

COMINCO LTD.

EXPLORATION

NTS: 93 L9W

WESTERN DISTRICT

14 October 1983

GEOPHYSICAL SURVEYS

ON THE

TOPLEY RICHFIELD PROPERTY

OMINICA M.D., B.C.

LATITUDE: $54^{\circ}36'$ LONGITUDE: $126^{\circ}14'$

WORK PERFORMED: SEPT. 23 to OCT. 6, 1983

CLAIMS COVERED: RICHFIELD 1

CDF-1, CDF-2, CDF-3, CDF-4

**GEOLOGICAL BRANCH
ASSESSMENT REPORT**

11,454

REPORT BY:

INGO JACKISCH

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11 to 18		HLEM

COMINCO LTD.

EXPLORATION
N.T.S. 93 L9W

WESTERN DISTRICT
October 14, 1983

REPORT ON
INDUCED POLARIZATION AND HORIZONTAL LOOP EM SURVEYS

ON THE TOPLEY RICHFIELD PROPERTY

OMINICA M.D., B.C.

INTRODUCTION

During the period Sept. 23 to Oct. 6, 1983 a Cominco geophysical crew surveyed 14 kms of induced polarization and 12.5 kms of HLEM on the Richfield Property. This supplements a ground magnetometer survey of larger area completed in Sept. 1982.

The I.P. grid includes the area of the old Richfield workings, which has been explored by drilling and shafts since the late 1920's, but was never actually a producer. The purpose of the geophysical surveys was to investigate a broad magnetic low and follow the favourable geology to the north for subsequent further exploration.

The claims covered in the surveys are Richfield 2, CDF 1, CDF 2, CDF 3, and CDF 4. (Plate 251-83-2).

This report describes the survey procedures, presents the data, and briefly discusses the results.

LOCATION AND ACCESS

The Topley Richfield Property is located 10kms north of Topley, B.C., which is between Burns Lake and Houston on the Prince George to Prince Rupert Highway. (see Plate 251-83-1) The Richfield Mine is accessible from the paved Topley to Granisle road. (Turn right 10kms north of Topley onto a gravel road and follow for 1km. When this road intercepts a powerline turn right again onto a dirt, 4 wheel drive road for 1km. This road ends at the Richfield buildings and close to underground workings.)

GEOLOGY

Three rock types are present in the area covered by the I.P. grid. Andesites and some ultrabasic rocks occur predominately to the west, andesitic lapilli tuffs to the east, and sandwiched in between these two units is an altered rhyolitic tuff containing a high percentage of carbonates (calcite, dolomite, and ankerite). This last rock type hosts the Au/Ag mineralization. All units dip 45° to the west. The Au/Ag mineralization occurs with minor pyrite, estimated at 1-5%.

GEOPHYSICAL SURVEYS

Induced Polarization/Resistivity

One Huntex Mk 4 receiver (reading separations n=3,4) and one Scintrex IPR8 receiver (reading n=1,2) were used in combination with a Phoenix 2kW IPT1 motor generator/transmitter unit. Readings were taken in the time domain using a 2 second ON/2 second OFF alternating square wave. Total integrating times from 150 milliseconds to 1850 milliseconds and from 650 milliseconds to 1170 milliseconds in the current off mode were set for the Huntex Mk4 and Scintrex IPR8 respectively. All IPR8 chargeability readings, in "millivolts/volt", were converted to Mk4 "milliseconds" by the relationship:

$$\text{milliseconds} = 1.087 \times \text{mv}/\text{v}$$

This relationship was determined in the field by 39 repeat readings using both instruments.

The survey lines were 150 meters apart. A pole-dipole electrode array was selected with an "a" spacing of 50 meters and "n" separations of 1,2,3, and 4. The current electrode was kept to the east of the potential dipole for all readings. Care was taken to keep infinity and current access wires well away from the powerline on the western boundary of the grid. When the wire crossed the powerline it was always in a perpendicular orientation so the coupling would be minimized.

The apparent resistivity values are given in units of ohm-meters and were calculated from the relationship:

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

where V is the receiver voltage across the measuring dipole during the current on period I, and K is a geometrical factor dependent on the "a" spacing and "n" separation.

$$\text{(ie. } K=2\pi a n(n+1) \text{ for pole-dipole)}$$

Contour interval is every 1 millisecond for the chargeability and a logarithmic scale for the resistivities (ie. 1, 1.5, 2, 3, 5, 7.5, 10 etc.)

Horizontal Loop Electromagnetics (HLEM)

An Apex Max Min II was used for the HLEM survey. 50, 100, and 150 meter coil separations were all tried. The property was virtually flat topographically except for a few gullies, so the transmitter-receiver interconnecting coil could be used as a chain ensuring constant coil separation. Transmitter and receiver tilts were zero with the exception of the gullies where the tilts were estimated by an inclinometer. Any topographic effects remaining are indicated in the "in phase" component, but can be eliminated by subtracting 444 Hz in phase from 3555Hz in phase and plotting the result.

The frequencies used were 3555Hz, 1777Hz, and 444Hz. On the lines ending at the powerline 888Hz was used instead of 444Hz because the powerline was very "dirty" at low frequencies.

DISCUSSION OF RESULTS

Chargeabilities range from 0 to 20 milliseconds over the grid, and resistivities vary from 40 to 1600 ohm-meters.

The chargeability and resistivity data (Plates 251-83-5 to - 11) correlate with the three rock types present. The andesites (with ultrabasics) in the west have chargeabilities from 3 to 19 milliseconds (the higher values occurring at the western end of the lines are most likely due to powerline interference) and resistivities from 75 to 250 ohm-meters. The altered rhyolitic tuffs characteristically show low chargeabilities of between 0 to 2 milliseconds and low resistivities of 50 to 100 ohm-meters. The low chargeabilities could be due to the high percentage of carbonates (calcite, dolomite, and ankerite) present in this unit. The andesitic lapilli tuff to the east contains higher chargeabilities of 4 to 13 milliseconds and resistivities from 100-150 ohm-meters in the NE to 200-1600 ohm meters in the SE. It is not known why this variability in resistivity occurs in this rock unit.

The HLEM data (Plates 251-83-11 to 18) shows no bedrock conductors with either the 50, 100, or 150 meter coil separations. The conductor on line ON with the 100 meter coil separation occurs near the old underground workings and could be a result of these (ie rails, wiring, drill casing, etc.)

CONCLUSIONS

I.P. has worked as a subsurface mapping tool in delineating the three rock types present on the grid. Unfortunately no pyrite mineralization was detected in the chargeability data.

Respectively
submitted by:

Ingo Jackisch
Ingo Jackisch
Geophysicist

Endorsed for
release by :

G. Hazden
G. Hazden
Manager, Exploration W.D.

Distribution: Mining Recorder (2) ✓
Western District files (1)
Geophysics file (1)
Del Wiley (1)
Ingo Jackisch (1)
Administration (1)

APPENDIX I

STATEMENT OF EXPENDITURES

1. Salaries and Daily Charge	\$13,422.50
2. Equipment Rental	1,730.00
3. Motel, Expense Accounts, Room and Board, Truck Rental, 3 men x 14 days	<u>4,460.24</u>
TOTAL	\$19,612.74

