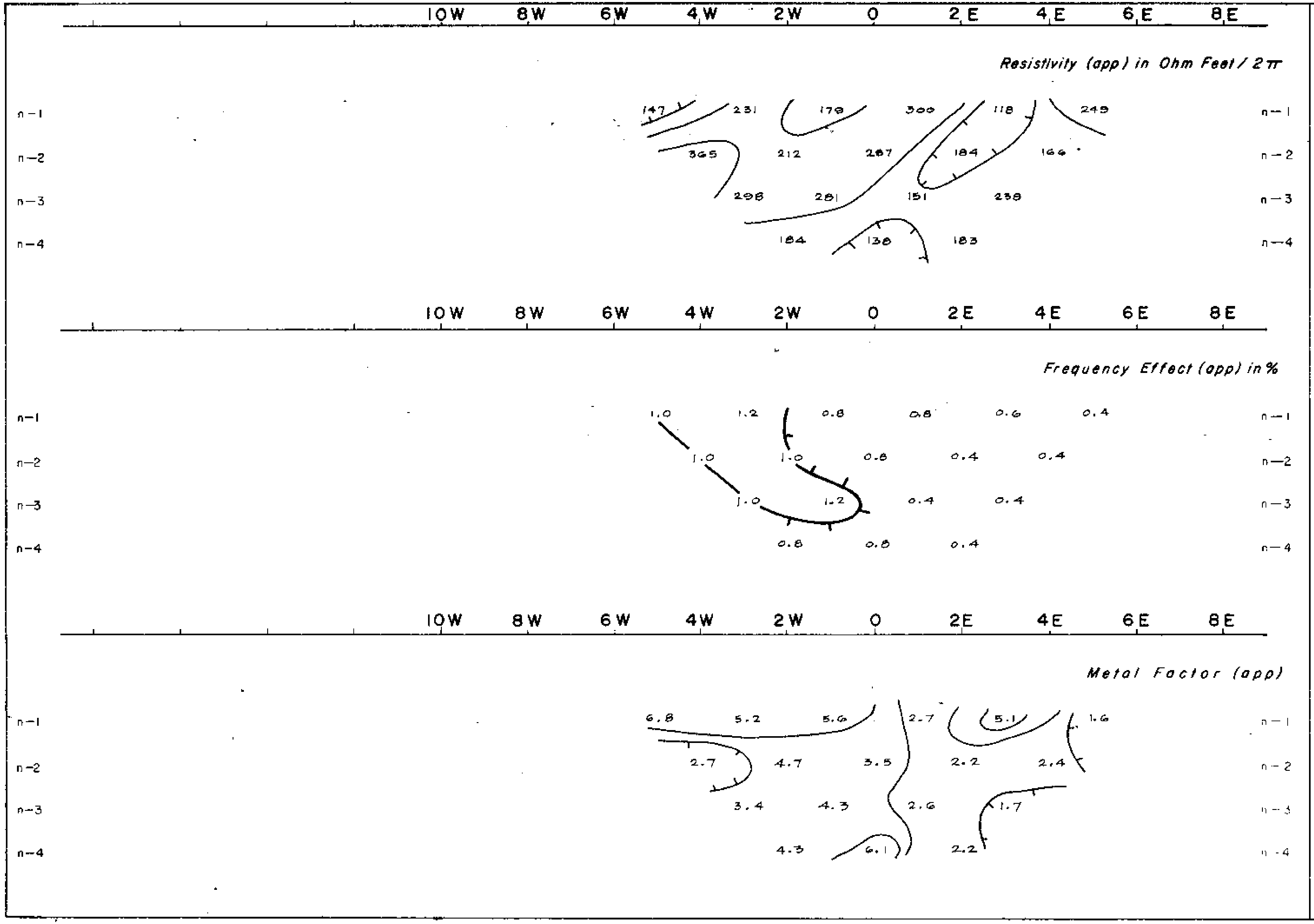
APPROVED

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

DATE JUNE 18, 1974

INDUCED POLARIZATION AND RESISTIVITY SURVEY
SURVEYED BY COMINCO LTD. EXPLORATION DIVISION

LINE NO 16 N



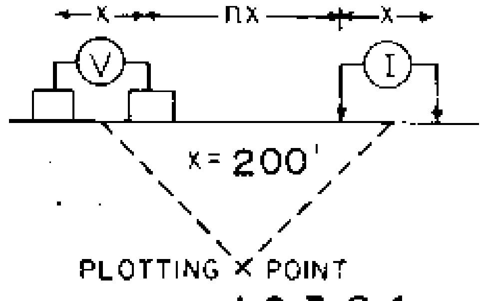
N.T.S. 92-I-6

DWG. NO. I.P.-84-9

COMINCO LTD.
VALLEY COPPER (TOKETIC PROPERTY)
SPENCES BRIDGE AREA
KAMLOOPS MINING DIVISION B.C.

LINE NO. 12 N

DIPOLE - DIPOLE
ELECTRODE CONFIGURATION



n = 1, 2, 3 & 4

SURFACE PROJECTION
OF ANOMALOUS ZONES
DEFINITE
PROBABLE
POSSIBLE

FREQUENCIES 0.31 & 5.0 cps

DATE SURVEYED MAY, 1974

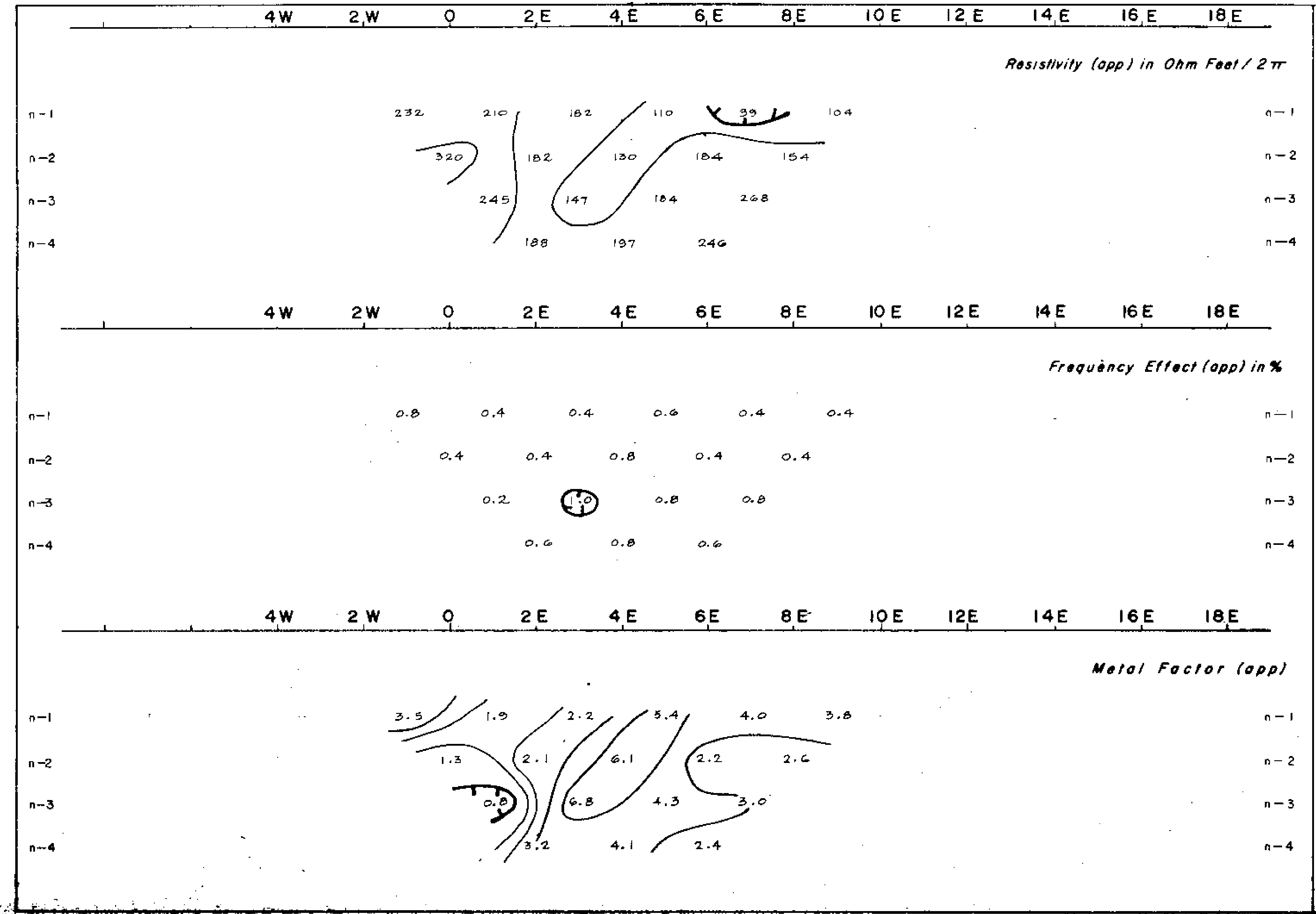
APPROVED

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

DATE JUNE 18, 1974

INDUCED POLARIZATION AND RESISTIVITY SURVEY
SURVEYED BY COMINCO LTD. EXPLORATION DIVISION

LINE NO. 12 N



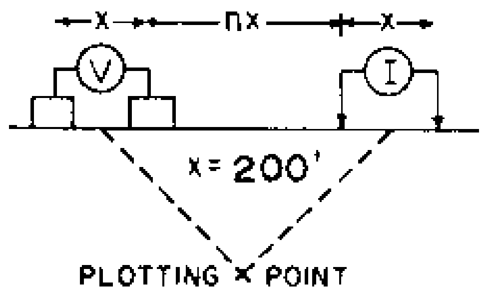
N.T.S. 92-I-6

DWG. NO. I.P.-84-10

COMINCO LTD.
VALLEY COPPER (TOKETIC PROPERTY)
SPENCES BRIDGE AREA
KAMLOOPS MINING DIVISION B.C.

