ARIS SUMMARY SHEET

District Geologist, Nelson Off Confidential: 89.11.09

ASSESSMENT REPORT 18169 MINING DIVISION: Golden

PROPERTY: Echo
LOCATION: LAT 50 01 00 LONG 116 15 25
UTM 11 5540529 553235
NTS 082K01W
CLAIM(S): Echo 1-4,Echo 7-8,Echo 11
OPERATOR(S): Cominco
AUTHOR(S): Price, M.A.
REPORT YEAR: 1988, 31 Pages
COMMODITIES
SEARCHED FOR: Lead,Zinc
GEOLOGICAL
SUMMARY: The claims are underlain by Helikian Middle Aldridge sediments. The sediments are predominantly quartzitic wacke turbidites with lesser interturbidite argillaceous material. Moyie gabbro sills and dykes intrude this package. Several sets of narrow quartz veins contain weak pyrite, pyrrhotite and arsenopyrite with minor galena and sphalerite.
WORK
DONE: Geophysical
EMGR 27.0 km;UTEM
Map(s) - 1; Scale(s) - 1:20 000

LOG NO: 1222 RD.

ACTION:

~~WESTERN CANADA~~

FILE NO:

COMINCO LTD.

EXPLORATION

NTS: 82K/1

GEOLOGICAL BRANCH
ASSESSMENT REPORT

18,169

ECHO 1988 RECONNAISSANCE

UTEM SURVEY

GOLDEN M.D., B.C.

- ASSESSMENT REPORT -

Latitude : 50°28'N

Longitude : 116°14'W

Work Performed by : J.J. Lajoie, I. Jackisch & M.A. Price
between August 6 and 17, 1988

FILMED

Claim Owner and Operator : COMINCO LTD.

Claims : ECHO 1 to 11

SUB-RECORDER
RECEIVED
DEC 13 1988
M.R. # .... $ ....
VANCOUVER, B.C.

NOVEMBER 1988

Michael A. Price

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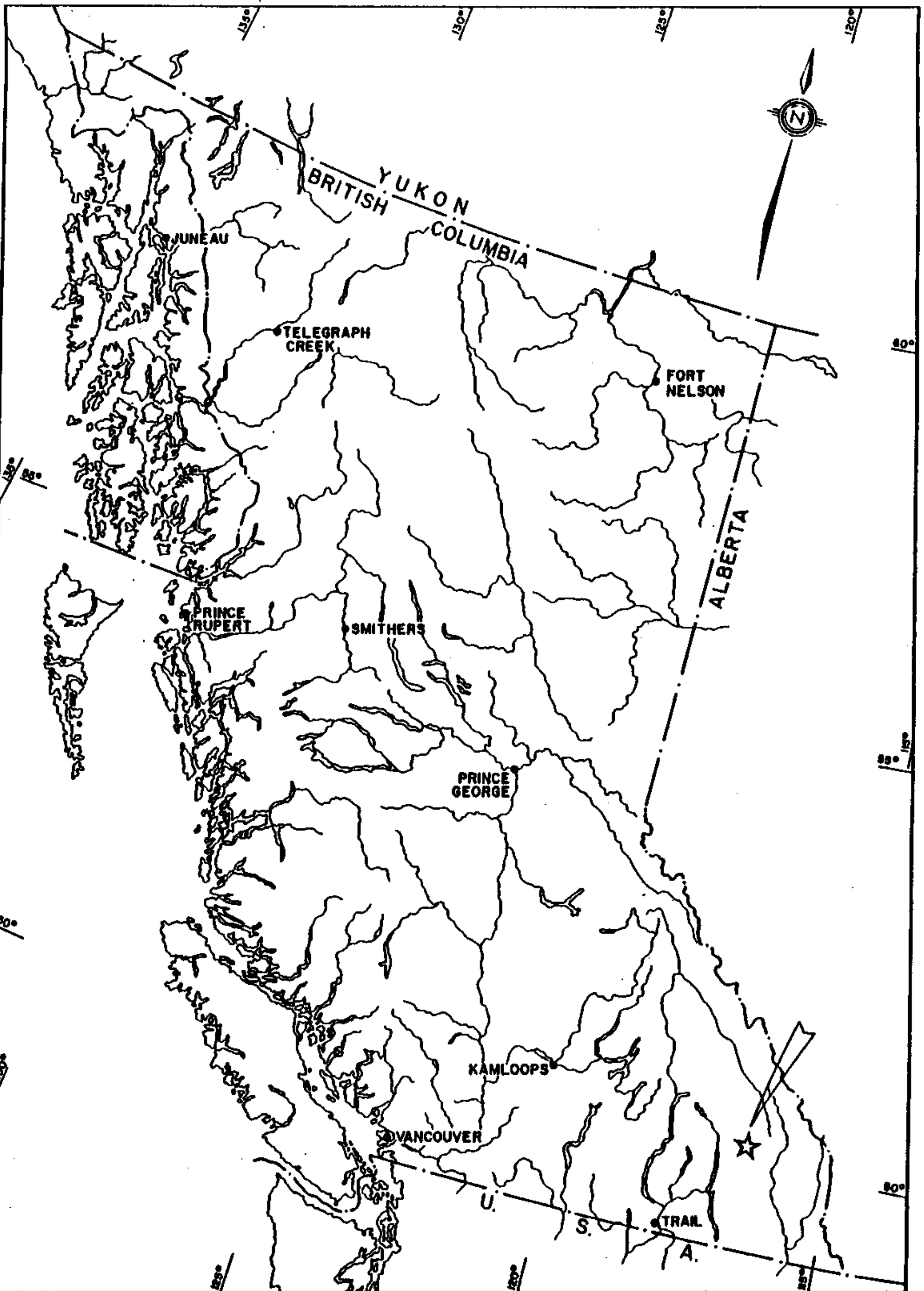


NTS 82·K/1

ECHO RECONNAISSANCE -1988-

0 100 200 300 400 500 Km.

Drawn by:		Traced by: c.m.b.	
Revised by	Date	Revised by	Date

Property Location Map

Scale: 1 : 6,370,000 Date: DECEMBER 1988 Plate: 344-88-1

NCI-112A-CL 210-0610

COMINCO LTD.

EXPLORATION | WESTERN DISTRICT

NTS: 82K/1

ECHO 1988 RECONNAISSANCE
UTEM SURVEY
GOLDEN M.D., B.C.

- ASSESSMENT REPORT -

INTRODUCTION

During the period of June 2 to August 17, 1988, a 27 km UTEM survey was conducted on the ECHO property. This property consists of the claims ECHO 1 to ECHO 11.

This region has a favourable geological environment for Pb-Zn sulphides. This region is underlain by rocks of the Aldridge Formation. In particular, there is an interest in the Pb-Zn potential associated with the Lower/Middle Aldridge contact.

LOCATION AND ACCESS

The ECHO property is approximately 20 km west of Canal Flats, B.C. There is no direct access to the property. The closest access by road is via the Doctor/Findlay road off of Highway 95. The Doctor Creek road will take one to the closest point nearest to the property. The remaining distance can be walked in about two to three hours.

GEOPHYSICAL SURVEY

The field work preparation started on June 2nd, and the survey was from August 6th to August 17th, 1988. Two loops were used to survey a total of 27 km of UTEM data.

The function of the UTEM survey in this regional assessment was to locate conductive features; the purpose being to isolate areas of interest for possible detailed studies.

DESCRIPTION OF UTEM SYSTEM

UTEM is an acronym for "University of Toronto ElectroMagnetometer". The system was developed by Dr. Y. Lamontagne (1975) while he was a graduate student of that University.

The field procedure consists of first laying out a large loop of single strand insulated wire and energizing it with current from a transmitter which is powered by a 1.7 kW motor generator. The loop is generally square shaped, wherever possible, with sides between 500 metres and 1,500 metres long. In this survey, a reconnaissance technique was used. The loops were approximately 2 km by 2 km in area. Lines were paced and compassed radially out from the loop, and stations were at approximately 100 metre intervals. The purpose of this kind of survey is to acquire maximum UTEM coverage of an area to help in the regional assessment of the property.

The transmitter loop is energized with a triangular current waveform at a carefully controlled frequency (30.9 Hz for this survey). The receiver system includes a sensor coil and backpack portable receiver module which has a digital recording facility on cassette magnetic tape. The time synchronization between transmitter and receiver is achieved through quartz crystal clocks in both units which must be accurate to about one second in 50 years.

The receiver sensor coil measures the vertical magnetic component of the electromagnetic field and responds to its time derivative. Since the transmitter current waveform is triangular, the receiver coil will sense a square wave in the absence of geologic conductors. Deviations from a square wave are caused by electrical conductors which may be geologic or cultural in origin. The receiver stacks any pre-set number of cycles in order to increase the signal to noise ratio.

The UTEM receiver gathers and records 9 channels of data at each station. The higher number channels (7-8-9) correspond to short time or high frequency while the lower number channels (1-2-3) correspond to long time or low frequency. Therefore, poor or weak conductors will respond on channels 9, 8, 7 and 6. Progressively better conductors will give responses on progressively lower number channels as well. For example, massive, highly conducting sulphides or graphite will produce a response on all nine channels.

The UTEM receiver records data digitally on a cassette. This tape is played back into a computer at the base camp. The mini computer processes the data and controls the plotting on a small (11" x 15") graphics plotter. Data are portrayed as profiles of each of the nine channels, shown for each survey line of each transmitter loop. These profiles and an interpretive plan are appended to this report.

The magnetic field amplitudes from both the transmitter loop (primary field) and from the electric currents induced in the ground (secondary field), vary considerably from the beginning of a line near the transmitter loop, to the end of the survey line far away from the transmitter loop. In order to present such data, a normalizing scheme must be used. In this survey, the primary field from the loop is used for normalizing and presenting the data as continuously normalized plots.

Continuously normalized plots.

This is the standard normalization scheme.

a) For Channel 1:

$$\% \text{ Ch.1 anomaly} = \frac{\text{Ch.1} - P}{P} \times 100$$

where P is the primary field from the loop at the station and Ch.1 is the observed amplitude for Channel 1.

b) For the remaining channels (n=2 to 9)

$$\% \text{ Ch.n anomaly} = \frac{\text{Ch.n} - \text{Ch.1}}{\text{Ch.1}} \times 100$$

where Ch.n is the observed amplitude of Channel n (2 to 9).