APPENDIX II

CERTIFICATION

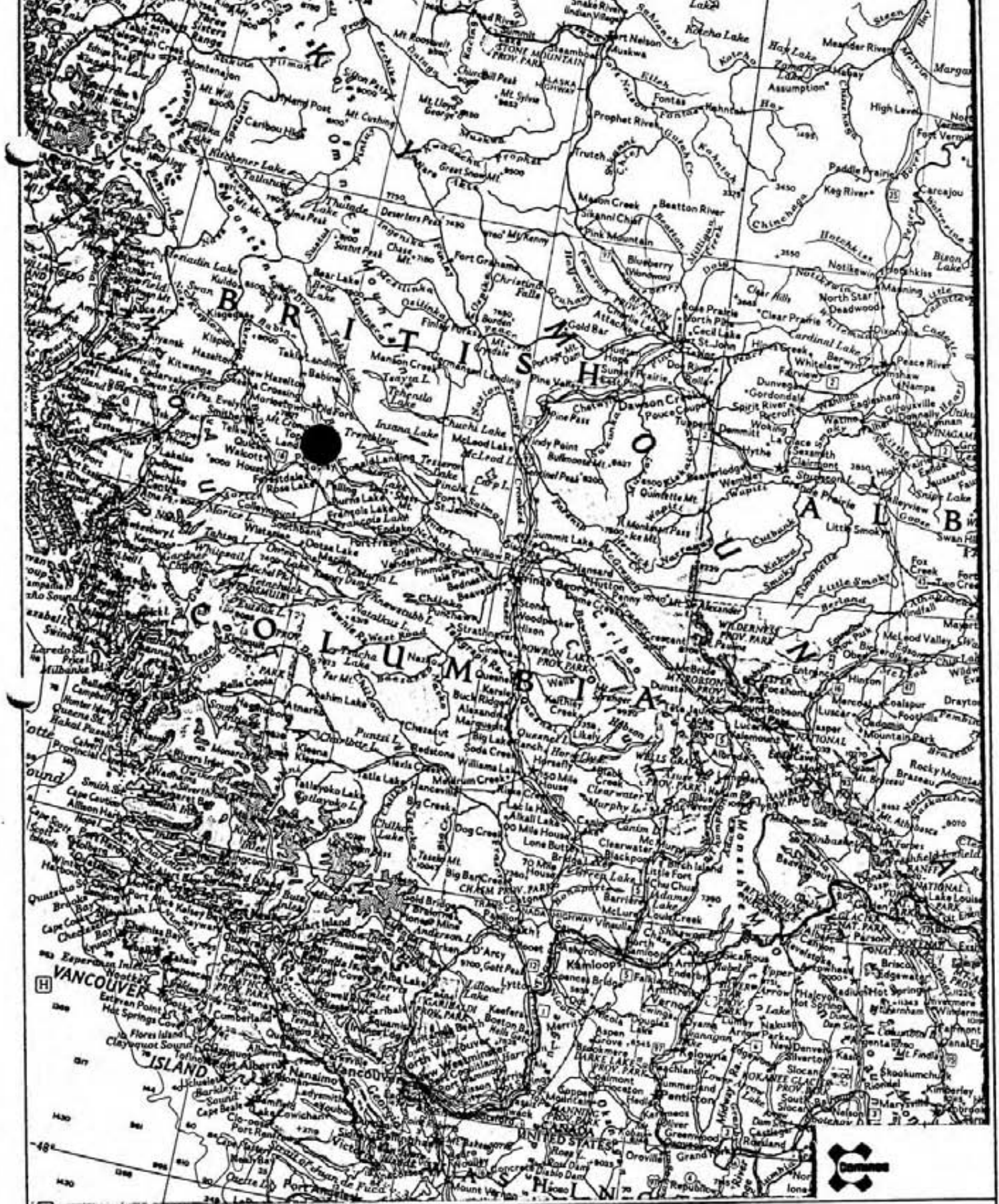
I, INGO JACKISCH, OF 424 SOMERSET STREET, IN THE CITY OF NORTH VANCOUVER,
IN THE PROVINCE OF BRITISH COLUMBIA, DO HEREBY CERTIFY:

1. THAT I graduated from the University of B.C. in 1975 with a B.Sc. in geophysics;
2. THAT I am registered with the Association of Professional Engineers of B.C. as an engineering pupil, and am a member of the B.C. Geophysical Society.
3. THAT I have been practising my profession for the past nine years.
4. THAT the attached statement of expenditures of Appendix I is true and accurate to the best of my knowledge, information, and belief.



Ingo Jackisch, Geophysicist

14 October 1981



Drawn by: _____ Traced by: _____

Revised by	Date	Revised by	Date

LOCATION MAP

Scale: _____ Date: _____ Plate: 251-83-1

1:10000 Scale Date: SEPT 29 1982 Form 251-83-2

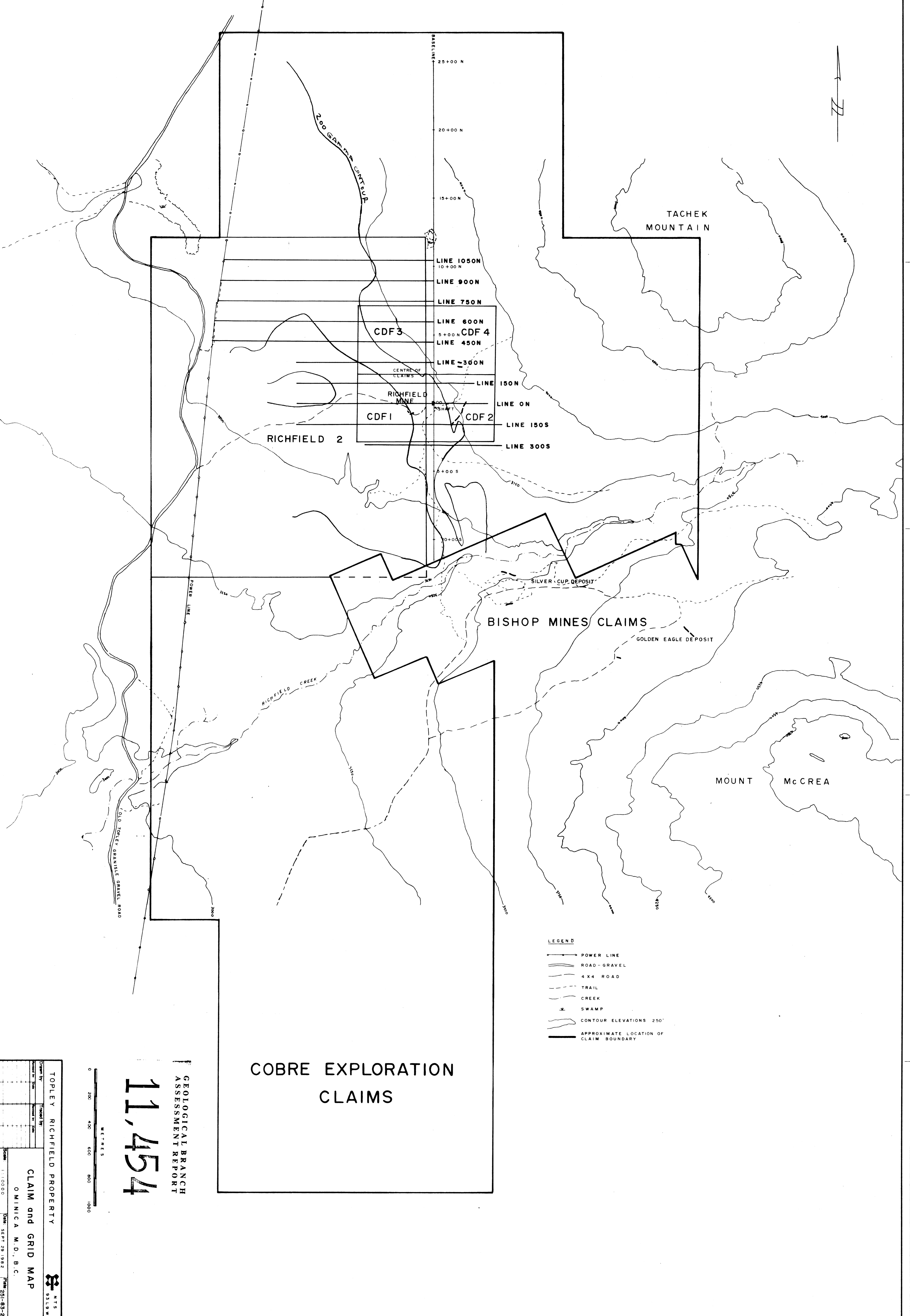
NTS
3/18/82
TOPLEY RICHFIELD PROPERTY
CLAIM and GRID MAP
OMINICA M.D., B.C.