LINE NO. 8 N

DIPOLE - DIPOLE
ELECTRODE CONFIGURATION



n = 1, 2, 3 & 4

SURFACE PROJECTION
OF ANOMALOUS ZONES
DEFINITE
PROBABLE
POSSIBLE

FREQUENCIES 0.31 & 5.0 cps

DATE SURVEYED MAY, 1974

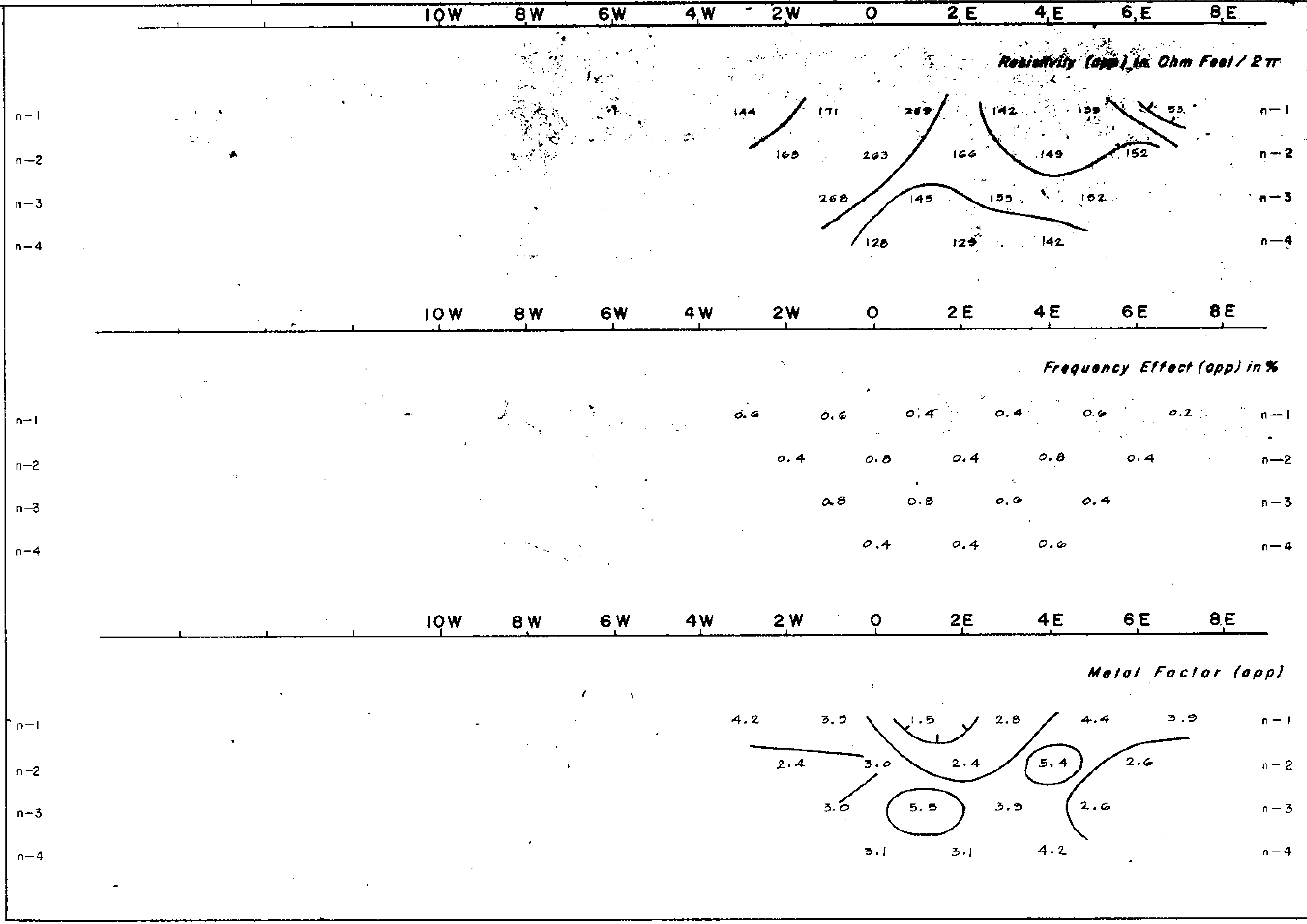
APPROVED

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

DATE JUNE 18, 1974

INDUCED POLARIZATION AND RESISTIVITY SURVEY
SURVEYED BY COMINCO LTD. EXPLORATION DIVISION

LINE NO. 8 N



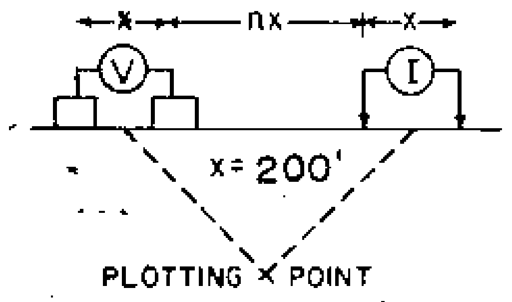
N.T.S. 92-I-6

DWG. NO. I.P.-84-11

COMINCO LTD.
VALLEY COPPER (TOKETIC PROPERTY)
SPENCES BRIDGE AREA
KAMLOOPS MINING DIVISION B. C.

LINE NO. 4 N

DIPOLE - DIPOLE
ELECTRODE CONFIGURATION



n = 1, 2, 3 & 4

SURFACE PROJECTION
OF ANOMALOUS ZONES
DEFINITE
PROBABLE
POSSIBLE

FREQUENCIES 0.31 & 5.0 cps

DATE SURVEYED MAY, 1974

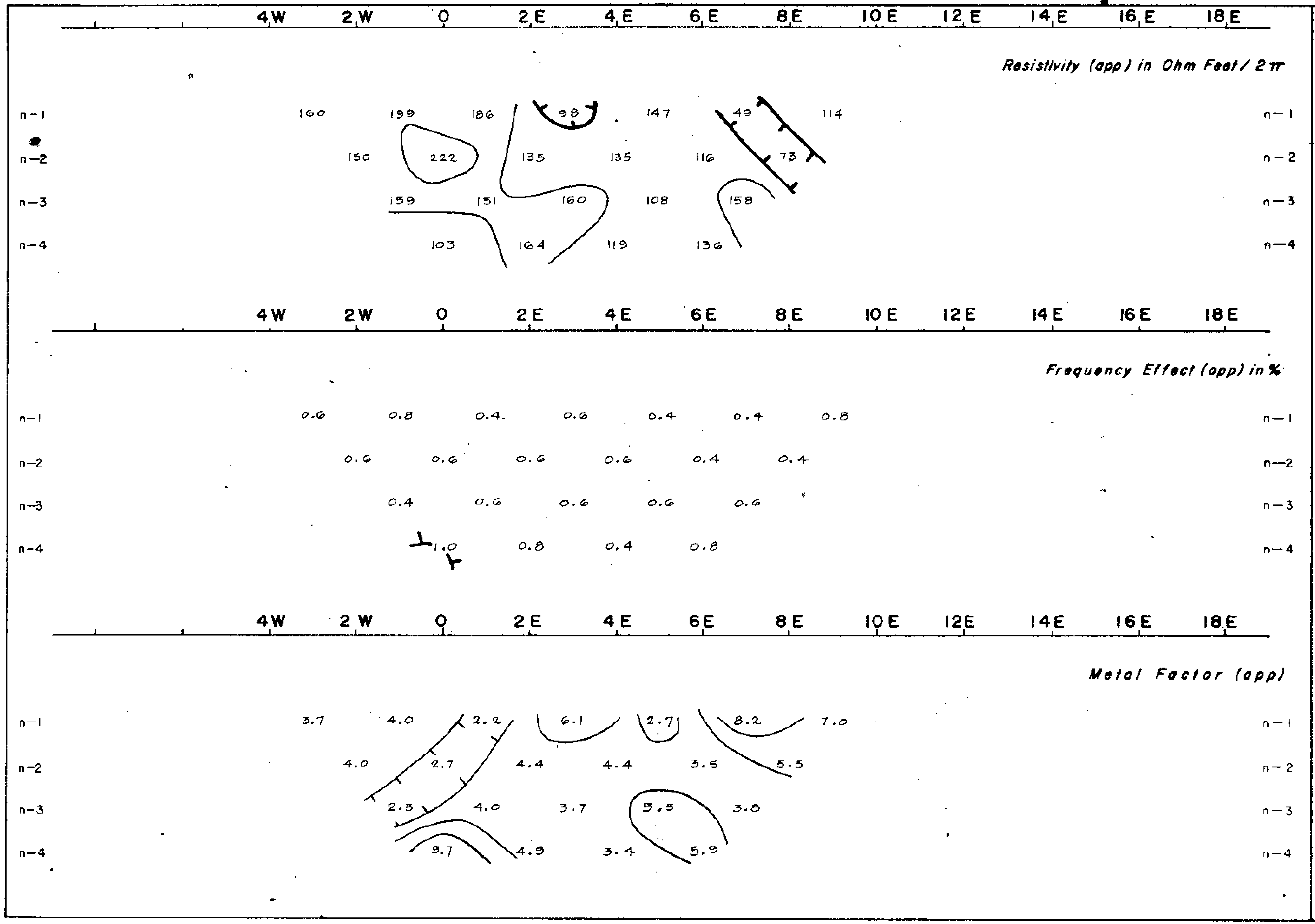
APPROVED

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

DATE JUNE 18, 1974

INDUCED POLARIZATION AND RESISTIVITY SURVEY
- SURVEYED BY COMINCO LTD. EXPLORATION DIVISION

LINE NO. 4N



N.T.S. 92-I-6

DWG. NO. I.P.-84-12

COMINCO LTD.

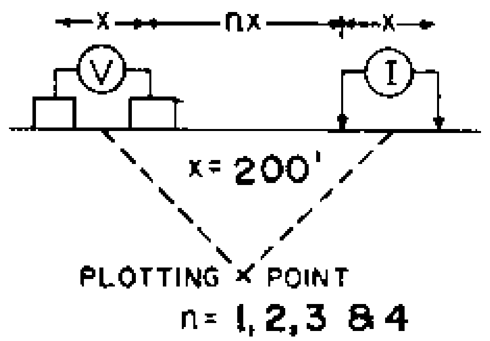
VALLEY COPPER (TOKETIC PROPERTY)

SPENCES BRIDGE AREA

KAMLOOPS MINING DIVISION B.C.

LINE NO. 0-N BASELINE

DIPOLE - DIPOLE
ELECTRODE CONFIGURATION



SURFACE PROJECTION
OF ANOMALOUS ZONES

DEFINITE
PROBABLE
POSSIBLE

FREQUENCIES 0.31 & 5.0 cps

DATE SURVEYED MAY, 1974

APPROVED

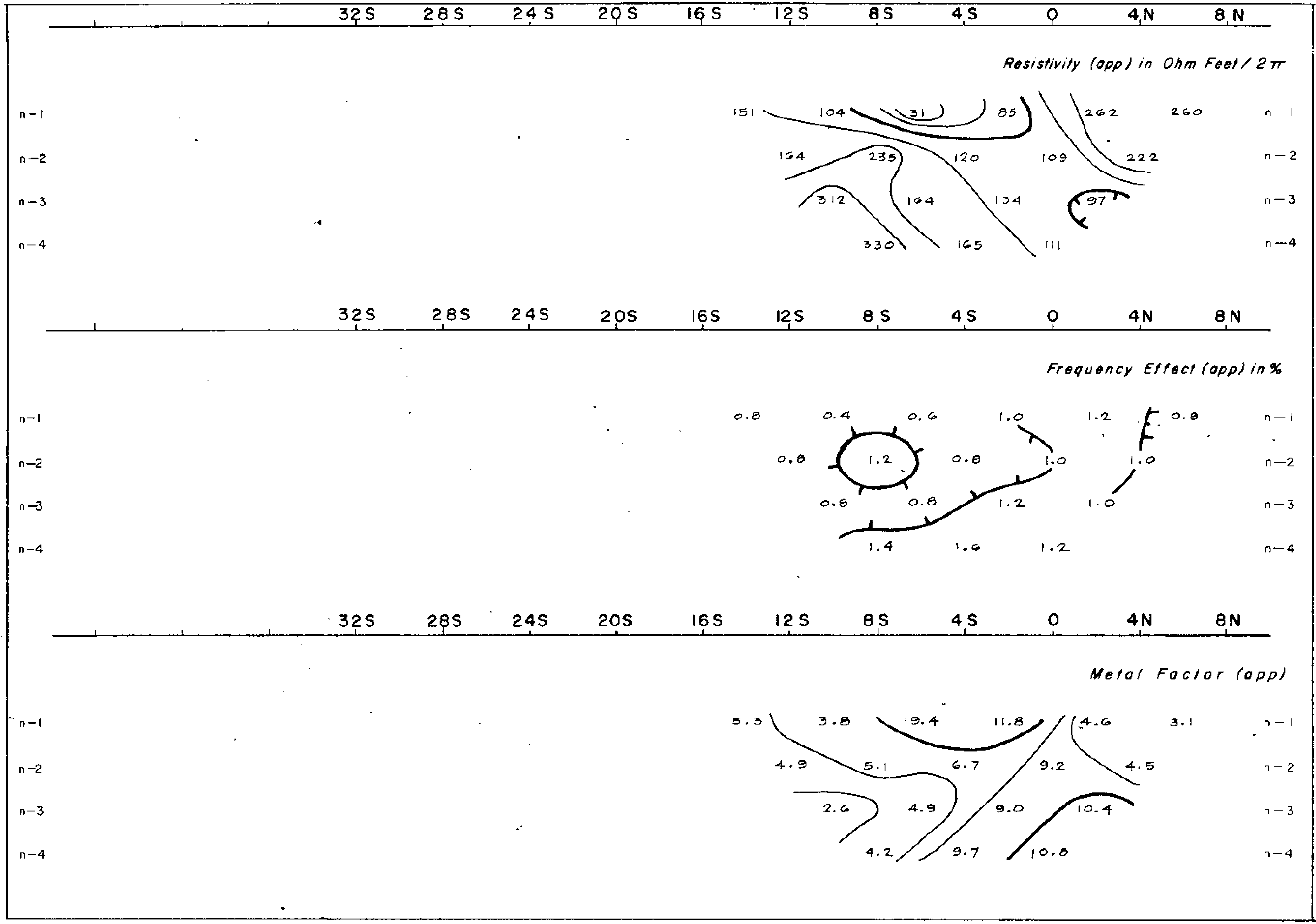
NOTE: CONTOURS AT LOGARITHMIC INTERVALS 1-1.5-2-3-5-7.5-10

DATE JUNE 18, 1974

INDUCED POLARIZATION AND RESISTIVITY SURVEY

SURVEYED BY COMINCO LTD. EXPLORATION DIVISION

LINE NO. 0-N BASELINE



N.T.S. 92-I-6

DWG. NO. I.P.-84-13

COMINCO LTD.

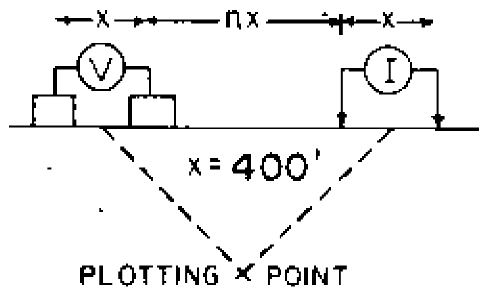
VALLEY COPPER (TOKETIC PROPERTY)

SPENCES BRIDGE AREA

KAMLOOPS MINING DIVISION B.C.

