

COMINCO LTD.

EXPLORATION

WESTERN DISTRICT

N.T.S. 92I/10E

GEOPHYSICAL REPORT

ON AN

INDUCED POLARIZATION SURVEY

CHUM PROPERTY

Chuwahls Mountain Area, B.C.; Kamloops Mining Division

Latitude: $50^{\circ}31'N$; Longitude: $120^{\circ}31'W$

Work Performed: June 13-23, 25, 26; July 13, 14

On Claims: Chum 1, 2, 4, 5, 8

JANUARY 1979

Alan Scott

7244
part 2882

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* * * * *

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INTRODUCTION

The CHUM property is located some 18 kilometers southwest of Kamloops, B.C, as indicated on accompanying Plate 139-78-1. The lines surveyed, in relation to the claims, are indicated on Plate 139-78-2.

During the summer of 1978, a Cominco geophysical crew completed some 25 line kilometers of multi separation induced polarization survey over portions of the CHUM claims.

This report describes this induced polarization survey, presents the data, and discusses the results.

LOCATION AND ACCESS

The CHUM claims are located in the Chuwels Mountain area, some 18 kms southwest of the city of Kamloops, B.C. They lie immediately north of Walloper Lake.

Access to the property can be gained by turning west off the Lac La Jeune highway, some 500 meters north of Stake Lake.

GEOLOGY

The CHUM property is located some 15 km south of the Afton deposit. Outcrops on the property are very few, but mapping by Cominco geologist M. J. Osatenko (1977), identified an alkaline stock consisting of pyroxenite, gabbro, diorite, monzonite and pyritic monzonite-dioritic breccia. These rocks are described as similar to those of the Iron Mask batholith.

The IP survey was initiated to try to define the possible location and extent of sulphide mineralization within the survey area.

INDUCED POLARIZATION SURVEY

G. J. Niemeyer, geophysical technician, was the party chief/receiver operator on the survey.

A Scintrex IPR-8 receiver, in combination with a Huntco 7.5 kw motor generator/transmitter were used on the survey. This equipment operates in the time domain, employing a 2 second current on/2 second current off alternating square wave. The chargeability (IP) values plotted are the M₂₃₂ values, and the units are millivolts/volt. To convert to the more common millisecond value (such as would be obtained with the older model IPR-7), the numbers should be multiplied by 0.7, for a "typical" decay curve. For a more detailed discussion of this instrument, the reader is referred to the Scintrex manual for the IPR-8.

The pole dipole electrode array was used on the survey. Lines 22, 16, 14, and 10S were surveyed at an "a" spacing of 100 m and "n" separations of 1 and 2. Lines 8, 6 and 4S were surveyed at an "a" spacing of 50 m and "n" separations of 1 and 2. The remaining 9 lines (2S to 9N) were surveyed at an "a" spacing of 50 m and "n" separations of 1, 2, 3, and 4. Lines 1+70S, 0+00 and 1+00N are part of a different grid than the rest of the survey lines, and lie to the east of Lodgepole Lake. These lines were surveyed with the current electrode to the west of the potential dipole. The main grid was surveyed with the current electrode to the east of the potential dipole.

The apparent resistivity data is given in units of ohm meters. The values were calculated from the relation:

$$\text{apparent resistivity} = (V/I) \cdot K$$

where V is the voltage across the potential measuring dipole due to a transmitted current I, and K is a geometric factor dependant upon the "a" spacing and "n" separation.

DESCRIPTION OF RESULTS

The induced polarization (chargeability) and apparent resistivity data is presented in standard pseudo section format as Plates 139-78-3 to 18 inclusive.

Lines 1+70S, 0+00 and 1+00N (Plates 139-78-3 to 5) lie to the east of Lodgepole Lake. These lines were surveyed to better define an IP anomaly from a survey conducted on behalf of Canadian Johns Manville in 1971. The strongest response on this grid was on line 1+00N between stations 350W to 550W. The highest $n=1$ reading was 49.0 millivolts per volt at station 425W. Chargeability values were moderately high on all three of these survey lines. No outcrop is present in the vicinity of this anomaly.

The remaining survey lines form a grid lying west of Lodgepole Lake. Lines 22, 16, 14, and 10S were surveyed in a reconnaissance manner, that is wide spaced lines surveyed with a relatively large electrode separation of "a" = 100 m ($n=1$ and 2 only). Chargeability response was quite low on these survey lines. The highest value was 13.1 millivolts per volt on line 10S at station 1900E ($n=2$). This station is reaching the geographic vicinity of the east grid previously discussed. A very weak anomaly (peak value 6 mv/v) is located just west of the baseline on line 16S. However, it is associated with, and may be in part caused by, an increase in apparent resistivity. No outcrop is present in the vicinity of these anomalies.

Those survey lines on this western grid that lie to the north of line 10S, were surveyed at a more detailed electrode spacing of "a" = 50 meters. A moderate chargeability high of some 20 mv/v was detected between stations 800E to 900E ($n=1$) on line 6+00S. Lines 8S and 4S were run on either side, to determine the extent of this high. It was not detected on either of these lines. No outcrop is present in the vicinity of this anomaly.

A well defined near surface anomaly was detected on line 2+00N and centered at 100E. The anomaly peaks at 10.0 mv/v. The weak anomaly centered at 100W on line 4+00N, and the stronger response of 9.2 mv/v at 250W on line 6+00N, appear to lie along strike to it. Weak highs were also detected on line 4+00N at 350W and on line 6+00N at 600W. Adjacent outcrops are few but comprise diorite and basalt with less than 1% pyrite and traces of chalcopyrite.

Moderately high chargeability values were obtained on line 6+00N at station 750E. The $n=3$ and $n=4$ values were 12.7 mv/v. Adjacent outcrops are basalt with traces of pyrite and chalcopyrite.

An unusual type of chargeability anomaly was detected on line 8+00N centered at 950W. An $n=1$ chargeability high of 14.5 mv/v is flanked by negative values. An adjacent outcrop contains some 2% pyrite in altered basalt.

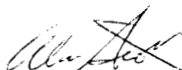
CONCLUSIONS

Portions of the CHUM mineral claims were surveyed with time domain IP in the summer of 1978. The survey was done over two grids. A small grid to the east of Lodgepole Lake was surveyed to redefine the location of an anomaly from a previous, 1971, survey.

The larger survey area lies to the west of Lodgepole Lake. Several weak to moderately anomalous chargeability highs were detected on this grid, as described in the previous section of this report. Three of the anomalies have adjacent outcrops showing minor pyrite and traces of chalcopyrite. No outcrop was found in the vicinity of the other anomalies.

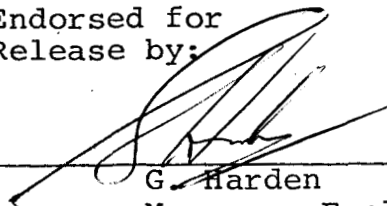
Further correlation of this data to geological and geochemical information, may indicate if further work is justified.