0 200 400 600 800 1000 METERS

11,454

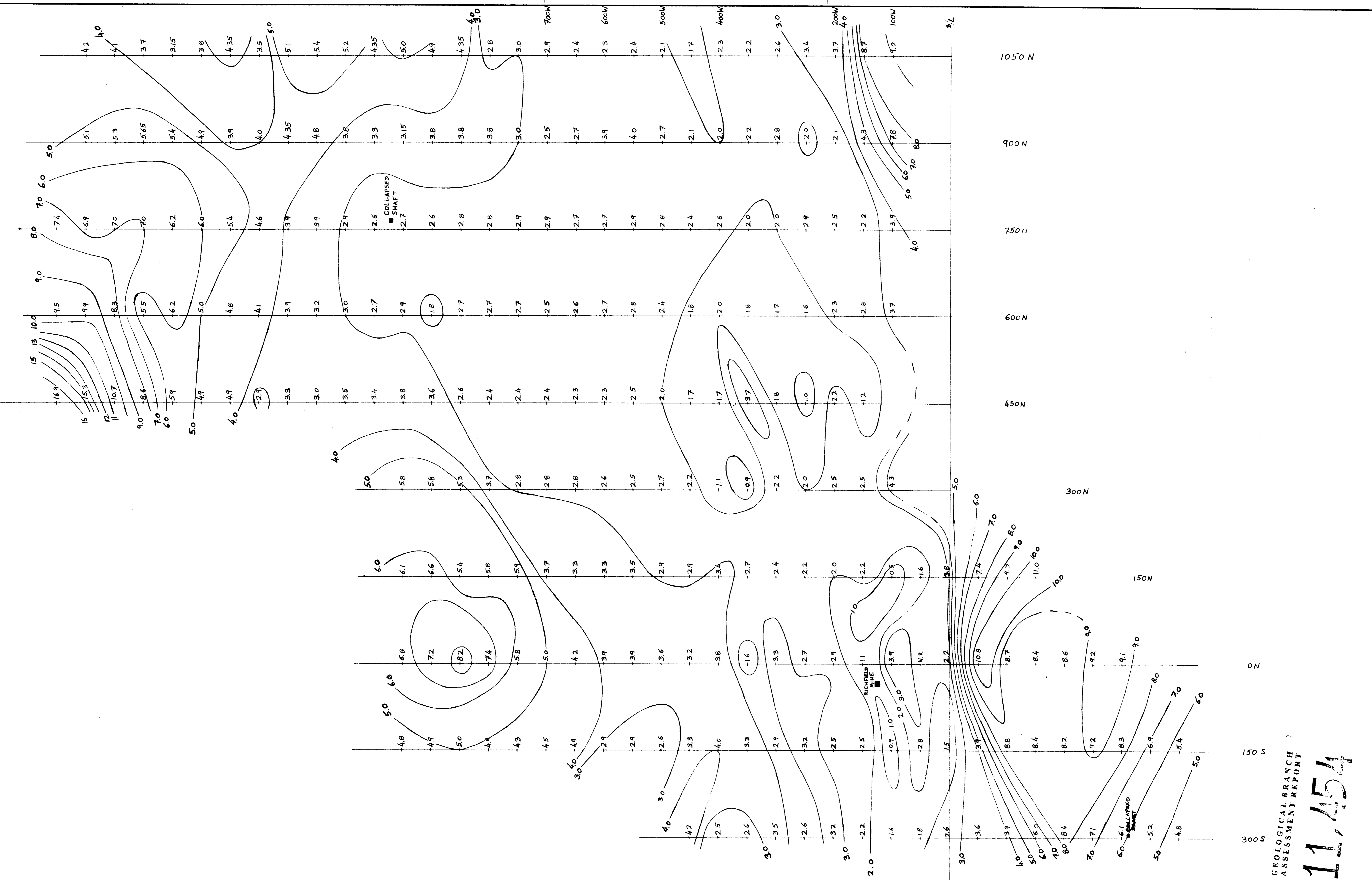
GEOLOGICAL BRANCH
ASSESSMENT REPORT

COBRE EXPLORATION CLAIMS



LEGEND

- POWER LINE
- ROAD - GRAVEL
- 4 X 4 ROAD
- TRAIL
- CREEK
- ✕ SWAMP
- CONTOUR ELEVATIONS 250'
- APPROXIMATE LOCATION OF CLAIM BOUNDARY



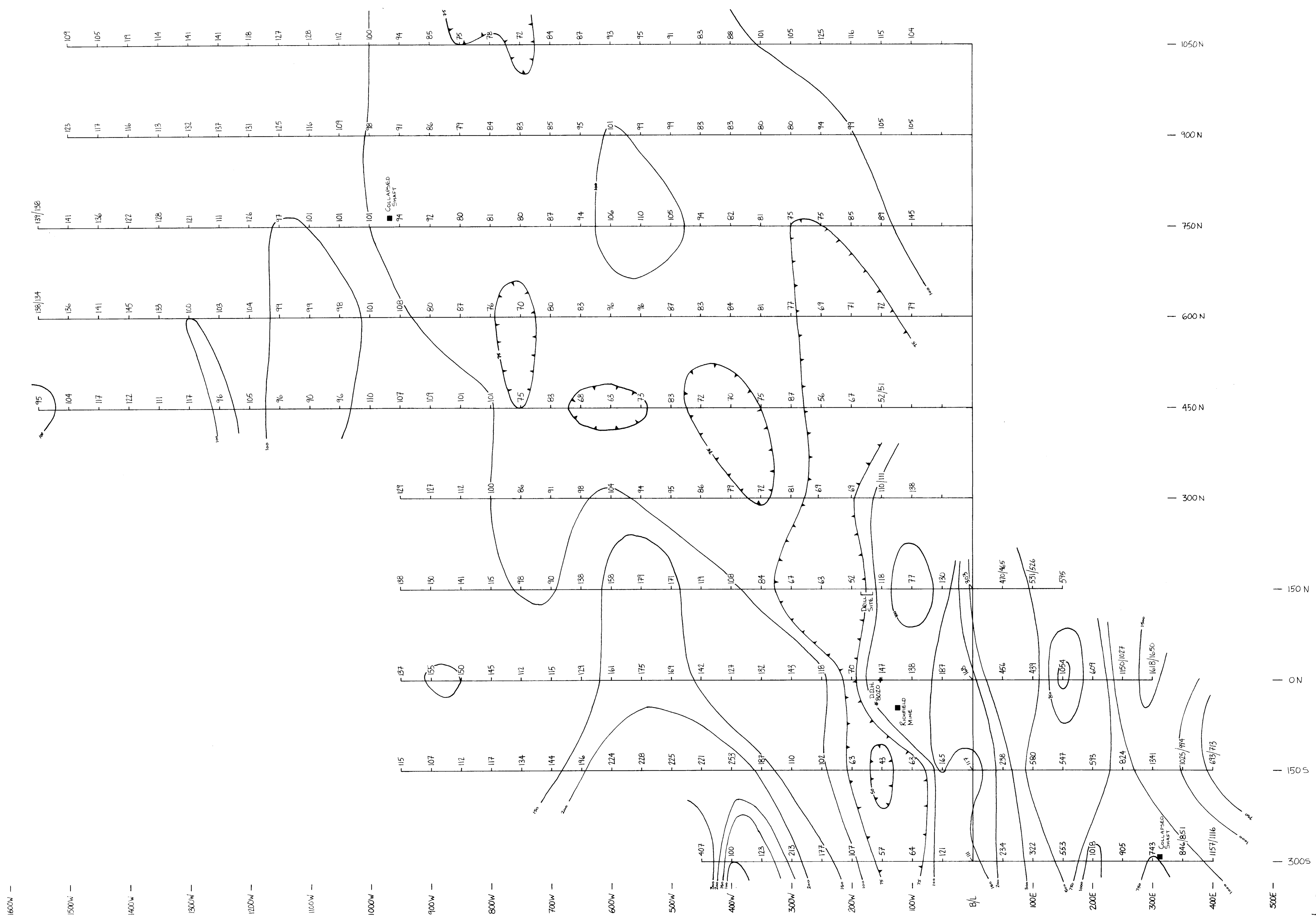
TOPLEY RICHFIELD PROPERTY

<small>Drawn by:</small>	<small>Traced by:</small>
<small>Revised by: Date</small>	<small>Revised by: Date</small>

CHARGEABILITY N = 2, a = 50m

Scale: 1:2500 Date: OCT. 1983 Plate: 251-83-3

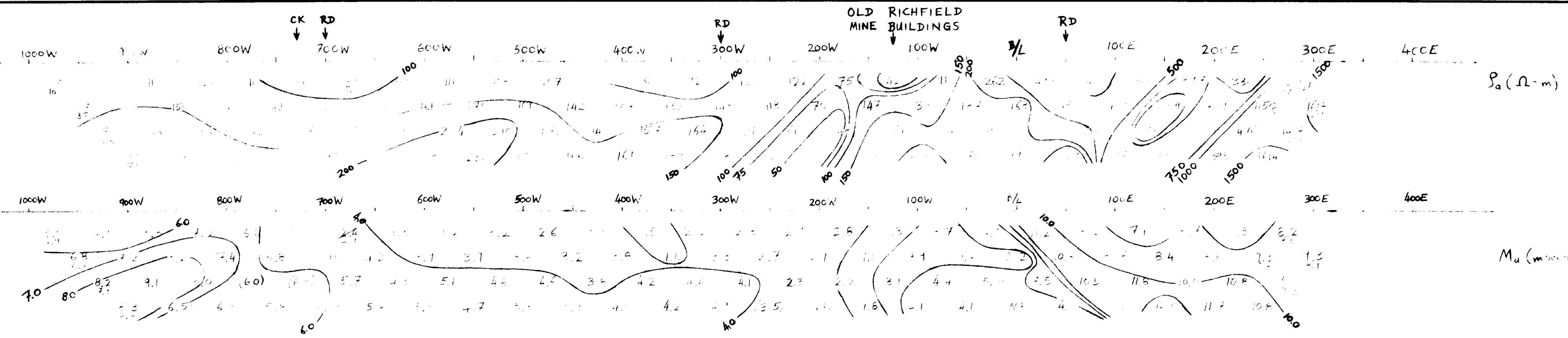
GEOLOGICAL BRANCH
 ASSESSMENT REPORT
75171