LINE NO. 16 E

DIPOLE - DIPOLE
ELECTRODE CONFIGURATION



n = 1, 2, 3 & 4

SURFACE PROJECTION
OF ANOMALOUS ZONES
DEFINITE
PROBABLE
POSSIBLE

FREQUENCIES 0.31 & 5.0 cps

DATE SURVEYED MAY, 1974

APPROVED

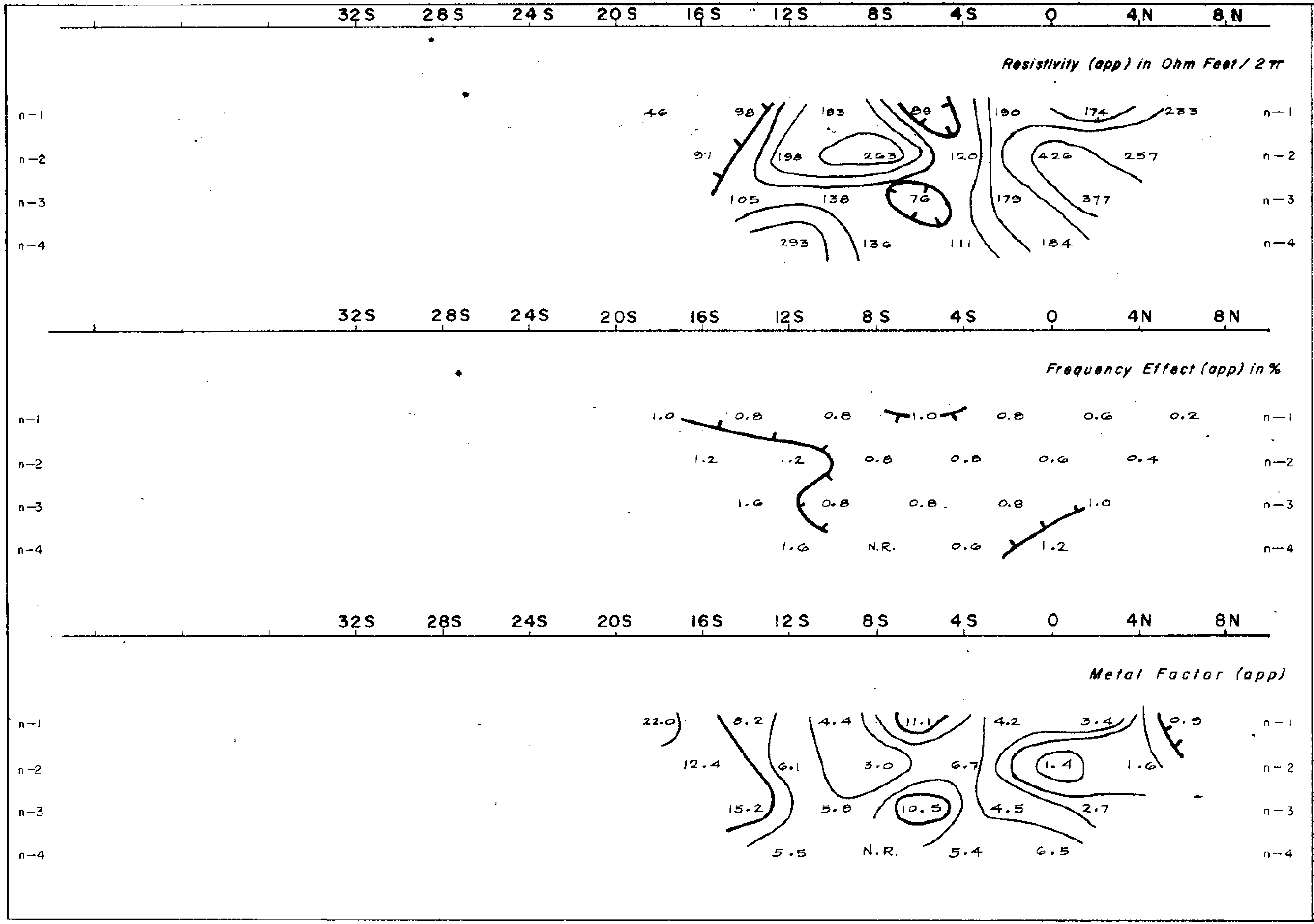
NOTE: CONTOURS AT
LOGARITHMIC INTERVALS
1-1.5-2-3-5-7.5-10

DATE JUNE 18, 1974

INDUCED POLARIZATION AND RESISTIVITY SURVEY

SURVEYED BY COMINCO LTD. EXPLORATION DIVISION

LINE NO. 16 E



N.T.S. 92-I-6

DWG. NO. I.P.-84-14

COMINCO LTD.

VALLEY COPPER (TOKETIC PROPERTY)

SPENCES BRIDGE AREA

KAMLOOPS MINING DIVISION B. C.

LINE NO. 20 E

DIPOLE - DIPOLE
ELECTRODE CONFIGURATION

x = 400'

PLOTTING POINT
n = 1, 2, 3 & 4

SURFACE PROJECTION
OF ANOMALOUS ZONES
DEFINITE
PROBABLE
POSSIBLE

FREQUENCIES 0.31 & 5.0 cps

DATE SURVEYED MAY, 1974

APPROVED

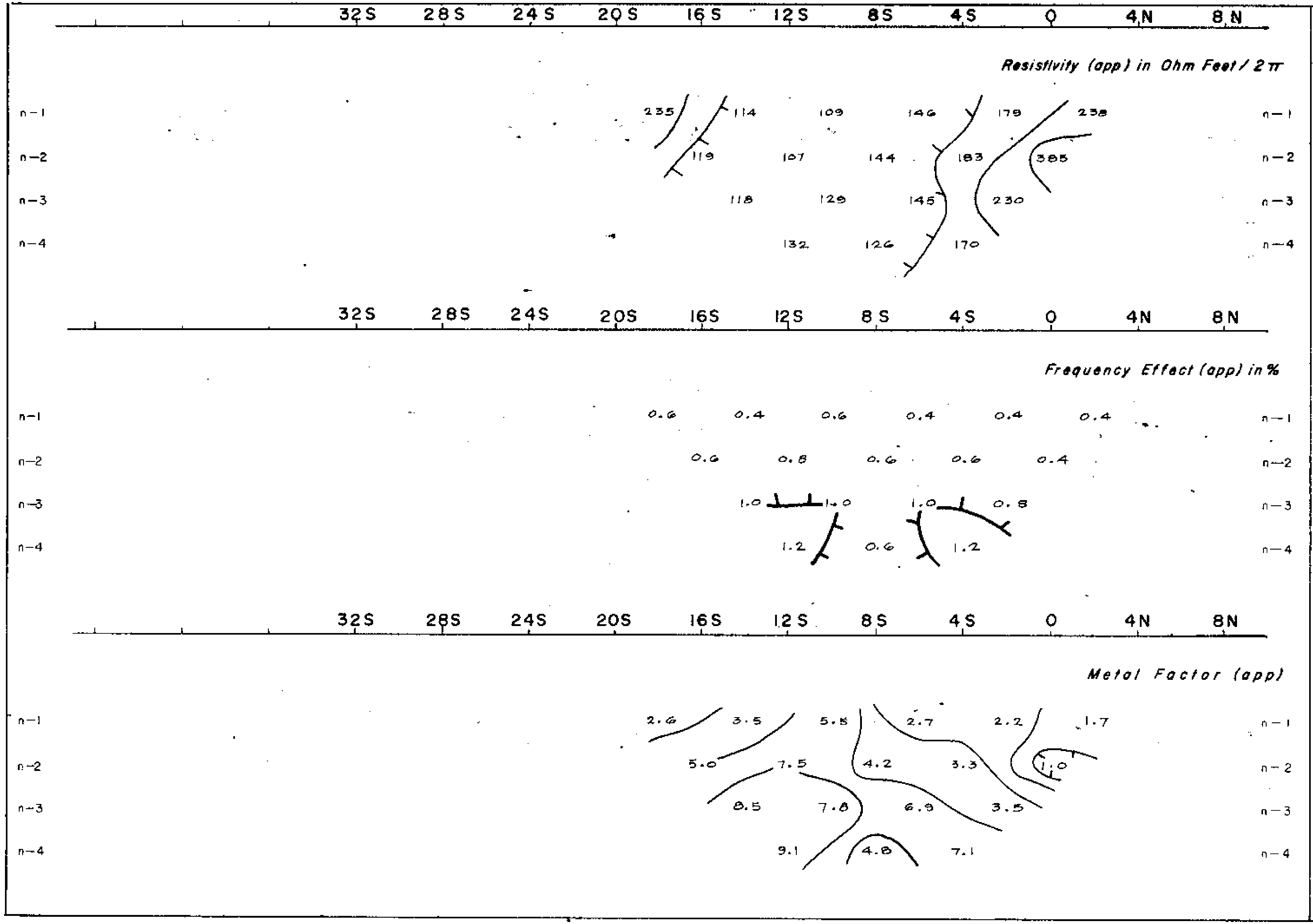
NOTE: CONTOURS AT LOGARITHMIC INTERVALS 1-1.5-2-3-5-7.5-10

DATE JUNE 18, 1974

INDUCED POLARIZATION AND RESISTIVITY SURVEY

SURVEYED BY COMINCO LTD. EXPLORATION DIVISION

LINE NO. 20E



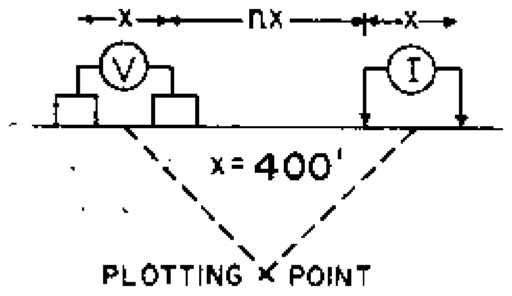
N.T.S. 92-I-6

DWG. NO. I.P.-84-15

COMINCO LTD.
VALLEY COPPER (TOKETIC PROPERTY)
SPENCES BRIDGE AREA
KAMLOOPS MINING DIVISION B. C.