INTERPRETATION

Both crossover and contact responses were observed in the UTEM data. Plate 344-88-2 is a compilation of the UTEM anomalies depicted on the Data Sections (D.S. 1 to D.S. 16).

Loop 1

The line labels used for Loop 1 were 4, 5, and 9 to 14. The UTEM survey for Loop 1 detected several contact responses. They all indicate small variations (Ch.6 to Ch.4 responses) in the resistivity. None warrant further investigation.

Loop 2

Line labels for Loop 2 were 10, 15, 20, 25, 50, 55, 60 and 65. There are several contact responses depicted on these lines. Two are of geophysical interest. On both Lines 20 and 25 there are contact responses on the late time Channel 3. In addition, there are two other features on these two lines, First, there are unusally high values for all of the late time channels (most notably on Line 25) on the loop side of the contact response, indicating a more conductive feature nearby.

Second, there is a Channel 4 crossover associated with the contact response on Line 25. The combination of all three of these factors together indicate conductor and/or a conductive region that warrants a further detailed study.

CONCLUSIONS

From the 27 km UTEM reconnaissance survey, one area was found to be of interest for further surveying. It is the region around the southeast portion of the 1988 survey. Specifically, it is the area surrounding the southern section of Lines 25, 20 and to the south of these two lines.

Report by: Mike Price
M. A. Price, B.Sc.
Geophysicist, Cominco Ltd.

Endorsed for Release: John Hamilton
J. M. Hamilton, P.Eng.
Manager, Exploration
Western Canada
Cominco Ltd.

Distribution:

Mining Recorder	(2)
Western Canada Expl.	(1)
Kootenay Expl.	(1)
Administration	(1)
Geophysics File	(1)

APPENDIX I

IN THE MATTER OF THE B.C. MINERAL ACT

AMD THE MATTER OF A GEOPHYSICAL PROGRAMME

CARRIED OUT ON THE ECHO 1 TO 11 CLAIMS

LOCATED APPROX. 20 KM WEST OF CANAL FLATS, B.C.

IN THE GOLDEN MINING DIVISION OF THE

PROVINCE OF BRITISH COLUMBIA,

MORE PARTICULARLY

N.T.S. 82K/1

STATEMENT

I, Michael A. Price, of the City of North York, in the Province of Ontario, 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 "Exhibits A & B" to this statement are true copies of expenditures incurred on a geophysical survey on the ECHO 1 to 6 and ECHO 7 to 11 claims respectively;

3. THAT the said expenditures were incurred between June 2nd and August 17th, 1988 for the purpose of mineral exploration on the above-noted claims.

Mike Price

Michael A. Price, B.Sc.
Geophysicist, Cominco Ltd.

Dated this 21 day of November, 1988
at Vancouver, B.C.

A P P E N D I X II

E X H I B I T "A"

STATEMENT OF GEOPHYSICAL EXPENDITURES (1988)

ECHO RECONNAISSANCE PROPERTY

ECHO 1 to 6 Mineral Claims

June 2 to August 11, 1988

1. STAFF COSTS

a)	D. Anderson, supervision 3 days @ $275/day	825.00	
b)	J.J. Lajoie, geophysicist 12 days @ $375/day	4,500.00	
c)	I. Jackisch, geophysicist 9.5 days @ $300/day	2,850.00	
d)	M.A. Price, geophysicist 4 days @ $275/day	1,100.00	
e)	S. Kemp, assistant 15 days @ $125/day	1,875.00	
f)	N. Murphy, assistant 9.5 days @ $100/day	950.00	
g)	P. Muir, assistant 9 days @ $100/day	900.00	13,000.00

2. OPERATING DAY CHARGES
Note: This charge is applied for those day on which useful data are acquired, to cover the cost of data compilation, drafting, interpretation and report.

3.5 days @ $350/day	1,225.00

3. EQUIPMENT RENTAL

UTEM System

Travel & Standby (1 receiver) 2 days @ $ 75/day	150.00	
Operating Days (1 receiver) 1/2 day @ $150/day	75.00	
Operating Days (2 receivers) 2 days @ $225/day	450.00	675.00
Carried Forward		14,900.00

	Carried Forward		$ 14,900.00

4. EXPENSE ACCOUNTS

J.J. Lajoie	1,397.52	
I. Jackisch	349.10	
M.A. Price	521.66	
S. Kemp	201.25	
N. Murphy	105.00	
P. Muir	99.23	2,673.76

5. MISCELLANEOUS

Freight Charges - Vancouver to Cranbrook	362.88	
Freight Charges - Cranbrook to Vancouver	192.00	
Freight Charges - UTEM Equipment	503.10	
Wire Winder Replaced	600.00	
Use of Radio	50.00	
Transportation:		
Okanagan Helicopters	2,388.41	
One 4x4 Truck - 11.5 days @ $40/day	460.00	4,556.39
T O T A L		$ 22,130.15

I certify this to be a true Statement of Expenditures for the geophysical program on the ECHO 1 to 6 claims in 1988.

Michael A. Price, B.Sc.
Geophysicist, Cominco Ltd.

APPENDIX II

EXHIBIT "B"

STATEMENT OF GEOPHYSICAL EXPENDITURES (1988)

ECHO RECONNAISSANCE PROPERTY

ECHO 7 to 11 Mineral Claims

August 12 to August 17, 1988

1. STAFF COSTS

a)	D. Anderson, supervision 1 day @ $275/day	275.00	
b)	J.J. Lajoie, geophysicist 5 days @ $375/day	1,875.00	
c)	I. Jackisch, geophysicist 4.5 days @ $300/day	1,350.00	
d)	M.A. Price, geophysicist 5.5 days @ $275/day	1,512.50	
e)	S. Kemp, assistant 4.5 days @ $125/day	562.50	
f)	N. Murphy, assistant 4.5 days @ $100/day	450.00	
g)	P. Muir, assistant 4.5 days @ $100/day	450.00	6,475.00

2. OPERATING DAY CHARGES
Note: This charge is applied for those day on which useful data are acquired, to cover the cost of data compilation, drafting, interpretation and report.

2 days @ $350/day		700.00

3. EQUIPMENT RENTAL

UTEM System		
Travel & Standby (2 receivers) 4.5 days @ $112.50	506.25	
Operating Days (2 receivers) 1 day @ $225/day	225.00	731.25
Carried Forward		$ 7,906.25

		Carried Forward	$ 7,906.25
4.	EXPENSE ACCOUNTS		
	J.J. Lajoie	236.81	
	I. Jackisch	76.74	
	M.A. Price	59.48	
	S. Kemp	86.25	
	N. Murphy	45.00	
	P. Muir	42.52	546.80
5.	TRANSPORTATION		
	Okanagan Helicopter	2,321.31	
	Bighorn Helicopter	760.50	3,081.81
		T O T A L	$ 11,534.86

I certify this to be a true Statement of Expenditures for the geophysical program on the ECHO 7 to 11 claims in 1988.

Mike Price

Michael A. Price, B.Sc.
Geophysicist, Cominco Ltd.

APPENDIX III

CERTIFICATE OF QUALIFICATIONS

I, MICHAEL A. PRICE, of 35 Fourwinds Drive, in the City of North York, in the Province of Ontario, do hereby certify:

1. THAT I graduated from the University of Toronto in 1985 with a B.Sc. in Geophysics/Physics.

2. THAT I have been practising my profession for the past three years, and that I have been working with the UTEM system for these three years.

3. THAT I have been employed by Cominco Ltd. for the past four months.

Michael A. Price, B.Sc.
Geophysicist, Cominco Ltd.

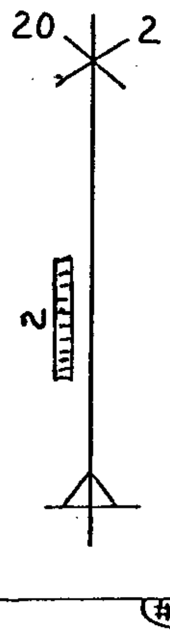
NOVEMBER 1988

LEGEND

UTEM COMPILATION MAP AND DATA SECTIONS

SYMBOL	CHANNEL	MEAN DELAY TIME
		30 Hz
	1	12.8 ms
	2	6.4
	3	3.2
	4	1.6
	5	0.8
	6	0.4
	7	0.2
	8	0.1
	9	0.05
	10	0.025

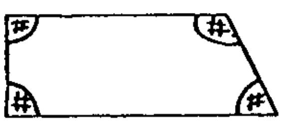
In the data sections, the upper graph contains Channels 9 to 5, the centre graph contains Channels 5 to 2, and the lower graph contains Channel 1. Station numbers are indicated along the abscissa. Elevations along the survey line are shown by the solid profile in the lower graph, the scale for which is the ordinate on the right hand side of the graph.



Axis of a crossover anomaly. The right superscript indicates the latest anomalous channel. The left superscript indicates depth to current axis in metres, or S = shallow depth, M = moderate depth and D = deep.