Respectfully submitted by:



Alan Scott
Geophysicist

Endorsed for
Release by:



G. Harden
Manager, Exploration
Western District

ARS/deb
10 January 1979
Distribution:

Mining Recorder (2)
Western District (1)
Geophysics File (1)

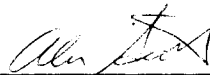
APPENDIX I

IN THE MATTER OF THE B.C. MINERAL ACT
AND IN THE MATTER OF A GEOPHYSICAL PROGRAMME
CARRIED OUT ON PORTIONS OF THE CHUM MINERAL CLAIMS
ON THE CHUM PROPERTY
LOCATED 18 KM SW OF KAMLOOPS IN THE KAMLOOPS MINING DIVISION
OF THE PROVINCE OF BRITISH COLUMBIA, MORE PARTICULARLY
N.T.S.: 92I/10E

S T A T E M E N T

I, ALAN SCOTT, OF THE CITY OF VANCOUVER IN THE PROVINCE
OF BRITISH COLUMBIA, MAKE OATH AND SAY:

1. THAT I AM EMPLOYED AS A GEOPHYSICIST BY COMINCO LTD.
AND, AS SUCH, HAVE A PERSONAL KNOWLEDGE OF THE FACTS
TO WHICH I HEREINAFTER DEPOSE;
2. THAT ANNEXED HERETO AND MARKED AS "APPENDIX II" TO
THIS STATEMENT IS A TRUE COPY OF EXPENDITURES INCURRED
ON GEOPHYSICAL SURVEY ON THE CHUM MINERAL CLAIMS;
3. THAT THE SAID EXPENDITURES WERE INCURRED BETWEEN THE
13TH OF JUNE AND 14TH OF JULY, 1978, FOR THE PURPOSE
OF MINERAL EXPLORATION OF THE ABOVE NOTED CLAIMS.



Alan Scott
Geophysicist

ARS/deb
10 January 1979

APPENDIX II

CHUM CLAIMS

STATEMENT OF EXPENDITURES

(IP Survey)

SALARIES: (IP Survey done June 13-23, 25, 26; July 13, 14)

G.J. Niemeyer	15 days @ \$120/day	= \$ 1,800	
I. Cummings	15 days @ \$ 82/day	= \$ 1,230	
C. LaPrairie	15 days @ \$ 82/day	= \$ 1,230	
R. Grant	15 days @ \$ 82/day	= \$ 1,230	
J. Reader	13 days @ \$ 82/day	= \$ 1,066	
B. Lum	4 days @ \$ 82/day	= \$ 328	
D. Saunders	4 days @ \$ 82/day	= \$ 328	
J.M. Niemeyer	4 days @ \$ 82/day	= \$ 328	
M. Siefert	2 days @ \$ 82/day	= \$ 164	
			<u>\$ 7,704.00</u>

MISCELLANEOUS:

Food, lodging, gas, consumables \$ 3,524.19

OPERATING CHARGES:

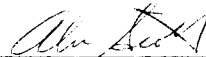
(Towards report, drafting, supervision)

14 days @ \$ 175/operating day \$ 2,625.00

GEOPHYSICAL EQUIPMENT & TRUCK RENTALS
AND CHARGES:

14 days @ \$282/operating day \$ 3,948.00

TOTAL:..... \$ 17,801.19



Alan Scott
Geophysicist

ARS/deb
10 January 1979

APPENDIX III

C E R T I F I C A T I O N

I, Alan Scott, of 4013 West 14th Avenue, in the City of Vancouver, in the Province of British Columbia, do hereby certify that:

1. I graduated from the University of British Columbia in 1970 with a B.Sc. in Geophysics.
2. I am a member of the Association of Professional Engineers of the Province of Saskatchewan, the Society of Exploration Geophysicists of America, and the British Columbia Geophysical Society.
3. I have been practising my profession for the past nine years.

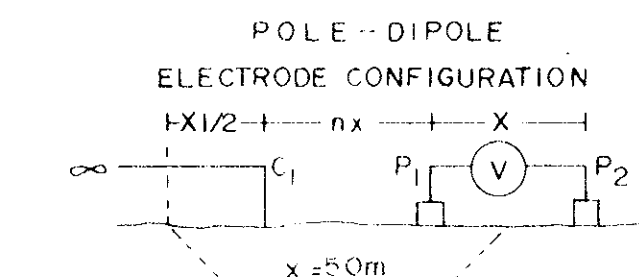


Alan Scott
Geophysicist

ARS/deb
10 January 1979

COMINCO LTD. CHUM PROPERTY KAMLOOPS M.D. B.C.

LINE NO. 1170S



CURRENT ELECTRODE WEST OF POTENTIAL DIPOLE

DATE SURVEYED JUNE 22, 1978

CONTOUR INTERVALS:
APP RES — 100 ρ_a
APP CHARG — 5.0 MV/V

DATE

TRANSMITTER — HUNTEC 7.5 KW
RECEIVER — IPR 8

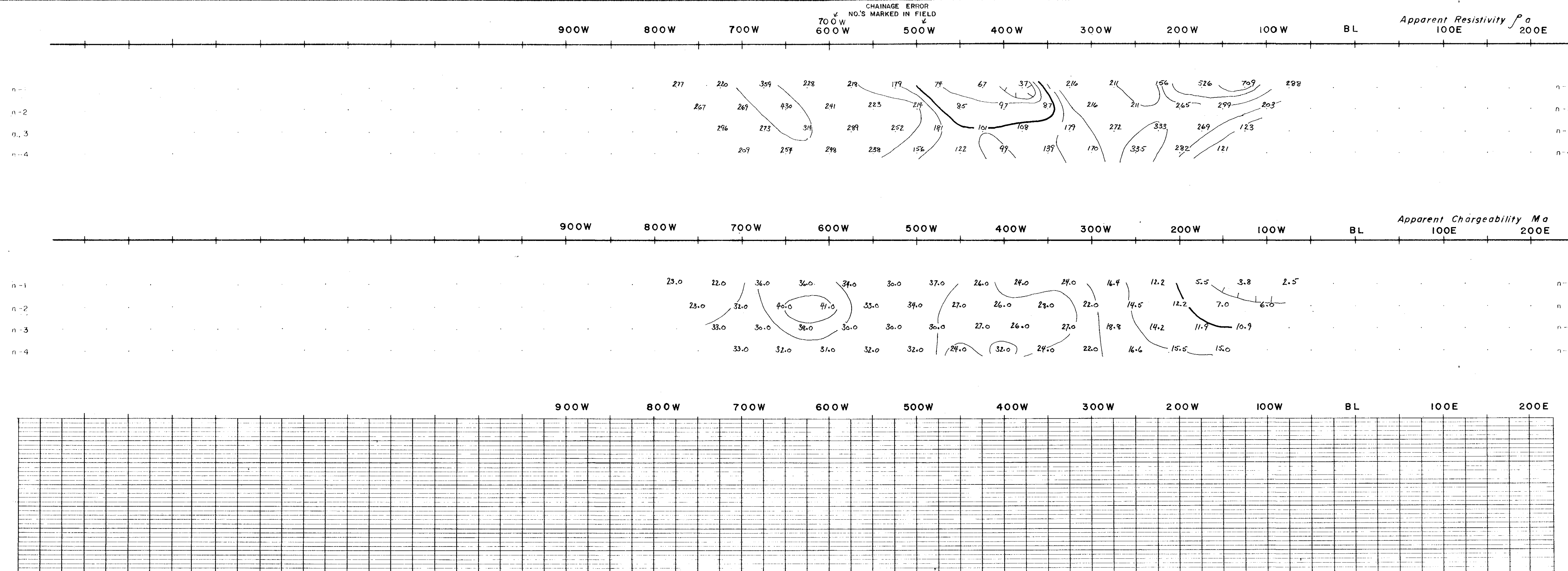
INDUCED POLARIZATION AND RESISTIVITY SURVEY
SURVEYED BY COMINCO LTD., EXPLORATION DIVISION