LINE NO. 24 E

DIPOLE - DIPOLE
ELECTRODE CONFIGURATION



SURFACE PROJECTION
OF ANOMALOUS ZONES
DEFINITE
PROBABLE
POSSIBLE

FREQUENCIES 0.31 & 5.0 cps

DATE SURVEYED MAY, 1974

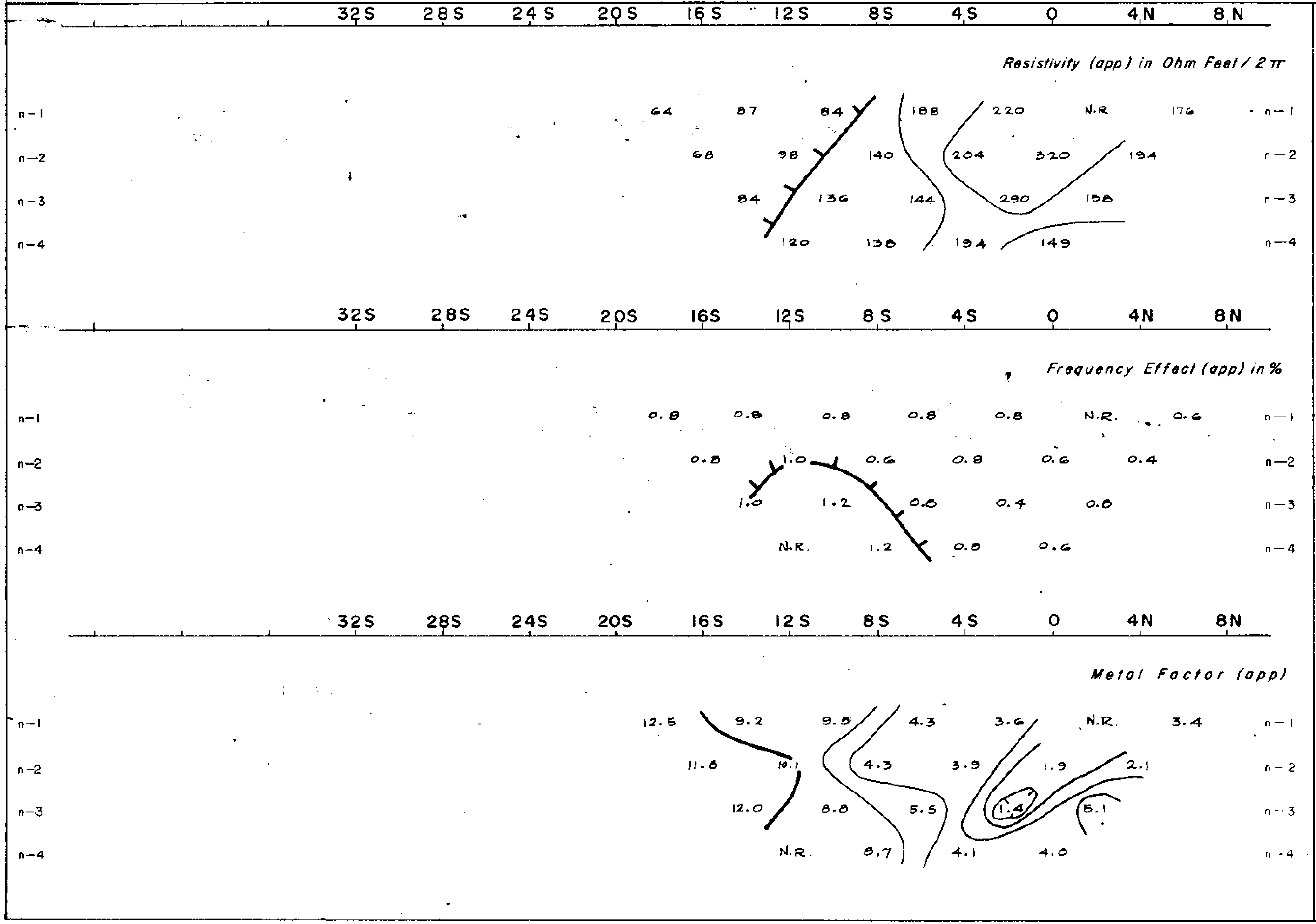
APPROVED

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

DATE JUNE 18, 1974

INDUCED POLARIZATION AND RESISTIVITY SURVEY
SURVEYED BY COMINCO LTD. EXPLORATION DIVISION

LINE NO. 24 E



N.T.S. 92-I-6

DWG. NO. I.P.-84-16

COMINCO LTD.
VALLEY COPPER (TOKETIC PROPERTY)
SPENCES BRIDGE AREA
KAMLOOPS MINING DIVISION B.C.

LINE NO. 28 E

DIPOLE - DIPOLE
ELECTRODE CONFIGURATION
x nx x
x = 400'
PLOTTING POINT
n = 1, 2, 3 & 4

SURFACE PROJECTION
OF ANOMALOUS ZONES
DEFINITE
PROBABLE
POSSIBLE

FREQUENCIES 0.31 & 5.0 cps

DATE SURVEYED MAY, 1974

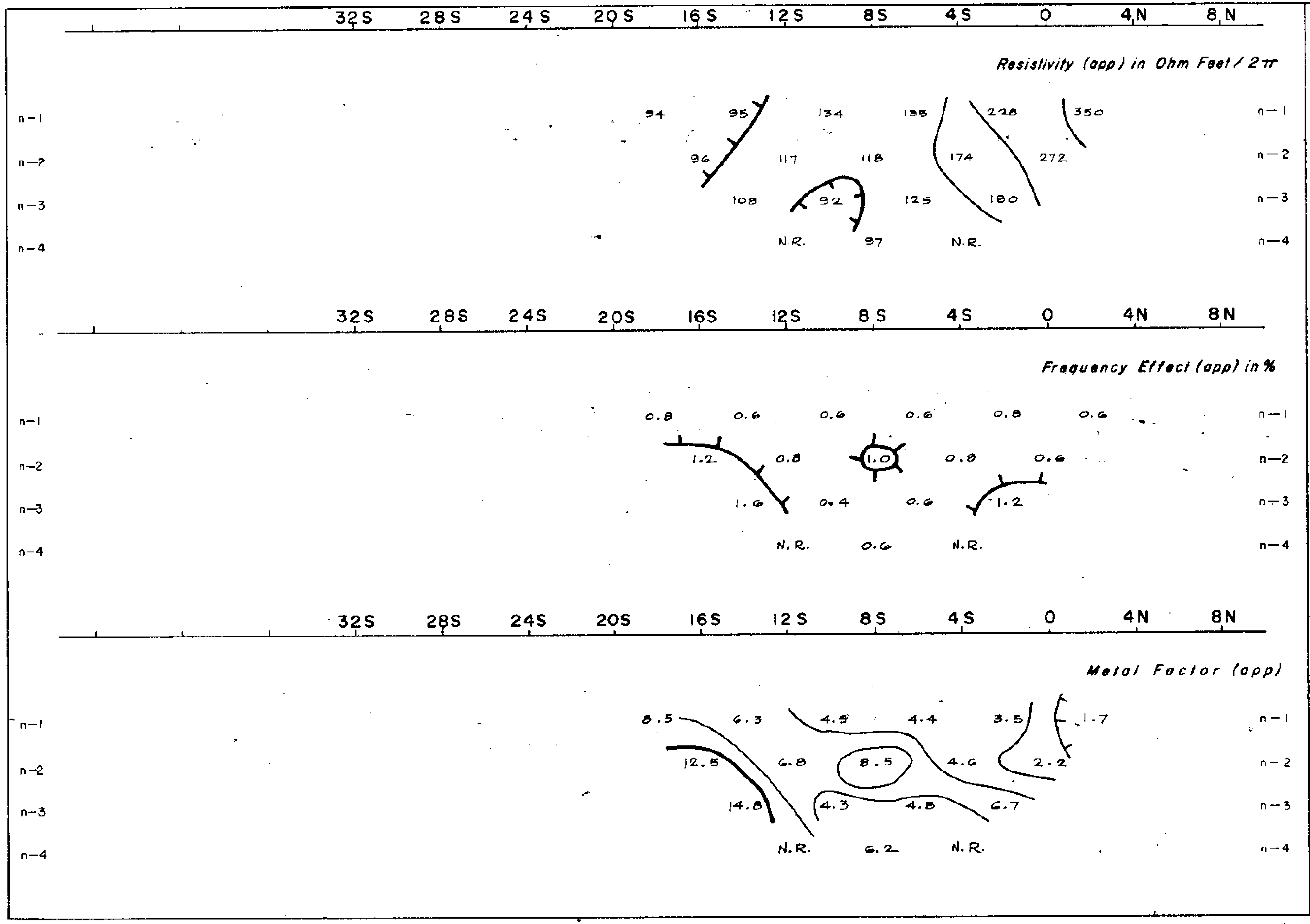
APPROVED

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

DATE JUNE 18, 1974

INDUCED POLARIZATION AND RESISTIVITY SURVEY
SURVEYED BY COMINCO LTD. EXPLORATION DIVISION

LINE NO. 28 E



N.T.S. 92-I-6

DWG. NO. I.P.-84-17

COMINCO LTD.

VALLEY COPPER (TOKETIC PROPERTY)

SPENCES BRIDGE AREA

KAMLOOPS MINING DIVISION B.C.

LINE NO. 32 E

DIPOLE - DIPOLE ELECTRODE CONFIGURATION

x = 400'

PLOTTING POINT

n = 1, 2, 3 & 4

SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE

PROBABLE

POSSIBLE

FREQUENCIES 0.31 & 5.0 cps

DATE SURVEYED MAY, 1974

APPROVED

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

DATE JUNE 18, 1974

INDUCED POLARIZATION AND RESISTIVITY SURVEY

SURVEYED BY COMINCO LTD. EXPLORATION DIVISION

LINE NO. 32E

N.T.S. 92-I-6

DWG. NO. I.P.-84-18

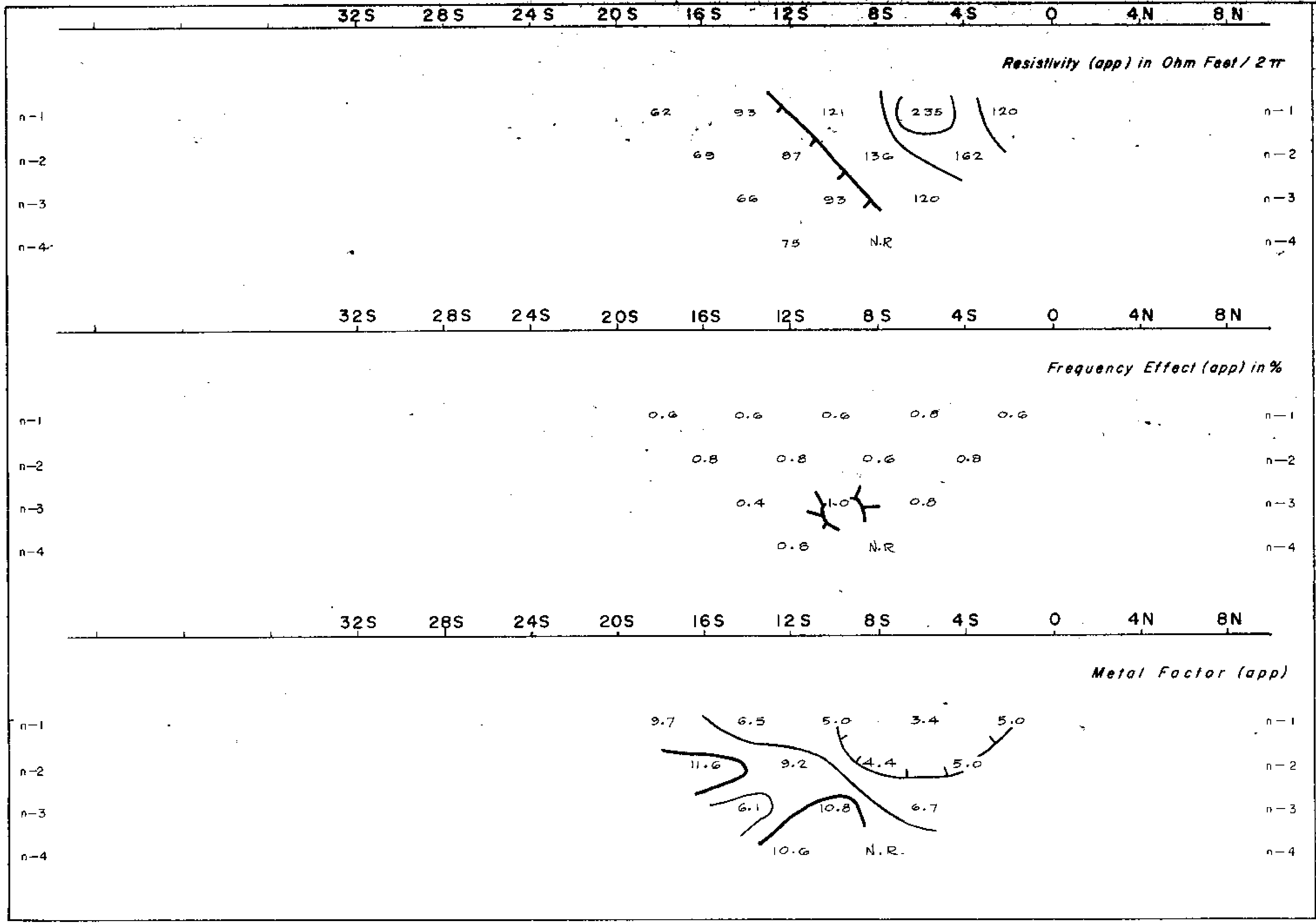
COMINCO LTD.

VALLEY COPPER (TOKETIC PROPERTY)

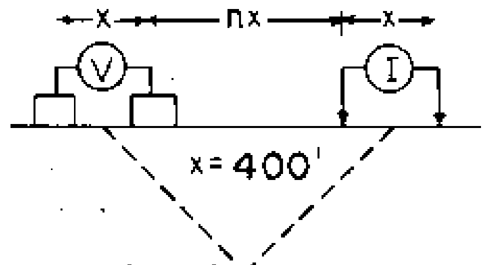
SPENCES BRIDGE AREA

KAMLOOPS MINING DIVISION B. C.

