COMINCO LTD.

EXPLORATION

WESTERN DISTRICT

NTS: 82F/8

GEOLOGICAL BRANCH
ASSESSMENT REPORT

11,128

GEOPHYSICAL REPORT

UTEM SURVEY ON THE

L E W C L A I M S

Fort Steele Mining Division

Latitude : 49°20'N

Longitude : 116°04'W

Work Performed By : Syd J. Visser, Bob Holroyd, Doug McCollor, and Jules J. Lajoie

Claim Owner and Operator : COMINCO LTD.

MARCH 1983

E. TOM EADIE

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COMINCO LTD.

EXPLORATION WESTERN DISTRICT

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GEOPHYSICAL REPORT

UTEM SURVEY ON THE LEWIS CREEK CLAIMS

LIST OF CLAIMS

Cominco Interest - 100%

Adjoining Cominco's "VINE GROUP" to the west, Fort Steele M.D., B.C.:

The claims listed below are covered or partly covered by the grid.

Name	Number of Units	Record Numbers	Assessment Work Due
LEW 10	15	915	May 5, 1987
LEW 12	20	917	May 5, 1987
LEW 13	20	918	May 5, 1987
LEW 14	10	919	May 5, 1985
LEW 15	20	920	May 5, 1987
LEW 16	20	921	May 5, 1985
LEW 17	10	922	May 5, 1985
LEW 18	9	923	May 5, 1986
LEW 19	10	924	May 5, 1986
LEW 20	20	925	May 5, 1985
LEW 22	12	1445	June 2, 1985
LEW 23	12	1446	June 2, 1985

INTRODUCTION

The Lewis Creek claims are located about 32 km S.W. of Cranbrook, B.C. (see Plate 241-83-1). The access to the west of the grid is along Highway 3 from Cranbrook, and then along the Lumberton Road, the Moyie River Road, and then the Lewis Creek Road. Access to east end is via Highway 3, turning off to go through Moyie Lake Provincial Park and then following the Lamb Creek and Rabbit Foot Creek roads.

All of the lines in the current grid are accessible by a myriad of logging and power line roads.

The original Lewis Creek claims were staked in 1980 by Cominco Ltd. There has been additional staking in more recent years. They are underlain by the clastic sediments of the Middle and Lower Aldridge Formation of Proterozoic age. These rocks have been intruded by the Moyie gabbros. The sediments of the Aldridge Formation are known to host the Sullivan orebody near Kimberley, B.C.

This report describes a UTEM electromagnetic survey which had the objective of locating electrical anomalies which may be caused by economic mineralization.

UTEM #3 ground transient EM System Lamontagne Geophysics Ltd.

DESCRIPTION OF THE 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 at that University.

The field procedure consists of laying out a large loop of single-strand insulated wire and energizing it with a transmitter powered by a motor generator. The loop is generally square shaped, wherever possible, with sides between 500 metres and 1,500 metres long. In this survey, the loop dimensions were approximately 1,500 x 1,000 metres. Survey lines are located outside the loop and are generally oriented perpendicular to the side of the loop. The field procedure is very similar to Turam, a better known electromagnetic surveying method.

The transmitter loop is energized with a triangular current at a carefully controlled frequency (30.974 Hz for this survey). The receiver consists of one sensor coil, associated electronics, and a facility for digital recording on a cassette magnetic tape. The time synchronization between transmitter and receiver is achieved through quartz crystal clocks in both units.

The receiver sensor coil measures the vertical component of the magnetic field and it responds to the time derivative of the magnetic field. Since the transmitter current waveform is triangular, the receiver coil will sense a perfect square wave in the absence of geologic conductors. Deviations from a perfect square wave are caused by electrical conductors which may be geologic or cultural in origin.

The UTEM receiver gathers and records nine channels of data at each station. The later number channels (7-8-9) correspond to short time or high frequency while the lower numbered 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.

It was mentioned above that the UTEM receiver records data digitally on a cassette. This tape is played back into a minicomputer at the base camp. The minicomputer 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.

FIELD WORK

A field report including personnel is included in Appendix I. In total, approximately 60 kilometres of readings were taken, with a station spacing of 50 metres. In addition to the vertical field measurements, horizontal fields were also measured on one line. All of this surveying took place between June 19th and July 28th, 1982.