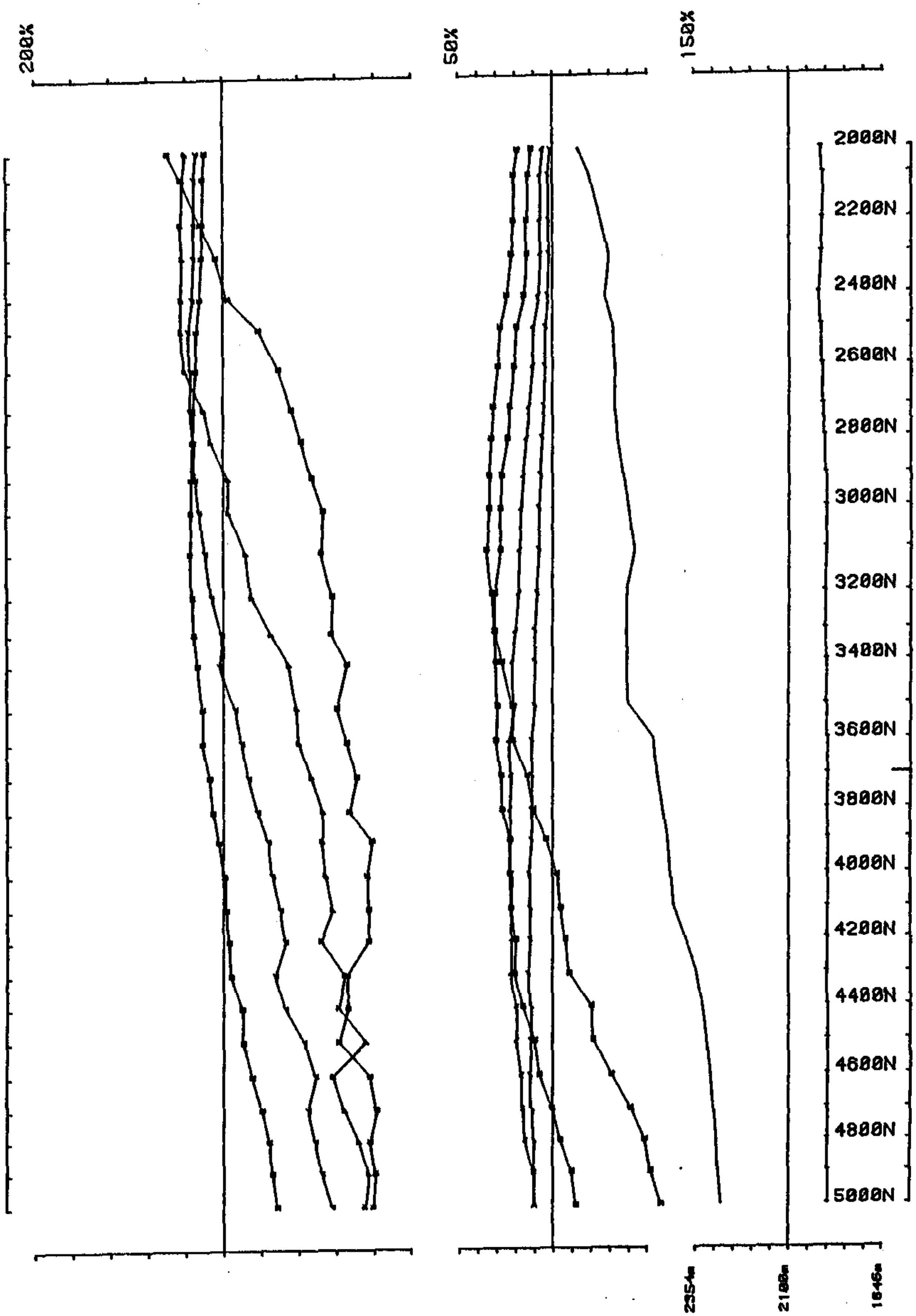
Indicates a negative anomaly of width shown by the dash. The latest anomalous channel is shown. Can sometimes be confused with the negative part of a crossover anomaly.

Indicates contact between two regions of differing resistivity. Arrow points to low resistivity zone.



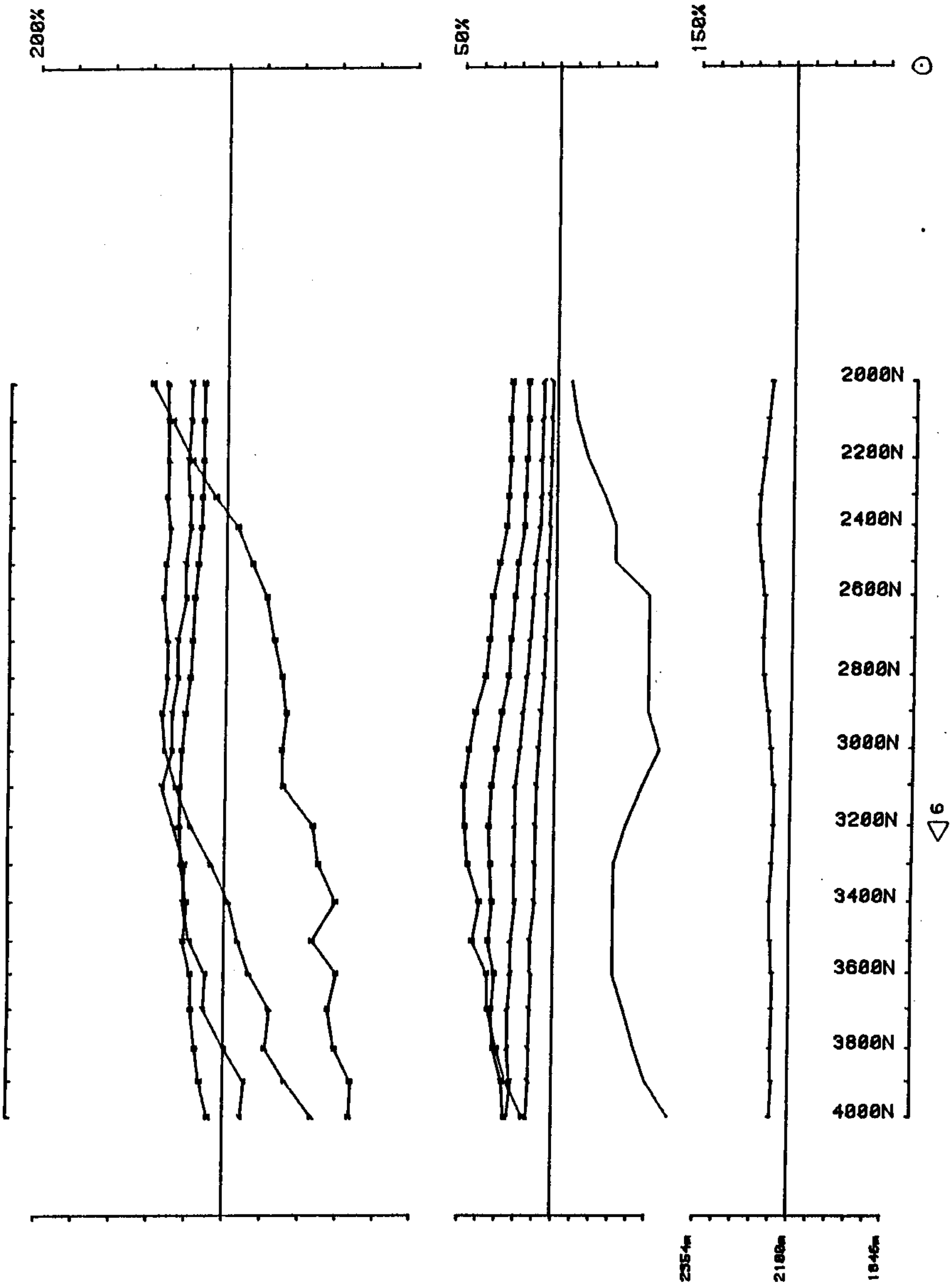
Outline of a transmitter loop

DATA SECTIONS



Area ECKO RECCE UTEM 88 Cominco operator JJL, IJ, MP freq(hz) 30.974

Loopno 1 Line 4 component Hz secondary Ch 1 normalized Ch 1 reduced



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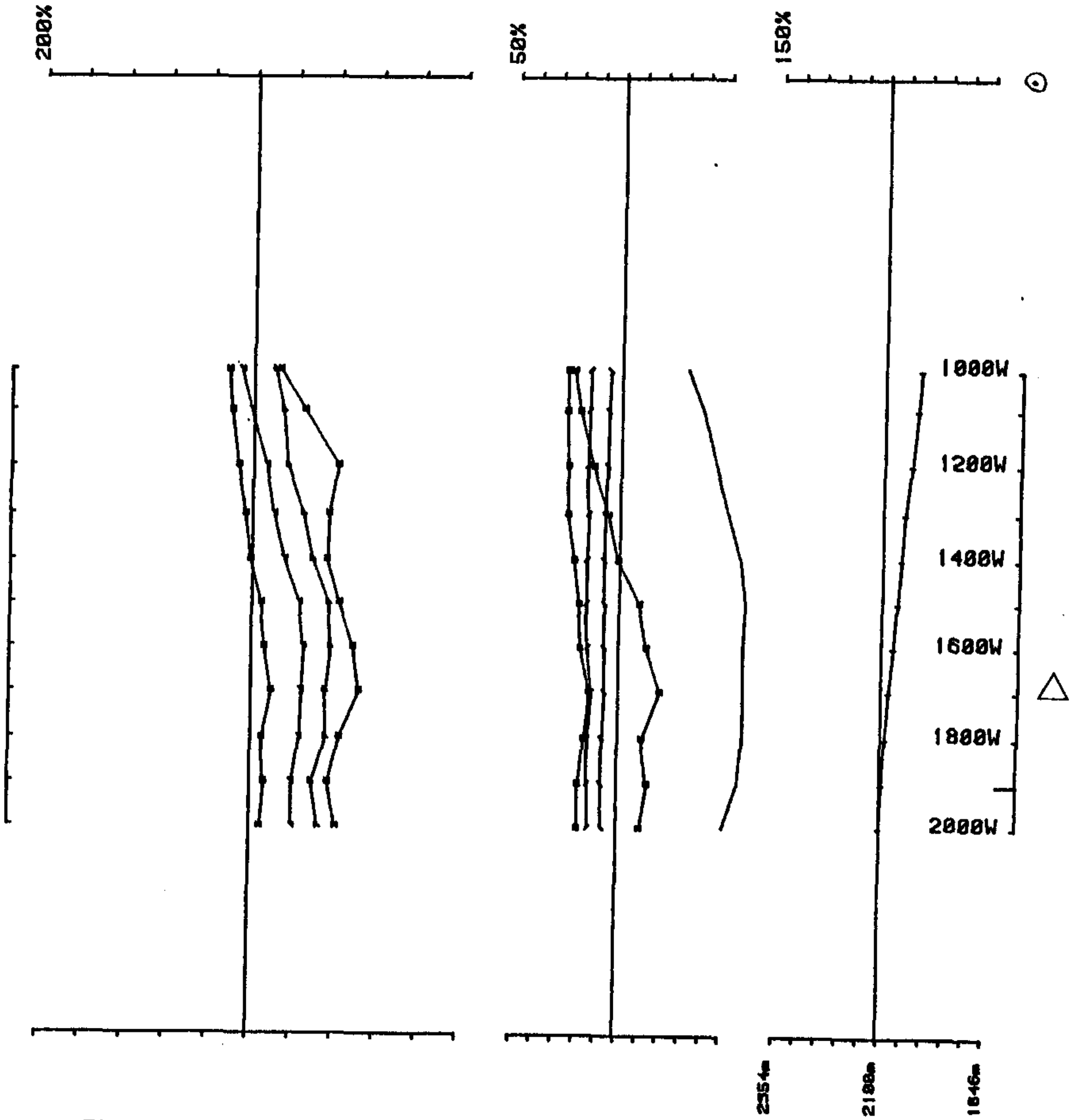
Loopno 1 Line 5 component Hz secondary Ch I normalized Ch I reduced