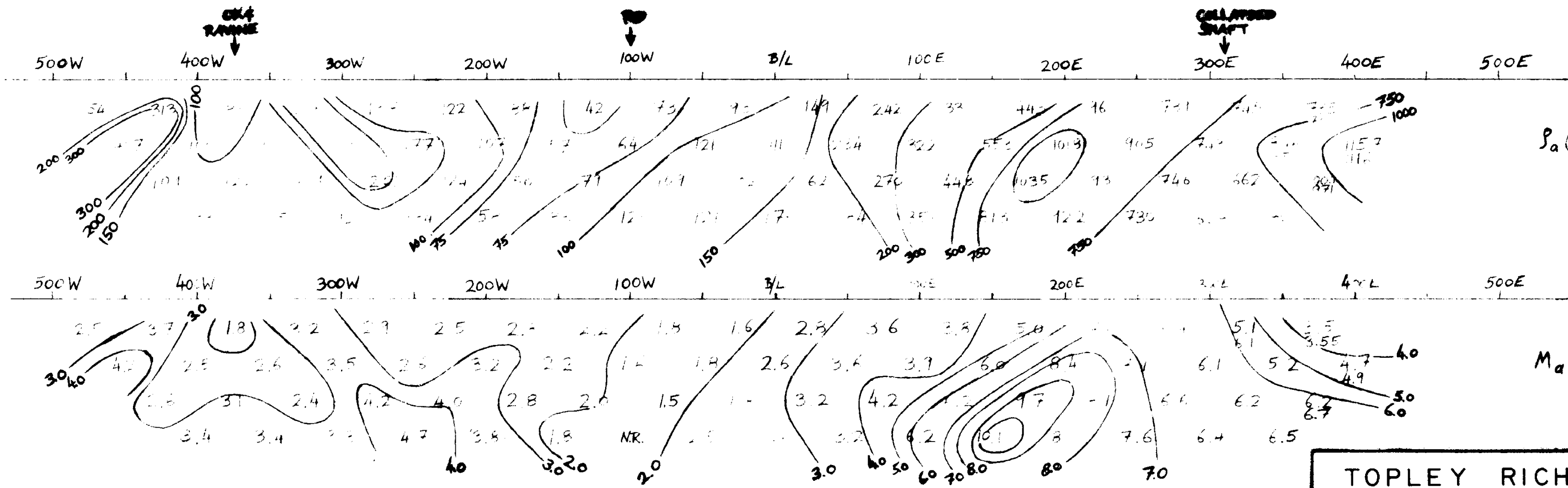
1050 N
 900 N
 750 N
 600 N
 450 N
 300 N
 150 N
 ON
 150 S
 300 S

GEOLOGICAL BRANCH
 ASSESSMENT REPORT
11,454

TOPLEY RICHFIELD PROPERTY			
Drawn by:	Traced by:		
Revised by:	Date:	Revised by:	Date:
INDUCED POLARIZATION RESISTIVITY $N=2$, $a=50$ metres			
OMINICA M.D., B.C.			
Scale: 1:2500	Date: OCTOBER 1983	Plate: 251-83-4	



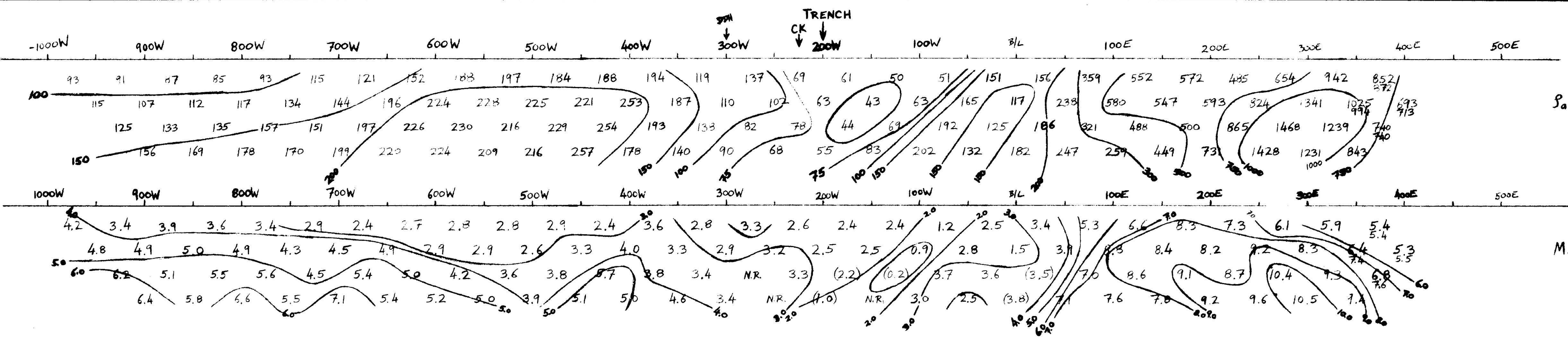
LINE ON



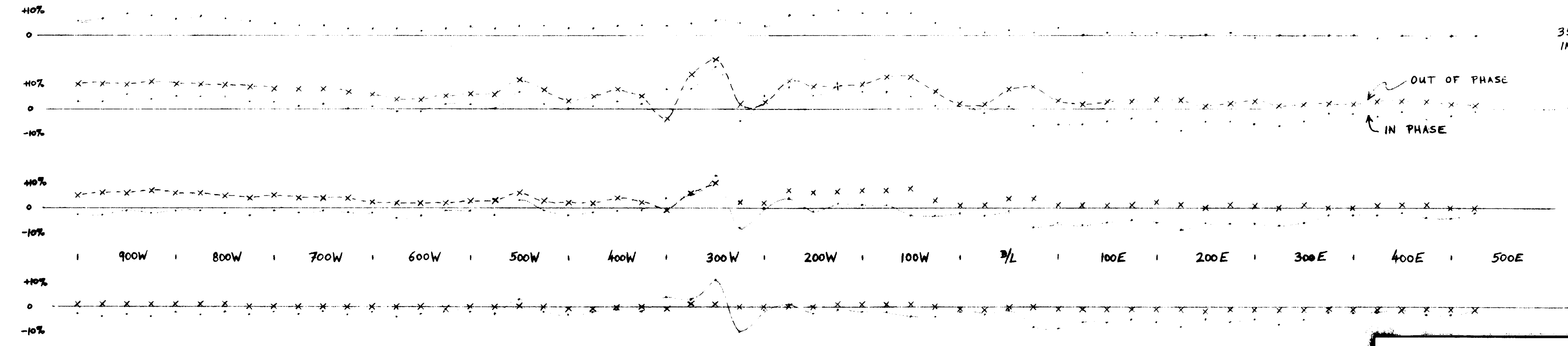
LINE 300S
GEOLOGICAL BRANCH
ASSESSMENT REPORT

11,454
Ma (m/sec)

TOPLEY RICHFIELD PROPERTY		NTS 93L9W
Drawn by	Traced by	
Revised by	Date	Revised by Date
LINE ON&300S INDUCED POLARIZATION OMINICA M.D., B.C.		
Scale	1:2500	Date OCT. 1983 Plate 251-83-5



LINE 150 S



LINE 150 S

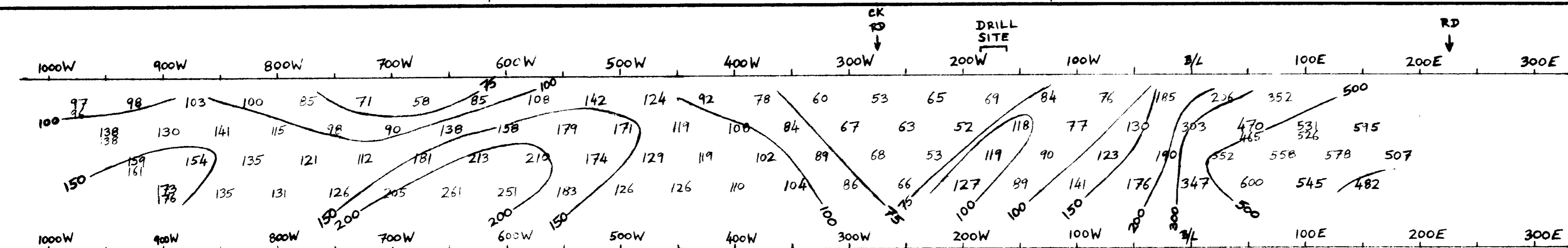
HORIZONTAL LOOP EM

50 METER COIL SEPARATION

GEOLOGICAL BRANCH
 ASSESSMENT
 1777 Hz

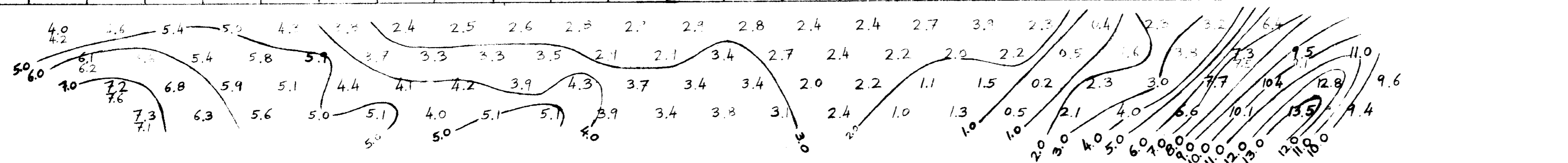
444 Hz
11,454

TOPLEY RICHFIELD PROPERTY				NTS
Drawn by:	Traced by:			93L9W
Revised by:	Date:	Revised by:	Date:	
LINE 150 S INDUCED POLARIZATION OMINICA M.D., B.C.				
Scale:	1:2500	Date:	OCT. 1983	Plate 251-83-6

