

5240

COMINCO LTD.

EXPLORATION

WESTERN DISTRICT

NTS 82F-15

50° 117° SE

82F/15W

INDUCED POLARIZATION AND RESISTIVITY SURVEY

COPA PROPERTY

RIONDEL AREA, SLOCAN M.D., B.C.

Department of
Mines and Technical Resources
ASSESSMENT REPORT
NO. 5240 MAP.....

October 15, 1974

John M. Hamilton, P.Eng.

Field Work performed during the period September 22 to
September 28, 1974.

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ATTACHMENTS

I.P. Profiles Numbered IP-87-1 to IP-87-8, inclusive

In Pocket at Rear:

Statutory Declaration Relating to Expenditures

Statement of Expenditures

#| Plan showing Claims, Claim Location, IP results

SUMMARY

Four line miles of fairly detailed I.P. work were completed on the Copa Property near Riondel, B.C., by Geoterrex Ltd. for Cominco Ltd. in late September, 1974. This work has resulted in location of several areas of anomalous chargeability response. Most chargeability highs, including the strongest ones, correlate with resistivity highs and may not indicate an increase in chargeable material. A few of the weaker chargeability highs do not correlate with high resistivities and the geologic significance of these responses is not known.

A few pronounced resistivity lows occur. Many of these are coincident with Bernard Creek or its tributaries.

INTRODUCTION

The Copa Property is located on Bernard Creek which flows westernly from the property into Kootenay Lake, a distance of three miles. The mouth of Bernard Creek is located about eight miles north of the town of Riondel, site of the (closed down) Bluebell Mine. Access is by dirt road negotiable by pick-up truck, although four-wheel drive is recommended. Bernard Creek drops from 3,500 feet at the property to the lake level of about 1,700 feet in a distance of three miles. The property consists of sixteen mineral claims called Copa Nos. 1-16 inclusive, Record Nos. 17744-17759 inclusive respectively, and is held by Cominco Ltd. by staking.

The present geophysical survey was conducted over the south-central one-third of the property at the suggestion of N.L.Szabo, Geochemist, Cominco Ltd. The purpose of the survey was to try to locate and trace zones disseminated copper sulphide mineralization in drift covered areas. Other work by Cominco to date consists of reconnaissance geological and soil geochemical work, as well as line-cutting in preparation for the present geophysical survey.

GEOLOGY

The property is underlain by Windermere sediments of late Proterozoic age which dip moderately to steeply to the west. Quartzites of the Hamill Series locally contain

disseminated copper sulphides, and these quartzites are overlain and intercalated with magnesian limestone of the Badshot Formation, which is in turn overlain by the Lardeau Series of schist, quartzite and paragneiss. A small granitic intrusion, probably of Mesozoic age, is located $\frac{1}{2}$ mile east of the property and a larger similar intrusion lies 2 miles to the west.

INDUCED POLARIZATION AND RESISTIVITY SURVEY

1. Method

The survey was performed by John Loback, Geophysicist, of Geoterrex Ltd., Ottawa, assisted by Cletus Newell, G. Rasmussen and B. Marsh, between September 22 and September 28, 1974. The survey was performed with Geoterrex's Elliot 1.5 kw time domain I.P. transmitter and their Scintrex IPR 7 receiver.

About $3\frac{1}{2}$ miles of line were surveyed, on seven parallel lines spaced 400 feet apart, using a 100-foot receiver dipole and reading 4 separations. In addition, the baseline measuring $\frac{1}{2}$ mile was surveyed using a similar pole-dipole array.

2. Data Presentation

Plate 1, Plan showing second separation chargeabilities, geophysical grid and claim locations at a scale of 1"=400', with a location map of the claim group shown as an inset; this map in pocket at rear.

The following data profiles, bound in this book:

<u>Line Number</u>	<u>Drawing Number</u>	<u>Dipole Length</u>
Baseline	IP-87-1	100 feet
104N	IP-87-2	"
108N	IP-87-3	"
112N	IP-87-4	"
116N	IP-87-5	"
120N	IP-87-6	"
124N	IP-87-7	"
128N	IP-87-8	"

3. Results

Induced polarization results as noted above were obtained with a Scintrex IPR-7 receiver, a time domain receiver of the Newmont Type. This unit and the Elliot 1.5 KVA transmitter were set up to operate with two seconds current on, two seconds current off. Secondary voltages (chargeabilities) were integrated for 0.65 seconds, commencing 0.45 seconds after current was shut off, and were normalized for primary voltage as usual. Apparent chargeabilities range from a low of 4 msec to a high of 55 msec. In general, areas with responses smaller than 15 msec are probably background, while areas with responses greater than 25 msec deserve scrutiny. Approximately 700 chargeability readings were attempted; 9 could not be obtained due to noise and/or poor ground contacts.

Resistivity values range from less than 300 ohm-meters to more than 10,000 ohm-meters and show a fairly wide range of values on most lines. In general, values are lower in areas close to Bernard Creek and in particular distinct resistivity lows are common but not exclusively related to areas coincident with creeks.

Areas of anomalous chargeability show a tendency to correlate directly with areas of high resistivity, and in such cases the higher chargeability does not necessarily indicate an increase in the amount of chargeable material present. Good examples of this correlation are present at the east end of Lines 116N, 120N and 124N, and this correlation is present but not as pronounced near the south end of the Baseline and perhaps near the area centred at 10E on Line 104N. This latter area shows a "layering" of electrical values, with higher values present at greater separations, particularly on the resistivity pseudo-section. Such a response pattern normally indicates a near surface layer (probably but not necessarily overburden) of higher conductivity than the underlying material. Other examples of resistivity layering are present for instance at the east end of Lines 112N and 116N, and near the Baseline on Line 116 N.

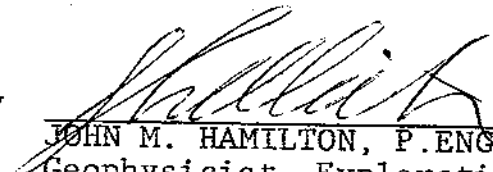
Chargeability responses which do not correlate directly with resistivity highs do occur but are rare, and are in general weaker than the ones that do show the correlation. One of these is located between 0 and 3W on Line 104N, although even here a resistivity high occurs on third and fourth separation. A second rather weak and diffuse chargeability

response which does not correlate with a resistivity high is located from 0 to 3E on Line 108N. A third example of this type is located between 6E and 8E on Line 112N with an apparent significant depth to the source, although here the chargeability pattern is not complete due to missed readings.

CONCLUSIONS

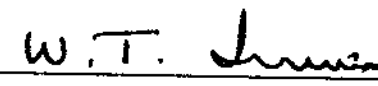
In conclusion, it appears that four line miles of fairly detailed I.P. work on this property have located several areas of anomalous chargeability response, but the majority of these, including the strongest ones, correlate with high resistivity zones and may not indicate increased chargeable material. A few weaker chargeability highs are present which do not correlate with resistivity highs; the geologic significance of these is not known.