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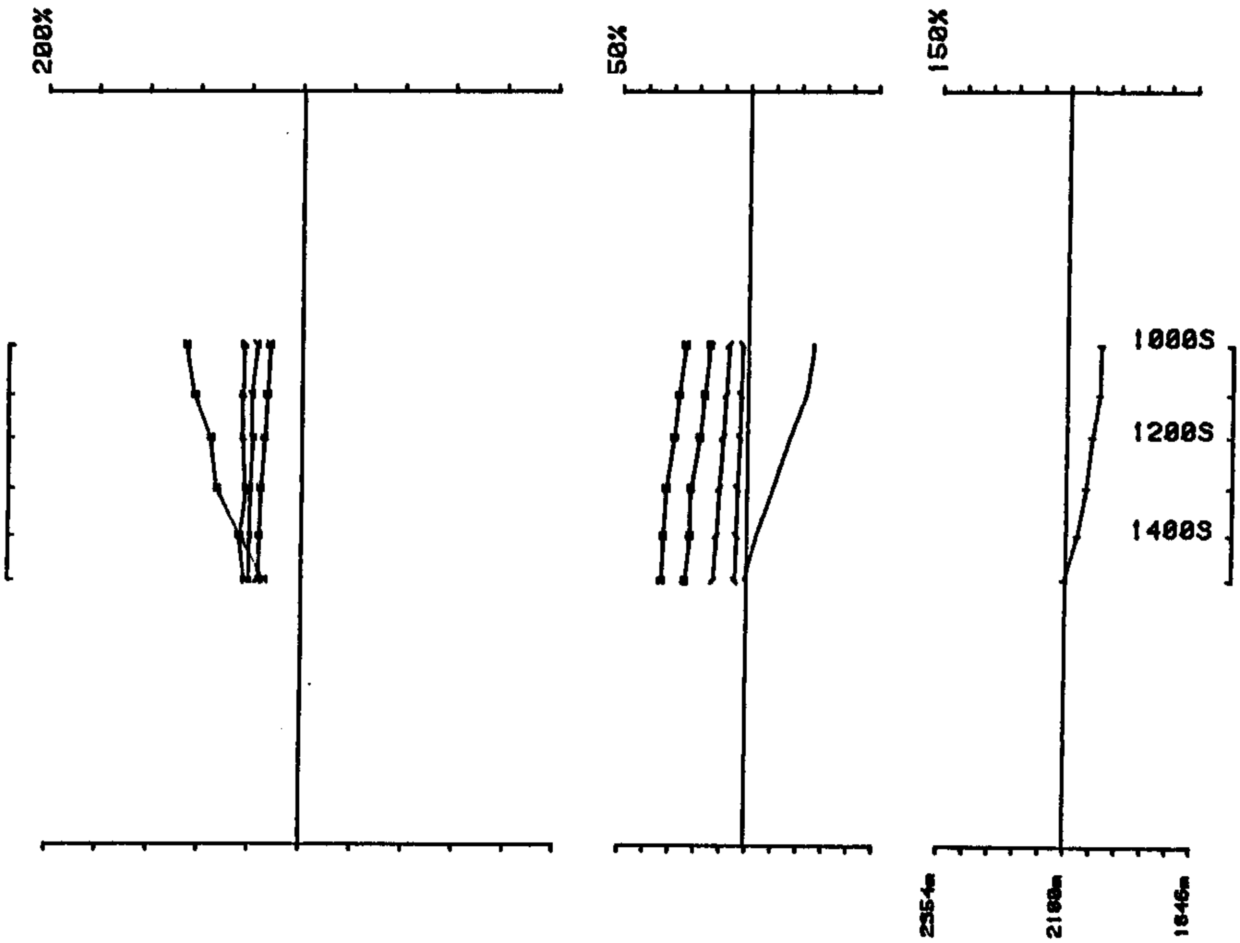
Loopno 1 Line 9 component Hz secondary Ch 1 normalized Ch 1 reduced



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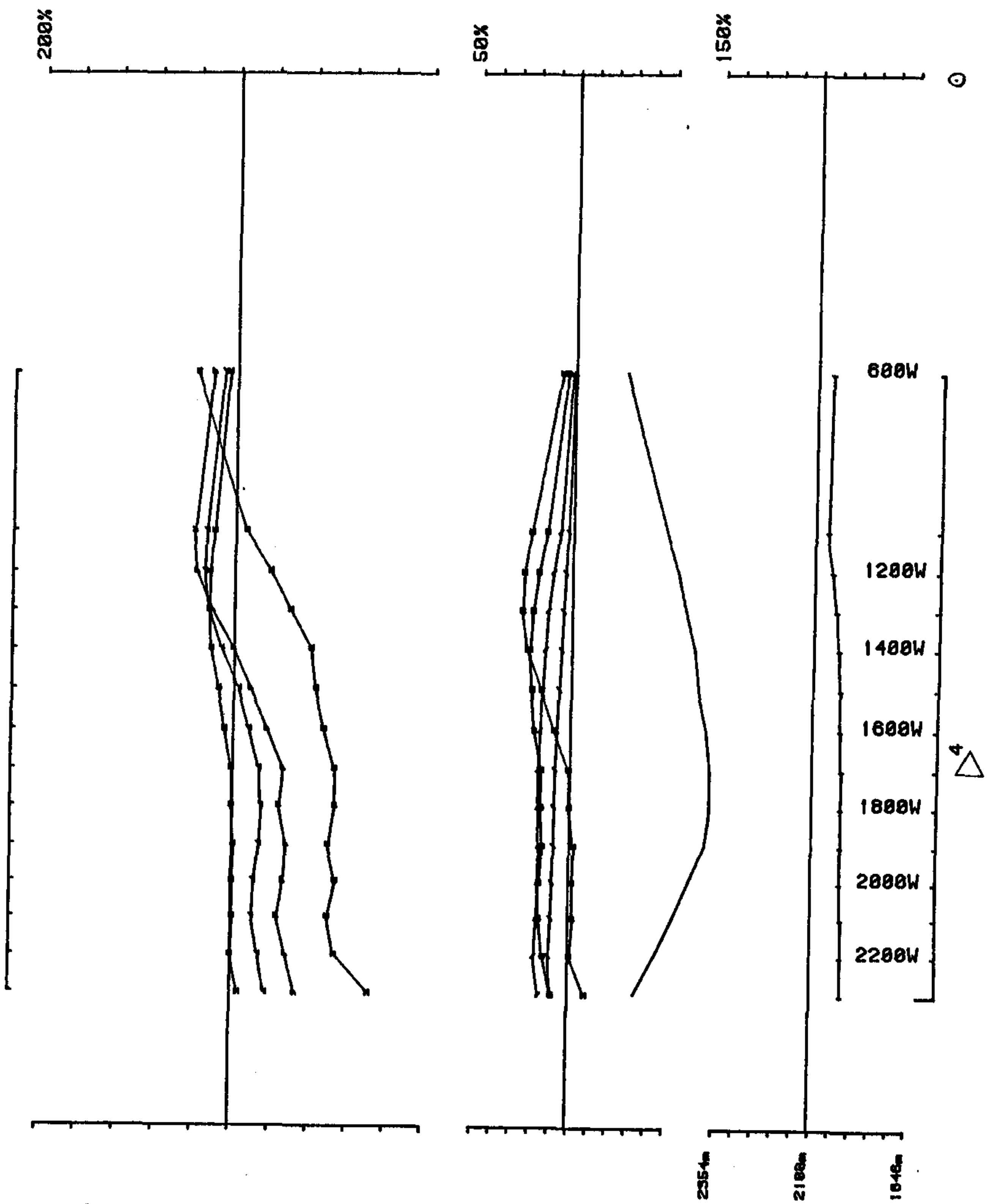
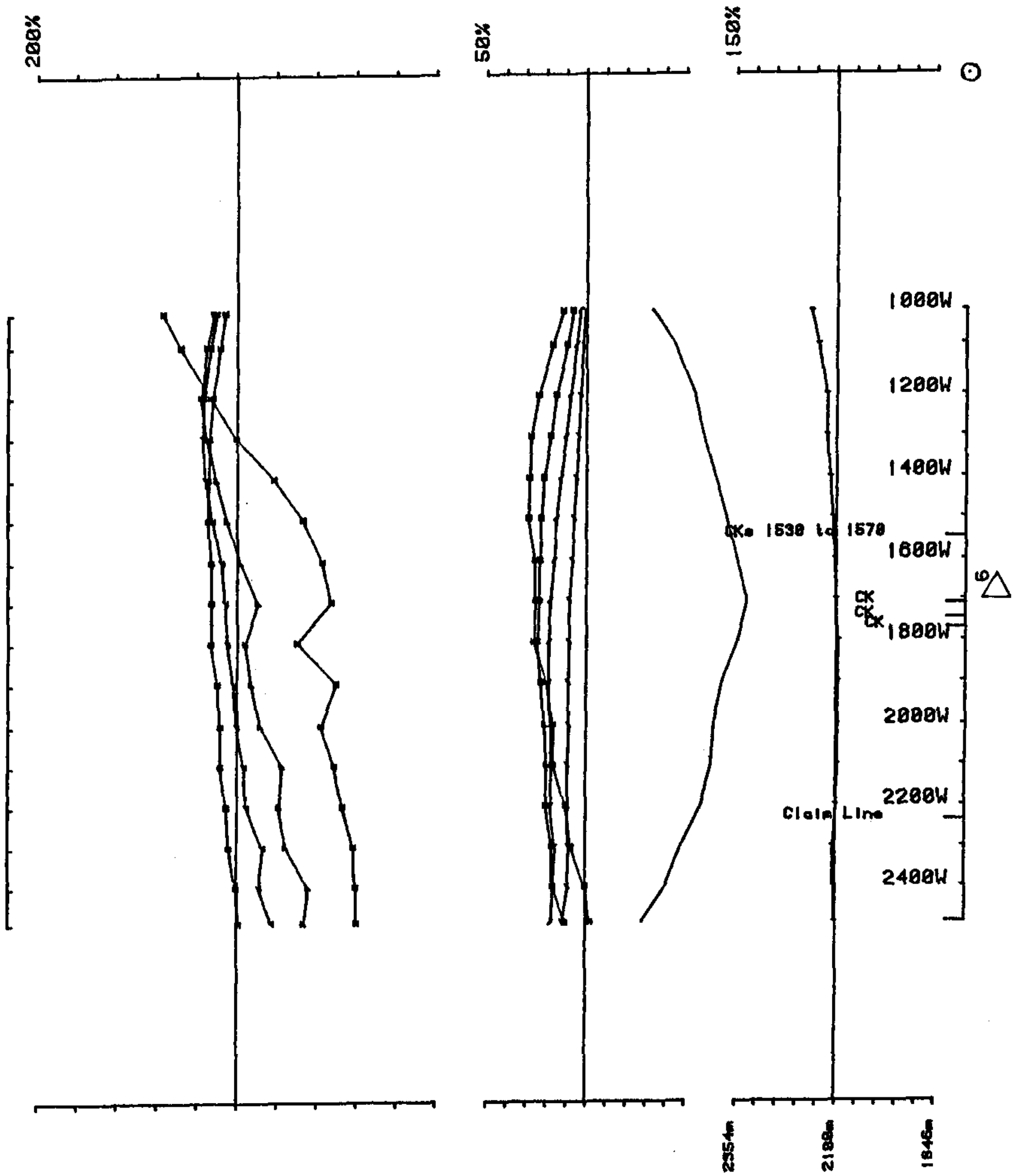
Loopno 1 Line 10 component Hz secondary Ch 1 normalized Ch 1 reduced