The main problems of the survey were the crooked lines and two high voltage power lines that pass through the centre of the grid (Plate 241-83-2). Because of the power lines, two large swaths of the grid were not covered with UTEM. Interference from these power lines caused the survey to go more slowly than usual because more averaging of the received signal was necessary.

DATA PRESENTATION

The results of the survey are presented in the UTEM compilation map, Plate 241-83-2, and 61 Data Sections (D.S.) in Appendix III. There is also a location and claim map, Plate 241-83-1. The grid is in the metric system.

Therefore, L5000N, 2000E means Line 5000 metres north and Station 2000 metres east.

In order to reduce the field data, the theoretical primary field of the loop must be computed at each station. The normalization of the data is as follows:-

a) For channel 1:

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

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

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

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

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

In this type of normalization, chainage error is removed from all channels except for Channel 1.

Topography is plotted alongside Channel 1.

INTERPRETATION

The UTEM results have been summarized on Plate 241-83-2. No strong, massive sulphide type responses were detected on these claims. However, there were very many weak crossover anomalies, as can be seen on the compilation map. In particular, most of these weak conductors fall into two areas which have been labelled Zones A and B.

Accurate interpretation of these conductors is a problem due to their poor conductivity of less than 1 mho. They all appear to be shallow to moderate depth, certainly less than 75 metres, and are steeply dipping. Based on the known geology, it is assumed that these features are fault zones with either clays, micaceous minerals, graphite or sulphides within the fault zone causing some conductivity.

The chance that there are some sulphides associated with these fault zones indicates that they should be followed up by geochemistry or some detailed geophysics on a closer line spacing.

CONCLUSIONS

The 1982 UTEM survey on the LEW claims detected no large massive sulphide responses. However, several weak responses, probably caused by faults, were detected. Because some of these fault zones may be associated with sulphides, some soil geochemistry or more detailed geophysics should be done to locate possible drill targets.

Report by: _____
E. Tom Eadie, M.Sc.
Geophysicist
Cominco Ltd.

Approved by: _____
John M. Hamilton, P.Eng.
Chief Geologist
Sullivan Mine
Cominco Ltd.

ETE/jel

DISTRIBUTION:

Mining Recorder, Cranbrook	(2)
Kootenay Exploration	(1)
Western District, Exploration	(1)
Exploration Administration	(1)
Technical Support Group	(1)

REFERENCES

Lamontagne, Y., 1975 — Applications of Wideband, Time Domain EM Measurements in Mineral Exploration: Doctoral Thesis, University of Toronto

Eadie, E. Tom, 1980 — Geophysical Report on UTEM Survey on the LEW Claims, December 1980, Assessment Report Submitted to Mining Recorder in Cranbrook

Visser, S.J., 1981 — Geophysical Report - UTEM Survey on the LEW Claims, November 1981, Assessment Report Submitted to Mining Recorder in Cranbrook

APPENDIX I

FIELD REPORT FOR: LEW CLAIMS

DATE	LOOP #	LINE	FIELD CREW	COMPUTER	COMMENTS
1982					
JUNE 19	1	3000N	JJL, DM		SJV camp setup 1/2 day equipment breakdown
20					equipment down, JJL left for Vancouver
21					equipment problems
22					equipment problems
23					equipment problems
24	1	3500N	SJV, DM		1/2 day equipment problems
25	Yves arrived to solve the Tx problems; the problems are related to the power lines. The thunder activity in the early afternoon is resonating with the power line causing spikes in the loop and setting of the protection circuitry in the Tx. The problems were, therefore, grid-related and some of the cost of fixing it should be charged to the project.				
26					equipment repair
27	1	4500N	SJV, DM		
28	1	5500N 5000N	DM	SJV	
29	2	6000N 6500N	DM	SJV	JJL returns to camp
30	3	6000N	DM, JJL	SJV	
JULY 1	3	5500N	JJL	SJV, DM	1/2 day due to rain
2	4	5500N 6000N 6500N	JJL	SJV, DM	DM learning the computer
3	5	4500N 4000N	JJL, DM	SJV	
4	5	6000N 6500N	JJL	SJV, DM	

