

COMINCO LTD.

EXPLORATION
NTS: 82M/13

WESTERN DISTRICT

GEOPHYSICAL REPORT

ON

INDUCED POLARIZATION, VLF, AND MAGNETICS SURVEYS

CK CLAIMS

Raft River Area, B.C., Kamloops Mining Division

Latitude: $51^{\circ}55'N$; Longitude: $119^{\circ}35'N$

Work Performed: Oct. 22-Nov. 9, 1978

MINERAL RESOURCES BRANCH ASSESSMENT REPORT 7299 NO. _____

MARCH 1979

ALAN SCOTT

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INTRODUCTION

The CK claims are located some 50 road kilometers north east of Clearwater, B.C. Plate 132-78-1 shows the general location of the property, and plate 132-78-2 shows the lines surveyed in relation to the claims.

During the 1978 field season, a total of 38.3 line kilometers of multi separation induced polarization survey, 39.3 line kilometers of total field magnetics survey, and 21.8 line kilometers of VLF electromagnetics survey were completed over portions of the CK claims. Although the work forms one continuous grid of data, it was conducted as three separate surveys. All the work was done by Cominco geophysical crews, except for the third IP survey which was done under contract by Peter E. Walcott & Associates Ltd.

The data from the first two surveys was submitted for assessment credits in June and October of 1978. This report gives the results of the third survey, which consisted of 17.3 line kilometers of magnetics survey and 17.4 line kilometers of IP survey.

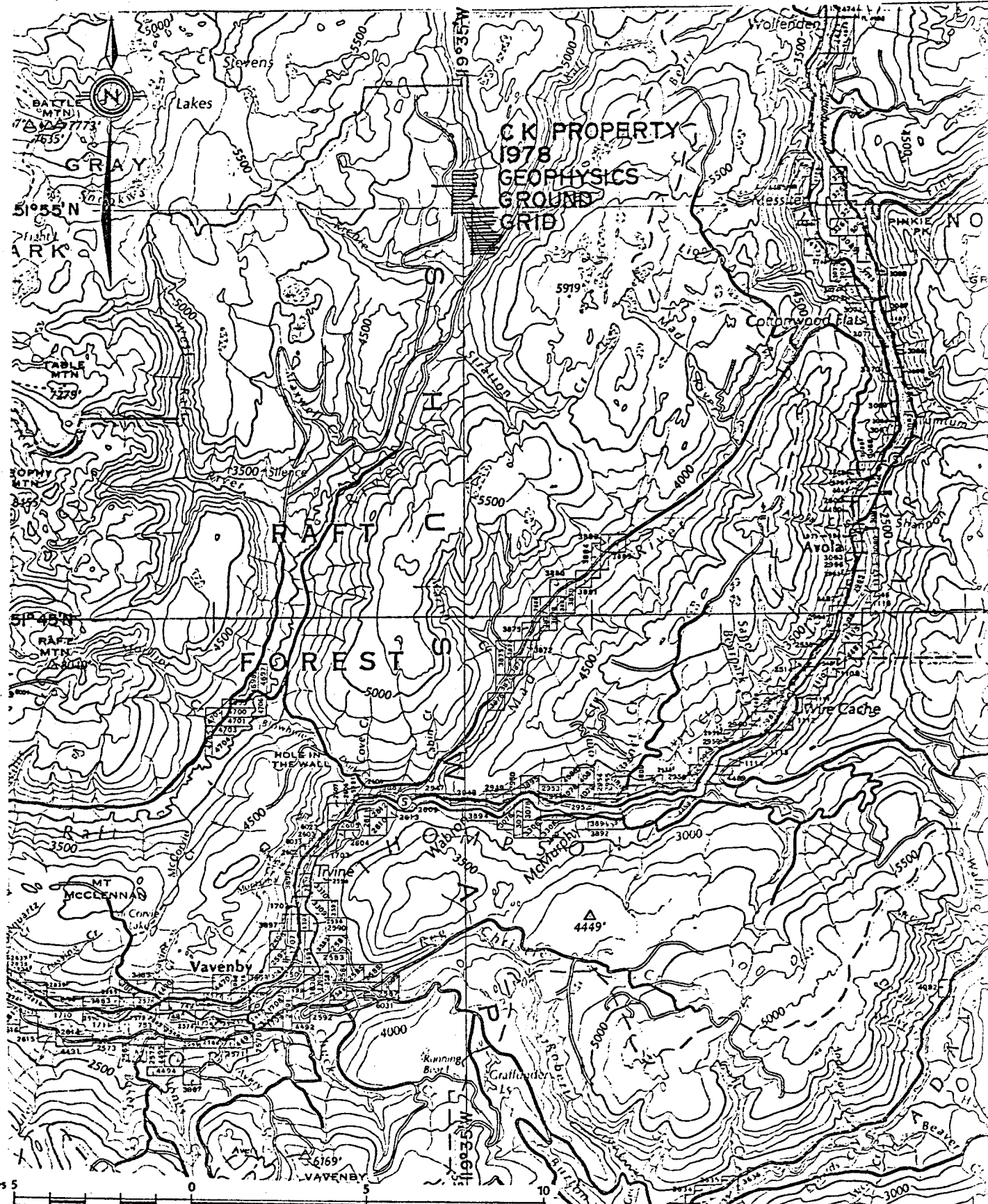
LOCATION AND ACCESS

Access to the CK claims can be gained by turning north off highway number 5 at Clearwater onto a well maintained logging road, which follows the Raft River valley. The 1978 geophysical survey grids straddle McClosky Creek, which drains into the Raft River some 50 road kilometers north of Clearwater. (Location map on following page).