7244
part 2082

Apparent Resistivity ρ_a
100E 200E

Apparent Chargeability M_a
100E 200E

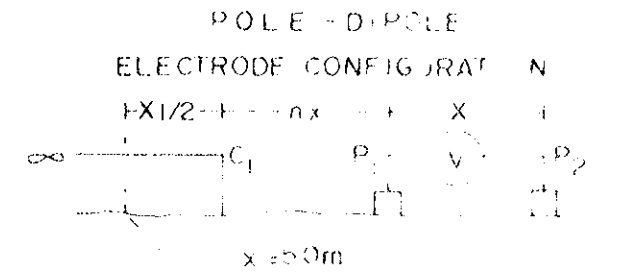
CHAINAGE ERROR
NO.'S MARKED IN FIELD
700W 600W 500W



LINE 1170S

COMINCO LTD. CHUM PROPERTY KAMLOOPS M.D. BC.

LINE NO. 1100N



DATE SURVEYED JUNE 23, 1978

CONTOUR INTERVALS:
APP RES - 100 ρ_a
APP CHARG - 5.0 MVI

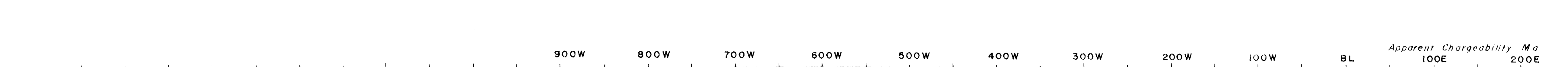
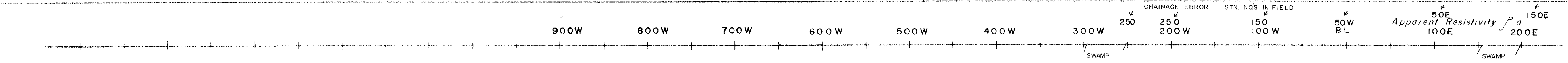
APPROVED AS

TRANSMITTER - HUNTEC 7.5 Kw
RECEIVER - IPR 8

7244

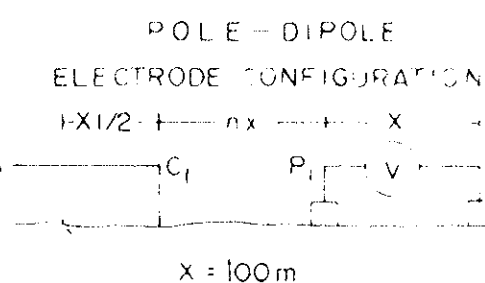
part 2 of 2

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



COMINCO LTD.
CHUM PROPERTY
KAMLOOPS M.D., B.C.

LINE NO. 22+00S



PLOTTING POINT
n = 1, 2, 3, 4

CURRENT ELECTRODE EAST, POLE POTENTIAL, DIPOLE

DATE SURVEYED JUNE 21, 1978

CONTOUR INTERVALS:
APP RES - 100 ρ_a
APP CHARG - 5.0. MV/V

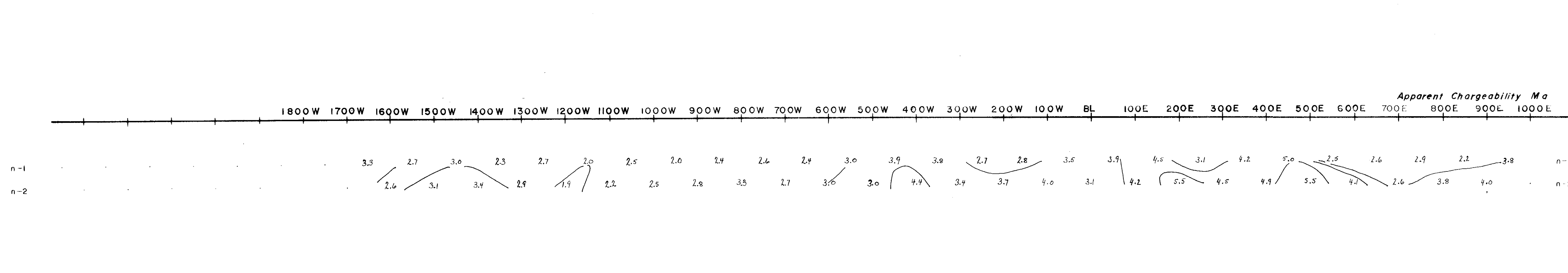
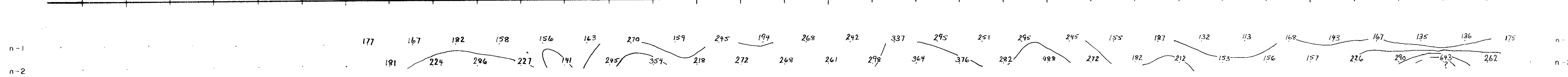
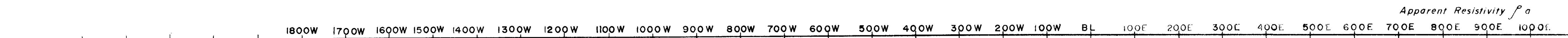
APPROVED *RA*

DATE

TRANSMITTER - HUNTEC 7.5 KW
RECEIVER - IPR 8

7244
part 2 of 2

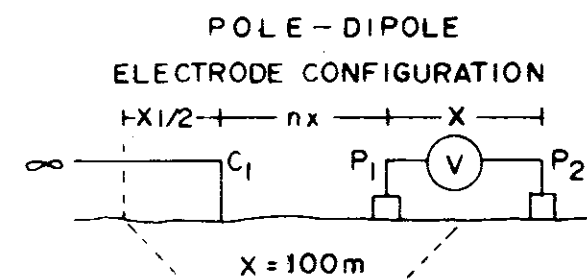
INDUCED POLARIZATION RESISTIVITY SURVEY
SURVEYED BY COMINCO LTD., EXPLORATION DIVISION



LINE 22+00S

COMINCO LTD. CHUM PROPERTY KAMLOOPS M.D., B.C.