Area ECHO RECCE UTEM 88 Cominco operator JJL, IJ, MP freq(hz) 30.974
Loopno 1 Line 11 component Hz secondary Ch 1 normalized Ch 1 reduced



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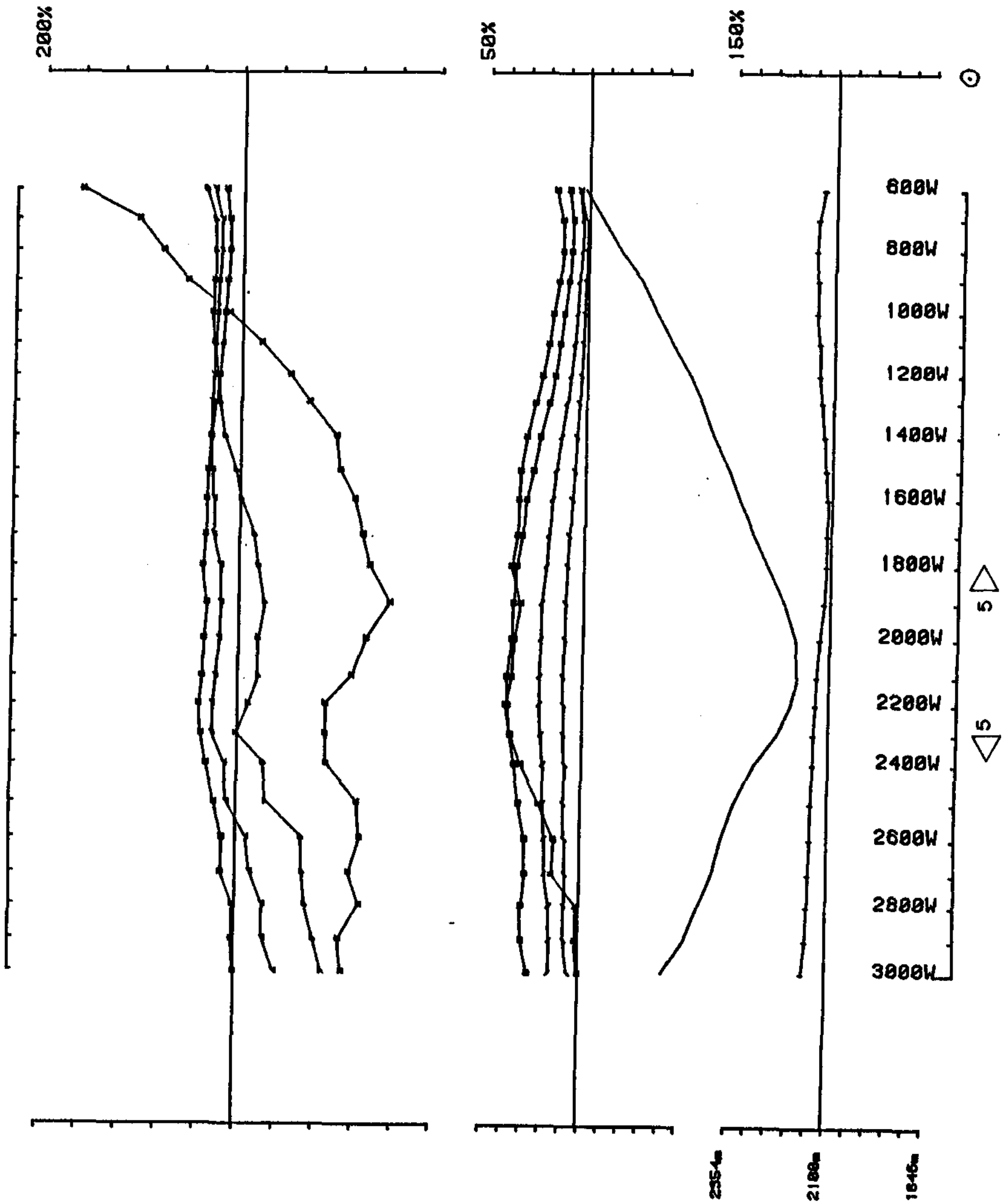
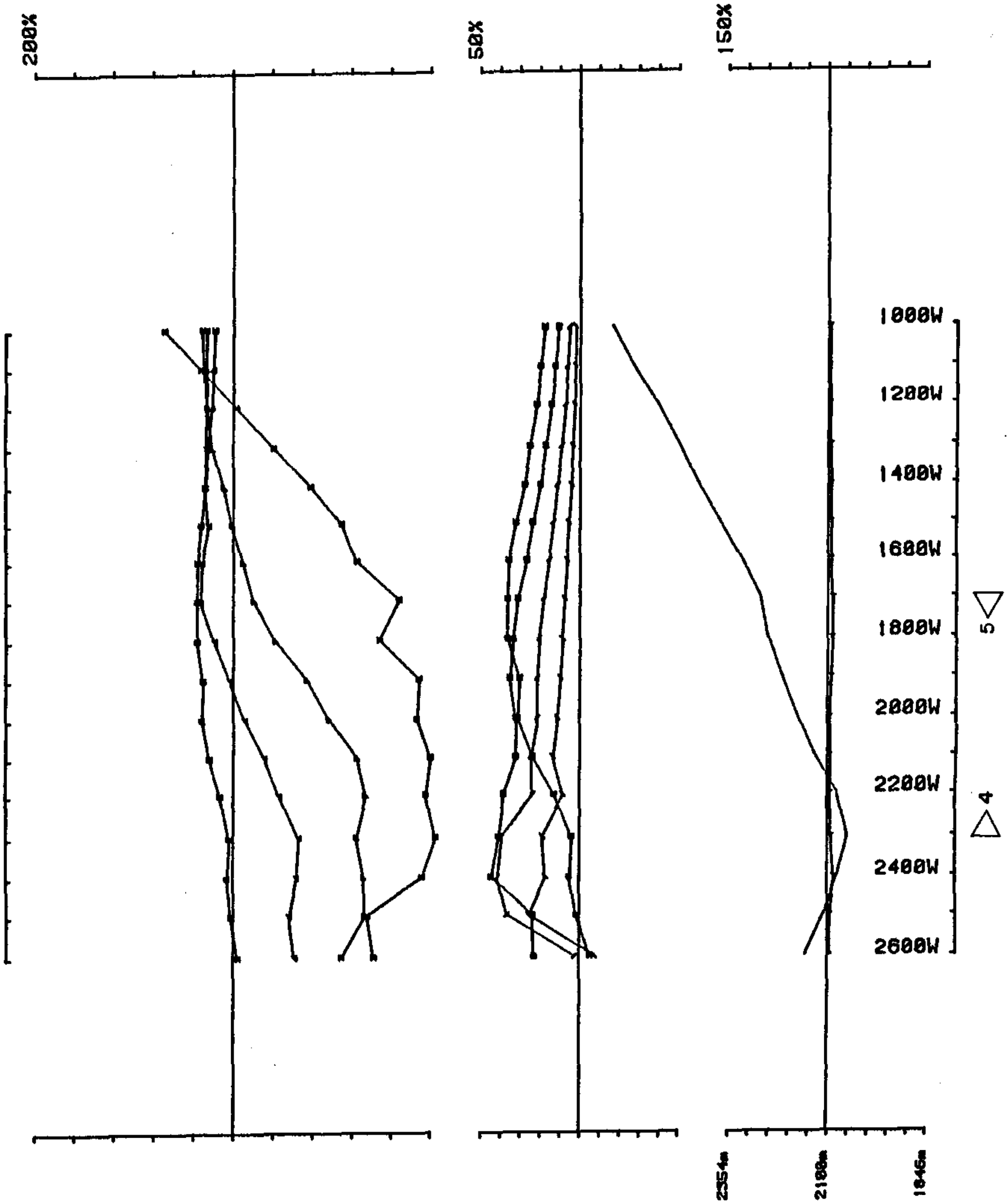
Loopno 1 Line 12 component Hz secondary Ch 1 normalized Ch 1 reduced

D.P. 6



Area ECHO RECCE UTEM 88 Cominco operator JJL, IJ, MP freq(hz) 30.974
Loopno 1 Line 13 component Hz secondary Ch 1 normalized Ch 1 reduced