GEOLOGY

The CK property is underlain by highly metamorphosed sediments of the Shuswap Complex. Dominant rock types are biotite gneiss and pegmatite along with amphibolite, calc silicate, marble, and lamprophyre and diabase dykes.

The geology and geochemistry of the property has been described in detail elsewhere (Murrell 1979).



CK PROPERTY
1978
GEOPHYSICS
GROUND
GRID

Miles 5

Scale of Kilometres
5 0 5 10

N.T.S.
82 M

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

LOCATION MAP
KAMLOOPS M. D., B.C.

Scale: 1:250,000 Date: JUNE 1978 Plate: 132-78-11

GEOPHYSICAL SURVEYS

Magnetics Survey

Scintrex MP-2 proton precession magnetometers were used for the magnetics surveys. The instrument reads the earth's total magnetic field to the nearest gamma. The data was corrected for diurnal variation using the base station and sub base station looping method, and tie ins between surveys was accomplished by repeating sections of adjacent lines.

Readings were normally taken at 25 meter intervals on cross lines 100 meters apart. The data is presented in contour plan form on plate 132-78-3, which includes the data obtained from the two previous 1978 surveys.

Induced Polarization Survey

The IP survey was conducted under contract by Peter E. Walcott & Associates. Data from this survey is plotted on pseudo section plates 132-78-30 to 43 inclusive.

A Crone N-IV receiver and Hunttec 7.5 KW motor generator/transmitter were used for the Walcott survey. This is a time domain system and the same 2 second on/off charging cycle was used for this survey as was used on earlier surveys conducted by Cominco with a Scintrex IPR-8 receiver. However, the Crone receiver gives chargeability values in a different fashion to the Scintrex IPR-8. The Crone unit reads out the ratio of secondary to primary voltage integrated over a period of time. Units are therefore given as millivolt seconds per volt, or more commonly stated simply as milliseconds. A conversion factor has been applied to all the Walcott data to make it conform to the values that would have been obtained for an IPR-8. The factor was calculated as the average ratio of Crone N-IV to Scintrex IPR-8 for the 23 overlapped stations on lines 0 to 5N. The value obtained was 1.47.

The pole-dipole electrode array was used on the surveys, with an "a" spacing of 50 meters and "n" separations

of 1,2,3, and 4. Some detail coverage was also obtained at an "a" spacing of 25 meters. In all cases, the current electrode was kept to the west 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 dependent upon the "a" spacing and "n" separation.

DISCUSSION OF SURVEY RESULTS

Magnetics

The total field magnetics data is plotted and contoured in plan form, on accompanying plate 132-78-3.

The dominant pattern is of a series of discontinuous, elongated, moderate amplitude, magnetic highs trending northwest to southeast across the property. These relatively large scale features presumably represent the response of stratigraphic units that are relatively magnetic. Amphibolite and some of the biotite gneisses are likely candidates for these highs; and pegmatites and marbles in areas of low (background) magnetic field strength.

In addition to these large scale, weakly magnetic features, there are several localized strongly magnetic highs. These features may be caused by either pyrrhotite mineralization, or magnetite associated with lamprophyre or diabase dykes.

Induced Polarization

The induced polarization (chargeability) and apparent resistivity results are presented in pseudo section format on the accompanying plates 132-78-30 to 35 for lines 1700S to 1200S, and on plates 36 to 43 for lines 100S

to 500N.

The strongest response on the southern survey area was on line 1200S, between stations 1900E and 2150E. The anomaly was detailed at a 25 meter electrode separation, and showed two distinct anomalies, one at 1912E and a wider anomalous zone from 2000E to 2075E. Both anomalies have coincident low apparent resistivities.

The strongest response on the northern area was on line 100N between station 800E and 950E. Again detailing at a 25 meter electrode separation gives distinct anomalies with one zone centered at 820E and the other at 900E. The anomaly at 825E has coincident low apparent resistivity.

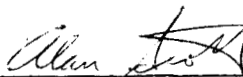
CONCLUSION

Magnetics and multiseperation IP surveys were conducted over portions of the CK claims in the fall of 1978, to further define the extent of anomalies detected on two earlier surveys done in the summer of 1978. Results of those surveys were reported previously (June and October 1978).

Several high chargeability zone were detected on the present survey, with the strongest responses on lines 1200S and 100N, as described in the previous section.

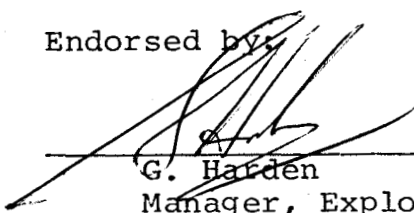
Drill testing to determine the source has been recommended. Depending on the results of such testing, other lower amplitude anomalies along strike to these could also warrant testing.