LINE NO. 14+00S



CURRENT ELECTRODE EAST OF POTENTIAL DIPOLE

DATE SURVEYED JUNE 20, 1978

CONTOUR INTERVALS:
APP. RES. — 100 Ω
APP. CHARG — 5.0 MV/V

APPROVED *[Signature]*

DATE _____

TRANSMITTER — HUNTEC 7.5 KW
RECEIVER — IPR 8

7244
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INDUCED POLARIZATION AND RESISTIVITY SURVEY
SURVEYED BY COMINCO LTD., EXPLORATION DIVISION

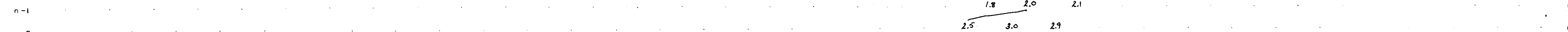
Apparent Resistivity ρ_a

1000W 900W 800W 700W 600W 500W 400W 300W 200W 100W BL 100E 200E 300E 400E 500E 600E 700E 800E 900E 1000E 1100E 1200E 1300E 1400E 1500E 1600E 1700E 1800E 1900E 2000E

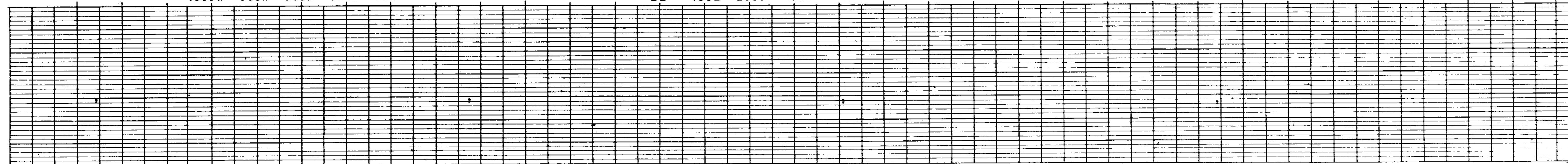


Apparent Chargeability M_a

1000W 900W 800W 700W 600W 500W 400W 300W 200W 100W BL 100E 200E 300E 400E 500E 600E 700E 800E 900E 1000E 1100E 1200E 1300E 1400E 1500E 1600E 1700E 1800E 1900E 2000E



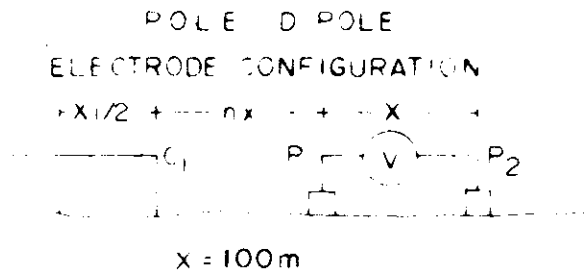
1000W 900W 800W 700W 600W 500W 400W 300W 200W 100W BL 100E 200E 300E 400E 500E 600E 700E 800E 900E 1000E 1100E 1200E 1300E 1400E 1500E 1600E 1700E 1800E 1900E 2000E



LINE 14+00S

COMINCO LTD. CHUM PROPERTY KAMLOOPS M.D., B.C.

LINE NO. 10+00S



PLOTTING POINT
n = 1, 2

CURRENT ELECTRODE EAST OF POTENTIAL DIPOLE

DATE SURVEYED JUNE 19, 1978

CONTOUR INTERVALS:
APP RES - 100 ρ_a
APP CHARG - 5.0 MV/V

APPROVED [Signature]

DATE _____

TRANSMITTER - HUNTEC 7.5 KW
RECEIVER - IPR 8

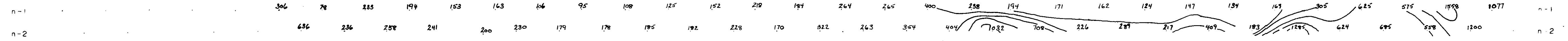
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POST 282

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

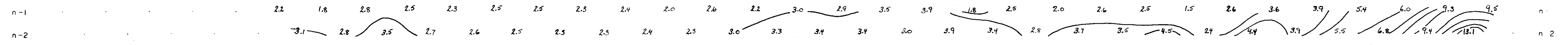
Apparent Resistivity ρ_a

1000W 900W 800W 700W 600W 500W 400W 300W 200W 100W BL 100E 200E 300E 400E 500E 600E 700E 800E 900E 1000E 1100E 1200E 1300E 1400E 1500E 1600E 1700E 1800E 1900E 2000E

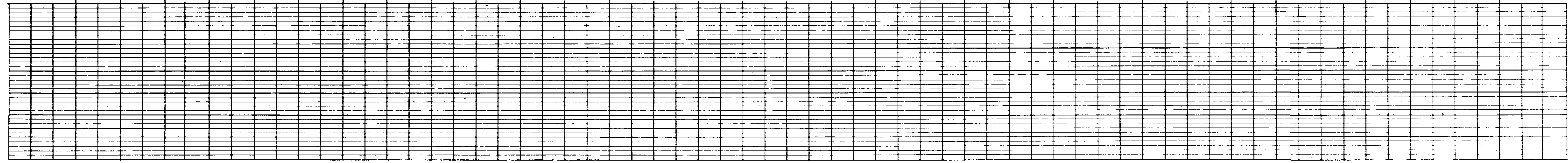


Apparent Chargeability M_a

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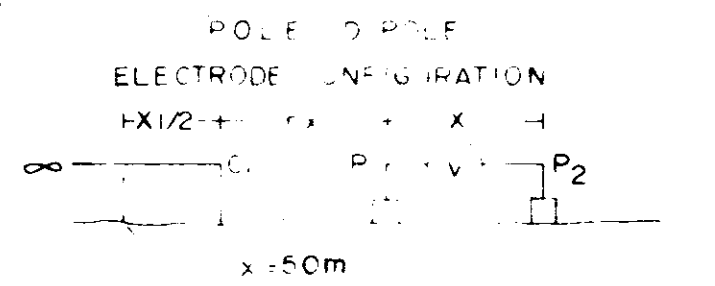
1000W 900W 800W 700W 600W 500W 400W 300W 200W 100W BL 100E 200E 300E 400E 500E 600E 700E 800E 900E 1000E 1100E 1200E 1300E 1400E 1500E 1600E 1700E 1800E 1900E 2000E



LINE 10+00S

COMINCO LTD.
CHUM PROPERTY
KAMLOOPS M.D., BC.