DATE		LOOP #	LINE	FIELD CREW	COMPUTER	COMMENTS
1982						
JULY	5	6	5500N 5000N	DM	SJV	JJL Left
	6	7	4500N 4000N	DM	SJV	
	7	7	3500N 3000N	DM	SJV	
	8	8	7000N 7500N	DM	SJV	
	9	8	8000N 8500N	DM	SJV	
	10				SJV	DM - equipment maintenance, catching up on loop layout, etc
	11	10	3500N 3000N	DM	SJV	BH arrived today
	12	11	7500N 7000N	DM	SJV, BH	
	13	11	8500N 8000N	BH	DM	SJV discussing next grid with Doug and getting supplies
	14	12	8000N 7000N	DM	BH	SJV checking for lines on Lew South; none to be found
	15	11	8500N 8000N	BH	DM	NOTE: these lines had to be redone from July 13 because #8 was used, SJV checking access to the Vine grid
	16	12	7500N	DM	BH, SJV	slow due to power line and broken loop
	17				SJV	** day off for the rest of crew
	18					SJV, DM showing BH some special features on the computer Equipment maintenance ** day off for rest of crew SJV - return to Vancouver

DATE	LOOP #	LINE	FIELD CREW	COMPUTER	COMMENTS
1982					
JULY 20	13	10000N 9500N 9000N	DM	BH	
21	13	9000N	BH	DM	replace switch in MG
22	13	9500N 10000N	DM	BH	
23	14	7000N 7500N	BH	DM	
24	15	9000N 8000N	DM	BH	
25	16	9000N 8500N	BH	DM	
26	17	9500N	DM	BH	fix broken loop
27	18	10000N 9500N	BH	DM	
28	19	8500N	DM, BH		detail line (Hx, Hy, Hz)

L E W C L A I M S

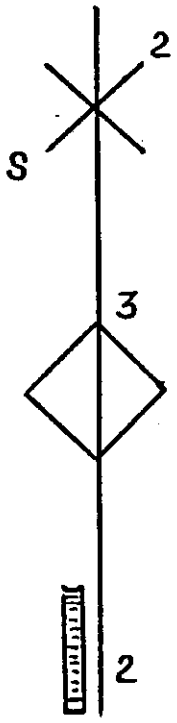
LIST OF PERSONNEL INVOLVED IN PROJECT

JJL	Dr. Jules J. Lajoie	Research Geophysicist COMINCO LTD. 853 - 409 Granville St. Vancouver, B.C. V6C 1T2
SJV	Syd J. Visser	Geophysicist COMINCO LTD. 853 - 409 Granville St. Vancouver, B.C. V6C 1T2
DM	Doug McCollor	Geophysicist COMINCO LTD. 853 - 409 Granville St. Vancouver, B.C. V6C 1T2
BH	Bob Holroyd	Geophysicist COMINCO LTD. 1700 - 120 Adelaide St., West TORONTO, Ontario M5H 1T1
GG	Greg Garvin	Helper COMINCO LTD. c/o Kootenay Exploration 1051 Industrial Road No. 2 Cranbrook, B.C. V1C 4K7
JS	Jon Sortome	Helper COMINCO Ltd. c/o Kootenay Exploration 1051 Industrial Road No. 2 Cranbrook, B.C. V1C 4K7
GM	Greg MacSporran	Helper COMINCO LTD. c/o Kootenay Exploration 1051 Industrial Road No. 2 Cranbrook, B.C. V1C 4K7

APPENDIX II

LEGEND

UTEM COMPILATION MAPS

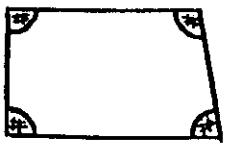


Axis of a crossover anomaly. The number indicates the latest anomalous channel.

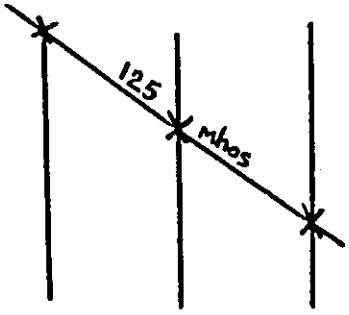
Depth indicated by: S - Shallow (< 30m)
M - Moderate (30-75m)
D - Deep (> 75m)

Axis of reversed crossover anomaly produced when a small conductor dips at less than 70° towards the transmitter. In normal crossover the positive response is towards the transmitter; reversed one, it is away from the transmitter.

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.



Outline of a transmitter loop.