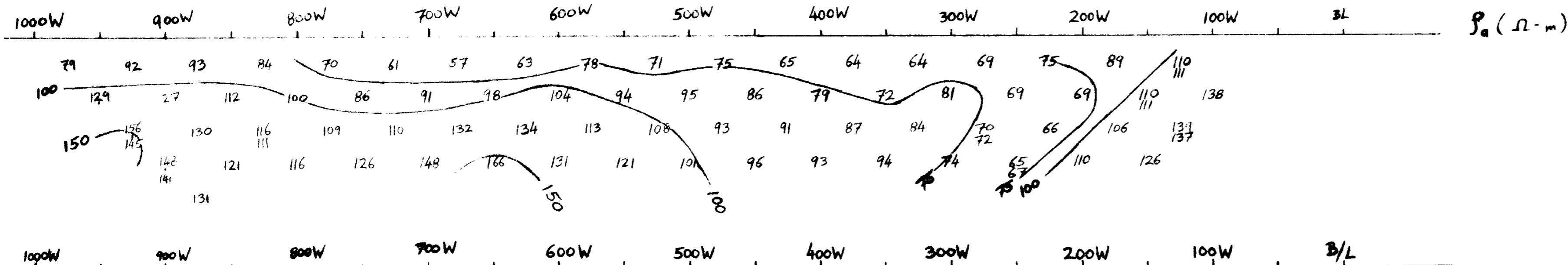


$\rho_a (\Omega\text{-m})$

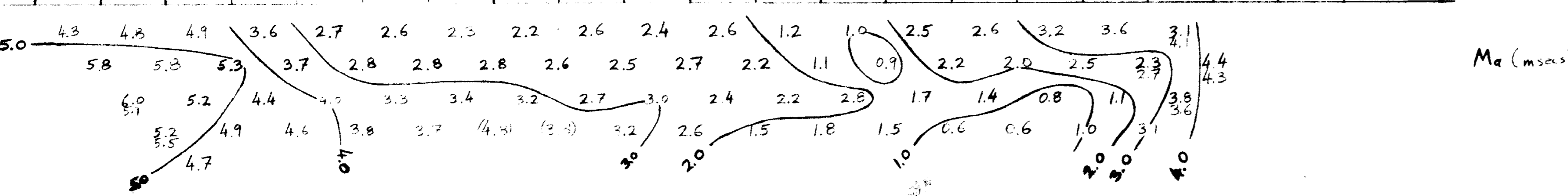
LINE 150N



$M_a (\text{msec})$



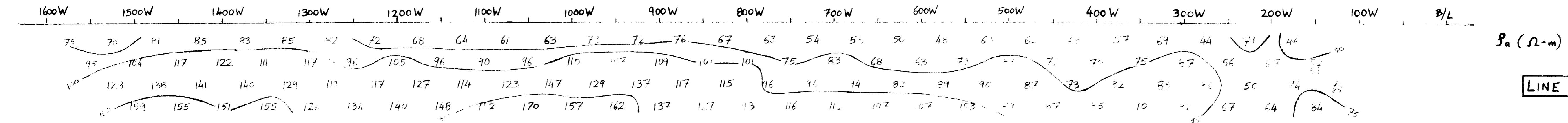
LINE 300N



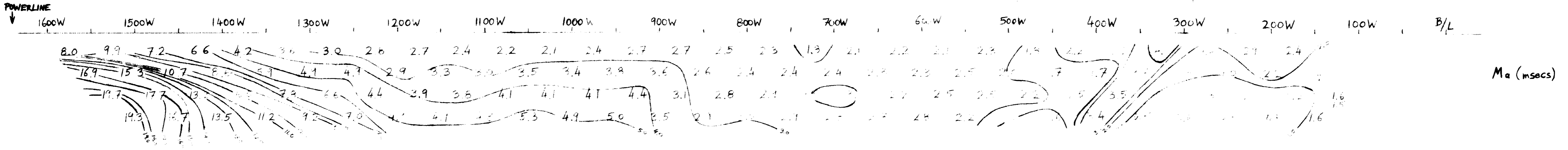
$M_a (\text{msec})$

11,454

TOPLEY RICHFIELD PROPERTY			
Drawn by:		Traced by:	
Revised by:	Date:	Revised by:	Date:
LINE 150N & 300N INDUCED POLARIZATION OMINICA M.D., B.C.			
Scale: 1:2500	Date: OCT. 1983	Plate: 251-83-7	FORM 210-000



LINE 450N



IN PHASE

OUT OF PHASE

3555 Hz

LINE 450N

HORIZONTAL LOOP E.M.

100 METER

COIL

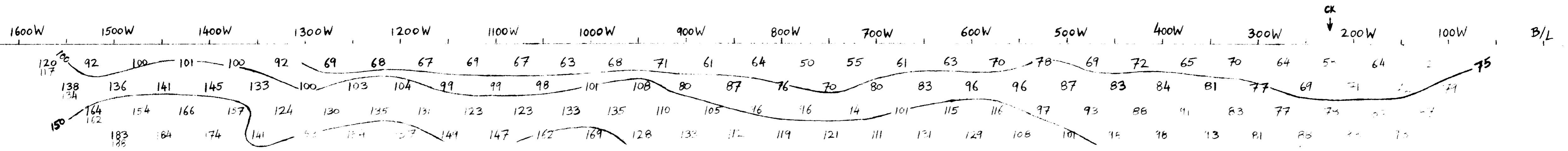
GEOLOGICAL BRANCH ASSESSMENT REPORT

1777 Hz

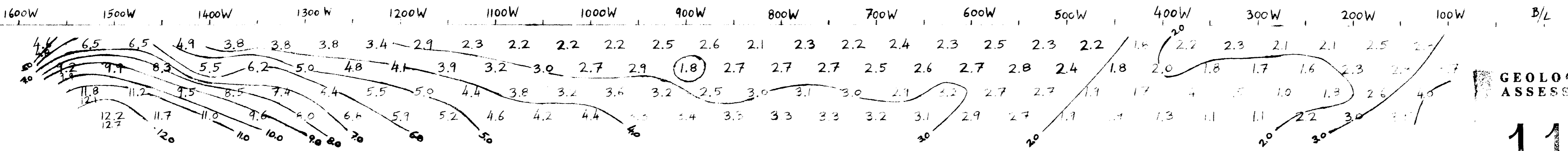
11,454
444 Hz

TOPLEY RICHFIELD PROPERTY

Drawn by	Traced by	LINE 450N INDUCED POLARIZATION OMINICA M.D., B.C.
Revised by	Revised by	
Date	Date	Scale 1:2500 Date OCT. 1983 Plate 251-83-8



LINE 600N



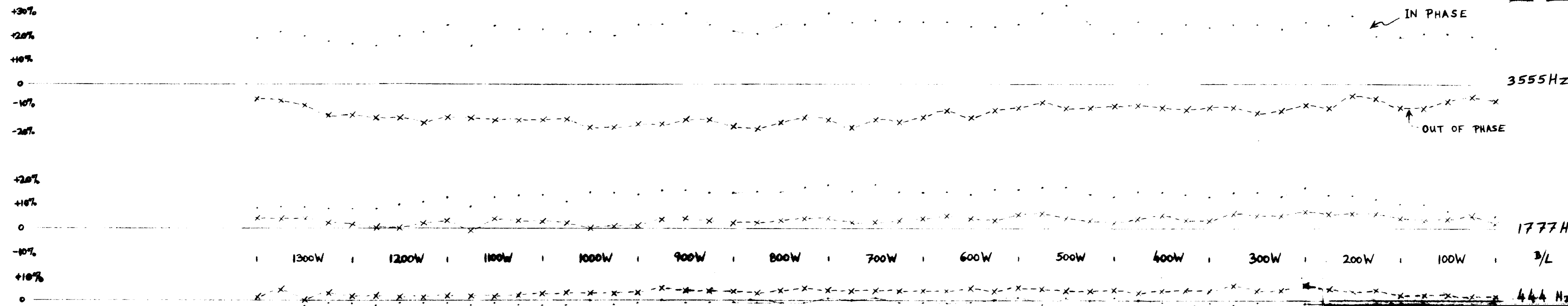
GEOLOGICAL BRANCH
ASSESSMENT


11,454

LINE 600N

HORIZONTAL
LOOP E.M.
3555HZ

100 METER
COIL SEPARATION

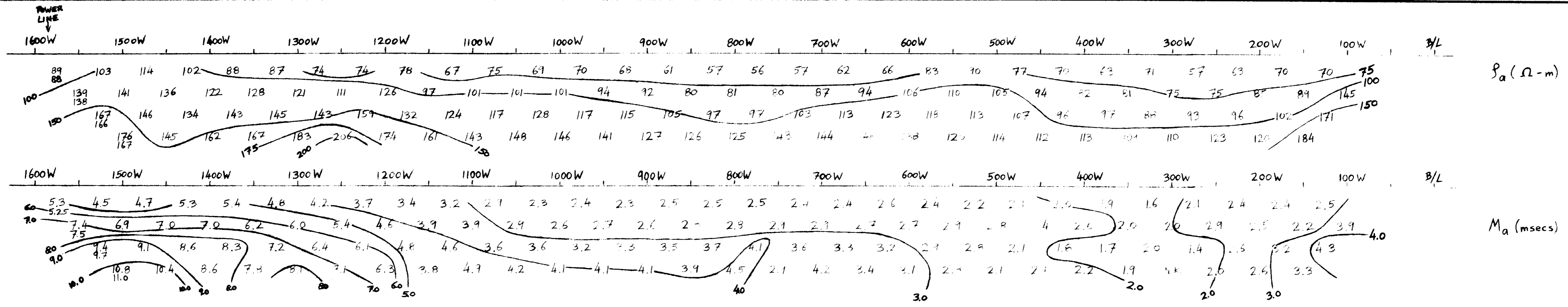


TOPLEY RICHFIELD PROPERTY 

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

LINE 600N
INDUCED POLARIZATION
OMINICA M.D., B.C.