LINE NO. 6+00S



PLACING POINT
#1, 3, 4
CURRENT ELECTRODE EAST
POTENTIAL DIPOLE

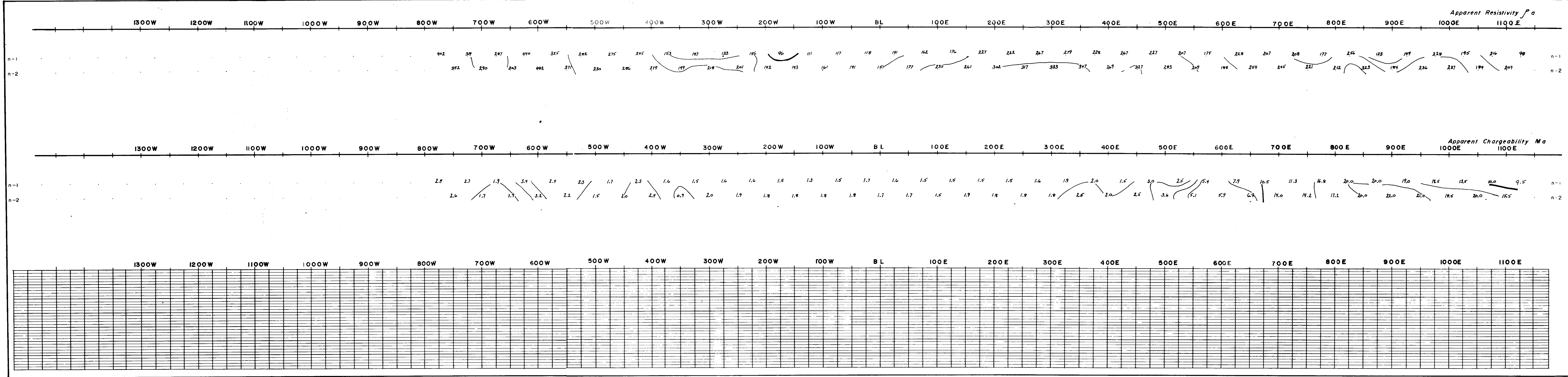
SURVEYED JUNE 18, 1978

CONTOUR INTERVALS:
APP RES.—100 ρ_a
APP CHARG.—5.0 MV/V

TRANSMITTER—HJNTEC 7.5 KW
RECEIVER—IPR 8

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

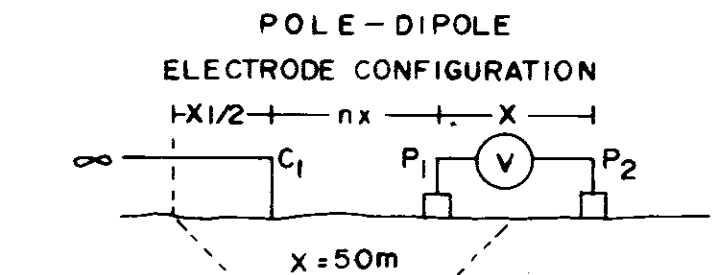
7244
part 2 of 2



LINE 6+00S

COMINCO LTD.
CHUM PROPERTY
KAMLOOPS M.D., BC.

LINE NO. 4+005



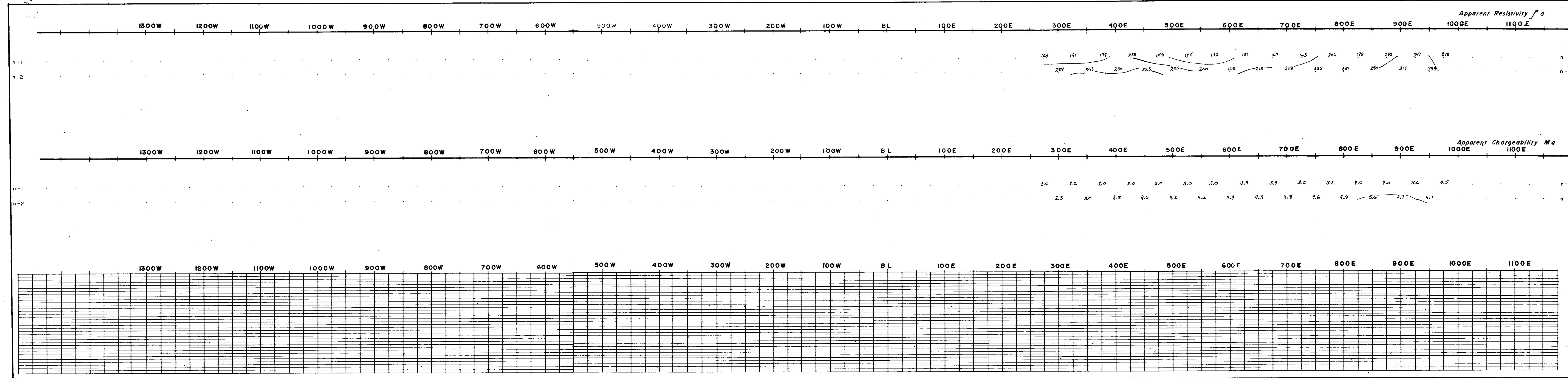
PLOTTING POINT
n = 1, 2, 3, 4
CURRENT ELECTRODE EAST OF POTENTIAL DIPOLE

DATE SURVEYED JULY 14, 1978
APPROVED *CA*

DATE _____
TRANSMITTER - HUNTEC 7.5 Kw
RECEIVER - IPR 8

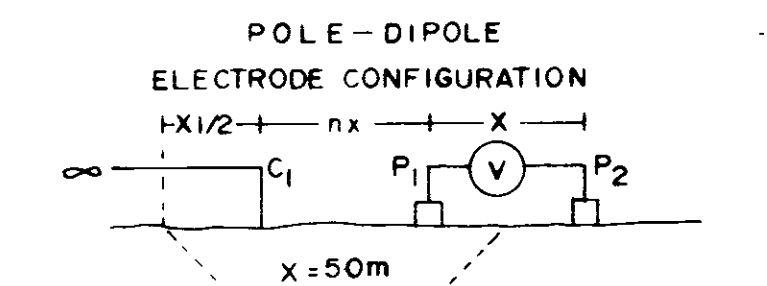
INDUCED POLARIZATION AND RESISTIVITY SURVEY
SURVEYED BY COMINCO LTD., EXPLORATION DIVISION

LINE 4+005



COMINCO LTD.
CHUM PROPERTY
KAMLOOPS M.D., BC.