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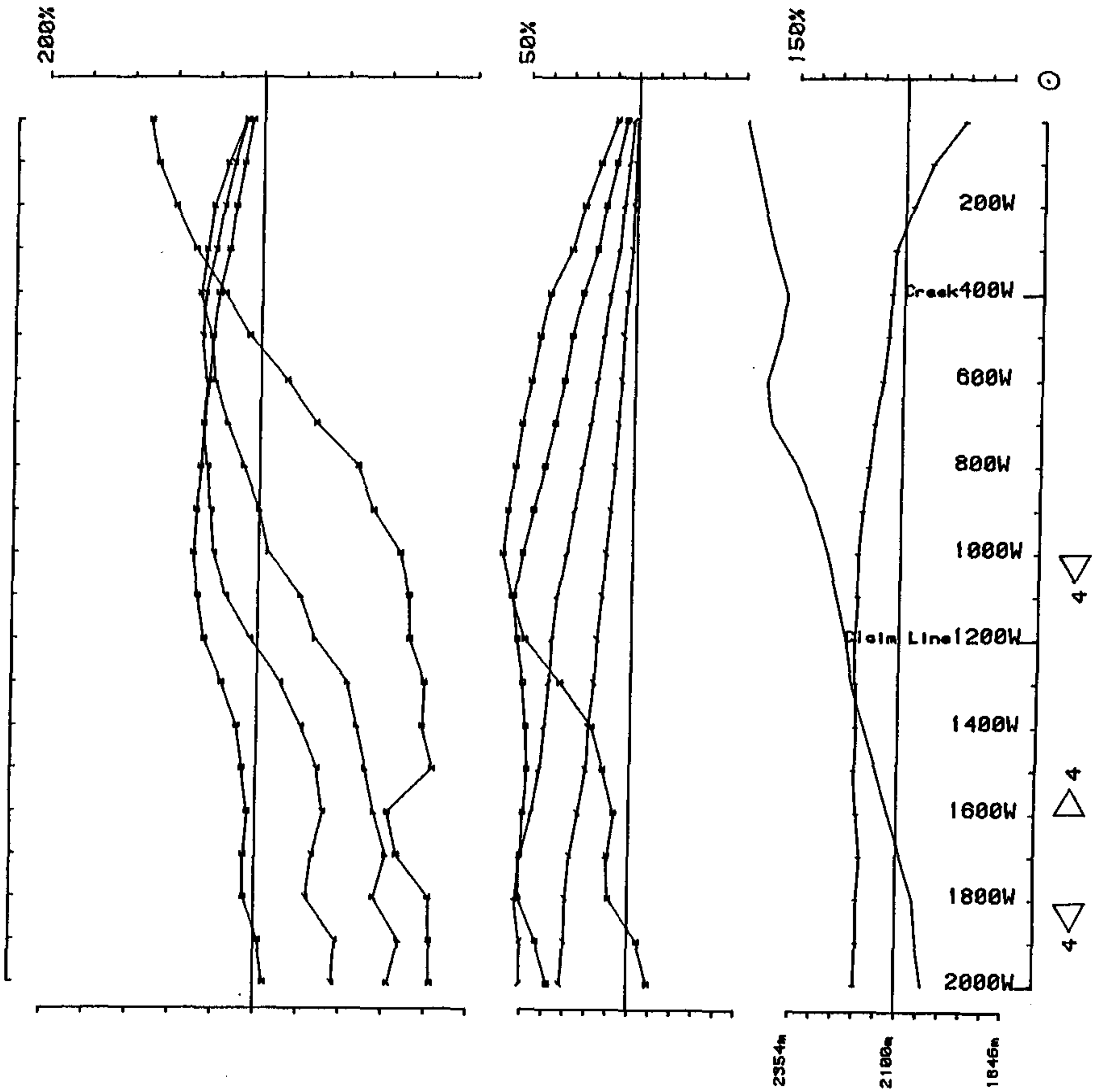
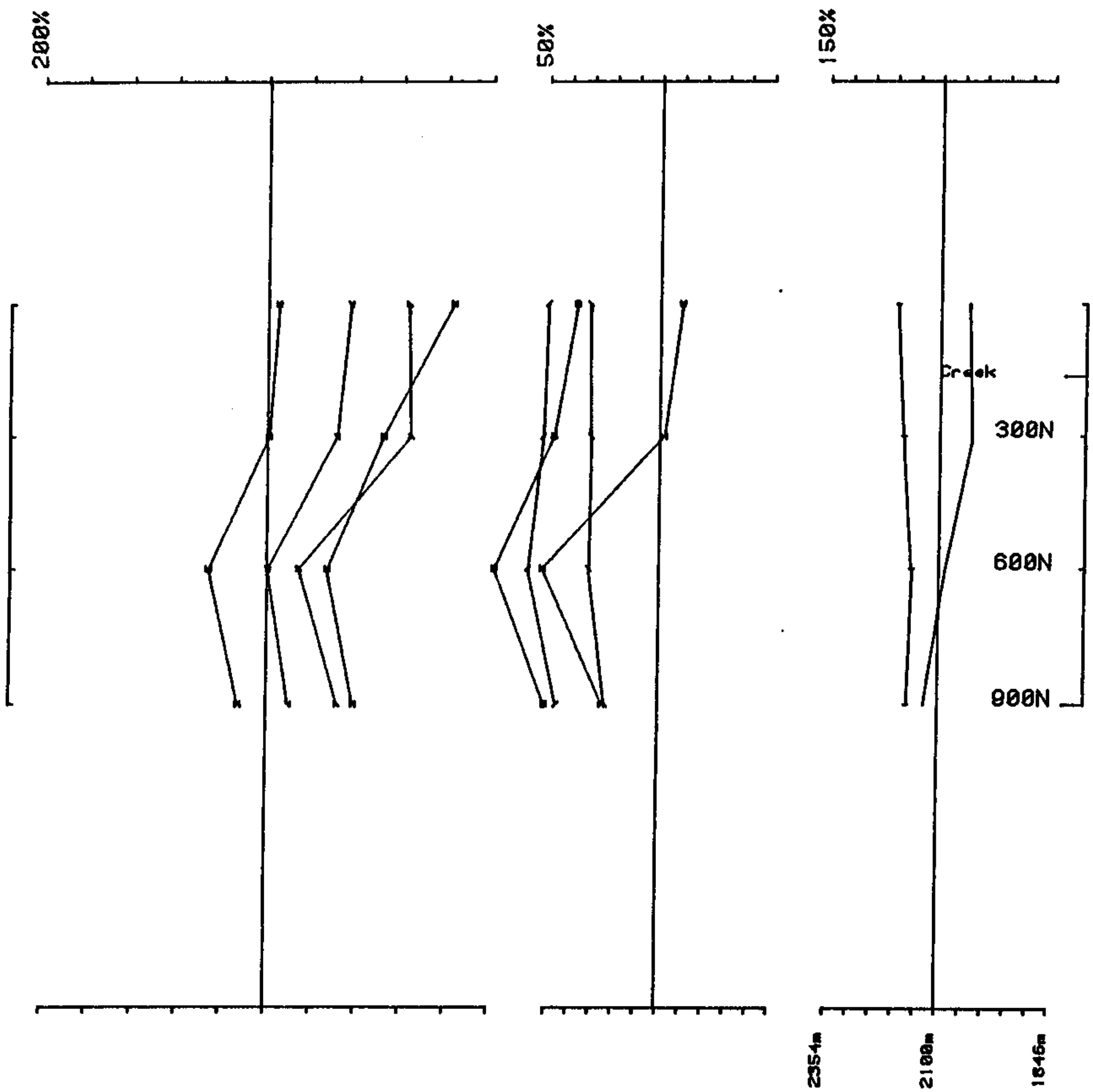
Loopno 1 Line 14 component Hz secondary Ch 1 normalized Ch 1 reduced



Area ECHO RECCE UTEM 88 Cominco operator JJL, IJ, MP freq(hz) 30.974
Loopno 2 Line 10 component Hz secondary Ch 1 normalized Ch 1 reduced