Submitted by


JOHN M. HAMILTON, P.ENG.
 Geophysicist, Exploration

Endorsed for

Release by


W.T. IRVINE, P.ENG.
 Manager, Western District

JMH:cpt

Distribution

Mining Recorder, Vancouver (2) *✓*
 Western District
 Geophysics File, Vancouver

DOMINION OF CANADA:
PROVINCE OF BRITISH COLUMBIA.
To Wit:

In the Matter of

STATUTORY DECLARATION RELATING
TO EXPENDITURES ON A GEOPHYSICAL
SURVEY OF THE COPA PROPERTY,
SLOCAN MINING DIVISION.

I, JOHN MURRAY HAMITON, PROFESSIONAL ENGINEER

of City of North Vancouver

in the Province of British Columbia, do solemnly declare that

1. Copies of a report regarding a geophysical survey on certain mineral claims situated in the Slocan 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 geophysical survey of the said claims showing in addition the dates during which those making the said survey 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 18th
day of October, 1974, A.D.

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

EXHIBIT "A"

COMINCO LTD.

EXPLORATION

WESTERN DISTRICT

LINE CUTTING AND GEOPHYSICS COST

COPA PROPERTY, SLOCAN M.D., RIONDEL

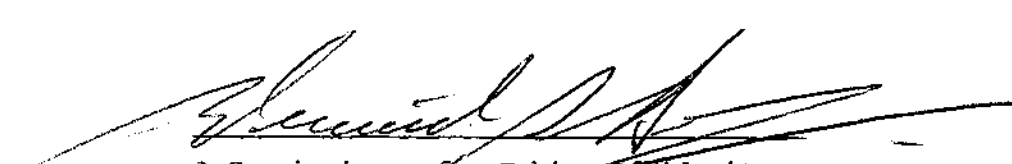
AREA, NTS 82-F-15, 50° 117° SE

1. Line Cutting Costs, 4 miles at \$150.00		\$ 600.00
Line cut during the period September 20-September 24, 1974.		
2. Geophysics Contract Costs, Data Acquisition only, Geoterrex Ltd., Ottawa, Canada		
Mobilization and Demobilization	\$1,322.75	
Survey Charges, 6½ days at \$325.00	2,112.50	
Vehicle Charges	250.88	
Room and Board, 4 men for 7 days	436.13	
Labour Costs	402.50	\$4,524.76
Geophysics done during the period September 22-September 24, 1974.		
3. Report Preparation Costs		
Drafting, J.P.Snyder, 5 days at \$30.00	\$ 150.00	
Interpretation, J.M.Hamilton, 2 days at \$75.00	150.00	
Typing, C.P.Trinidad, 1 day at \$30.00	30.00	330.00
	TOTAL	<u>\$5,454.76</u>

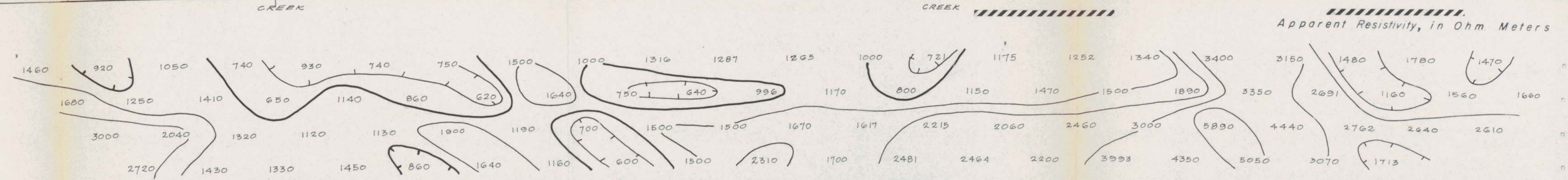
Signed by


JOHN M. HAMILTON, P.ENG.

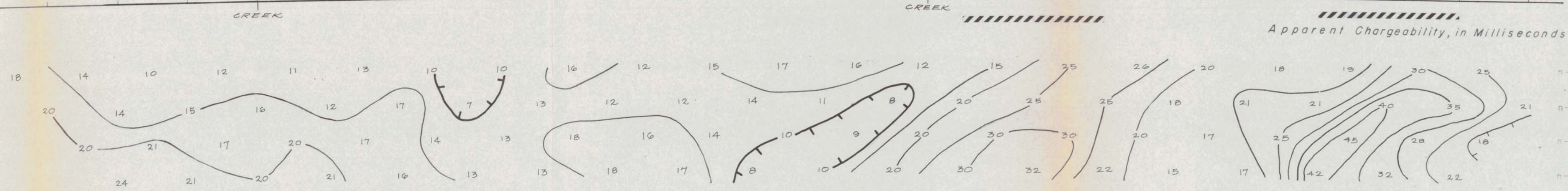
This is Exhibit "A" to the Statutory Declaration of John M. Hamilton declared before me this 18th day of October, 1974.


A Commissioner for Taking Affidavits
within British Columbia

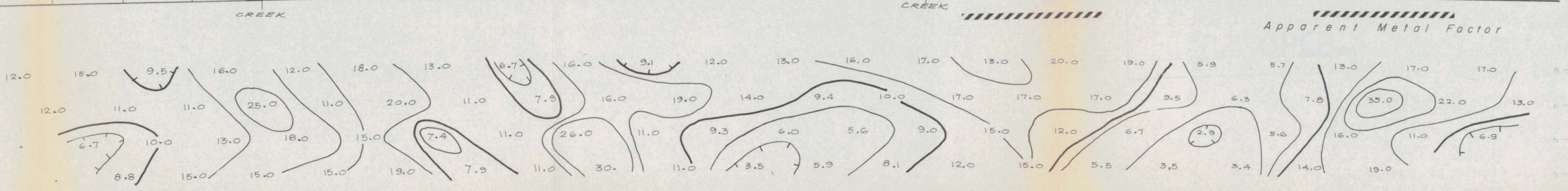
103N 104N 105N 106N 107N 108N 109N 110N 111N 112N 113N 114N 115N 116N 117N 118N 119N 120N 121N 122N 123N 124N 125N 126N



103N 104N 105N 106N 107N 108N 109N 110N 111N 112N 113N 114N 115N 116N 117N 118N 119N 120N 121N 122N 123N 124N 125N 126N



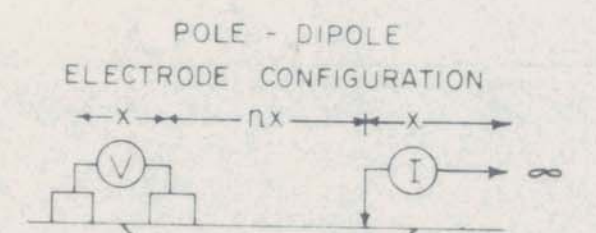
103N 104N 105N 106N 107N 108N 109N 110N 111N 112N 113N 114N 115N 116N 117N 118N 119N 120N 121N 122N 123N 124N 125N 126N



N.T.S. 82-F-15 DWG. NO. I.P.-87-1

COMINCO LTD.
COPA PROPERTY
 RIONDEL AREA, SLOCAN M.D., B.C.