LINE NO. 2+00.5

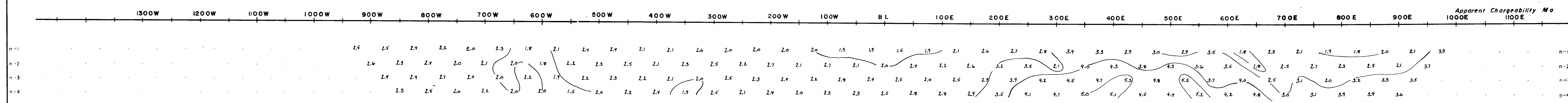
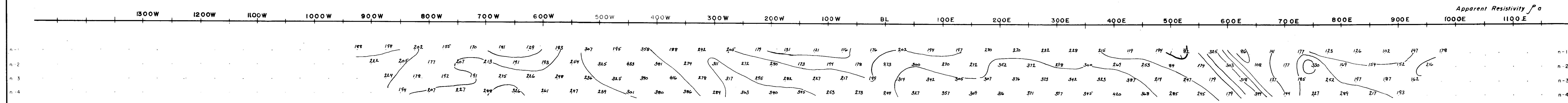


PLOTTING POINT
n = 1, 2, 3, 4
CURRENT ELECTRODE EAST OF POTENTIAL DIPOLE

DATE SURVEYED JUNE 14, 1978
APPROVED *[Signature]*
CONTOUR INTERVALS:
APP. RES. - 100 ρ_a
APP. CHARG. - 5.0 MV/V

TRANSMITTER - HUNTEC 7.5 Kw
RECEIVER - IPR 8

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



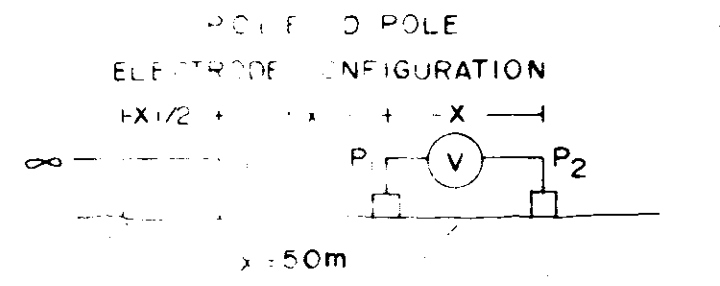
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LINE 2+00.5

7244
part 2 of 2

**COMINCO LTD.
CHUM PROPERTY
KAMLOOPS M.D., BC.**

LINE NO. 2+00N



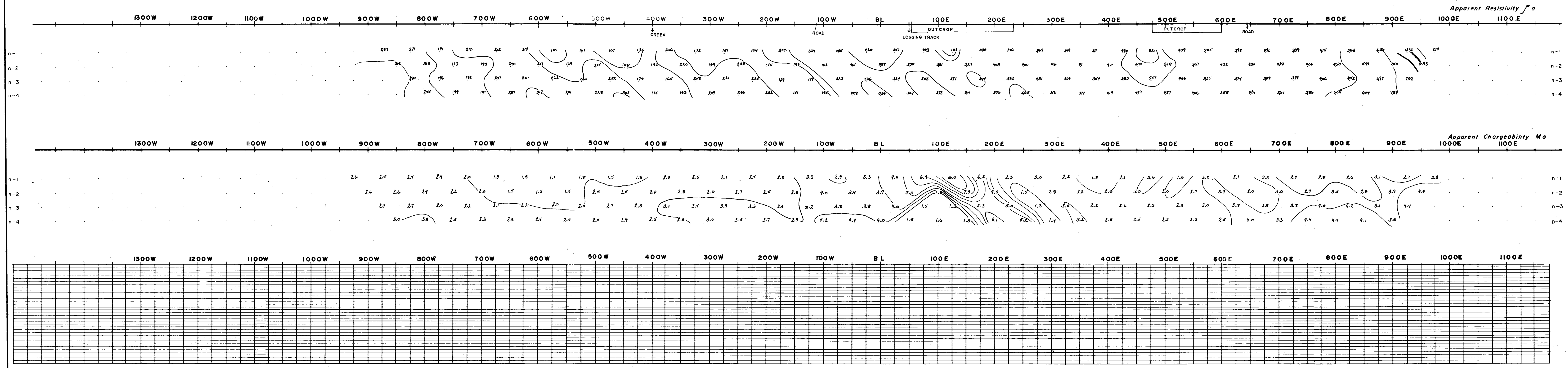
PLOTTING POINT
n-1, 2, 3, 4
CURRENT ELECTRODE EAST OF POTENTIAL DIPOLE

DATE SURVEYED JUNE 16, 1978
APPROVED [Signature]
DATE _____

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RECEIVER - IPR 8

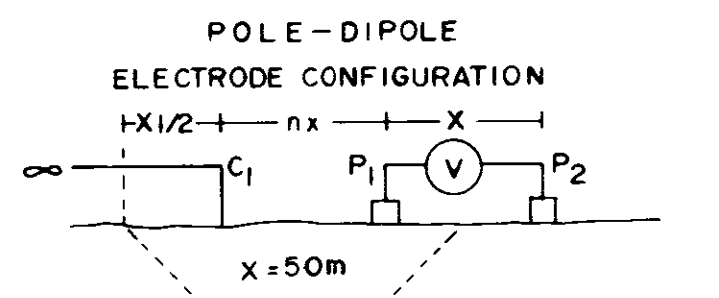
INDUCED POLARIZATION AND RESISTIVITY SURVEY
SURVEYED BY COMINCO LTD., EXPLORATION DIVISION

LINE 2+00N



COMINCO LTD.
CHUM PROPERTY
KAMLOOPS M.D., BC.