Scale: 1:2500 Date: OCT. 1983 Plate: 251-83-9

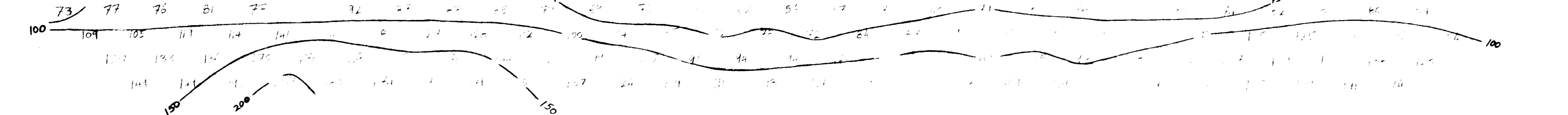


GEOLOGICAL BRANCH
ASSESSMENT REPORT

11,454

TOPLEY RICHFIELD PROPERTY				NTS 93L9W		
Drawn by:	Traced by:		LINE 750N INDUCED POLARIZATION OMINICA M.D., B.C. Scale: 1:2500 Date: OCT. 1983 Plate: 251-83-10			
Revised by:	Date:	Revised by:				Date:

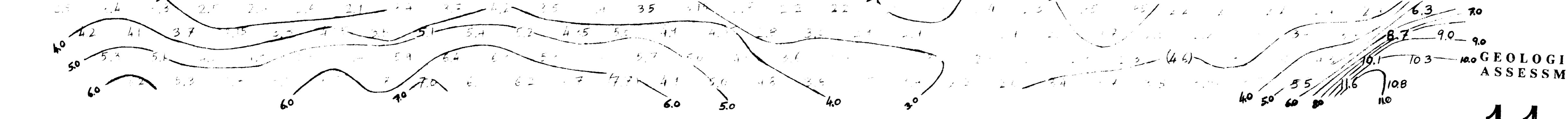
1500W 1400W 1300W 1200W 1100W 1000W 900W 800W 700W 600W 500W 400W 300W 200W 100W B/L



$P_a (\Omega - m)$

LINE 1050N

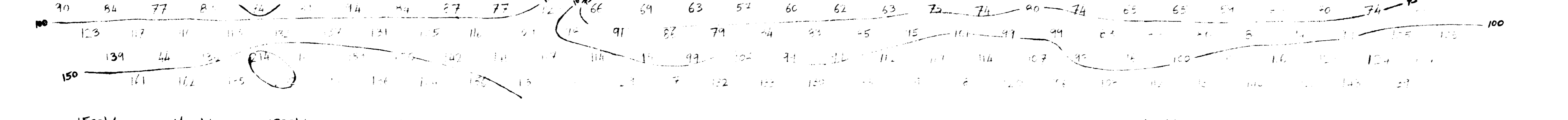
1500W 1400W 1300W 1200W 1100W 1000W 900W 800W 700W 600W 500W 400W 300W 200W 100W B/L



GEOLOGICAL ASSESSMENT

11,154

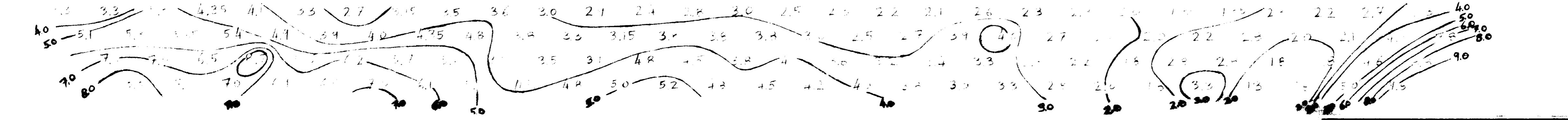
1500W 1400W 1300W 1200W 1100W 1000W 900W 800W 700W 600W 500W 400W 300W 200W 100W B/L




$P_a (\Omega - m)$

LINE 900N

1500W 1400W 1300W 1200W 1100W 1000W 900W 800W 700W 600W 500W 400W 300W 200W 100W B/L



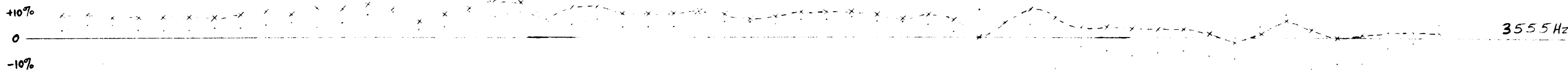
$M_a (msecs)$

TOPLEY RICHFIELD PROPERTY 

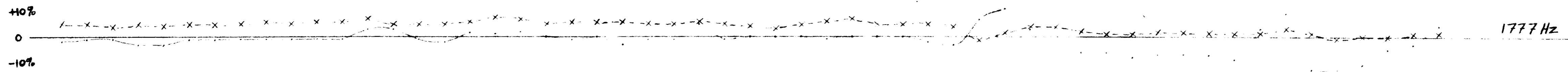
Drawn by:	Traced by:
Revised by:	Revised by:
Date:	Date:

LINE 1050N & 900N
INDUCED POLARIZATION
OMINICA M.D., B.C.

Scale: 1:2500 Date: OCT. 1983 Plate: 251-83-11

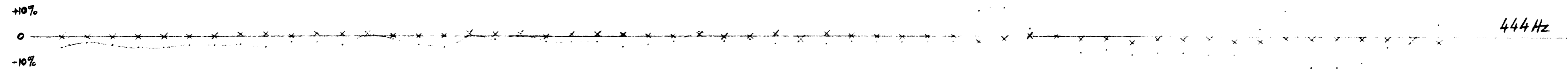


3555 Hz



1777 Hz

LINE ON
50 METER COIL

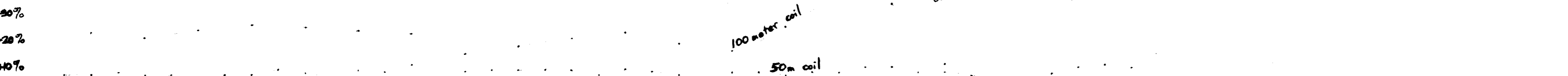


444 Hz

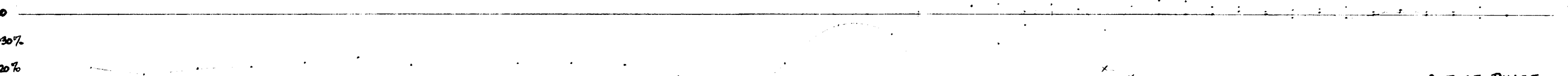
1000W | 900W | 800W | 700W | 600W | 500W | 400W | 300W | 200W | 100W | B/L | 100E | 200E | 300E | 400E