Respectfully submitted,



Alan Scott
Geophysicist

Endorsed by:


G. Harden

Manager, Exploration
Western District

ARS /deb

Distribution:

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

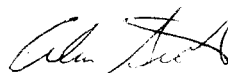
APPENDIX I

IN THE MATTER OF THE B.C. MINERAL ACT
AND IN THE MATTER OF A GEOPHYSICAL PROGRAMME
CARRIED OUT ON PORTIONS OF THE CK MINERAL CLAIMS
ON THE CK PROPERTY
LOCATED 150 KM NORTH OF KAMLOOPS IN THE KAMLOOPS MINING DIVISION
OF THE PROVINCE OF BRITISH COLUMBIA MORE PARTICULARLY
N.T.S. 82M/13

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 AND LINECUTTING ON
THE CK MINERAL CLAIMS;
3. THAT THE SAID EXPENDITURES WERE INCURRED FOR THE
PURPOSE OF MINERAL EXPLORATION OF THE ABOVE NOTED
CLAIMS BETWEEN THE 22ND OF OCTOBER AND THE 9TH OF
NOVEMBER, 1978.



Alan Scott
Geophysicist

ARS/deb
29 March 1979

APPENDIX II

CK CLAIMS

STATEMENT OF EXPENDITURES

(IP and Magnetics Survey, Linecutting)

Magnetics Survey:

Salaries:

G.J. Niemeyer (technician)
8 days @ \$120 960.00

Miscellaneous:

Food, lodging, gas, truck rental 510.00

Operating Charges:

6 days @ \$175/day 1,050.00

Equipment Rentals:

6 days magnetometer @ \$10 60.00

6 days mag base recorder @ 17.50 105.00

Total Magnetics Survey 2,685.00

Induced Polarization Survey:

17.4 line kilometer IP survey
@ 747/km 12,998.00

Drafting and report 350.00

Total IP Survey 13,348.00

Linecutting:

16.8 kms @ 416/km 6,989.00

TOTAL EXPENDITURES \$ 23,022.00



Alan Scott
Geophysicist

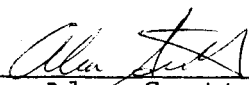
ARS/deb
29 March 1979

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.

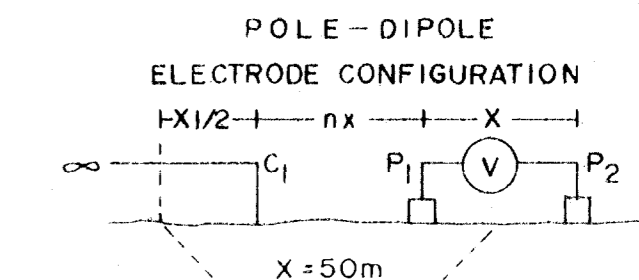


Alan Scott
Geophysicist

ARS/deb
29 March 1979

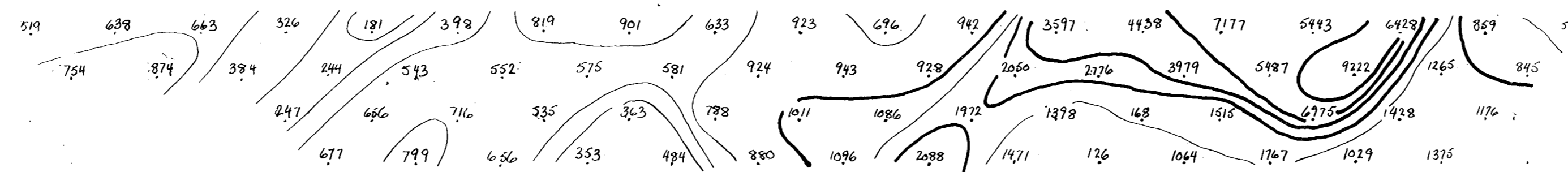
COMINCO LTD. CK PROPERTY KAMLOOPS M.D., B.C.

LINE NO. 17+00S



Apparent Resistivity $f a$

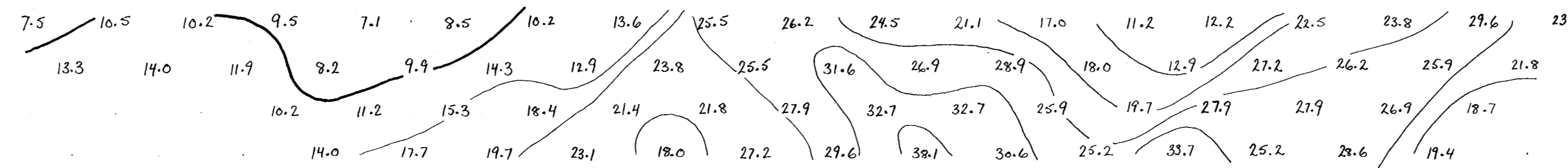
1700E 1750E 1800E 1850E 1900E 1950E 2000E 2050E 2100E 2150E 2200E 2250E 2300E 2350E 2400E 2450E 2500E 2550E 2600E 2650E



n-1
n-2
n-3
n-4

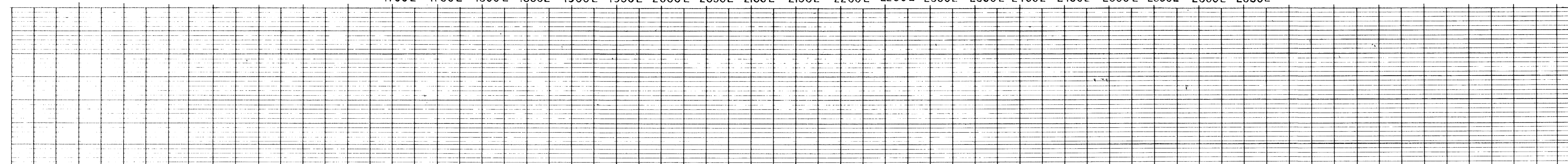
Apparent Chargeability $M a$

1700E 1750E 1800E 1850E 1900E 1950E 2000E 2050E 2100E 2150E 2200E 2250E 2300E 2350E 2400E 2450E 2500E 2550E 2600E 2650E



n-1
n-2
n-3
n-4

1700E 1750E 1800E 1850E 1900E 1950E 2000E 2050E 2100E 2150E 2200E 2250E 2300E 2350E 2400E 2450E 2500E 2550E 2600E 2650E



DATE SURVEYED NOVEMBER 6, 1978

CONTOUR INTERVALS :