LINE NO. 4+00N



PLOTTING POINT
n = 1, 2, 3, 4
CURRENT ELECTRODE EAST OF POTENTIAL DIPOLE

DATE SURVEYED JUNE 26, 1978

CONTOUR INTERVALS:
APP RES - 100 ρ_a
APP CHARG - 5.0 MV/V

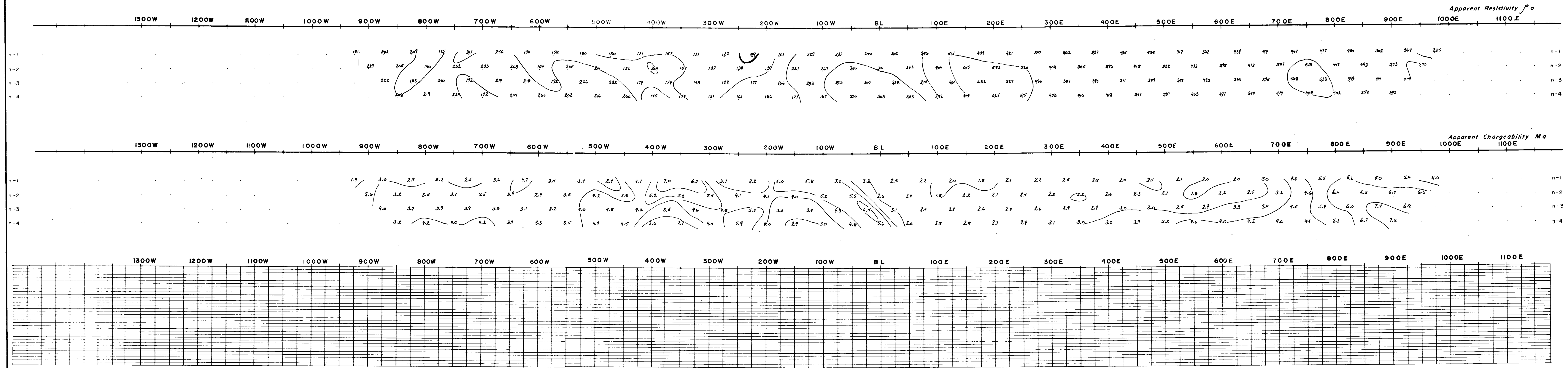
APPROVED *CA*

DATE

TRANSMITTER - HUNTEC 7.5 KW
RECEIVER - IPR 8

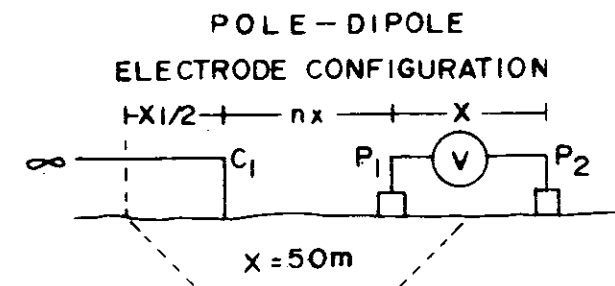
7244
part 2 of 2

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

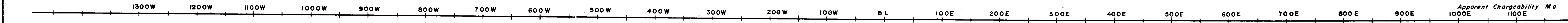
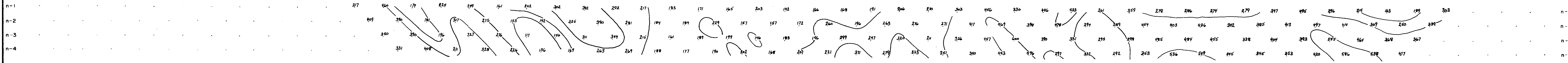


COMINCO LTD.
CHUM PROPERTY
KAMLOOPS M.D., BC.

LINE NO. 6+00N



PLOTTING POINT
 n = 1, 2, 3, 4
 CURRENT ELECTRODE EAST OF POTENTIAL DIPOLE



DATE SURVEYED JUNE 17, 1978

CONTOUR INTERVALS:
 APP. RES - 100 ρa
 APP. CHARG - 5.0 MV/V

APPROVED [Signature]

DATE _____

TRANSMITTER - HUNTEC 7.5 KW
 RECEIVER - IPR 8

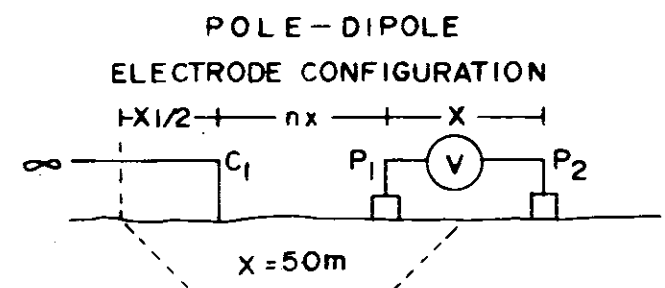
7244
PM 2102

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

LINE 6+00N

COMINCO LTD.
CHUM PROPERTY
KAMLOOPS M.D., BC.

LINE NO. 6+00N



PLOTTING POINT
n = 1, 2, 3, 4
CURRENT ELECTRODE EAST OF POTENTIAL DIPOLE

DATE SURVEYED JUNE 17, 1978

CONTOUR INTERVALS:
APP. RES. — 100 ρ_a
APP. CHARG. — 5.0 MV/V

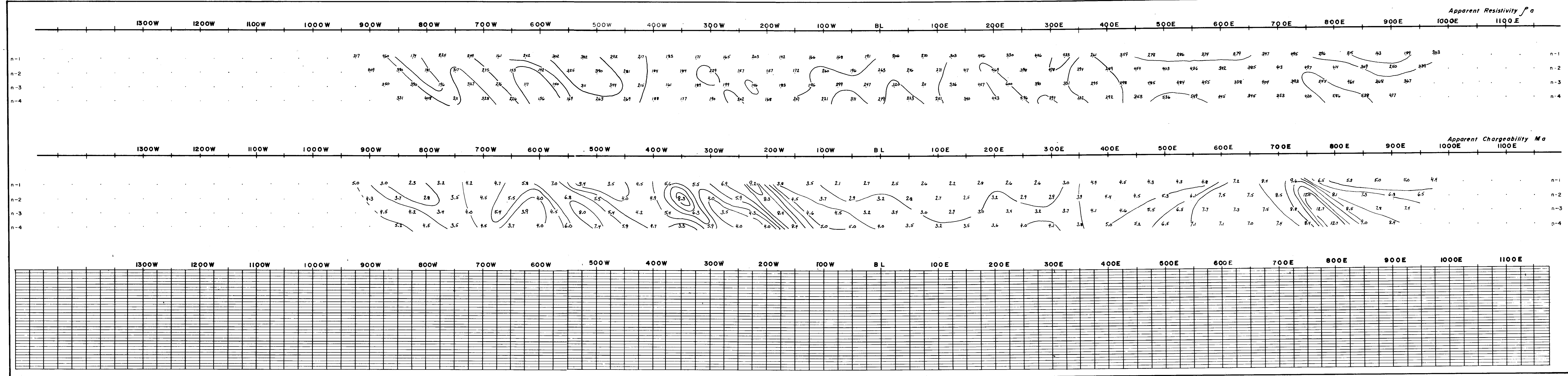
APPROVED *[Signature]*

DATE _____

TRANSMITTER — HUNTEC 7.5 KW
RECEIVER — IPR 8

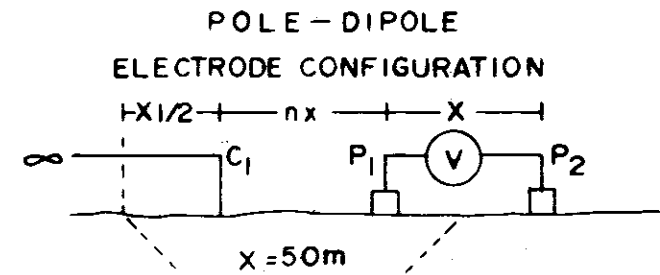
7244
part 2 of 2

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



COMINCO LTD.
CHUM PROPERTY
KAMLOOPS M.D., BC.