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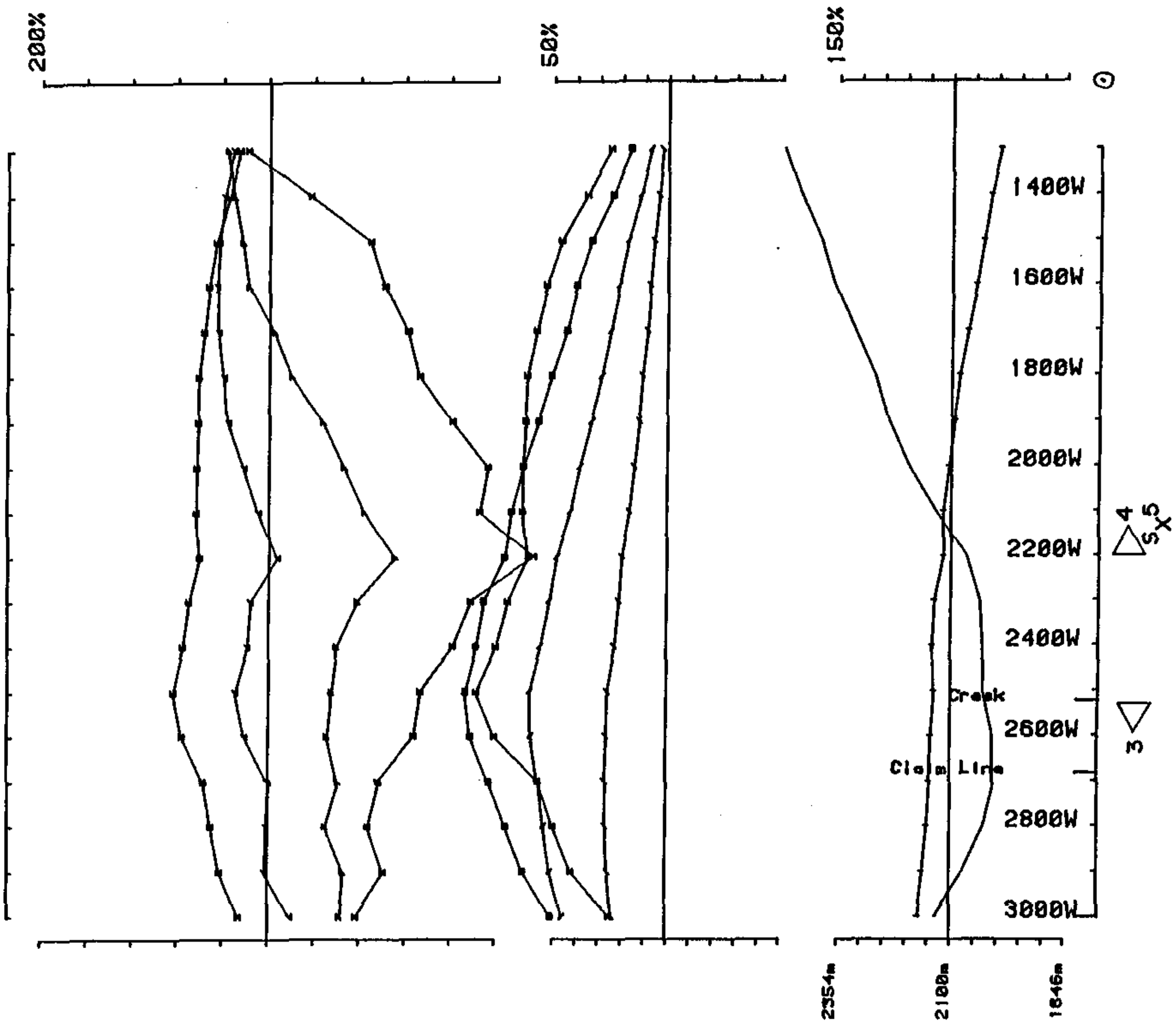
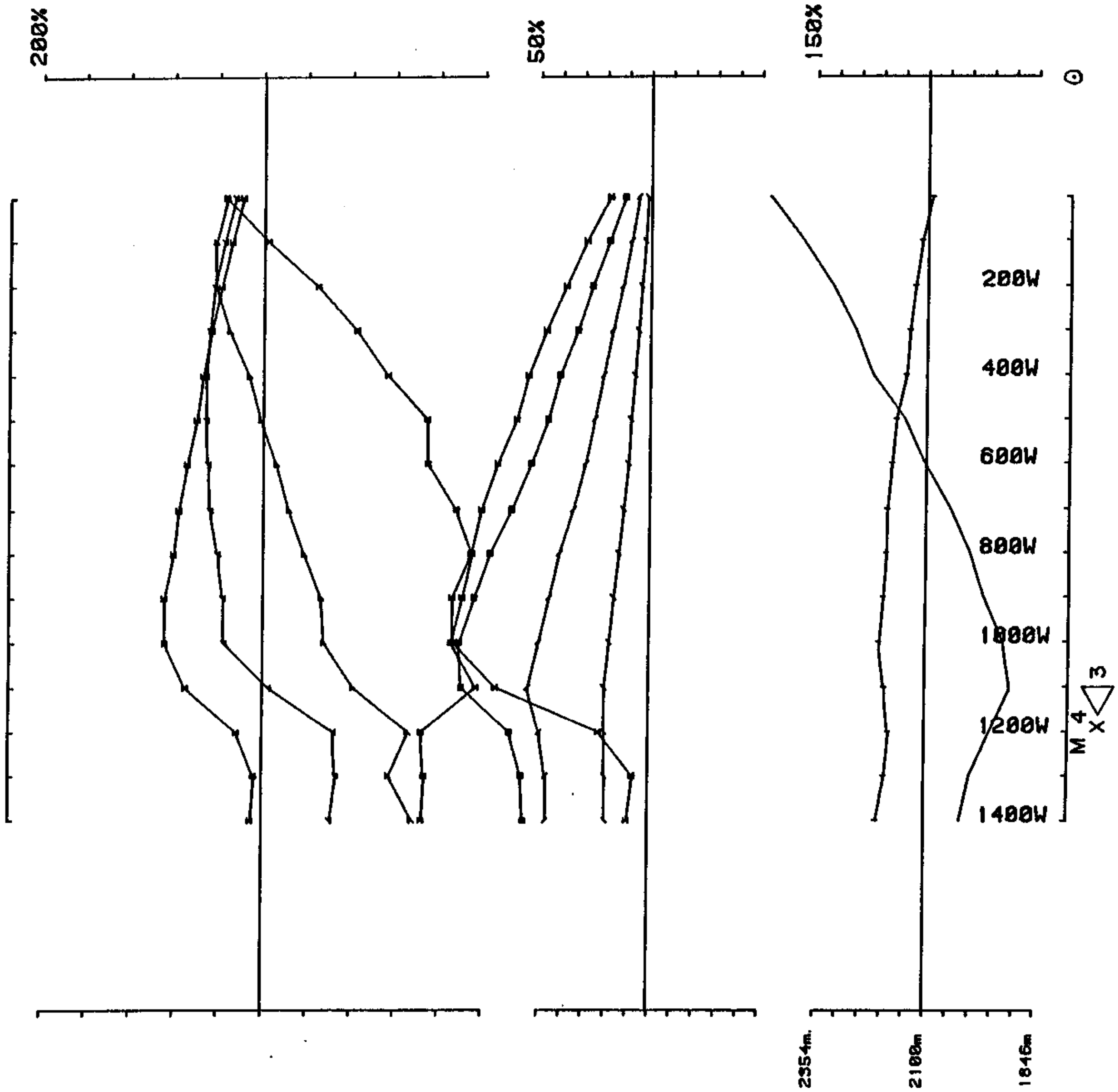
Loopno 2 Line 15 component Hz secondary Ch 1 normalized Ch 1 reduced

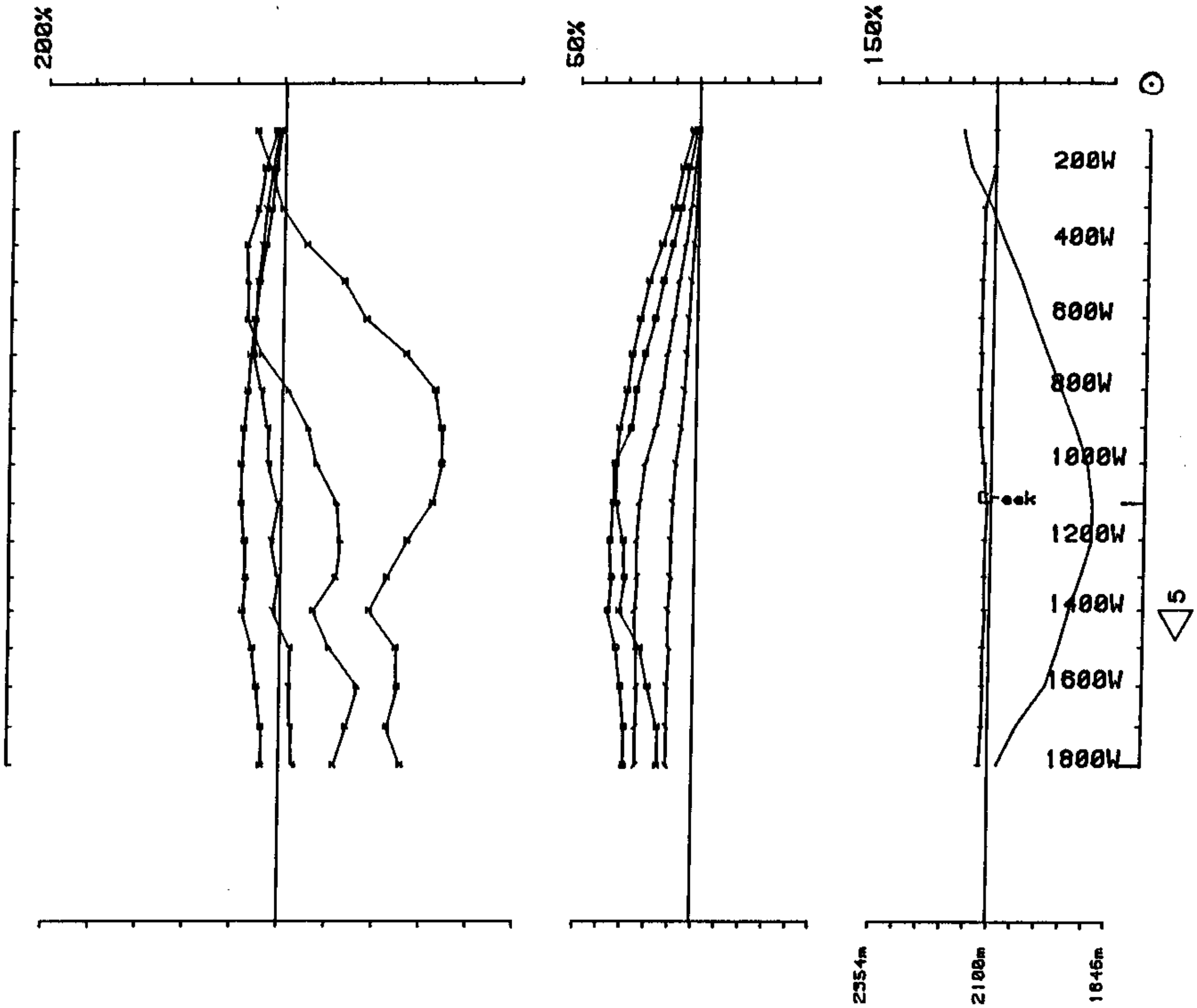
D.P. 10



Area ECHO RECCE UTEM 88 Cominco operator JJL, IJ, MP freq(hz) 30.974
Loopno 2 Line 20 component Hz secondary Ch 1 normalized Ch 1 reduced