LINE NO. 36 E



DIPOLE - DIPOLE ELECTRODE CONFIGURATION



PLOTTING × POINT

n= 1,2,3 & 4

SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE

PROBABLE

POSSIBLE

FREQUENCIES 0.31 & 5.0 cps

DATE SURVEYED MAY, 1974

APPROVED

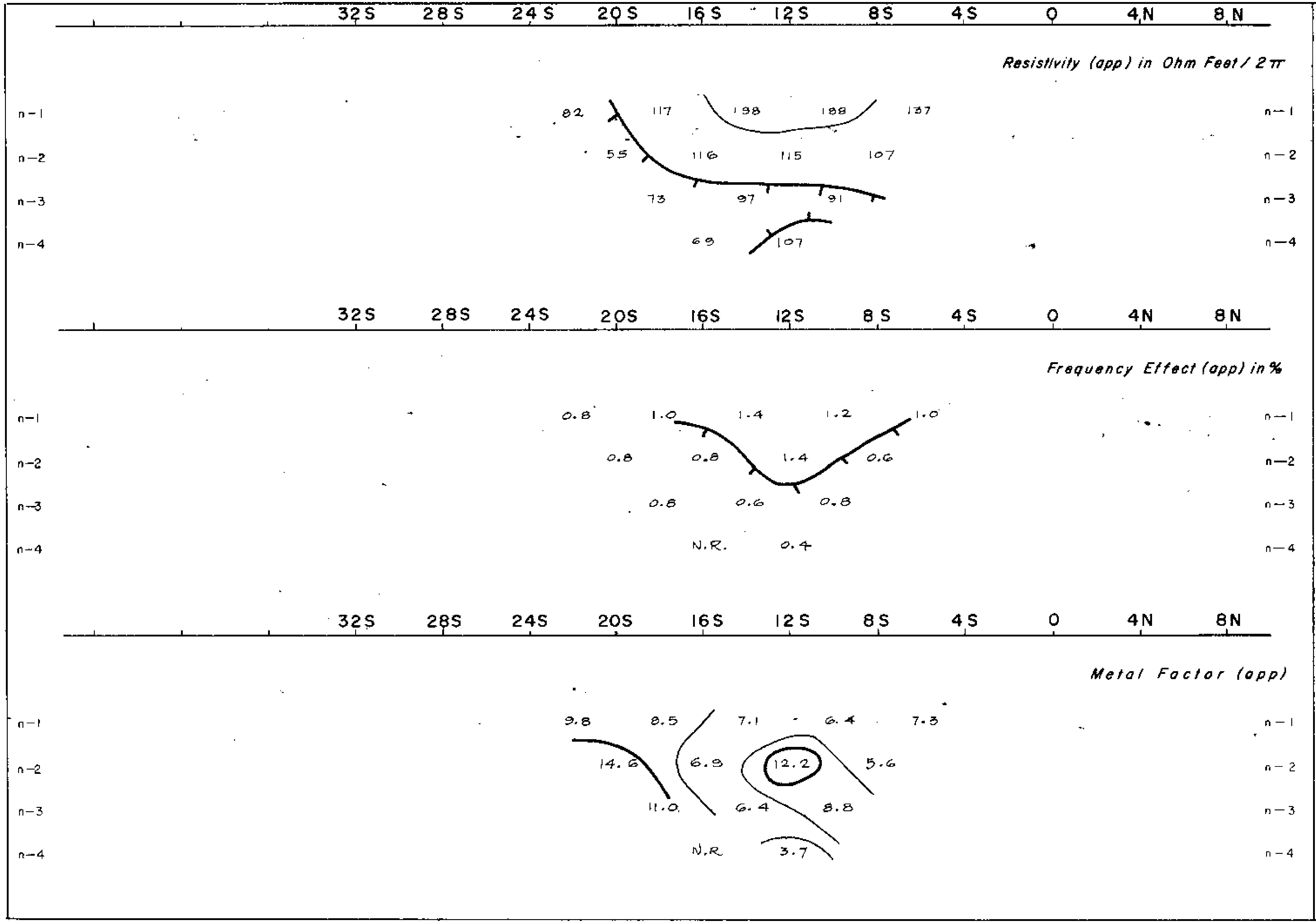
NOTE: CONTOURS AT LOGARITHMIC INTERVALS 1-1.5-2-3-5-7.5-10

DATE JUNE 18, 1974

INDUCED POLARIZATION AND RESISTIVITY SURVEY

SURVEYED BY COMINCO LTD. EXPLORATION DIVISION

LINE NO. 36E



N.T.S. 92-I-6

DWG. NO. I.P.-84-19

COMINCO LTD.

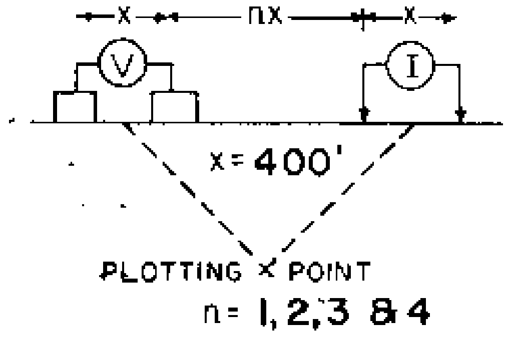
VALLEY COPPER (TOKETIC PROPERTY)

SPENCES BRIDGE AREA

KAMLOOPS MINING DIVISION B.C.

LINE NO. 40 E

DIPOLE - DIPOLE ELECTRODE CONFIGURATION



SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE

PROBABLE

POSSIBLE

FREQUENCIES 0.31 & 5.0 cps

DATE SURVEYED MAY, 1974

APPROVED

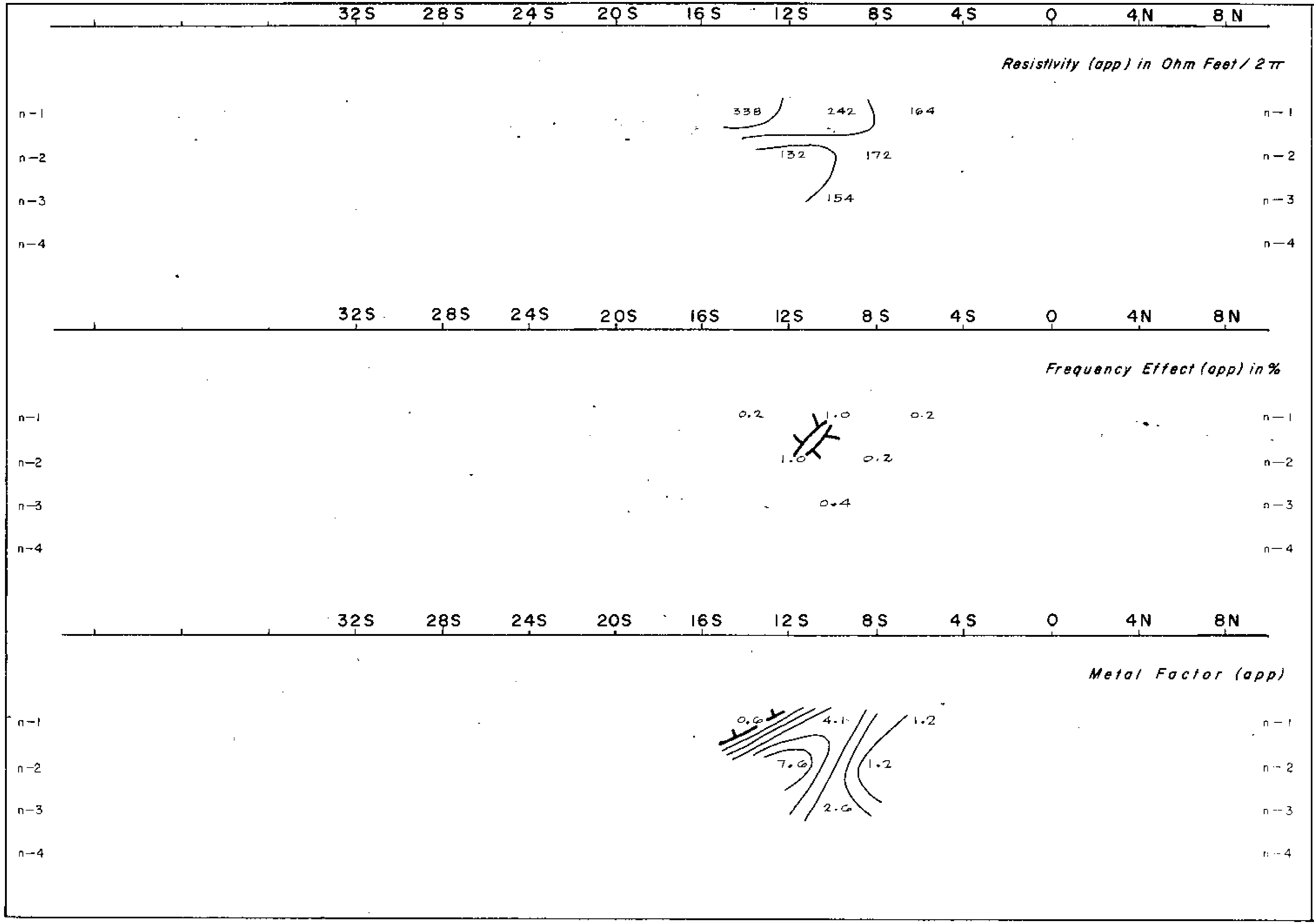
NOTE: CONTOURS AT LOGARITHMIC INTERVALS 1-1.5-2-3-5-7.5-10

DATE JUNE 18, 1974

INDUCED POLARIZATION AND RESISTIVITY SURVEY

SURVEYED BY COMINCO LTD. EXPLORATION DIVISION

LINE NO. 40 E



N.T.S. 92-I-6

DWG. NO. I.P.-84-20

COMINCO LTD.

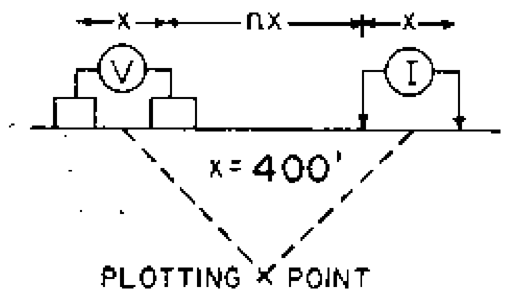
VALLEY COPPER (TOKETIC PROPERTY)

SPENCES BRIDGE AREA

KAMLOOPS MINING DIVISION B. C.

LINE NO. 44 E

DIPOLE - DIPOLE
ELECTRODE CONFIGURATION



PLOTTING X POINT
n = 1, 2, 3 & 4

SURFACE PROJECTION
OF ANOMALOUS ZONES
DEFINITE
PROBABLE
POSSIBLE

FREQUENCIES 0.31 & 5.0 cps

DATE SURVEYED MAY, 1974

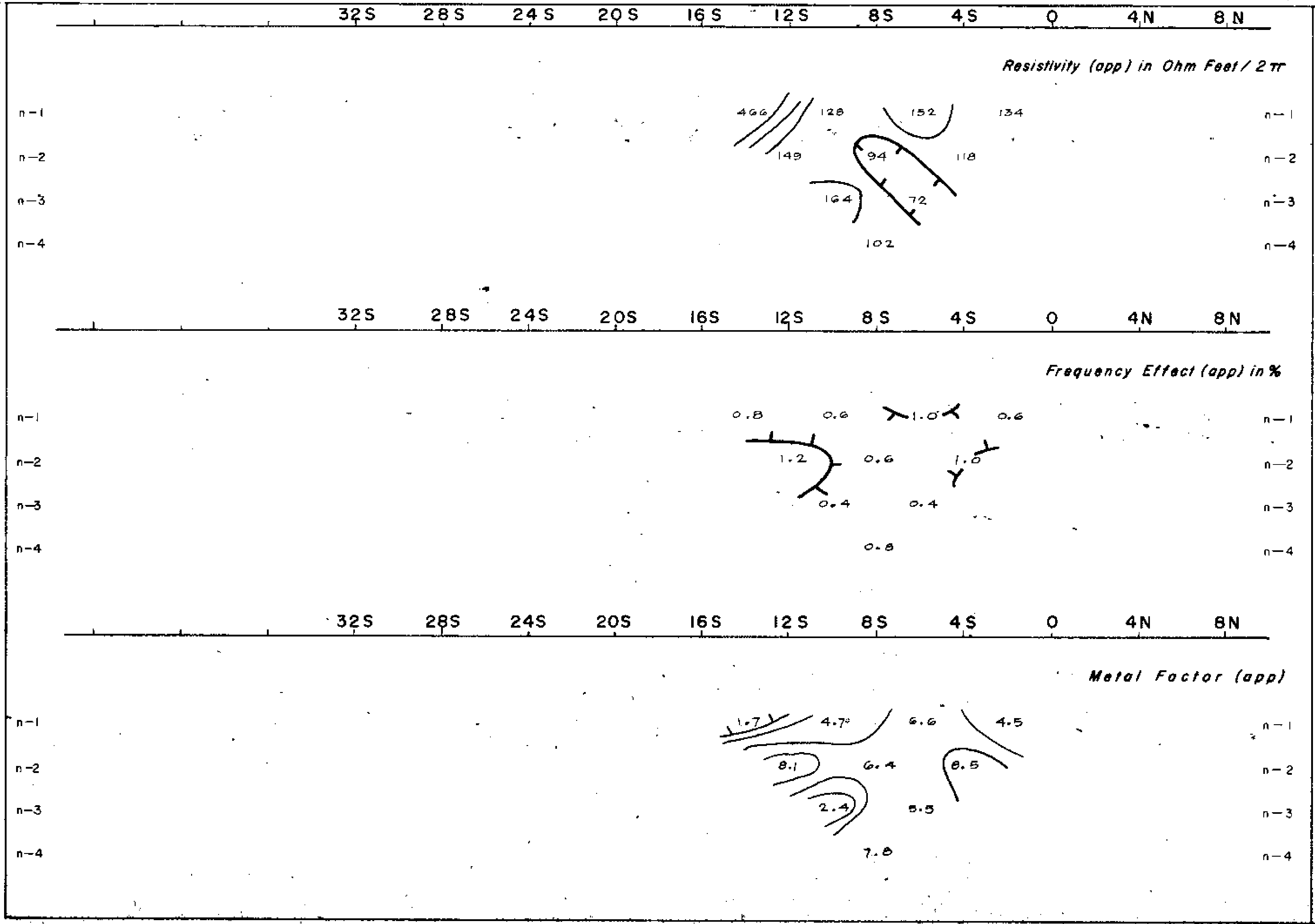
APPROVED

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

DATE JUNE 18, 1974

INDUCED POLARIZATION AND RESISTIVITY SURVEY
SURVEYED BY COMINCO LTD. EXPLORATION DIVISION

LINE NO. 44 E



N.T.S. 92-I-6

DWG. NO. I.P.-84-21

COMINCO LTD.
VALLEY COPPER (TOKETIC PROPERTY)
SPENCES BRIDGE AREA
KAMLOOPS MINING DIVISION B.C.