Conductor axis located by crossover anomalies with a conductance determination. The conductance is the interpreted conductivity x thickness of the conductor in mhos (same as Siemens).

Only the principal crossovers are indicated.

A P P E N D I X III

DATA SECTIONS

D.S. 1 - 61

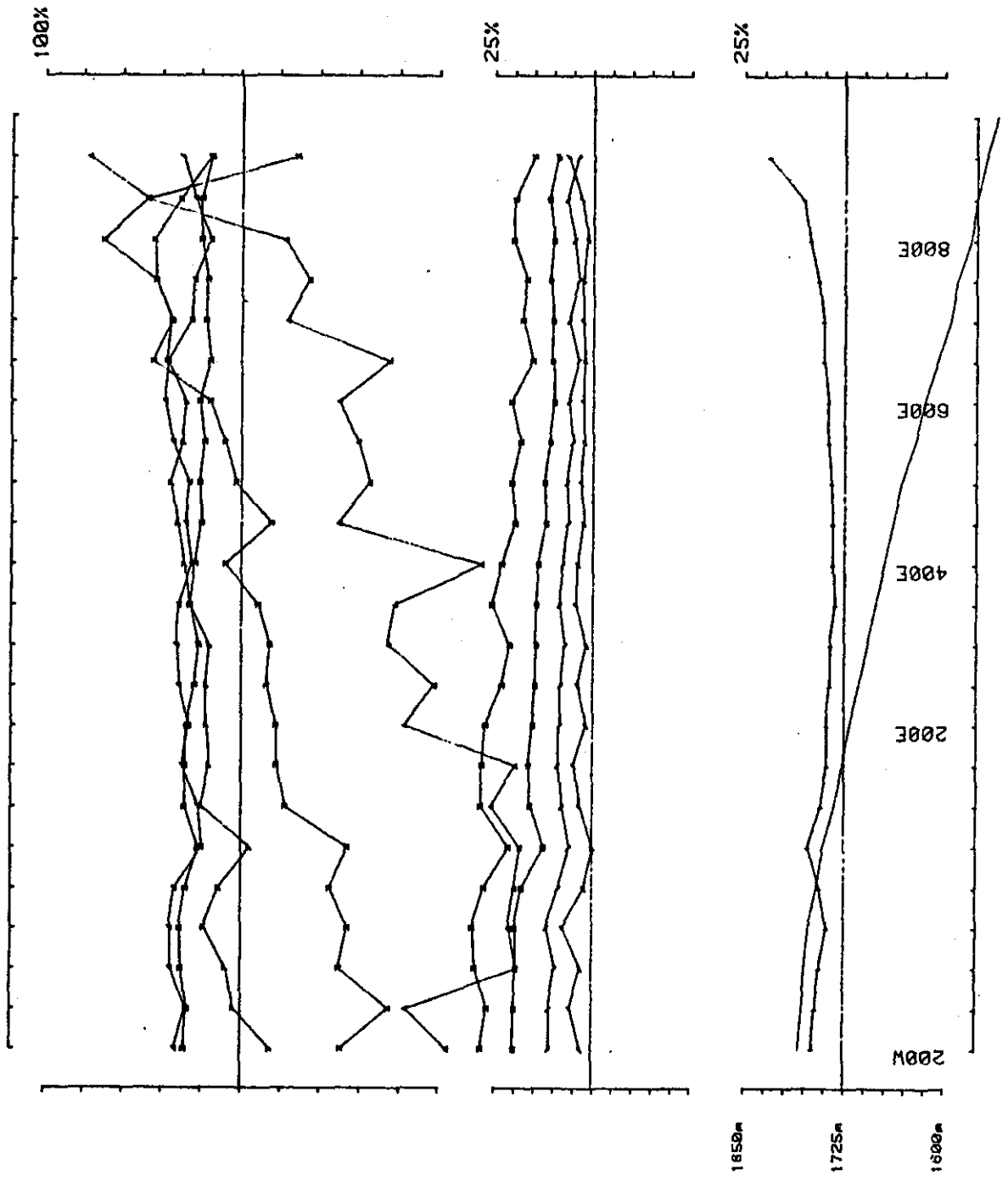
LEGEND

UTEM DATA SECTIONS