APP. RES. — 1, 1.5, 2, 3, 5, 7.5, 10 ohm meters APPROVED at

APP. CHARG. — 10mV/V

DATE _____

TRANSMITTER — 7.5kw HUNTEC

RECEIVER — CRONE N-IV

NOTE — Chargeability values have been divided by 1.47 to convert to Scintrex IPR-8 equivalent

7299

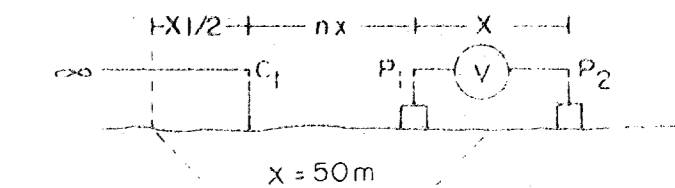
INDUCED POLARIZATION AND RESISTIVITY SURVEY
SURVEYED BY PETER E WALCOTT AND ASSOC. LTD.

LINE 17+00S

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

LINE NO. 16±00S

POLE-DIPOLE
ELECTRODE CONFIGURATION



PLOTTING POINT
n = 1, 2, 3, 4

CURRENT ELECTRODE WEST OF POTENTIAL DIPOLE

DATE SURVEYED NOVEMBER 8, 1978

CONTOUR INTERVALS:

APP RES - 1, 1.5, 2, 3, 5, 7.5, 10 ohm meters
APP CHARG - 10 mV/V

DATE

TRANSMITTER - 7.5 kw HUNTEC

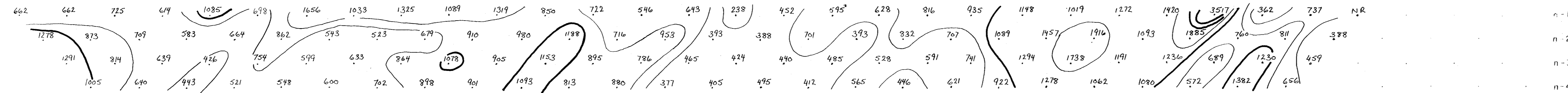
RECEIVER - CRONE N-IV

NOTE - Chargeability values have been divided by 1.47
to convert to Scintrex IPR-8 equivalent

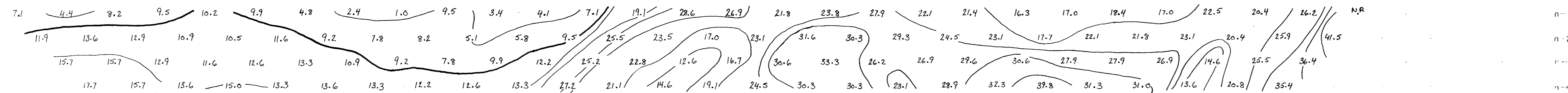
INDUCED POLARIZATION AND RESISTIVITY SURVEY
SURVEYED BY PETER E WALCOTT AND ASSOC. LTD.

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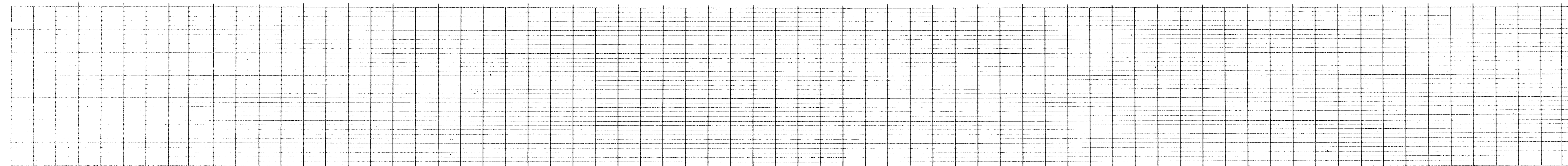
Apparent Resistivity ρ_a
1200E 1250E 1300E 1350E 1400E 1450E 1500E 1550E 1600E 1650E 1700E 1750E 1800E 1850E 1900E 1950E 2000E 2050E 2100E 2150E 2200E 2250E 2300E 2350E 2400E 2450E 2500E 2550E 2600E 2650E



Apparent Chargeability M_a
1200E 1250E 1300E 1350E 1400E 1450E 1500E 1550E 1600E 1650E 1700E 1750E 1800E 1850E 1900E 1950E 2000E 2050E 2100E 2150E 2200E 2250E 2300E 2350E 2400E 2450E 2500E 2550E 2600E 2650E