LINE NO. BASELINE



POLE - DIPOLE
 ELECTRODE CONFIGURATION
 x = 100'
 PLOTTING X POINT
 n = 1, 2, 3 & 4

NOTE: NEAR CURRENT ELECTRODE ALWAYS TO THE NORTH OF THE RECEIVER DIPOLE

SURFACE PROJECTION OF ANOMALOUS ZONES
 DEFINITE [Solid line]
 PROBABLE [Dashed line]
 POSSIBLE [Hatched line]

DATE SURVEYED SEPT., 1974

APPROVED *J. H. Little*

NOTE: RESISTIVITY AND METAL FACTOR CONTOURS AT LOGARITHMIC INTERVALS
 1-1.5-2-3-5-7.5-10

DATE OCT., 30, 1974

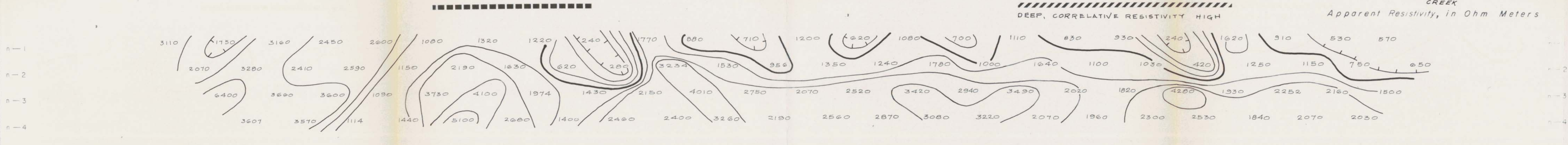
CHARGEABILITY CONTOUR INTERVAL 5 MILLISECONDS

5240 I.P. 1

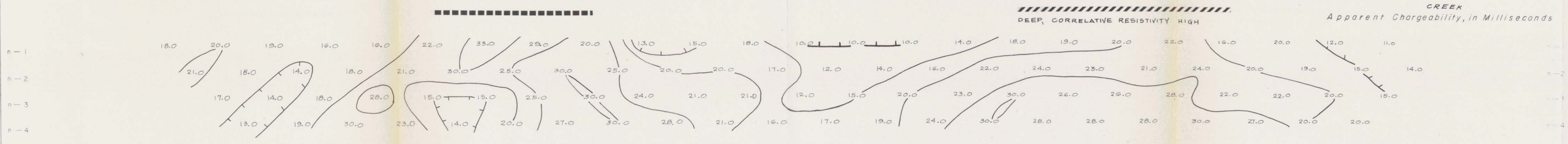
TIME DOMAIN I.P. AND RESISTIVITY PROFILE
 SURVEYED BY GEOTERREX LTD., (JOHN LOBACK B.Sc.)

LINE NO. BASELINE

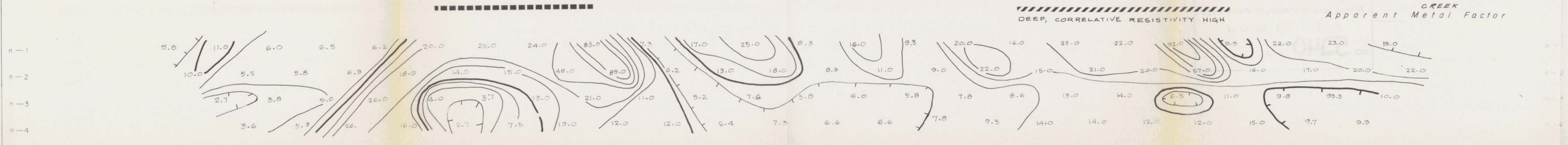
9W 8W 7W 6W 5W 4W 3W 2W 1W 0 1E 2E 3E 4E 5E 6E 7E 8E 9E 10E 11E 12E 13E 14E 15E 16E 17E 18E



9W 8W 7W 6W 5W 4W 3W 2W 1W 0 1E 2E 3E 4E 5E 6E 7E 8E 9E 10E 11E 12E 13E 14E 15E 16E 17E 18E



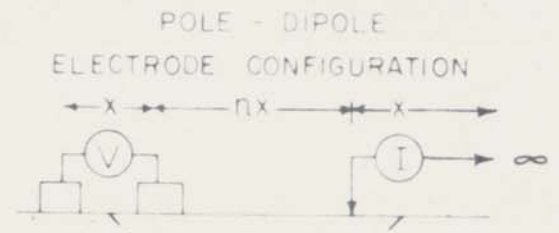
9W 8W 7W 6W 5W 4W 3W 2W 1W 0 1E 2E 3E 4E 5E 6E 7E 8E 9E 10E 11E 12E 13E 14E 15E 16E 17E 18E



N.T.S. 82-F-15 DWG. NO. I.P.-87-2

COMINCO LTD.
COPA PROPERTY
RIONDEL AREA, SLOCAN M.D., B.C.

LINE NO. 104 N



NOTE: NEAR CURRENT ELECTRODE ALWAYS TO THE WEST OF THE RECEIVER DIPOLE

SURFACE PROJECTION OF ANOMALOUS ZONES
DEFINITE [Solid Line]
PROBABLE [Dashed Line]
POSSIBLE [Hatched Line]

DATE SURVEYED SEPT., 1974

APPROVED *Shelton*

NOTE: RESISTIVITY AND METAL FACTOR CONTOURS AT LOGARITHMIC INTERVALS 1-1.5-2-3-5-7.5-10
CHARGEABILITY CONTOUR INTERVAL 5 MILLISECONDS

DATE OCT., 30, 1974

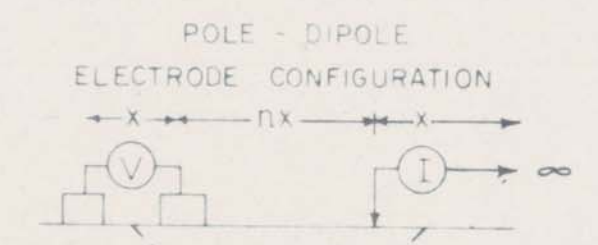
5240 I.P. 2

TIME DOMAIN I.P. AND RESISTIVITY PROFILE
SURVEYED BY GEOTERREX LTD., (JOHN LOBACK B.Sc.)

LINE NO. 104 N

COMINCO LTD.
COPA PROPERTY
 RIONDEL AREA, SLOCAN M.D., B.C.

LINE NO. 108 N



NOTE: NEAR CURRENT ELECTRODE ALWAYS TO THE WEST OF THE RECEIVER DIPOLE.