↑ RD ↑ RD ↑ DPH # 8020 ↑ RD ↑ RAVINE

100 meter coil
50m coil



3555 Hz - 444 Hz
GEOLOGICAL BRANCH
IN PHASE ASSESSMENT REPORT



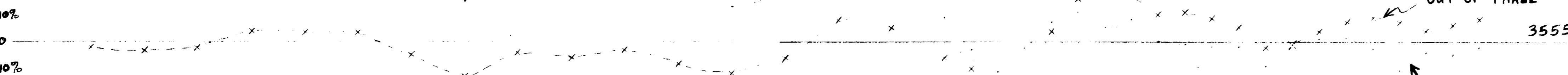
3555 Hz

OUT OF PHASE

IN PHASE

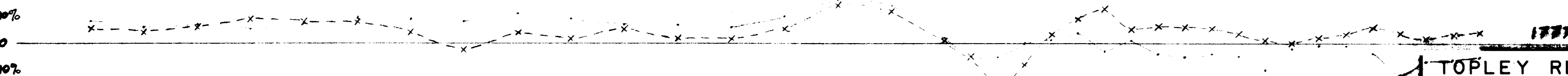
11,454
LINE ON

100 METER COIL



1777 Hz

1000W | 900W | 800W | 700W | 600W | 500W | 400W | 300W | 200W | 100W | B/L | 100E | 200E | 300E | 400E



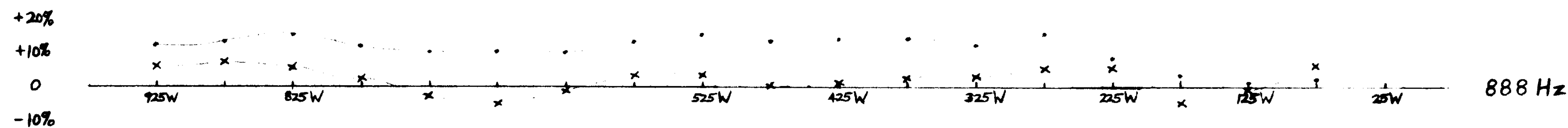
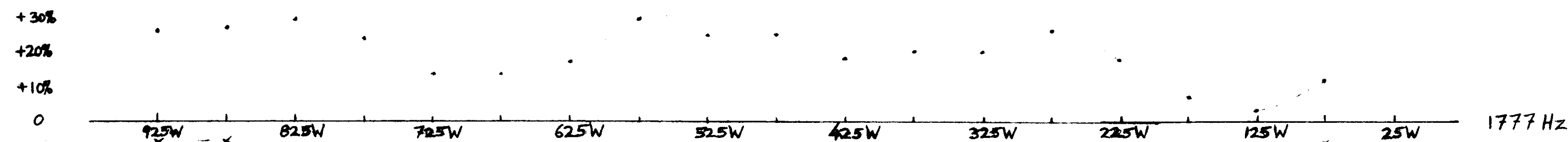
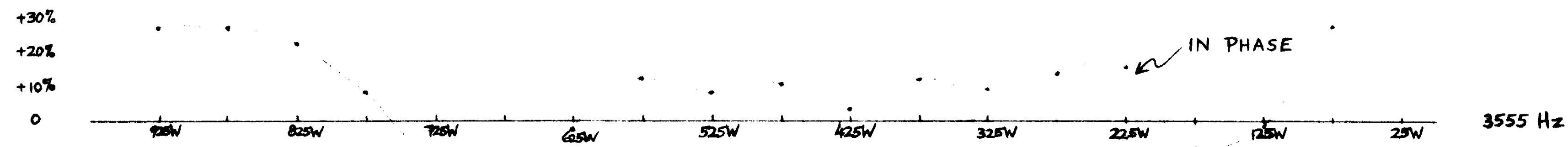
TOPLEY RICHFIELD PROPERTY

Traced by:	
Revised by:	Date:

LINE ON
HORIZONTAL LOOP E.M.
OMINICA M.D., B.C.

Scale: 1:2500 Date: OCT. 1983 Plate: 251-83-12

444 Hz

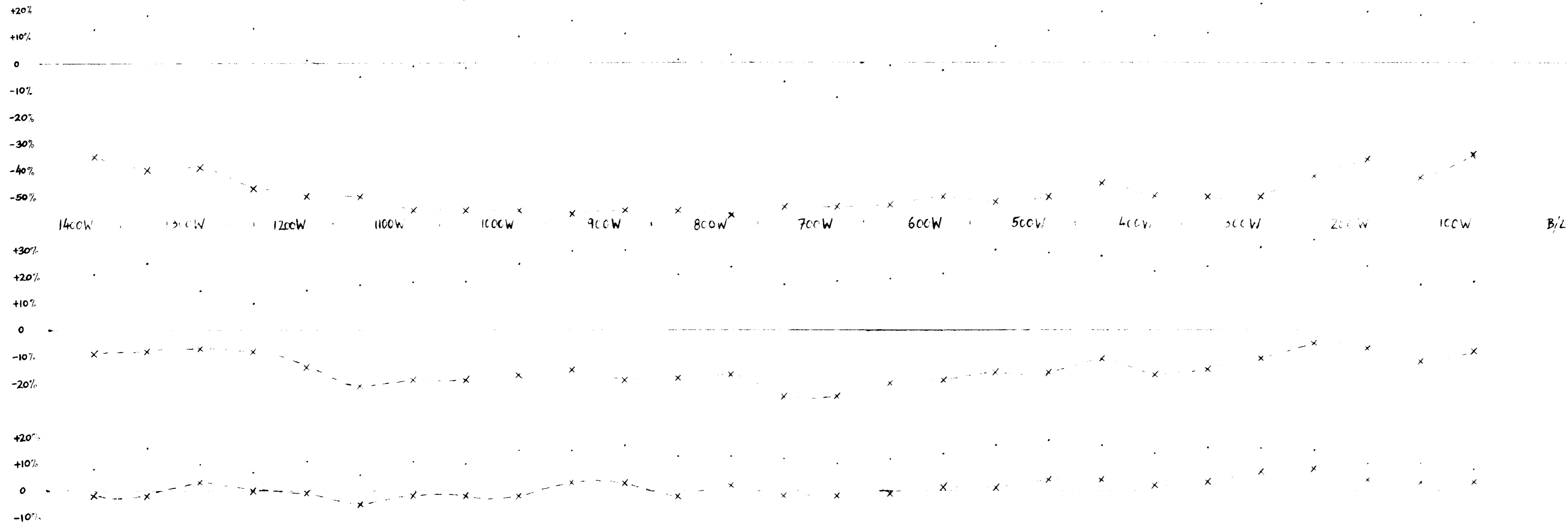


150 METER
COIL SEPARATION

GEOLOGICAL BRANCH
ASSESSMENT REPORT

11,454

TOPLEY RICHFIELD PROPERTY				NTS 93L9W	
Drawn by:	Traced by:		LINE 300N		
Revised by:	Date:	Revised by:	Date:	HORIZONTAL LOOP E.M.	
				OMINICA M.D., B.C.	
Scale: 1:2500		Date: OCT. 1983		Plate: 251-03-13	



3555 Hz

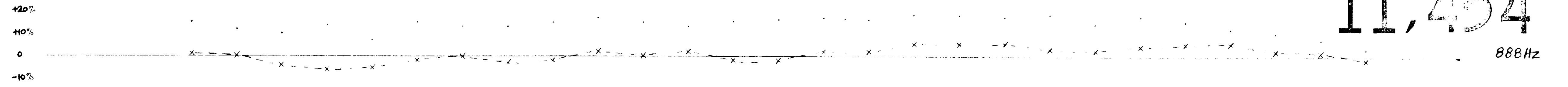
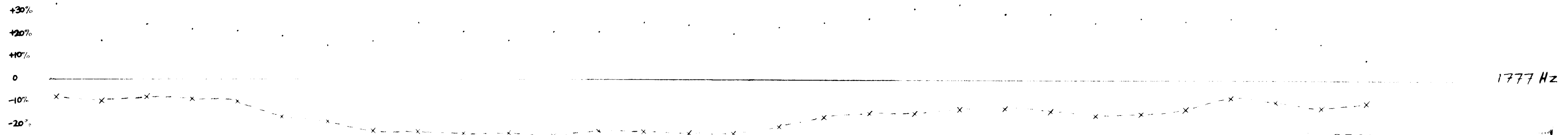
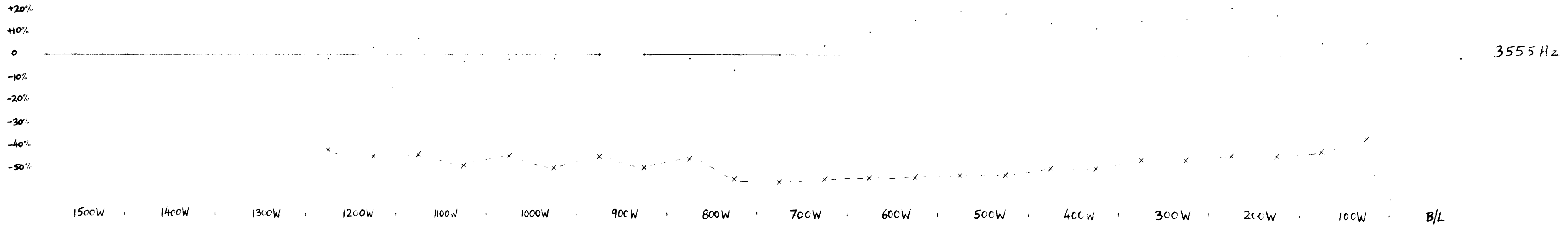
150 METER
COIL SEPARATION

1777 Hz

GEOLOGICAL BRANCH
ASSESSMENT REPORT

11,454
888 Hz

TOPLEY RICHFIELD PROPERTY				NTS 93L9W	
Drawn by:		Traced by:		LINE 450 N	
Revised by:	Date:	Revised by:	Date:	HORIZONTAL LOOP E.M.	
				O ₂ 25M OMINICA M.D., B.C.	
Scale 1:2500		Date OCT. 1983		Plate 251-83-14	