LINE NO. 8+00N



PLOTTING POINT
 n = 1, 2, 3, 4
 CURRENT ELECTRODE EAST OF POTENTIAL DIPOLE

DATE SURVEYED JUNE 25, 1978

CONTOUR INTERVALS:
 APP. RES. — 100 ρ_a
 APP. CHARG. — 5.0 MV/V

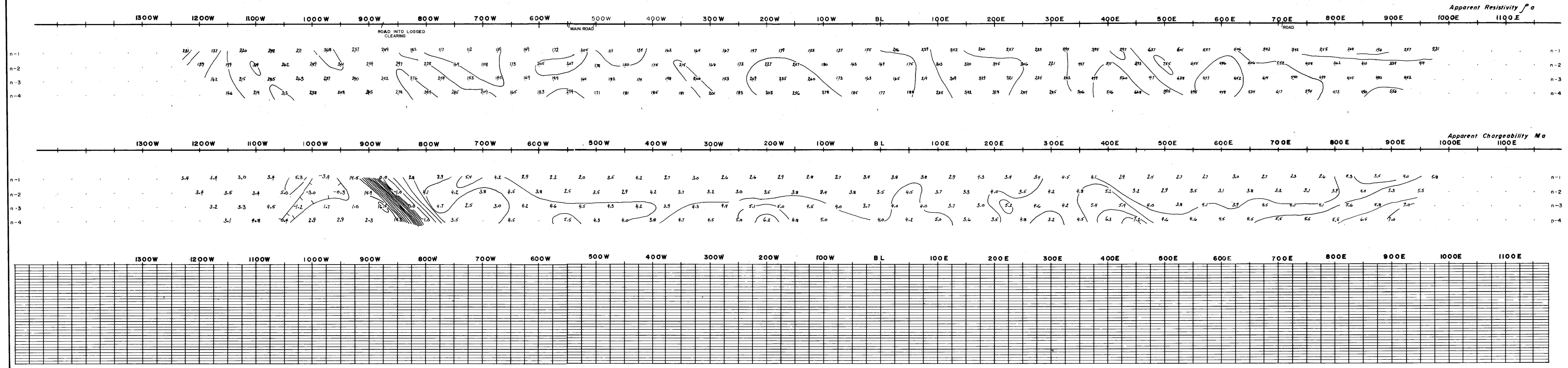
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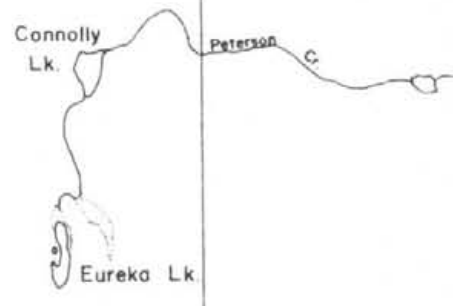
DATE _____

TRANSMITTER — HUNTEC 7.5 KW
 RECEIVER — IPR 8

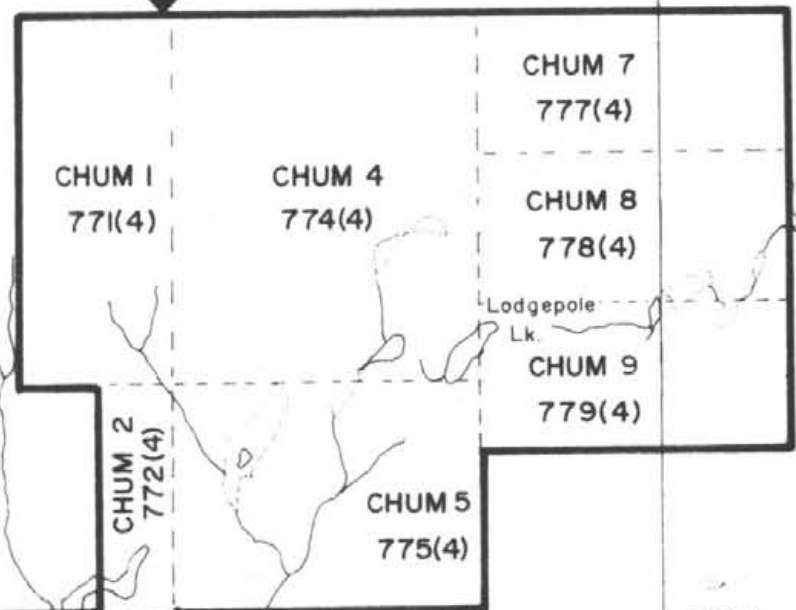
7244
 part 2082

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





CHUM PROPERTY



50°30'

120°30'

7244



921/10E, 9W

Drawn by:		Traced by: RAR	
Revised by	Date	Revised by	Date

LOCATION MAP
CHUM PROPERTY

part 2
032

Scale: 1:50,000

Date: January 26, 1979

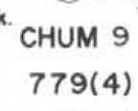
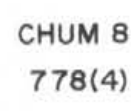
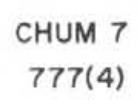
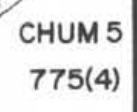
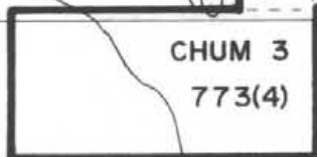
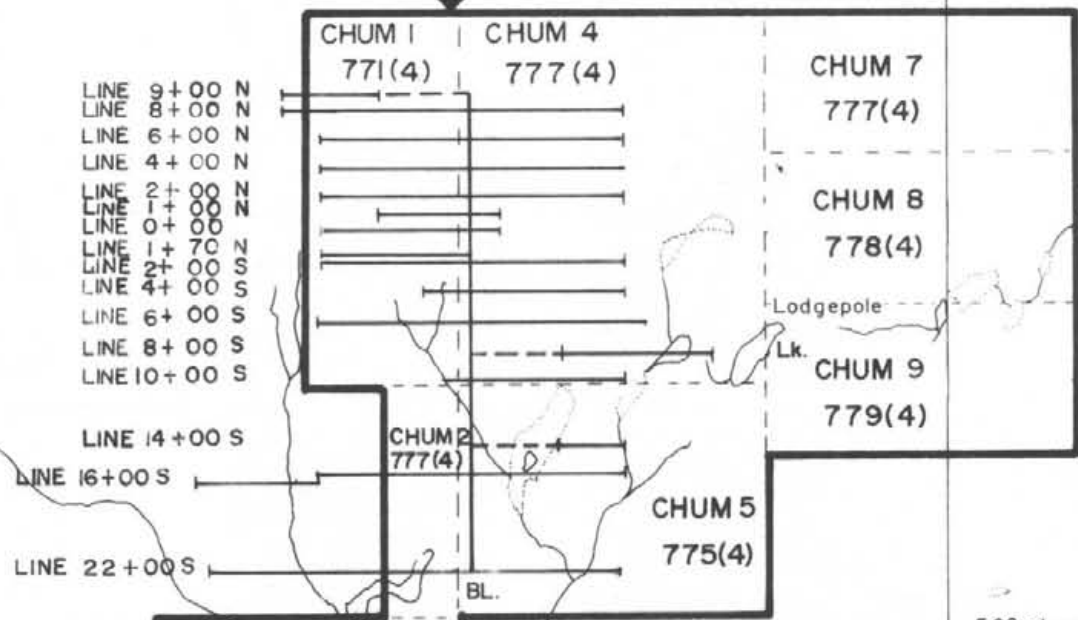
Plate: 1



1978 GEOPHYSICS
GROUND GRID

IP SURVEY

CHUM PROPERTY



50°30'
120°30'

7244

Handwritten signature



921/10E, 9W

Drawn by:		Traced by: RAR	
Revised by	Date	Revised by	Date

CHUM PROPERTY
CLAIM MAP
KAMLOOPS M.D., B.C.

part 2 of 2

Scale: 1:50,000

Date: January 26, 1979

Plate: 139-78-2