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

SURFACE PROJECTION OF ANOMALOUS ZONES
 DEFINITE
 PROBABLE
 POSSIBLE

DATE SURVEYED SEPT., 1974

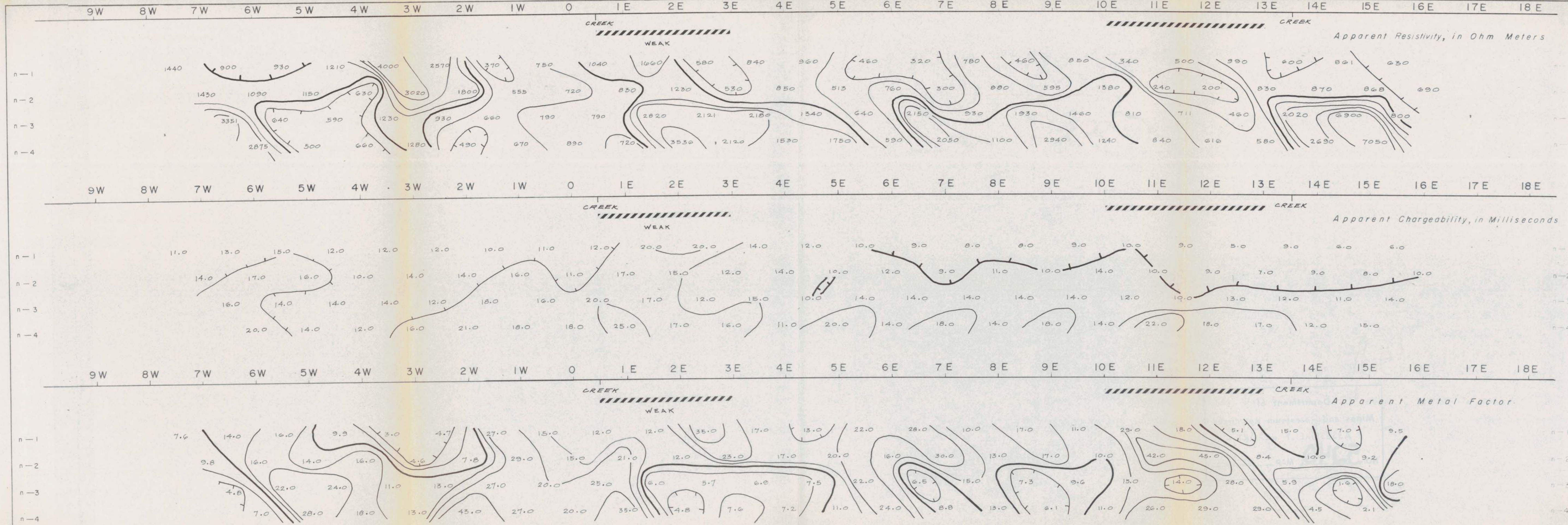
APPROVED

DATE OCT., 30, 1974

NOTE: RESISTIVITY AND METAL FACTOR CONTOURS AT LOGARITHMIC INTERVALS 1-15-2-3-5-7.5-10
 CHARGEABILITY CONTOUR INTERVAL 5 MILLISECONDS

5240 I.P.3

TIME DOMAIN I.P. AND RESISTIVITY PROFILE
 SURVEYED BY GEOTERREX LTD. (JOHN LOBACK B.Sc.)

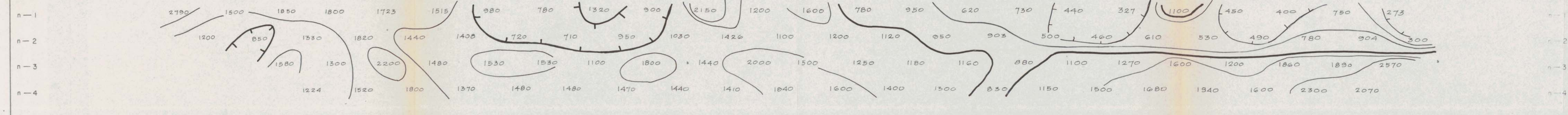


LINE NO 108 N

9W 8W 7W 6W 5W 4W 3W 2W 1W 0 1E 2E 3E 4E 5E 6E 7E 8E 9E 10E 11E 12E 13E 14E 15E 16E 17E 18E

DEEP CREEK

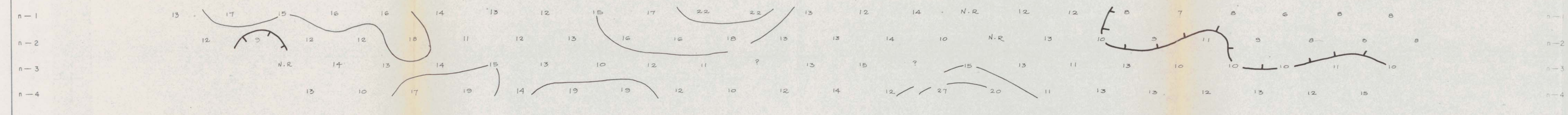
Apparent Resistivity, in Ohm Meters



9W 8W 7W 6W 5W 4W 3W 2W 1W 0 1E 2E 3E 4E 5E 6E 7E 8E 9E 10E 11E 12E 13E 14E 15E 16E 17E 18E

DEEP CREEK

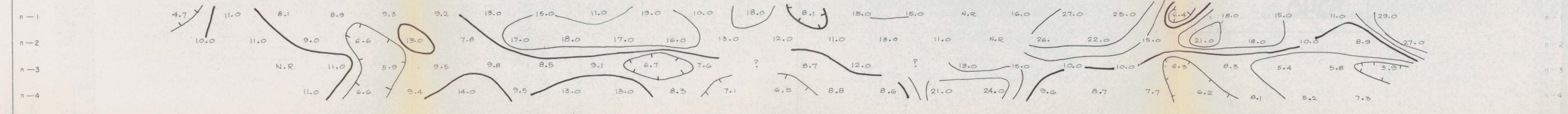
Apparent Chargeability, in Milliseconds



9W 8W 7W 6W 5W 4W 3W 2W 1W 0 1E 2E 3E 4E 5E 6E 7E 8E 9E 10E 11E 12E 13E 14E 15E 16E 17E 18E

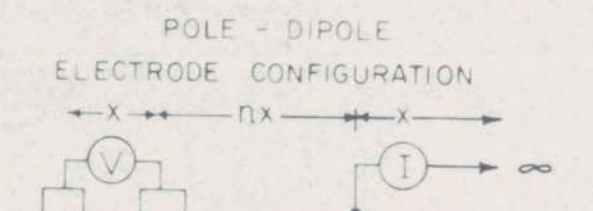
DEEP CREEK

Apparent Metal Factor



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COPA PROPERTY
RIONDEL AREA, SLOCAN M.D., B.C.