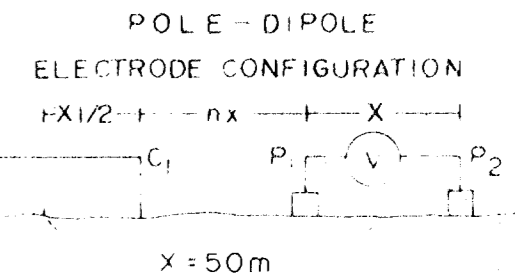
1200E 1250E 1300E 1350E 1400E 1450E 1500E 1550E 1600E 1650E 1700E 1750E 1800E 1850E 1900E 1950E 2000E 2050E 2100E 2150E 2200E 2250E 2300E 2350E 2400E 2450E 2500E 2550E 2600E 2650E



LINE 16±00S

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

LINE NO. 13+0.0S



PLOTTING POINT
n = 1, 2, 3, 4

CURRENT ELECTRODE WEST OF POTENTIAL DIPOLE

DATE SURVEYED NOVEMBER 1, 1978

CONTOUR INTERVALS:
APP RES - 1, 1.5, 2, 3, 5, 7.5, 10 ohm meters APPROVED PA
APP CHARG - 10Mv/V

DATE

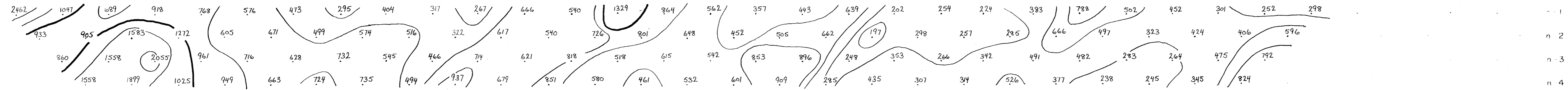
TRANSMITTER - 75 Kw HUNTEC
RECEIVER - CRONE N-IV
NOTE - Chargeability values have been divided by 147 to convert to Scintrex IPR-8 equivalent.

7299

INDUCED POLARIZATION AND RESISTIVITY SURVEY
SURVEYED BY PETER E WALCOTT AND ASSOC. LTD.

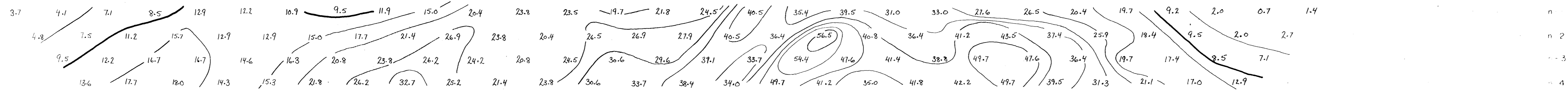
Apparent Resistivity ρ_a

1200E 1250E 1300E 1350E 1400E 1450E 1500E 1550E 1600E 1650E 1700E 1750E 1800E 1850E 1900E 1950E 2000E 2050E 2100E 2150E 2200E 2250E 2300E 2350E 2400E 2450E 2500E 2550E 2600E 2650E

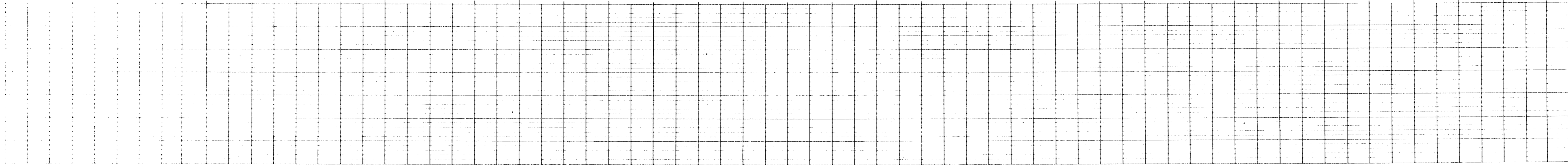


Apparent Chargeability M_a

1200E 1250E 1300E 1350E 1400E 1450E 1500E 1550E 1600E 1650E 1700E 1750E 1800E 1850E 1900E 1950E 2000E 2050E 2100E 2150E 2200E 2250E 2300E 2350E 2400E 2450E 2500E 2550E 2600E 2650E



1200E 1250E 1300E 1350E 1400E 1450E 1500E 1550E 1600E 1650E 1700E 1750E 1800E 1850E 1900E 1950E 2000E 2050E 2100E 2150E 2200E 2250E 2300E 2350E 2400E 2450E 2500E 2550E 2600E 2650E

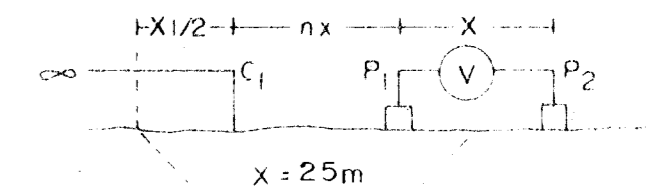


LINE 13+0.0S

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

LINE NO. 1+00N (detail)