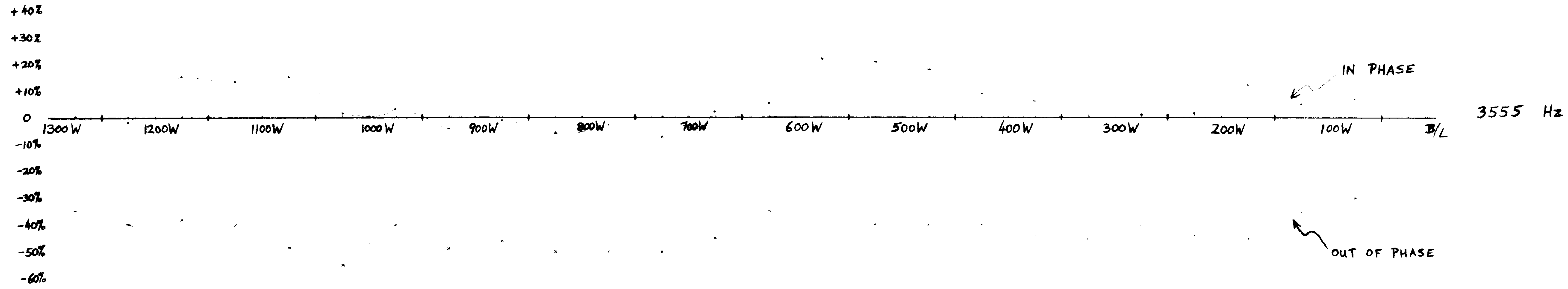


GEOLOGICAL BRANCH
ASSESSMENT REPORT

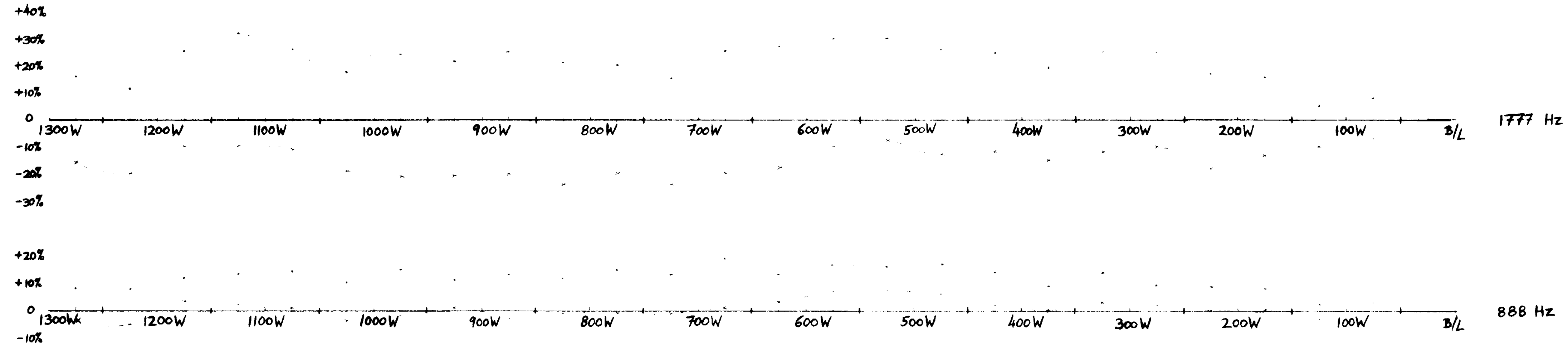
11,454

150 METER COIL SEPARATION

TOPLEY RICHFIELD PROPERTY				NTS 93L9W	
Drawn by:	Traced by:		LINE 600N		
Revised by:	Date:	Revised by:	Date:	HORIZONTAL LOOP E.M.	
				OMINICA M.D., B.C.	
Scale: 1:2500			Date: OCT. 1983		Plate: 251-83-15



150 METER
COIL SEPARATION

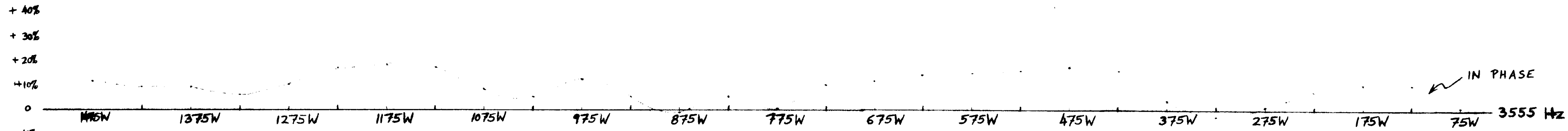


GEOLOGICAL BRANCH
ASSESSMENT REPORT

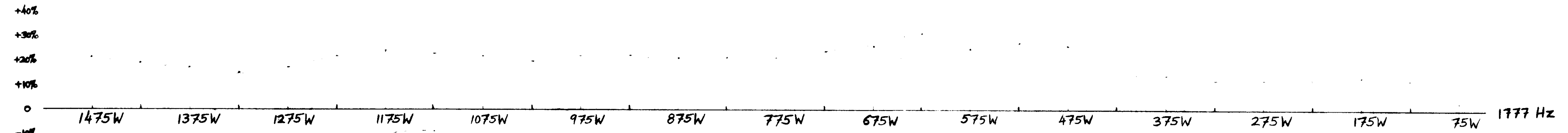
11,454

888 Hz

TOPLEY RICHFIELD PROPERTY				NTS 93L9W	
Drawn by:	Traced by:		LINE 750 N HORIZONTAL LOOP E.M. OMINICA M.D., B.C.		
Revised by: Date	Revised by:	Date			
			Scale: 1:2500	Date: OCT. 1983	Plate: 251-83-16

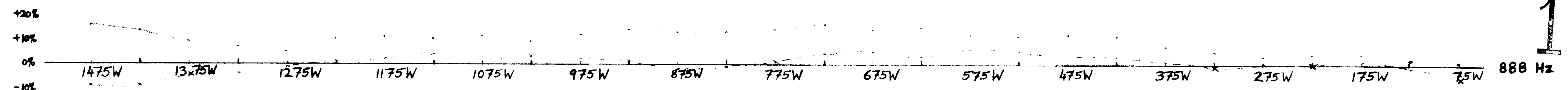


150 METER
COIL SEPARATION

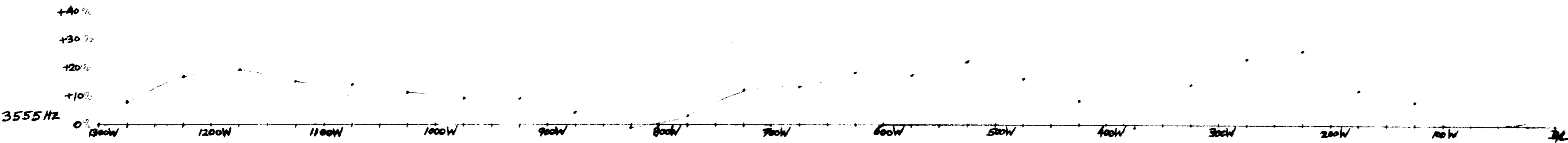


GEOLOGICAL BRANCH
ASSESSMENT REPORT

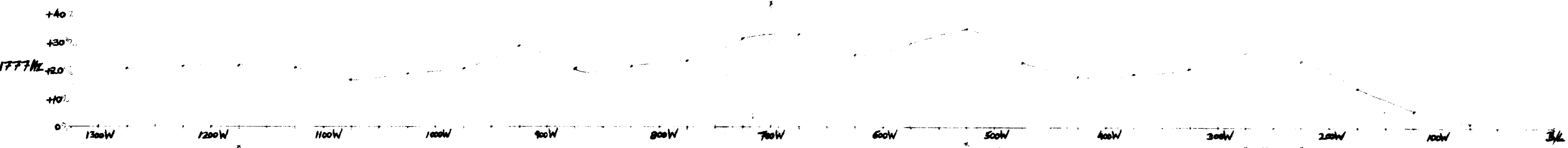
11,454



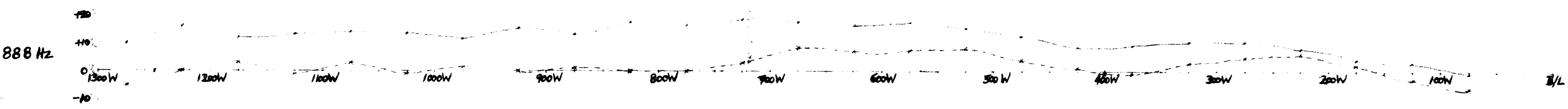
TOPLEY RICHFIELD PROPERTY				NTS 93L9W	
Drawn by:	Traced by:		LINE 900 N HORIZONTAL LOOP E.M. OMINICA M.D., B.C.		
Revised by: Date:	Revised by: Date:	Revised by: Date:			
			Scale: 1:2500	Date: OCT. 1983	Plate: 251-83-17



3555 Hz



1777 Hz



888 Hz

150M COIL SEPARATION

IN PHASE

OUT OF PHASE

GEOLOGICAL BRANCH
ASSESSMENT REPORT

11,454

TOPYLEY RICHFIELD PROPERTY		NTS 93LOW
Drawn by:	Traced by:	
Revised by:	Date:	LINE 1050 N HORIZONTAL LOOP E.M. 25M OMINICA M.D., B.C. Scale: 1:2500 Date: OCT. 1983 Plate 281-83-10