LINE NO. 112 N



NOTE: NEAR CURRENT ELECTRODE ALWAYS TO THE WEST OF THE RECEIVER DIPOLE

SURFACE PROJECTION OF ANOMALOUS ZONES
DEFINITE
PROBABLE
POSSIBLE

DATE SURVEYED SEPT., 1974

APPROVED *Shallit*

NOTE: RESISTIVITY AND METAL FACTOR CONTOURS AT LOGARITHMIC INTERVALS
1-15-2-3-5-7.5-10
CHARGEABILITY CONTOUR INTERVAL 5 MILLISECONDS

DATE OCT., 30, 1974

5240 I.P. 4

TIME DOMAIN I.P. AND RESISTIVITY PROFILE
SURVEYED BY GEOTERREX LTD., (JOHN LOBACK B.Sc.)

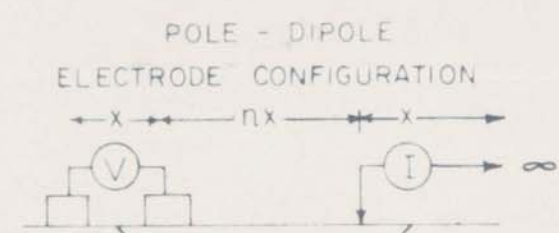
LINE NO. 112 N

9W 8W 7W 6W 5W 4W 3W 2W 1W 0 1E 2E 3E 4E 5E 6E 7E 8E 9E 10E 11E 12E 13E 14E 15E 16E 17E 18E

N.T.S. 82-F-15 DWG. NO. I.P.-87-5

COMINCO LTD.
COPA PROPERTY
RIONDEL AREA, SLOCAN M.D., B.C.

LINE NO. 116 N



NOTE: NEAR CURRENT ELECTRODE ALWAYS TO THE WEST OF THE RECEIVER DIPOLE

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

SURFACE PROJECTION OF ANOMALOUS ZONES
DEFINITE
PROBABLE
POSSIBLE

DATE SURVEYED SEPT, 1974

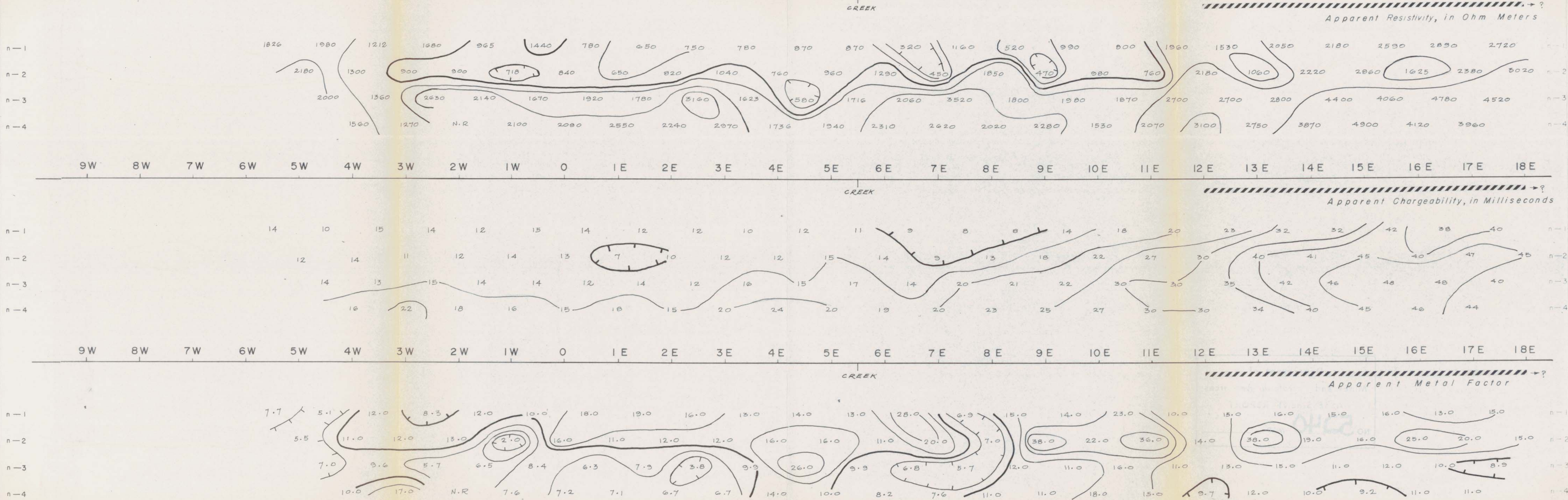
APPROVED *[Signature]*

DATE OCT. 30, 1974

NOTE: RESISTIVITY AND METAL FACTOR CONTOURS AT LOGARITHMIC INTERVALS 1-15-2-3-5-7.5-10
CHARGEABILITY CONTOUR INTERVAL 5 MILLISECONDS

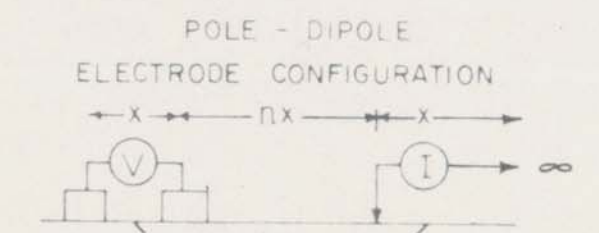
5240 I.P.S

TIME DOMAIN I.P. AND RESISTIVITY PROFILE
SURVEYED BY GEOTERREX LTD., (JOHN LOBACK B.Sc.)



COMINCO LTD.
COPA PROPERTY
 RIONDEL AREA, SLOCAN M.D., B.C.

LINE NO. 120 N



NOTE: NEAR CURRENT ELECTRODE ALWAYS TO THE WEST OF THE RECEIVER DIPOLE.

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

SURFACE PROJECTION OF ANOMALOUS ZONES
 DEFINITE [Solid Line]
 PROBABLE [Dashed Line]
 POSSIBLE [Hatched Line]