POLE-DIPOLE
ELECTRODE CONFIGURATION

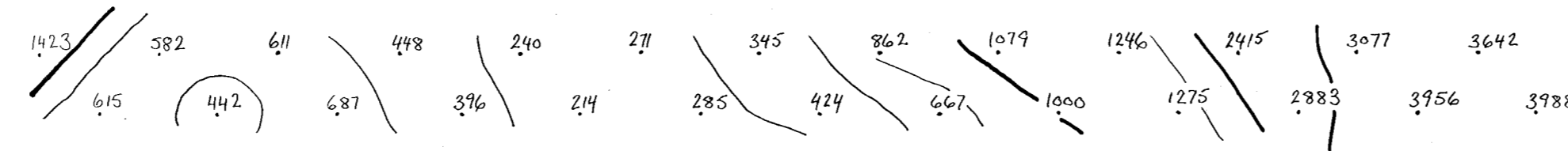


PLOTTING POINT
n = 1, 2, 3, 4

CURRENT ELECTRODE WEST OF POTENTIAL DIPOLE

Apparent Resistivity ρ_a

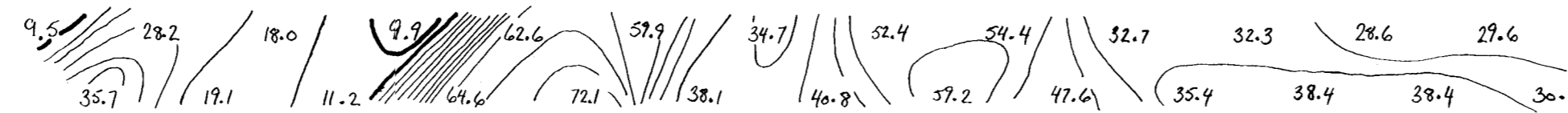
700E 725E 750E 775E 800E 825E 850E 875E 900E 925E 950E 975E 1000E 1025E 1050E



n-1
n-2

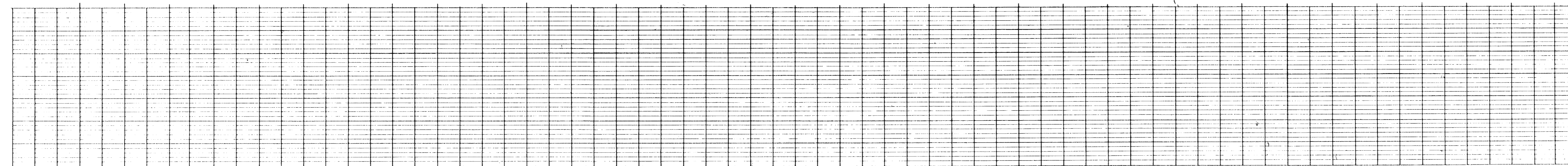
Apparent Chargeability M_a

700E 725E 750E 775E 800E 825E 850E 875E 900E 925E 950E 975E 1000E 1025E 1050E



n-1
n-2

700E 725E 750E 775E 800E 825E 850E 875E 900E 925E 950E 975E 1000E 1025E 1050E



DATE SURVEYED OCTOBER 27, 1978

CONTOUR INTERVALS:

APP. RES. — 1, 1.5, 2, 3, 5, 7.5, 10 ohm meters

APP. CHARG. — 10M_v/V

DATE

TRANSMITTER — 7.5 Kw HUNTEC

RECEIVER — CRONE N-IV

NOTE — Chargeability values have been divided by 1.47 to convert to Scintrex IPR-B equivalent

INDUCED POLARIZATION AND RESISTIVITY SURVEY

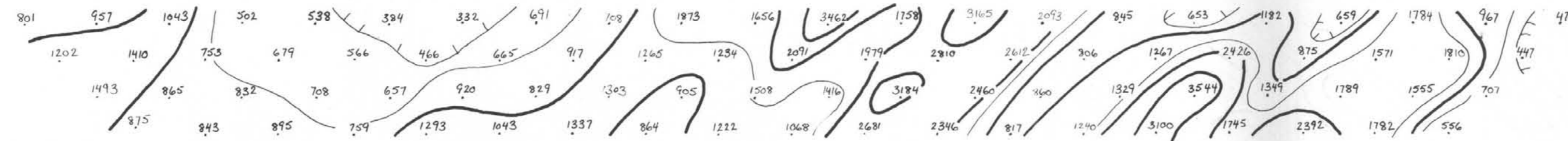
SURVEYED BY PETER E WALCOTT AND ASSOC. LTD.

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LINE 1+00N (detail)

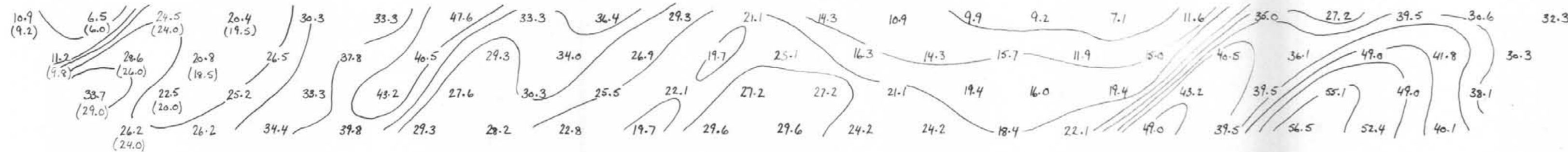
450E 500E 550E 600E 650E 700E 750E 800E 850E 900E 950E 1000E 1050E 1100E 1150E 1200E 1250E 1300E 1350E 1400E 1450E 1500E 1550E 1600E 1650E

Apparent Resistivity ρ_a



450E 500E 550E 600E 650E 700E 750E 800E 850E 900E 950E 1000E 1050E 1100E 1150E 1200E 1250E 1300E 1350E 1400E 1450E 1500E 1550E 1600E 1650E

Apparent Chargeability M_a



450E 500E 550E 600E 650E 700E 750E 800E 850E 900E 950E 1000E 1050E 1100E 1150E 1200E 1250E 1300E 1350E 1400E 1450E 1500E 1550E 1600E 1650E