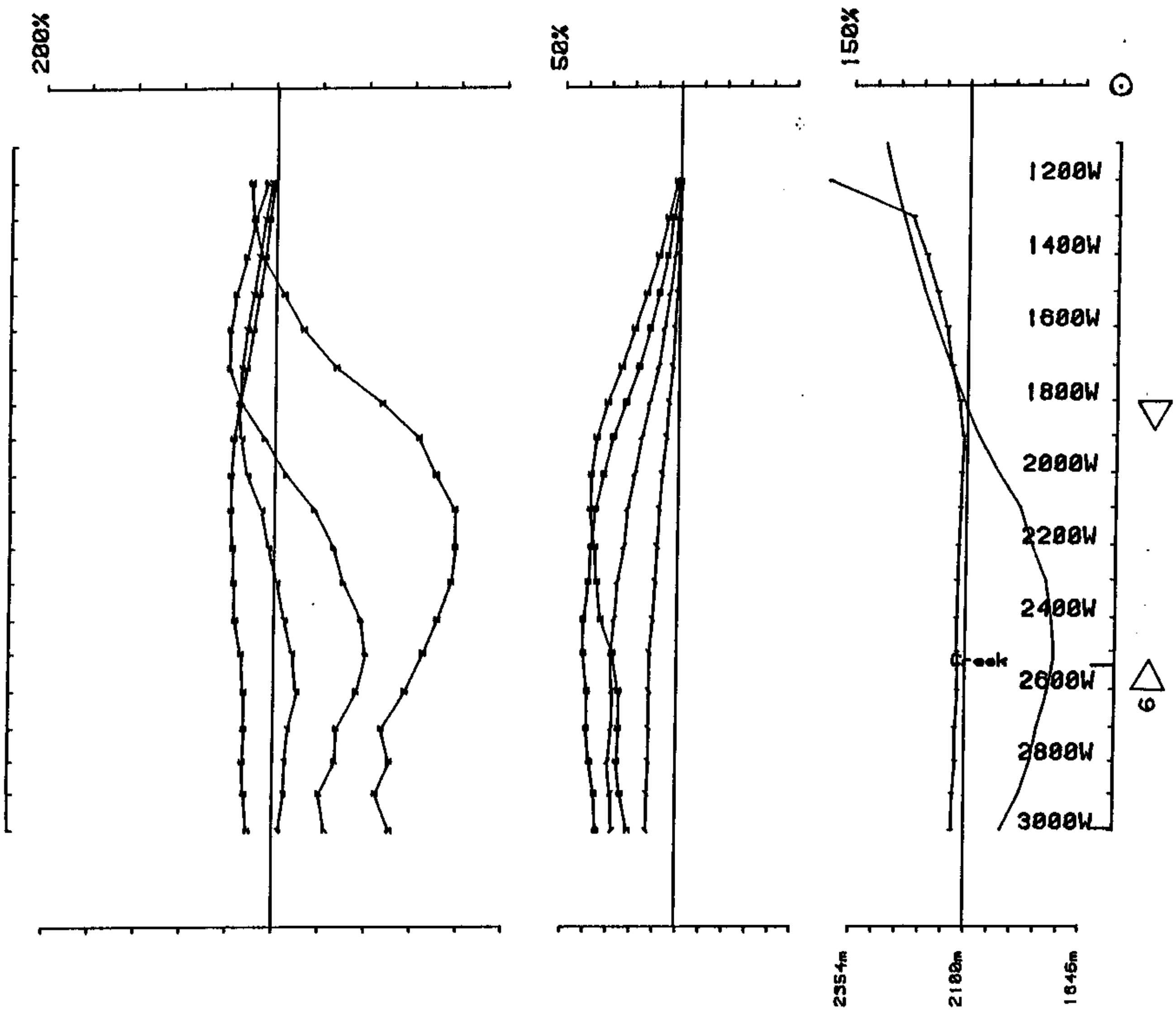


Area ECHO RECCE UTEM 88 Cominco operator JJL,IJ,MP freq(hz) 30.974
Loopno 2 Line 25 component Hz secondary Ch I normalized Ch I reduced



Area ECHO RECCE UTEM 88 Cominco operator JJL, IJ, MP freq(hz) 30.974
Loopno 2 Line 50 component Hz secondary Ch I normalized Ch I reduced

D.P. 13



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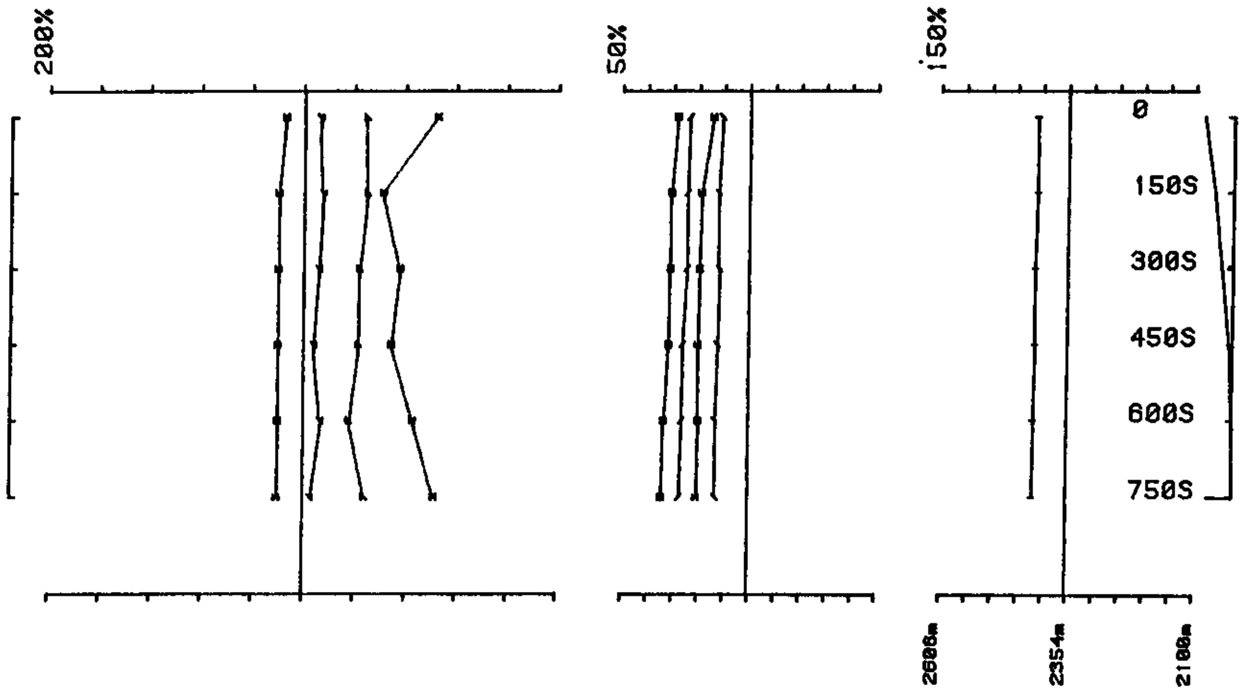
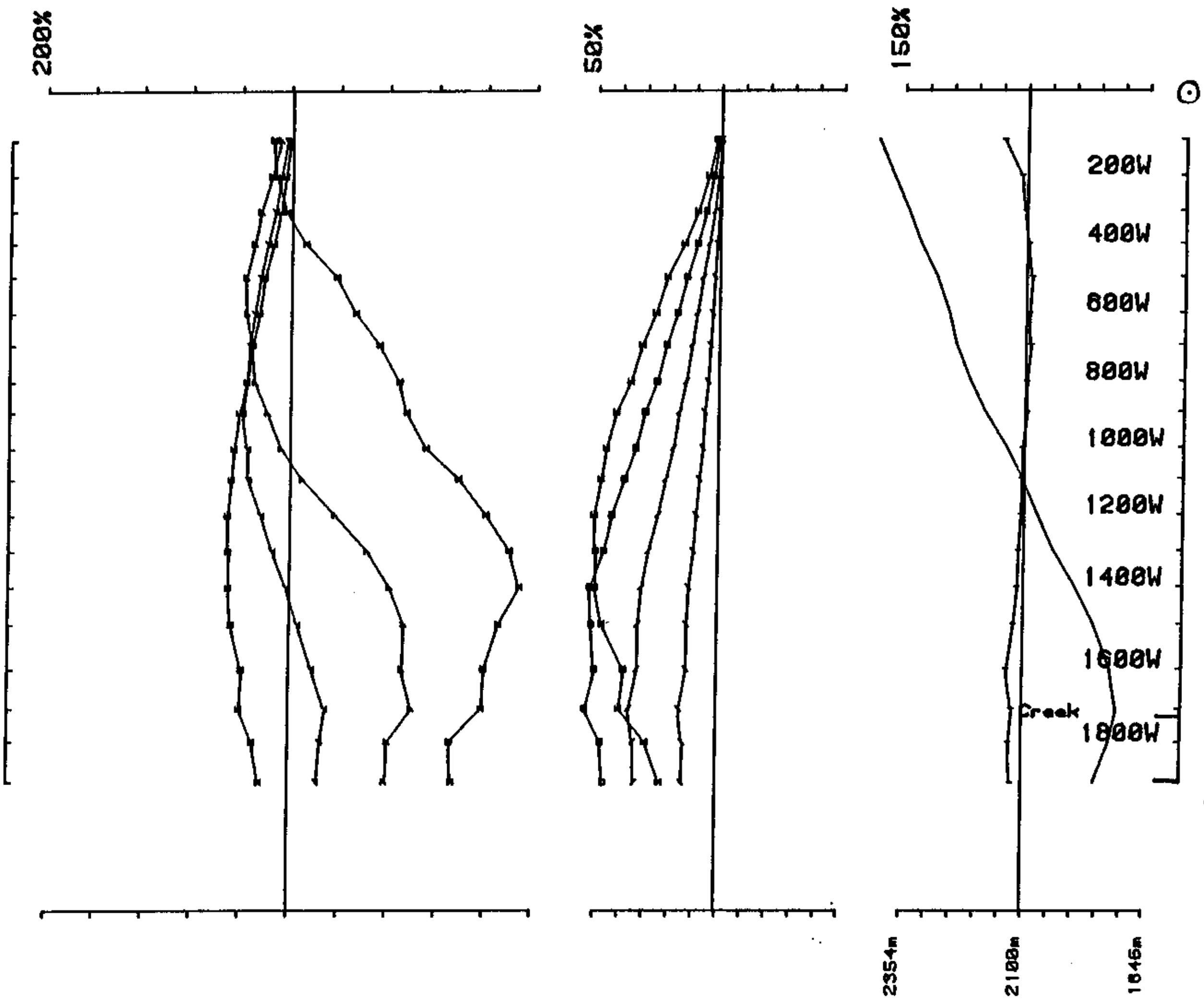
Loopno 2 Line 60 component Hz secondary Ch I normalized Ch I reduced



Area ECHO RECCE UTEM 88 Cominco operator JJL, IJ, MP freq(hz) 30.974
Loopno 2 Line 55 component Hz secondary Ch I normalized Ch I reduced

D.P. 15



Area ECHO RECCE UTEM 88 Cominco operator JJL, IJ, MP freq(hz) 30.974

Loopno 2 Line 65 component Hz secondary Ch I normalized Ch I reduced

L E G E N D

$^{M}X^{4}$ AXIS OF A CROSSOVER ANOMALY. THE NUMBER INDICATES THE LATEST ANOMALOUS CHANNEL. DEPTH INDICATED BY : S - Shallow, M - Moderate, D - Deep

AREA WHERE CONDUCTIVITY IS HIGHER THAN AVERAGE BACKGROUND.

OUTLINE OF UTEM TRANSMITTER LOOP AND LOOP NUMBER.

RECONNAISSANCE UTEM SURVEY LINE AND LINE NUMBER.

LEGAL CORNER POST and CLAIM BOUNDARY

GEOLOGICAL BRANCH
ASSESSMENT REPORT

10,169

0 100 500 1000 2000 METRES

ECHO PROPERTY -1988-		NTS 82-K/1
Drawn by:	Traced by:	RECONNAISSANCE UTEM SURVEY COMPILATION MAP
Revised by / Date	Revised by / Date	GOLDEN M.D., B.C.
Scale: 1 : 20,000	Date: DEC. 1988	Plate: 344-88-2

NCI-117-C.L.

FORM 210 0660