DATE SURVEYED SEPT., 1974

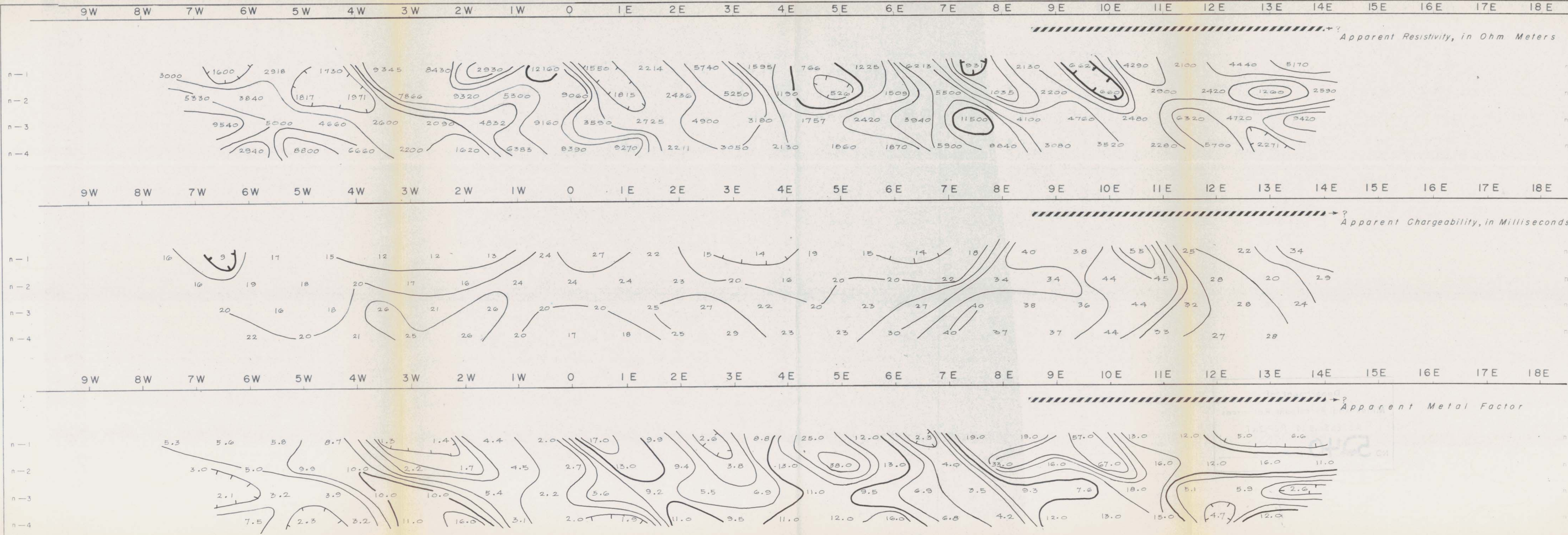
APPROVED *[Signature]*

DATE OCT., 30, 1974

NOTE: RESISTIVITY AND METAL FACTOR CONTOURS AT LOGARITHMIC INTERVALS
 1-15-2-3-5-7.5-10
 CHARGEABILITY CONTOUR INTERVAL 5 MILLISECONDS

5240 I.P. 6

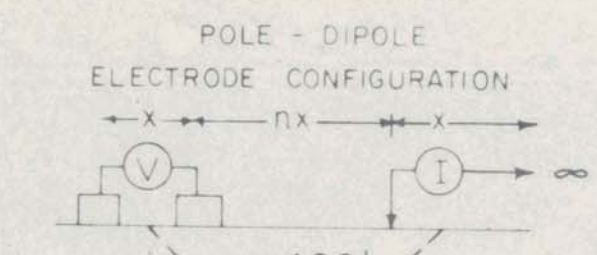
TIME DOMAIN I.P. AND RESISTIVITY PROFILE
 SURVEYED BY GEOTERREX LTD. (JOHN LOBACK B.Sc.)



LINE NO 120 N

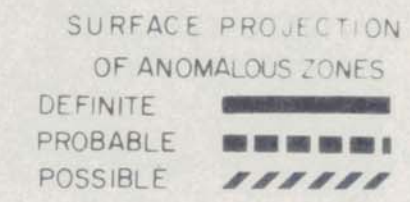
COMINCO LTD.
COPA PROPERTY
 RIONDEL AREA, SLOCAN M.D., B.C.

LINE NO. 124 N



NOTE: NEAR CURRENT ELECTRODE ALWAYS TO THE WEST OF THE RECEIVER DIPOLE

PLOTTING POINT
 $n = 1, 2, 3 \text{ \& } 4$



DATE SURVEYED SEPT., 1974

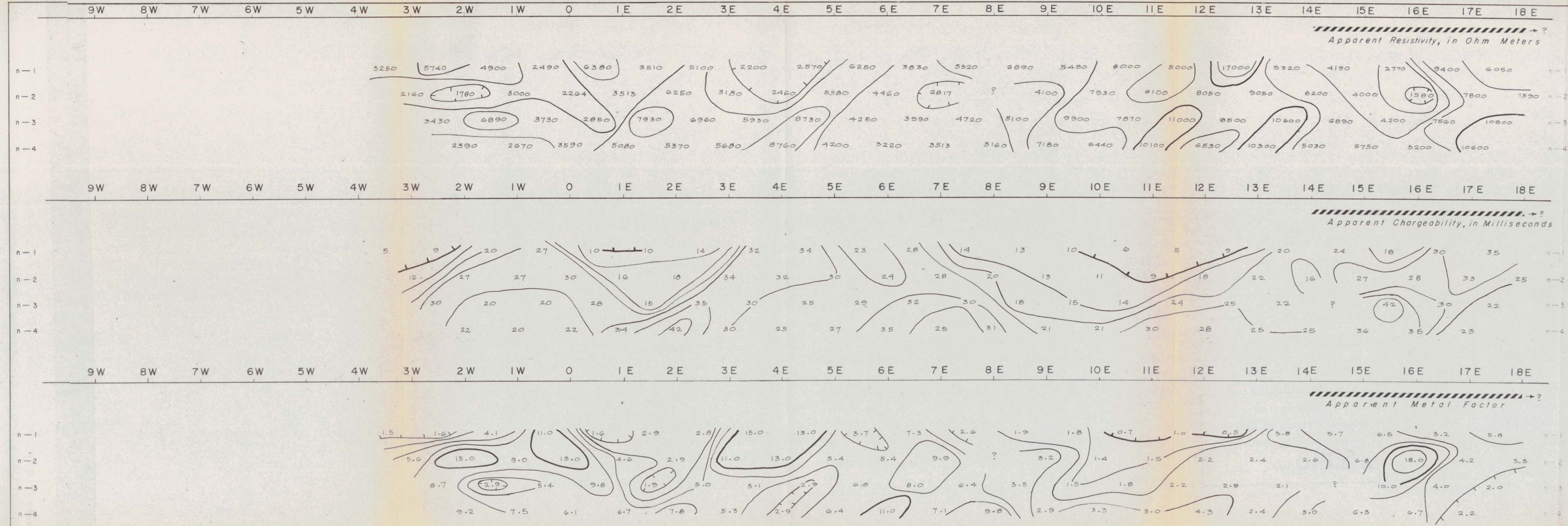
APPROVED *[Signature]*

DATE OCT., 30, 1974

NOTE: RESISTIVITY AND METAL FACTOR CONTOURS AT LOGARITHMIC INTERVALS
 1-1.5-2-3-5-7.5-10
 CHARGEABILITY CONTOUR INTERVAL 5 MILLISECONDS

5240 I.P. 7

TIME DOMAIN I.P. AND RESISTIVITY PROFILE
 SURVEYED BY GEOTERREX LTD., (JOHN LOBACK B.Sc.)



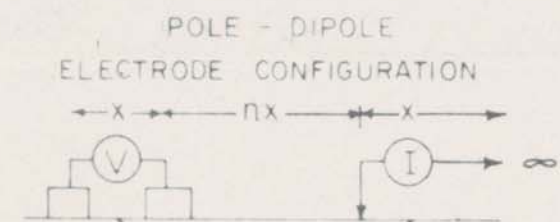
LINE NO 124 N

9W 8W 7W 6W 5W 4W 3W 2W 1W 0 1E 2E 3E 4E 5E 6E 7E 8E 9E 10E 11E 12E 13E 14E 15E 16E 17E 18E

N.T.S. 82-F-15 DWG. NO. I.P.-87-8

COMINCO LTD.
COPA PROPERTY
RIONDEL AREA, SLOCAN M.D., B.C.