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

LINE NO. 2+00N

POLE-DIPOLE

ELECTRODE CONFIGURATION

+X1/2 +X2 -X3 -X4

50m

50m

50m

50m

50m

50m

50m

50m

50m

50m

50m

50m

50m

50m

50m

50m

50m

50m

50m

50m

50m

50m

50m

50m

50m

50m

50m

DATE SURVEYED OCTOBER 26, 1978

CONTOUR INTERVALS

APP RES 1,1.5,2,3,5,7.5,10 ohm meters APPROVED *AS*

APP CHARG 10Mv/V

BRACKETED NUMBERS, RESULTS FROM EARLIER SURVEY. DATE

TRANSMITTER - 75 Kw HUNTEC

RECEIVER - CRONE N-IV

NOTE - Chargeability values have been divided by 1.47 to convert to Scintrex IPR-B equivalent.

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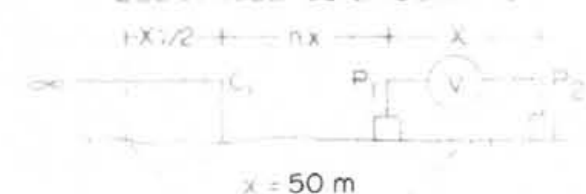
INDUCED POLARIZATION AND RESISTIVITY SURVEY
SURVEYED BY PETER E WALCOTT AND ASSOC. LTD.

LINE 2+00N

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

LINE NO 3+00N

POLE-DIPOLE
ELECTRODE CONFIGURATION



PLOTTING POINT
n=1, 2, 3, 4

CURRENT ELECTRODE WEST OF POTENTIAL DIPOLE

DATE SURVEYED OCTOBER 25, 1978

CONTOUR INTERVALS

APP RES - 1,1.5,2,3,5,7.5,10 ohm meters APPROVED *at*

APP CHARG - 10 Mv/V

BRACKETED NUMBERS, RESULTS FROM EARLIER SURVEY. DATE

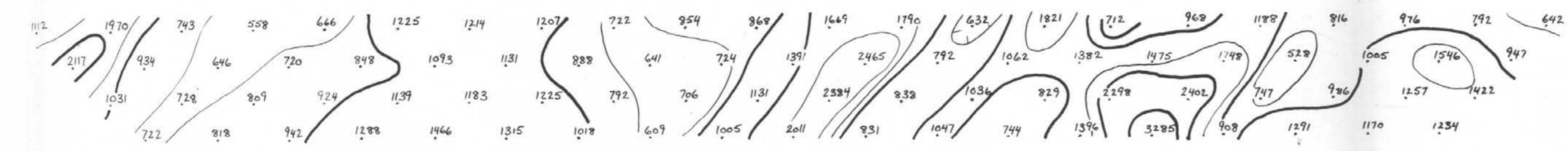
TRANSMITTER - 75 Kw HUNTEC
RECEIVER - CRONE N-IV
NOTE - Chargeability values have been divided by 1.47 to convert to Scintrex IPR-8 equivalent.

7299

INDUCED POLARIZATION AND RESISTIVITY SURVEY
SURVEYED BY PETER E WALCOTT AND ASSOC LTD.

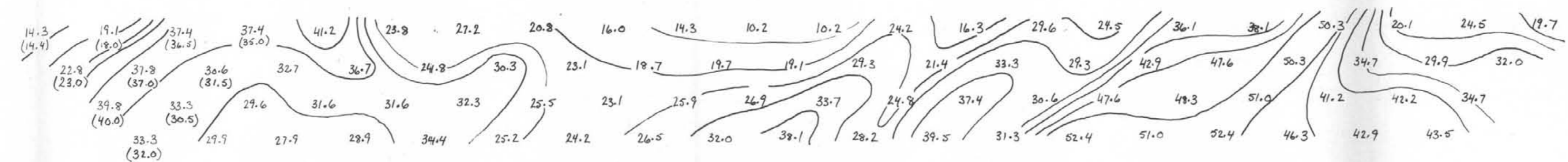
450E 500E 550E 600E 650E 700E 750E 800E 850E 900E 950E 1000E 1050E 1100E 1150E 1200E 1250E 1300E 1350E 1400E 1450E 1500E 1550E 1600E 1650E

Apparent Resistivity ρ_a

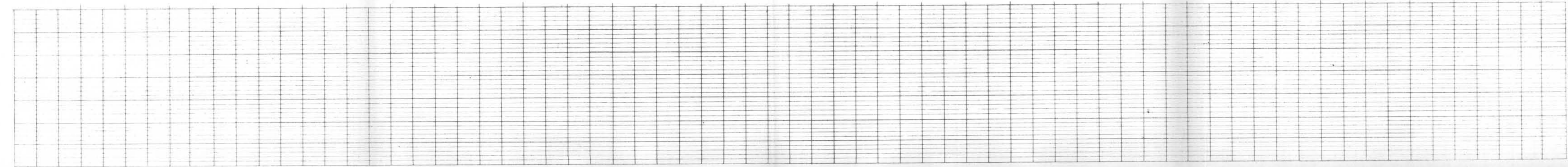


450E 500E 550E 600E 650E 700E 750E 800E 850E 900E 950E 1000E 1050E 1100E 1150E 1200E 1250E 1300E 1350E 1400E 1450E 1500E 1550E 1600E 1650E