LINE NO. 48 E

DIPOLE - DIPOLE
ELECTRODE CONFIGURATION

←x→←nx→←x→

V I

x=400'

PLOTTING × POINT
n=1,2,3 & 4

SURFACE PROJECTION
OF ANOMALOUS ZONES

DEFINITE
PROBABLE
POSSIBLE

FREQUENCIES 0.31 & 5.0 cps

DATE SURVEYED MAY, 1974

APPROVED

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

DATE JUNE 18, 1974

INDUCED POLARIZATION AND RESISTIVITY SURVEY

SURVEYED BY COMINCO LTD. EXPLORATION DIVISION

LINE NO. 48 E

APPENDIX I

NOTES ON THE INDUCED POLARIZATION METHOD

March 10, 1969. John M. Hamilton

THEORY:

Polarization is the separation of charge, or blocking action, of metallic or electronic conductors within a medium of ionic solution conduction. Induced polarization refers to this blocking action when caused by an applied electric current.

In its geological context, polarization, or I.P., refers to the electrochemical blocking phenomenon exhibited by metallic minerals such as most sulphides, magnetite and graphite, under the influence of an applied current. When a current is passed through the subsurface, conduction is ionic and is dependent upon ions in the water content of the subsurface because most minerals have a much higher specific resistivity than ground water. The "metallic" minerals have specific resistivities which are much lower than ground water. The I.P., effect occurs at the interfaces between ionic conductive conditions in ground water and electronic conductive conditions in metallic minerals. Electronic charges are built up on these interfaces which oppose the flow of current that produces them.

The blocking action, or I.P. effect, increases with the time during which the current is flowing in a given direction. Hence, if the current is periodically reversed, a high frequency current will be subject to less blocking, or I.P. effect, than will a low frequency, since less time is available for the blocking to occur at a high frequency. It is therefore possible to measure the I.P. effect by measuring resistivity at two frequencies. This is the basis of the frequency domain I.P. system. Field readings consist of current readings between the transmitter electrodes, and voltage readings between the receiver electrodes, at both the high and the low frequency. From these readings a resistivity can be calculated for each frequency, using the relationship V= IR (Ohm's Law) and geometrical constants applicable to the electrode array.

The resistivity values so obtained are actually apparent resistivity values, being an average of all the material sampled for each reading. The resistivity plotted is the high frequency value, since it is least dependent on blocking action or I.P. effect, and hence is a truer valu if polarizable material is present. The units used are ohm-feet/2π . To convert these units into ohm-meters used in some other I.P. systems, the ohm-feet/2π values should be multiplied by 1.9.

The percent frequency effect, actually an apparent frequency effect, is defined as $(R_L - R_H)/R_H \times 100\%$, where R_L and R_H are the resistivities at the low and high frequencies, respectively. The percent frequency effect is the parameter measured to show the I.P. effect, and is the frequency domain equivalent of the chargeability "m" used in time domain I.P. work,

The metal factor values are obtained by dividing the percent frequency effect by the resistivity and multiplying by 1000. The metal factor is proportional to the change in conductivity as the frequency of the applied current is varied, and can be shown to be equal to $(\sigma_H - \sigma_L) \times 2\pi \times 10^5$, where σ_H and σ_L are the conductivities at the high and low frequencies, respectively. The metal factor is generally more indicative of the conductive metallic content than is the frequency effect, although there are exceptions to this.

FIELD PROCEDURE:

Current is applied to the ground at two current electrodes (C_1 and C_2) spaced a distance x apart as shown in the accompanying diagram. The potential is measured at two potential electrodes (P_1 and P_2) also spaced a distance x apart and in line with the current electrodes. For any given locations of C_1 and C_2, readings are taken when the distance between the nearest current and potential electrodes is equal to nx, and n has values of 1, 2, 3, etc. The electrode spacing x is determined by the requirements of the survey. Larger values of x would be used when the object is greater depth penetration and faster progress, whereas smaller values of x are employed in more detailed surveys, to provide more accurate anomaly location, but for the smaller values of x, the penetration is less and the survey slower. The value chosen for x should not greatly exceed the width of the target sought. The penetration is greater for the larger values of n.

INTERPRETATION:

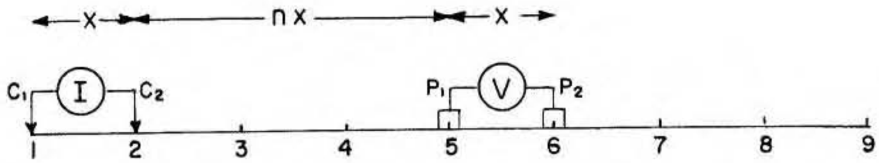
The values of the resistivity, metal factor and percent frequency effect are plotted on "pseudo-sections", where the plotting point is determined by the inters.ction of lines drawn at 45° from the horizontal, and originating at the mid-points of the current electrode spread and the potential electrode spread, as shown in the accompanying diagram. The choice of 45° from the horizontal is made because it simplifies plotting on gridded paper. There is no other basis for it, and lines at any other angle would produce just as "correct" a distribution of plotted values. The percent frequency effect is shown either as a superscript to each metal factor value, or as a separate, contoured plot similar to the first two. Depths to causative bodies cannot be scaled from the "pseudo-section," because the relationship between "pseudo-section" depths and true depths depends on anomalous body configuration and size, and other other inhomegeneities in the true resistivity distribution in the earth, as well as on the method used to plot the section.

The most favourable type of anomaly would show a frequency effect high with a resistivity low, to provide a marked metal factor high. A frequency effect high, with little or no change in resistivity, to provide a metal factor high, mirroring the frequency effect high, is also favourable. Of lesser interest, but of possible importance, are those anomalies showing no frequency effect change, but a distinct resistivity low, to produce a metal factor anomaly. The type of anomaly, its strength, size and shape should be considered in relation to the geological setting and the target sought.

The surface projection of anomalous zones are shown under the base line of the "pseudo-sections", or data plots. The location of anomalous zones is made after studying the responses at all separations, and is aided by data from computer and tank model-studies, as well as case histories and local geology when known. The source of an anomaly can at best be located only to within one electrode interval or x distance.

Anomalies are classified into three groups: definite, probable and possible. Grouping is based on the strength of the metal factor, the frequency effect, and the pattern of the anomaly. In general, the true metal factor is dependent on the concentration and distribution of chargeable material in the source, but the survey measures the apparent metal factor, which is an average. A large volume with a small percentage of sulphides could show the same metal factor as a smaller body with more concentrated sulphides. The apparent metal factor will approach the true metal factor when the anomalous body is large, and its depth to top small, relative to the electrode interval.

In some cases, a contoured data-plan is prepared, to show frequency effect, metal factor or resistivity values. Only data obtained at one separation is used on such a plan, and commonly the second separation data is plotted, to show results from an intermediate level of investigation. The surface projection of anomalous zones, as determined from the profiles, are also shown, and in many cases these will not coincide with contoured peaks, because data at other separations, if anomalous, will have been considered when locating anomalies. The most profitable use of contoured plans is as a trend indicator.



X = ELECTRODE SPREAD LENGTH OR ELECTRODE SPACING OR DIPOLE LENGTH

n = ELECTRODE SEPARATION = 1, 2, 3 . . . .