LINE NO. 128 N



NOTE: NEAR CURRENT ELECTRODE ALWAYS TO THE WEST OF THE RECEIVER DIPOLE

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

SURFACE PROJECTION OF ANOMALOUS ZONES
DEFINITE (solid line)
PROBABLE (dashed line)
POSSIBLE (hatched line)

DATE SURVEYED SEPT., 1974

APPROVED *J. Hall*

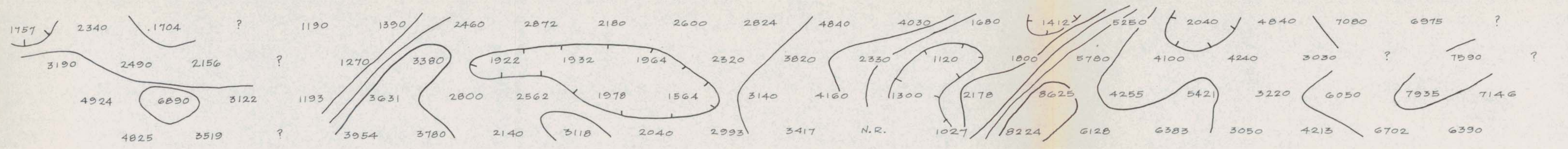
DATE OCT., 30, 1974

NOTE: RESISTIVITY AND METAL FACTOR CONTOURS AT LOGARITHMIC INTERVALS
1-1.5-2-3-5-7.5-10
CHARGEABILITY CONTOUR INTERVAL 5 MILLISECONDS

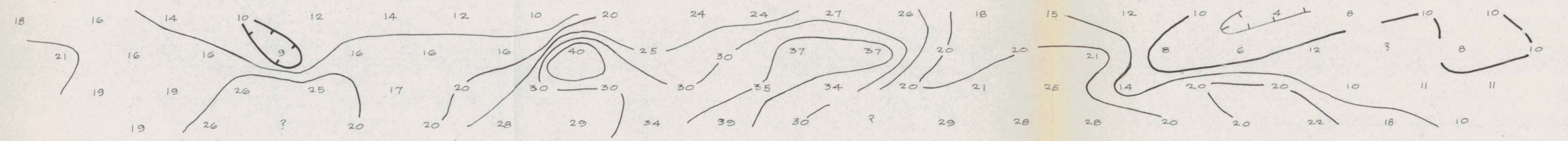
5240 I.P. 8

TIME DOMAIN I.P. AND RESISTIVITY PROFILE
SURVEYED BY GEOTERREX LTD. (JOHN LOBACK B.Sc.)