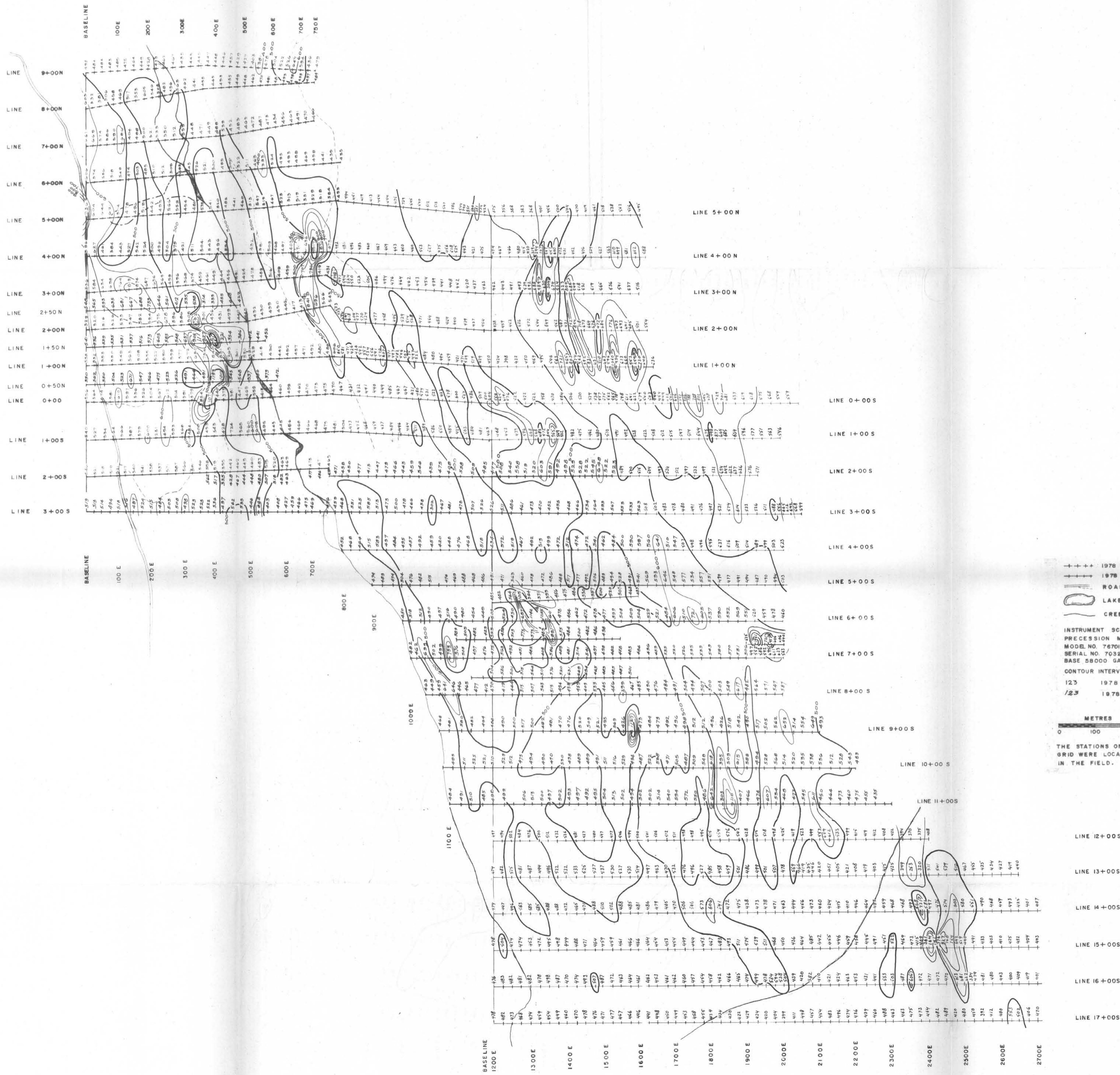
Apparent Chargeability M_a



450E 500E 550E 600E 650E 700E 750E 800E 850E 900E 950E 1000E 1050E 1100E 1150E 1200E 1250E 1300E 1350E 1400E 1450E 1500E 1550E 1600E 1650E



LINE 3+00N



+ + + + 1978 GEOPHYSICS GROUND GRID (MAY)
 - - - - 1978 GEOPHYSICS GROUND GRID (AUG)
 ROAD
 LAKE
 CREEK
 INSTRUMENT SCINTREX MP II PROTON
 PRECESSION MAGNETOMETER
 MODEL NO. 767010
 SERIAL NO. 703281
 BASE 58000 GAMMAS
 CONTOUR INTERVAL 100 GAMMAS
 123 1978 MAY READINGS
 123 1978 AUG. READINGS

METRES
 0 100 200
 THE STATIONS ON THE GRID WERE LOCATED IN THE FIELD.

LINE 0+00
 LINE 1+00
 LINE 2+00
 LINE 3+00
 LINE 4+00
 LINE 5+00
 LINE 6+00
 LINE 7+00
 LINE 8+00
 LINE 9+00
 LINE 10+00
 LINE 11+00
 LINE 12+00
 LINE 13+00
 LINE 14+00
 LINE 15+00
 LINE 16+00
 LINE 17+00

MINERAL RESOURCES BRANCH
 ASSESSMENT REPORT
7299
 NO.

C. K. PROPERTY

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

MAGNETOMETER SURVEY
KAMLOOPS M.D., B.C.

Scale: 1 : 5000 Date: SEPT. 1978 Plate: 132-78-3b