DIPOLE - DIPOLE ELECTRODE ARRAY

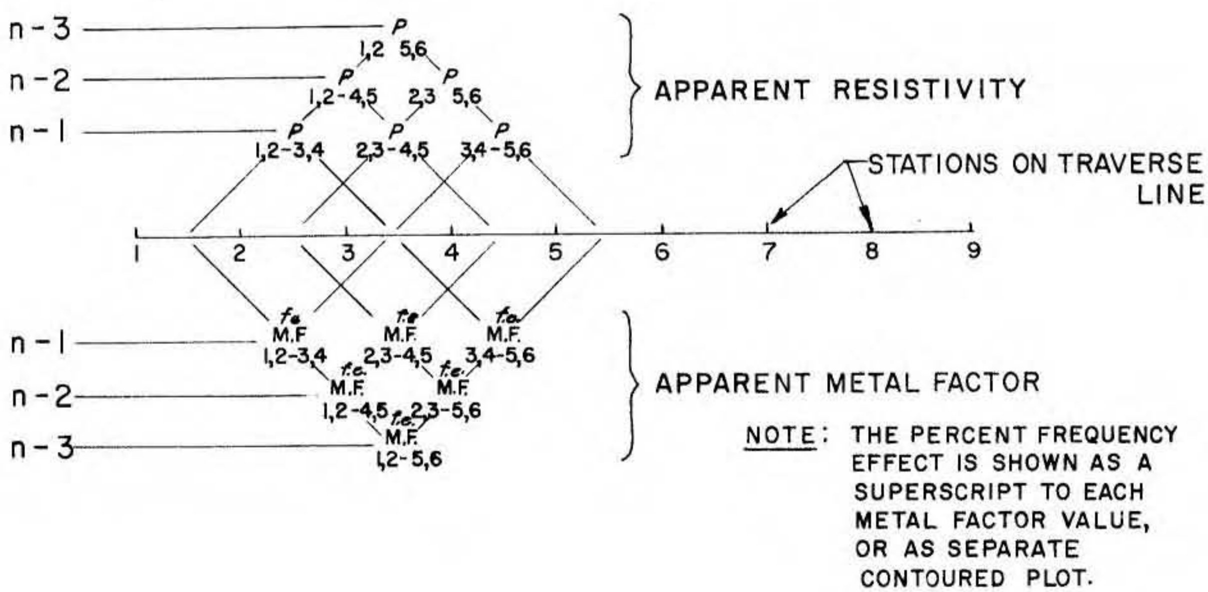
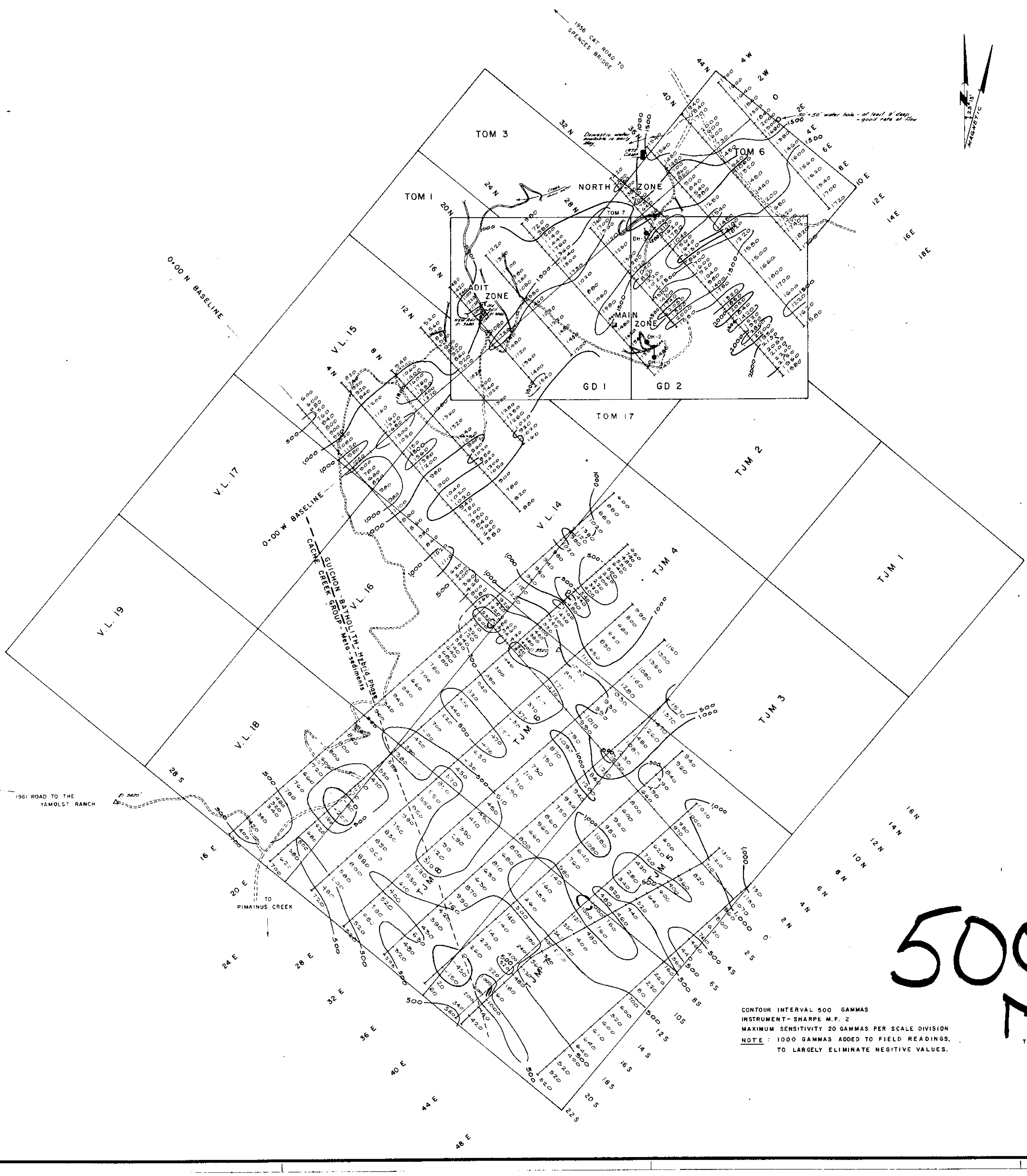
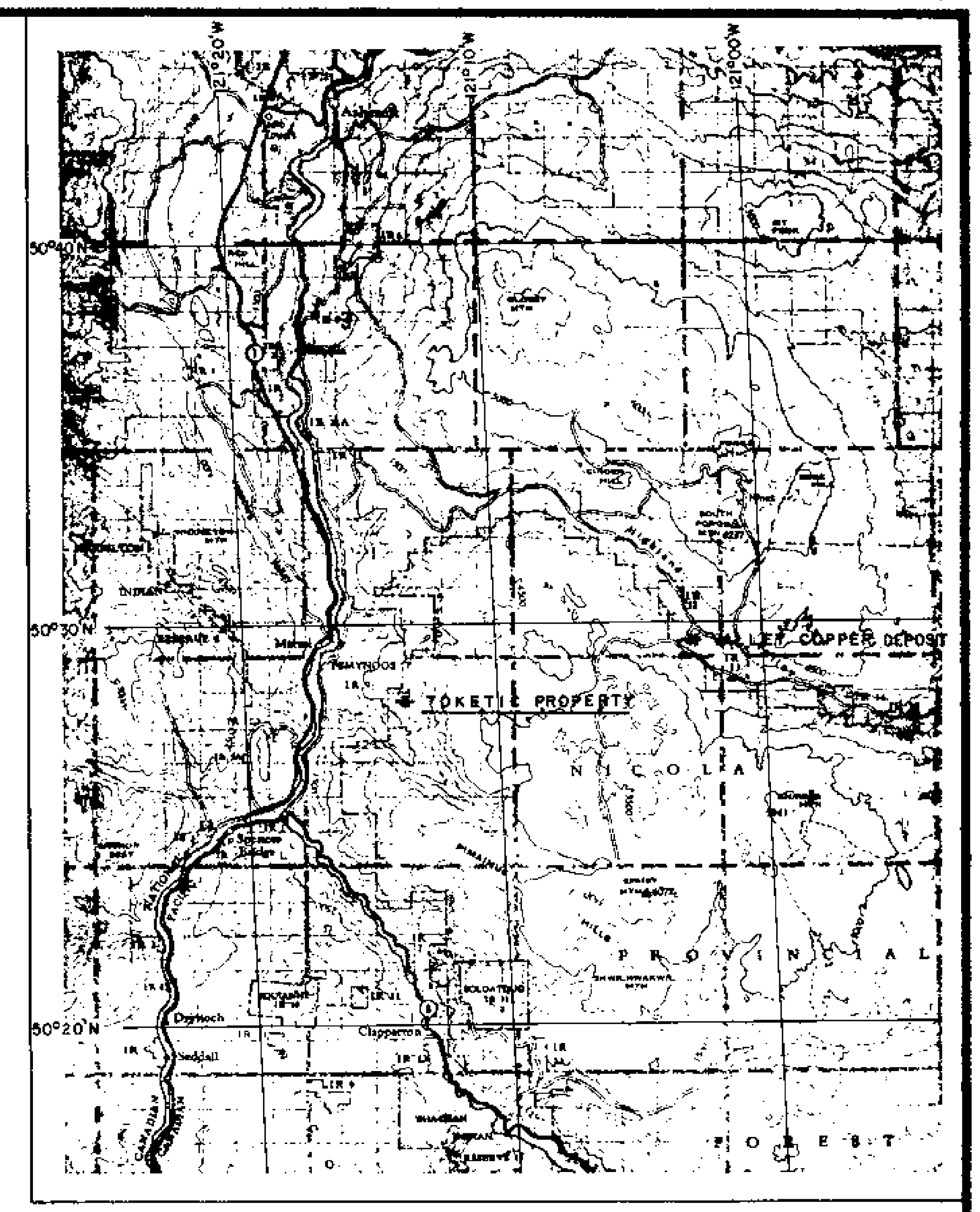


DIAGRAM SHOWING PLOTTING METHOD





LOCATION MAP

SCALE 1" = 4 MI.

5002
M1

NO. 5002 #1

SCALE

0 200' 400' 600' 800' 1000'

CONTOUR INTERVAL 500 GAMMAS
INSTRUMENT- SHARPE M.F. 2
MAXIMUM SENSITIVITY 20 GAMMAS PER SCALE DIVISION
NOTE : 1000 GAMMAS ADDED TO FIELD READINGS, TO LARGELY ELIMINATE NEGITIVE VALUES.

TO ACCOMPANY A REPORT BY J. M. HAMILTON P. ENG.

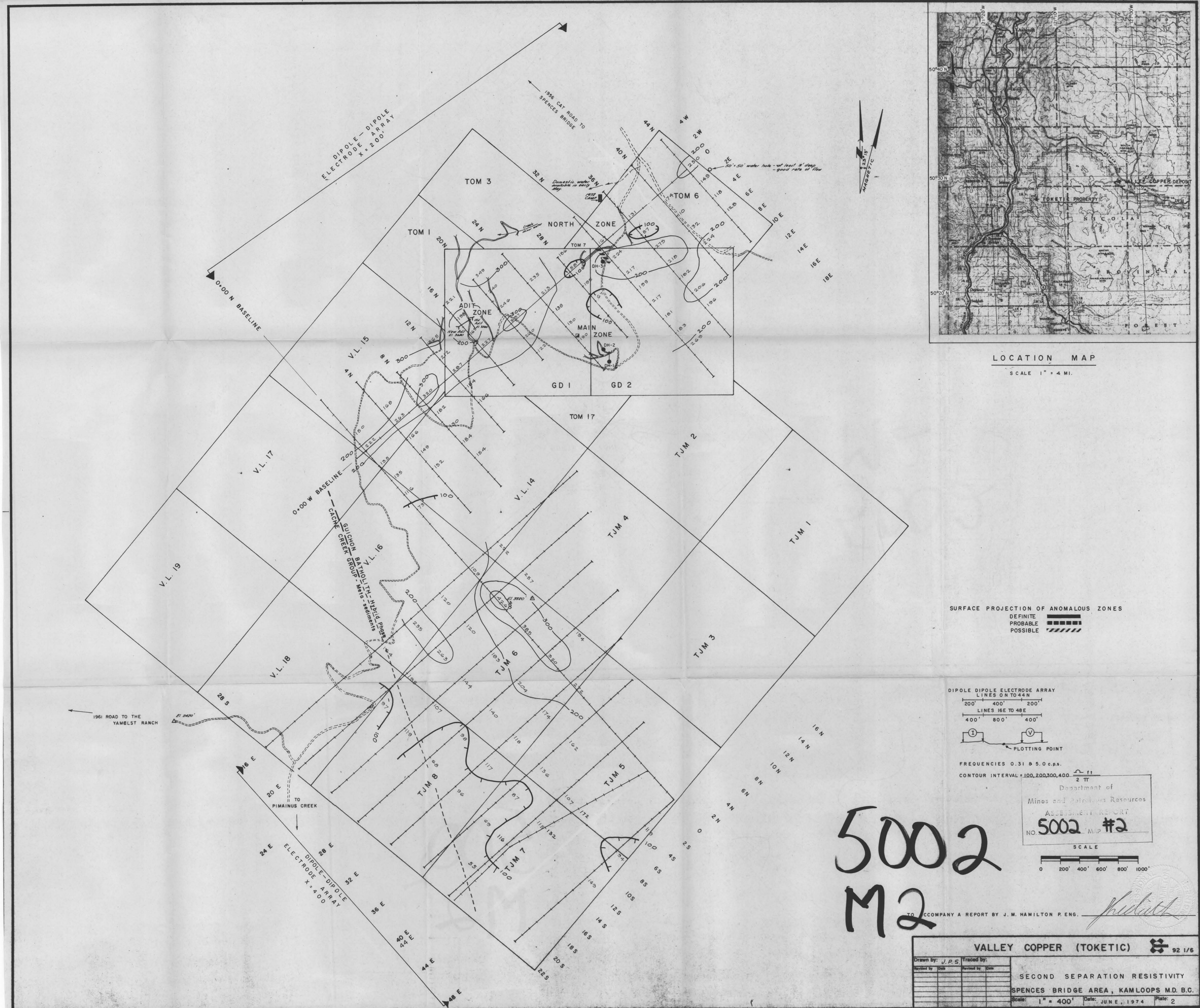
VALLEY COPPER (TOKETIC) 92 I/6

Drawn by: JPS | Traced by:

MAGNETOMETER SURVEY

SPENCES BRIDGE AREA, KAMLOOPS M.D. B.C.

Scale: 1" = 400' | Date: JUNE, 1974 | Plate: 1



5002
M2

TO ACCOMPANY A REPORT BY J. M. HAMILTON P. ENG.