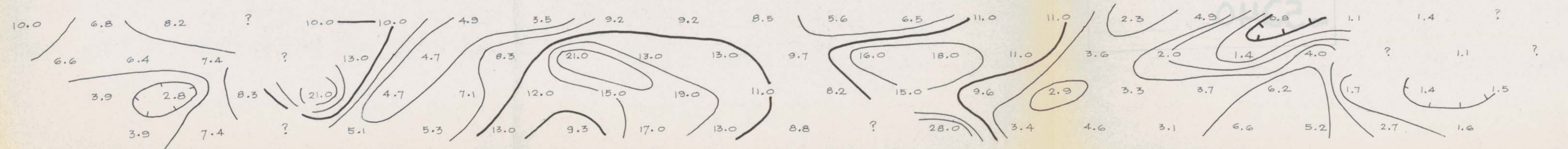
Apparent Resistivity, in Ohm Meters

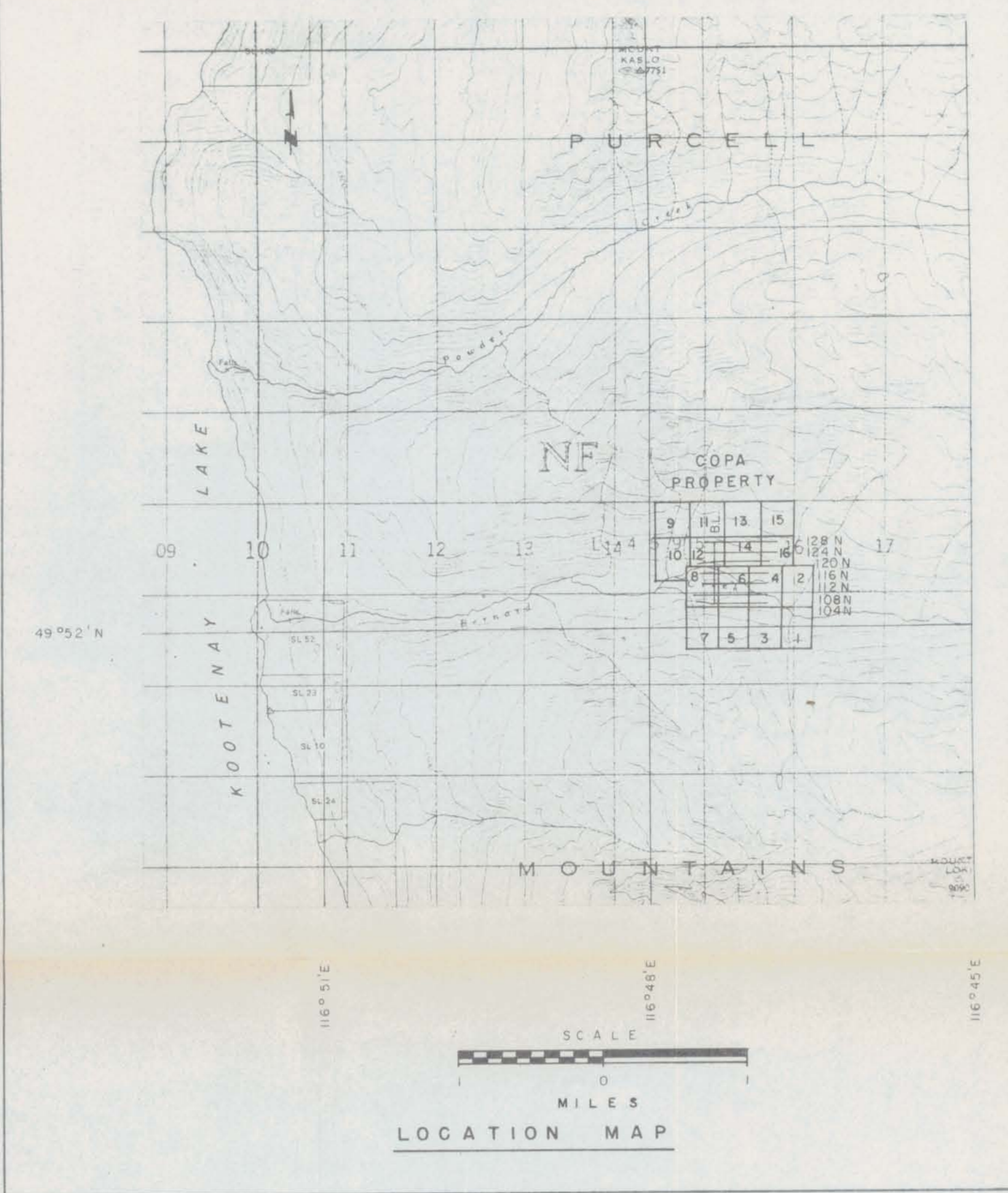
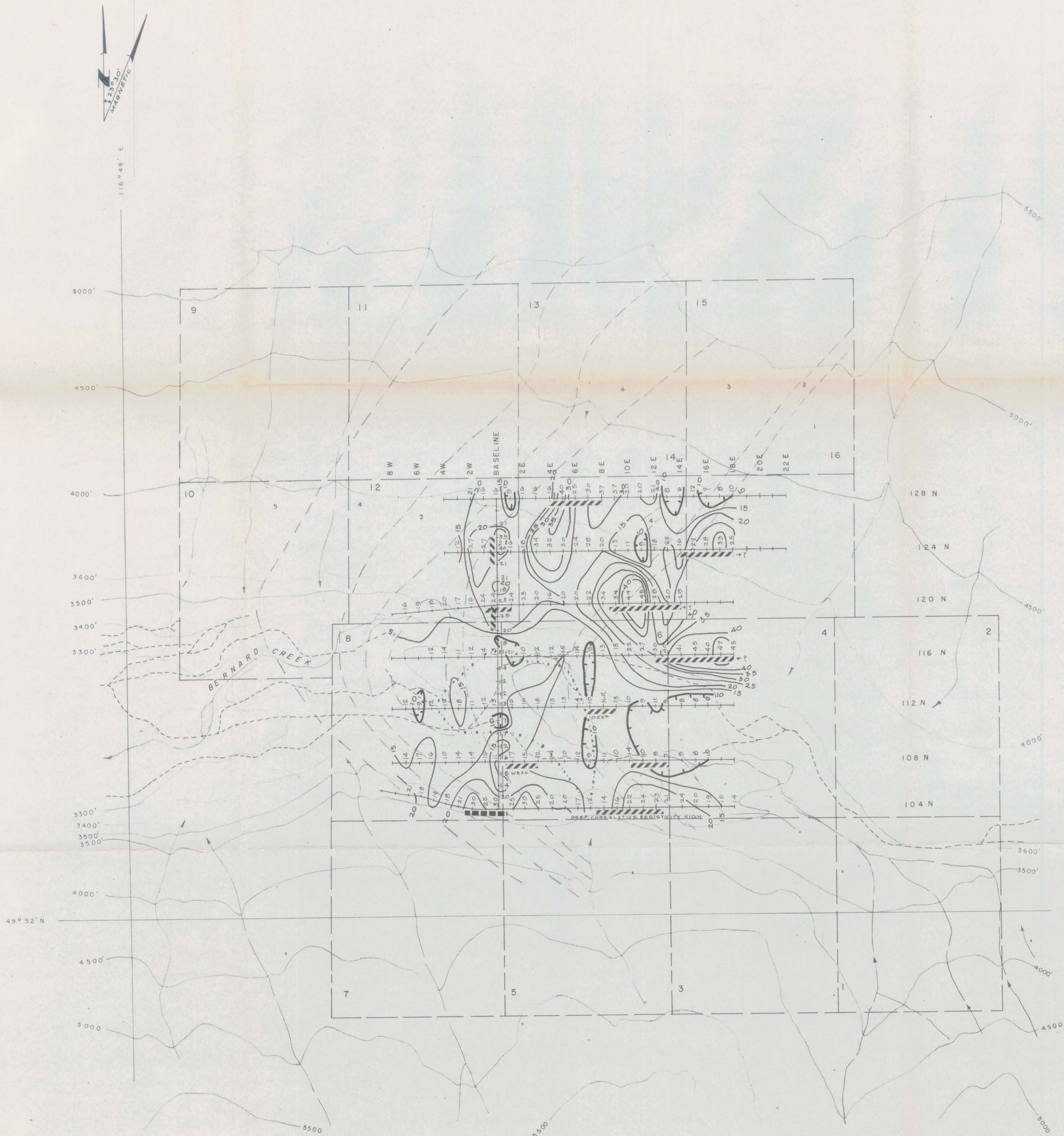


Apparent Chargeability, in Milliseconds



Apparent Metal Factor





LEGEND

- CREEK
- LAKE
- - - ROAD
- - - CLAIM BOUNDARY
- TOPOGRAPHIC CONTOUR

GEOPHYSICS LEGEND

- CHARGEABILITY CONTOUR INTERVAL 5 MILLISECONDS
- 1974 GEOPHYSICS IP SURVEY
- POLE - DIPOLE
- ELECTRODE CONFIGURATION
- NOTE: NEAR CURRENT ELECTRODE ALWAYS TO THE WEST OF RECEIVER DIPOLE LINES 104N, 108N, 112N, 116N, 120N, 124N, 128N BASELINE - TO THE NORTH OF RECEIVER
- PLOTTING POINT
- SURFACE PROJECTION OF ANOMALOUS ZONES
- DEFINITE
- PROBABLE
- POSSIBLE

GEOLOGY LEGEND

- HAMILL GROUP
 - 1. QUARTZ - MICA SCHIST, MINOR QUARTZITE
 - 2. QUARTZITE
 - 3. QUARTZITE, MINOR QUARTZ-MICA SCHIST
- BADSHOT FORMATION
 - 4. LIMESTONE
- LARDEAU GROUP INDEX FORMATION
 - 5. AMPHIBOLITE
 - 6. IMPURE QUARTZ-MICA SCHIST
- MINERALIZED QUARTZITE
- APPROXIMATE GEOLOGICAL CONTACTS

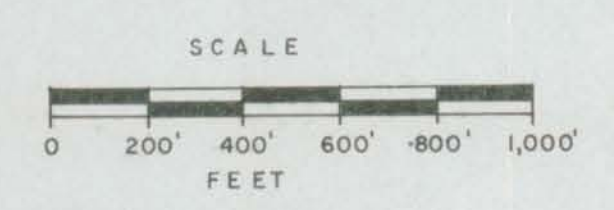
GEOCHEMICAL LEGEND

- Pb LEAD ANOMALIES
- Zn ZINC ANOMALIES

Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 5240 MAP #1

GEO PHYSICAL FIELD WORK BY GEOTERREX LTD., OTTAWA.

**5240
M1**



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

Drawn by	Traced by	COPA PROPERTY SECOND SEPARATION CHARGEABILITIES RIONDEL AREA, SLOCAN M.D., B.C.
Checked by	Reviewed by	
Scale AS SHOWN	Date OCT, 1974	Plate 1