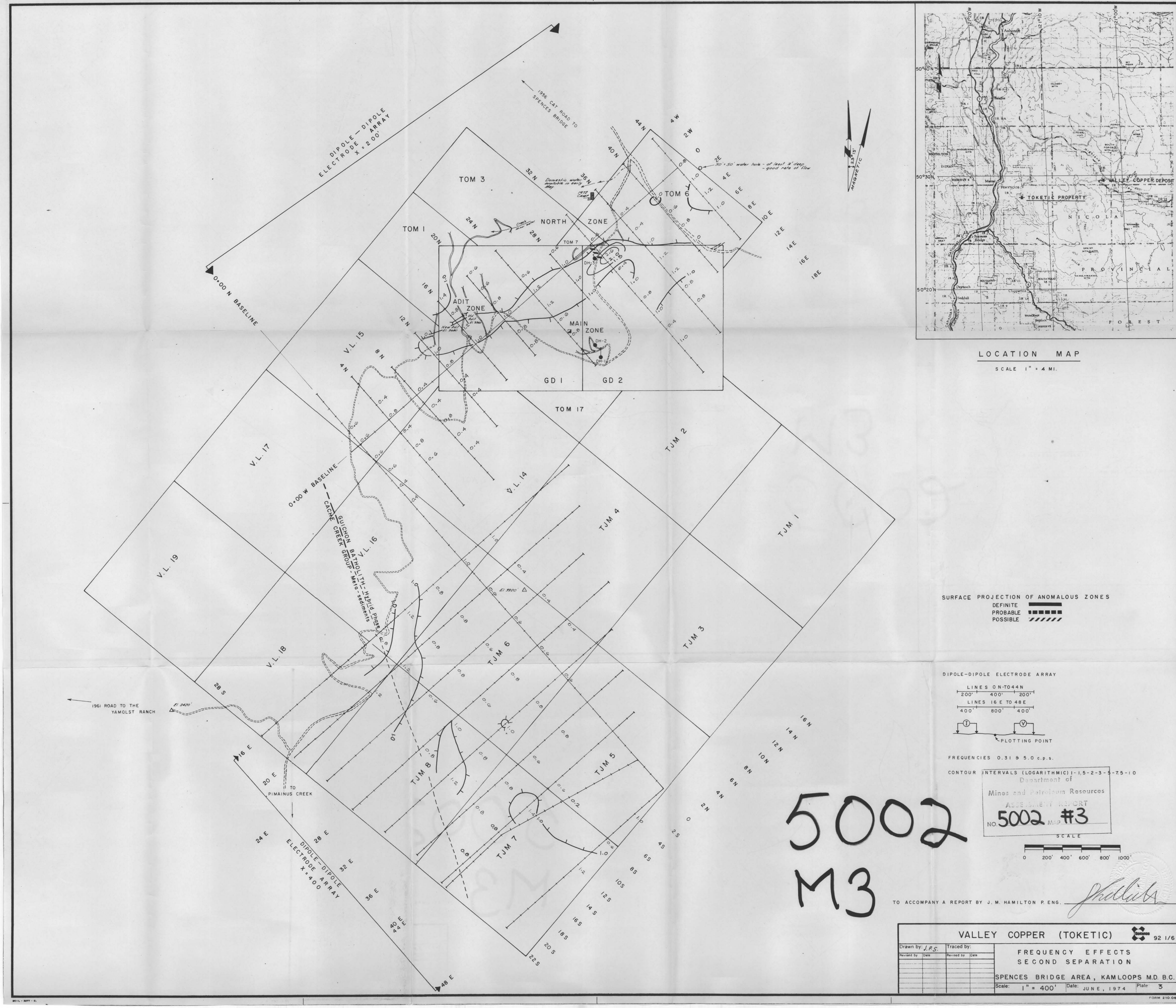
VALLEY COPPER (TOKETIC) 92 I/6

Drawn by: J.P.S. | Traced by:

SECOND SEPARATION RESISTIVITY

SPENCES BRIDGE AREA, KAMLOOPS M.D. B.C.

Scale: 1" = 400' | Date: JUNE, 1974 | Plate: 2



DIPOLE – DIPOLE ELECTRODE ARRAY X = 200'
1956 CAT ROAD TO SPENCES BRIDGE
0+00 N BASELINE
0+00 W BASELINE
TOM 3
TOM 1
TOM 6
TOM 7
TOM 17
NORTH ZONE
ADIT ZONE
MAIN ZONE
GD 1
GD 2
V.L. 15
V.L. 17
V.L. 14
V.L. 16
V.L. 19
V.L. 18
TJM 1
TJM 2
TJM 3
TJM 4
TJM 5
TJM 6
TJM 7
TJM 8
Domestic water available in early May
50' x 50' water hole – at least 3' deep – good rate of flow
GUICHON BATHOLITH – Hybrid Phase
CACHE CREEK GROUP – Meta-sediments
El. 3320
1961 ROAD TO THE YAMOLST RANCH
El. 2420'
TO PIMAINUS CREEK
DIPOLE – DIPOLE ELECTRODE ARRAY X = 400
MAGNETIC
23°15'
LOCATION MAP
SCALE 1" = 4 MI.
VALLEY COPPER DEPOSIT
TOKETIC PROPERTY
NICOLA
PROVINCIAL
FOREST
Spences Bridge
SURFACE PROJECTION OF ANOMALOUS ZONES
DEFINITE
PROBABLE
POSSIBLE
DIPOLE–DIPOLE ELECTRODE ARRAY
LINES 0N-TO 44N
200' 400' 200'
LINES 16 E TO 48 E
400' 800' 400'
PLOTTING POINT
FREQUENCIES 0.31 & 5.0 c.p.s.
CONTOUR INTERVALS (LOGARITHMIC) 1-1.5-2-3-5-7.5-10
Department of Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 5002 MAP #3
5002
M3
SCALE
0 200' 400' 600' 800' 1000'
TO ACCOMPANY A REPORT BY J. M. HAMILTON P. ENG.
VALLEY COPPER (TOKETIC)
92 I/6
Drawn by: J.P.S.
Traced by:
FREQUENCY EFFECTS
SECOND SEPARATION
SPENCES BRIDGE AREA, KAMLOOPS M.D. B.C.
Scale: 1" = 400'
Date: JUNE, 1974
Plate 3
FORM 210-0680

DOMINION OF CANADA:

PROVINCE OF BRITISH COLUMBIA.

TO WIT:

In the Matter of

STATUTORY DECLARATION RELATING TO EXPENDITURES ON LINE CUTTING AND GEOPHYSICAL SURVEYS OF THE TOKETIC PROPERTY, KAMLOOPS MINING DIVISION

NO. 5002

I, S.S. SELKE

of CITY OF NORTH VANCOUVER

in the Province of British Columbia, do solemnly declare that

1. COPIES OF A REPORT REGARDING GEOPHYSICAL SURVEYS ON CERTAIN MINERAL CLAIMS SITUATED IN THE KAMLOOPS MINING DIVISION ARE BEING FILED WITH THE MINING RECORDER IN VANCOUVER.

2. ATTACHED HERETO, AND MARKED WITH THE LETTER"A" UPON WHICH I HAVE SIGNED MY NAME AT THE TIME OF DECLARING HEREOF, IS A STATEMENT OF EXPENDITURES INCURRED IN CONNECTION WITH THE LINE CUTTING ON THE SAID CLAIMS SHOWING IN ADDITION THE DATES DURING WHICH THOSE DOING THE SAID LINE CUTTING PERFORMED THEIR WORK.

3. ATTACHED HERETO, AND MARKED WITH THE LETTER "B" UPON WHICH I HAVE SIGNED MY NAME AT THE TIME OF DECLARING HEREOF, IS A STATEMENT OF EXPENDITURES INCURRED IN CONNECTION WITH THE GEOPHYSICAL SURVEYS OF THE SAID CLAIMS SHOWING IN ADDITION THE DATES DURING WHICH THOSE MAKING THE SAID SURVEYS PERFORMED THEIR WORK.

And I make this solemn declaration conscientiously believing it to be true, and knowing that it is of the same force and effect as if made under oath and by virtue of the "Canada Evidence Act."

Declared before me at the CITY of VANCOUVER, in the Province of British Columbia, this 11 day of JUNE, 1974, A.D.

S.S. Selke

[illegible]

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

COMINCO LTD.

EXPLORATION | WESTERN DISTRICT

EXHIBIT "B"

GEOPHYSICAL SURVEY COSTS

TOKETIC PROPERTY, KAMLOOPS MINING DIVISION

NTS 92-I-6, 50° 121° NE

1.	Geophysical Survey Charges (as per internal Cominco Invoice)		$ 2,842.50
2.	Helpers' Wages:		
	J. Turner, 15 days at $37.50	$555.00	
	B. Claus, 13 days at $25.00	325.00	
	E. Ford, 18 days at $30.00	540.00	
	B.D. Ansley 18 days at$30.00	540.00	1,960.00
3.	Camp costs, 73 man days at $12.00		876.00
4.	Mobilization - Demobilization, Vancouver - property - return, including truck rental, 18 days and 550 miles		400.00
			$ 6,078.50

Work performed during period May 10-May 27, 1974.

Signed: S. S. Selke

S. S. Selke

THIS IS EXHIBIT "B" TO THE STATUTORY DECLARATION OF S.S. SELKE DECLARED BEFORE ME THIS 11 DAY OF JUNE 1974.

A COMMISSIONER FOR TAKING AFFIDAVITS FOR BRITISH COLUMBIA

COMINCO LTD.

EXPLORATION WESTERN DISTRICT

EXHIBIT "A"

LINE CUTTING COSTS

TOKETIC PROPERTY, KAMLOOPS MINING DIVISION

NTS 92-I-6, 50° 121° NE

1.	10.5 line miles at $205.50 (contract cost from Martinson Linecutting and Staking Ltd.)	$ 2,157.75
2.	Supervision by geologist, R.U.Bruaset, 2 days at $65.00	130.00
3.	Travelling costs, R.U.Bruaset, 400 miles at $0.10 per mile	40.00
		$ 2,327.75

Work performed during the period April 1 to April 15, 1974

Signed: S.S. Selke

S. S. Selke

THIS IS EXHIBIT "A" TO THE STATUTORY DECLARATION OF S.S. SELKE DECLARED BEFORE ME THIS 11 DAY OF JUNE 1974.

[signature]

A COMMISSIONER FOR TAKING AFFIDAVITS FOR BRITISH COLUMBIA

Memorandum

To	Accounting, Vancouver	Date	June 7, 1974
From	Geophysicist, Vancouver (JMH)	Invoice Number:	JMH-74-3
Subject	GEOPHYSICAL ACCOUNT BILLING	Reference	TOKETIC

(insert project or proposal name)

Please distribute the following charges as indicated by R.U. Bruaset and credit the Geophysical Account, code 705-80- 6700 .

5002

1.	Geophysicist Time		
	J.M. Hamilton, May 16 and May 19, 1974 2 days at $75.00		$ 150.00
2.	Technician Time		
	T.G. Kauppinen, May 10 - 27 inclusive 18 days at $50.00		900.00
3.	Interpretation, drafting, report writing		
	11½ operating days at $75.00 per day		862.50
4.	Instrument Rental		
	I.P. Unit, May 10 27 inclusive, 18 days at $45.00	$810.00	
	Magnetometer, May 10 - 21, 12 days at $10.00	120.00	930.00
			$2,842.50

JMHamilton:amm

Signed

INVOICE

MARTINSON
LINECUTTING AND STAKING LTD.

6860 Fairmont Street :: POWELL RIVER, B.C.

Telephone 485-2198

Date APRIL 15th 1974

IN ACCOUNT WITH

Cominco Ltd

200 GRANVILLE SQUARE

VANCOUVER, B.C.

Picket Line Miles 10.5	@ 205.50	per mile		$ 2157.75
Base Line Miles	@	per mile		
Transit Base Line Miles	@	per mile		
Mining Claims	@	per claim		
Claim Blocks	@	per block		
Geophysics				
Expenses				
Rentals				
Other:				
			TOTAL	$ 2157.75
			Less	—
			AMOUNT OWING	$ 2157.75

Nº 106

232

VALLEY COPPER (TSKETIC)
LINECUTTING.

Don Martinson

7236

DEAKIN EQUIPMENT LTD.

833 POWELL STREET, VANCOUVER, B.C. V6A 1H7
TELEPHONE: 253-2685

INVOICE NUMBER
№ 8913

INVOICE

SOLD TO: Cominco Ltd
[illegible]
~~[illegible]~~ Mining Division
2200 - 200 Granville St.
Vancouver, B.C.

SHIP TO: SAME

SHIPPING AND INVOICE DATE	SHIPPED VIA	PPD.	COLL.	PPD. CHG.	TERMS: 1% 10 DAYS NET 30	YOUR ORDER NO.	DATE ORDERED
May 8/74	Call					TGK-74-9	May 8/74

QTY. B.O.	QTY. ORDERED	DESCRIPTION	QTY. SHIPPED	UNIT PRICE	AMOUNT
	6	- [illegible]	6	.65 ea	3 90
	6	- [illegible]	6	.30 ea	1 80
	6	- [illegible]	6	.35 ea	2 10
	[illegible]	- [illegible]	6	.30 ea	1 80
	[illegible]	- [illegible]	6	1.45 ea	8 70
	6	- [illegible]	6	1.10 ea	6 60
	6	- [illegible]	6	.95 ea	5 70
	6	- [illegible]	3	.60 ea	1 80
	1	- [illegible]	1	1.40 ea	1 40
	1	- [illegible]	1	.55 ea	55
	[illegible]	- [illegible] 85 [illegible]	[illegible]	2.85 ea	5 70
		[illegible]		—	—
	1	- [illegible] pipe [illegible]	1	5.95 ea	5 95
	1	- [illegible]	1	1.40 ea	1 40
	1	- [illegible]	1	3.99 ea	3 99
	1	[illegible]	1	1.40 ea	1 40
	1	- [illegible]	1	4.95 ea	4 95
	[illegible]	- [illegible]	2	4.80 ea	9 60
	1	- [illegible]	1	5.65 ea	5 65
-	1	- [illegible]	1	6.50 ea	6 50

RLB's copy
Charge 232-05-5400
[illegible signature]

FEDERAL TAX	FEDERAL TAX NO.	PROVINCIAL TAX LIC. NO.		
INCL. [X] EXCL. [ ]			TOTAL	79 49
			PROV. TAX	3 97
			AMOUNT DUE	83 46

T. Krayf[illegible]

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