ORDINATE: Amplitude scale is given in %

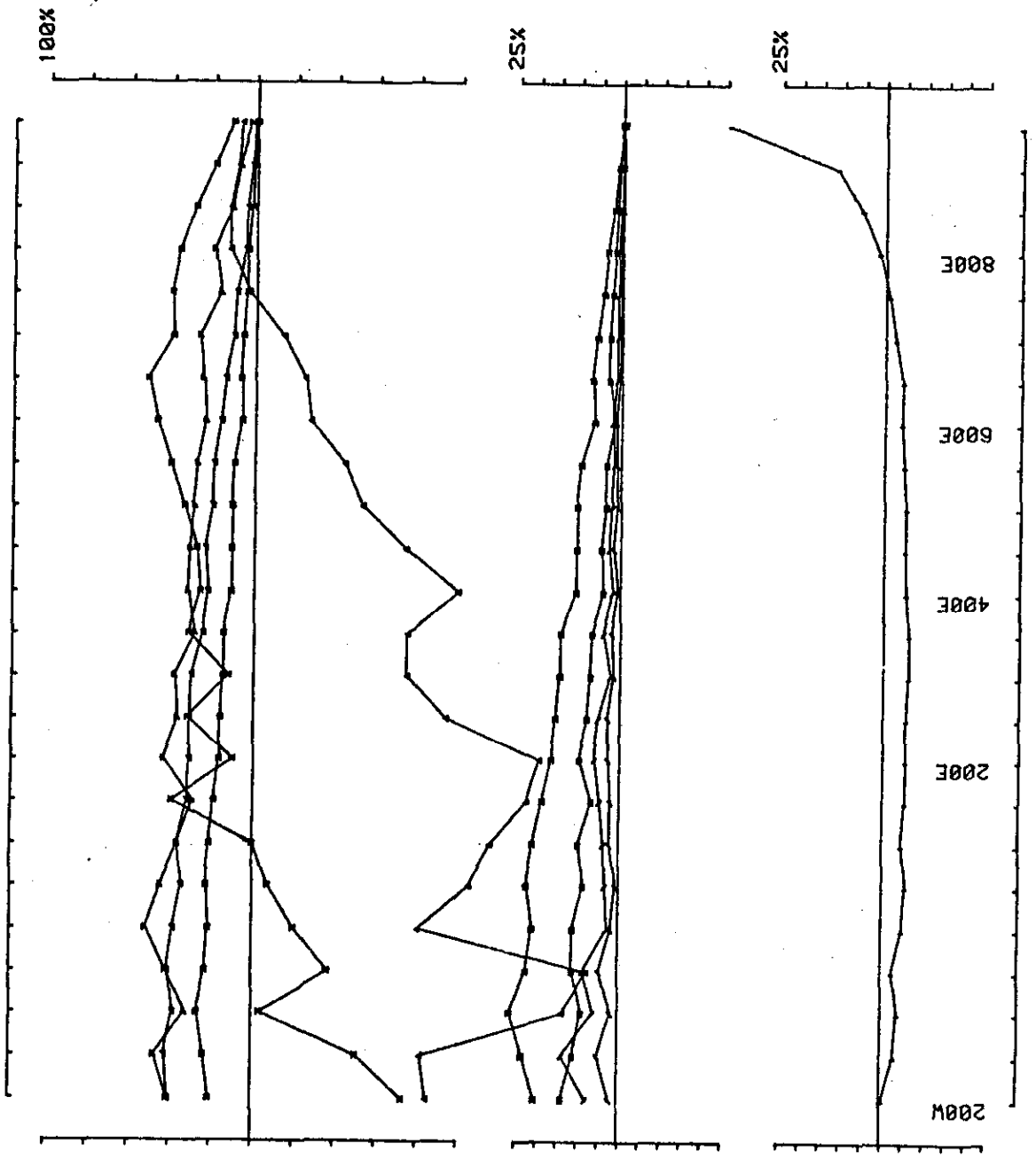
ABSCISSA: Station or Picket Numbers in Hundreds of Meters

SYMBOL	CHANNEL	MEAN DELAY TIME	
		15 Hz	30 Hz
	1	25.6 ms	12.8 ms
	2	12.8	6.4
	3	6.4	3.2
	4	3.2	1.6
	5	1.6	0.8
	6	0.8	0.4
	7	0.4	0.2
	8	0.2	0.1
	9	0.1	0.05
	10	0.05	



Area Lew North Cominco operator T&S freq(hz) 30.496

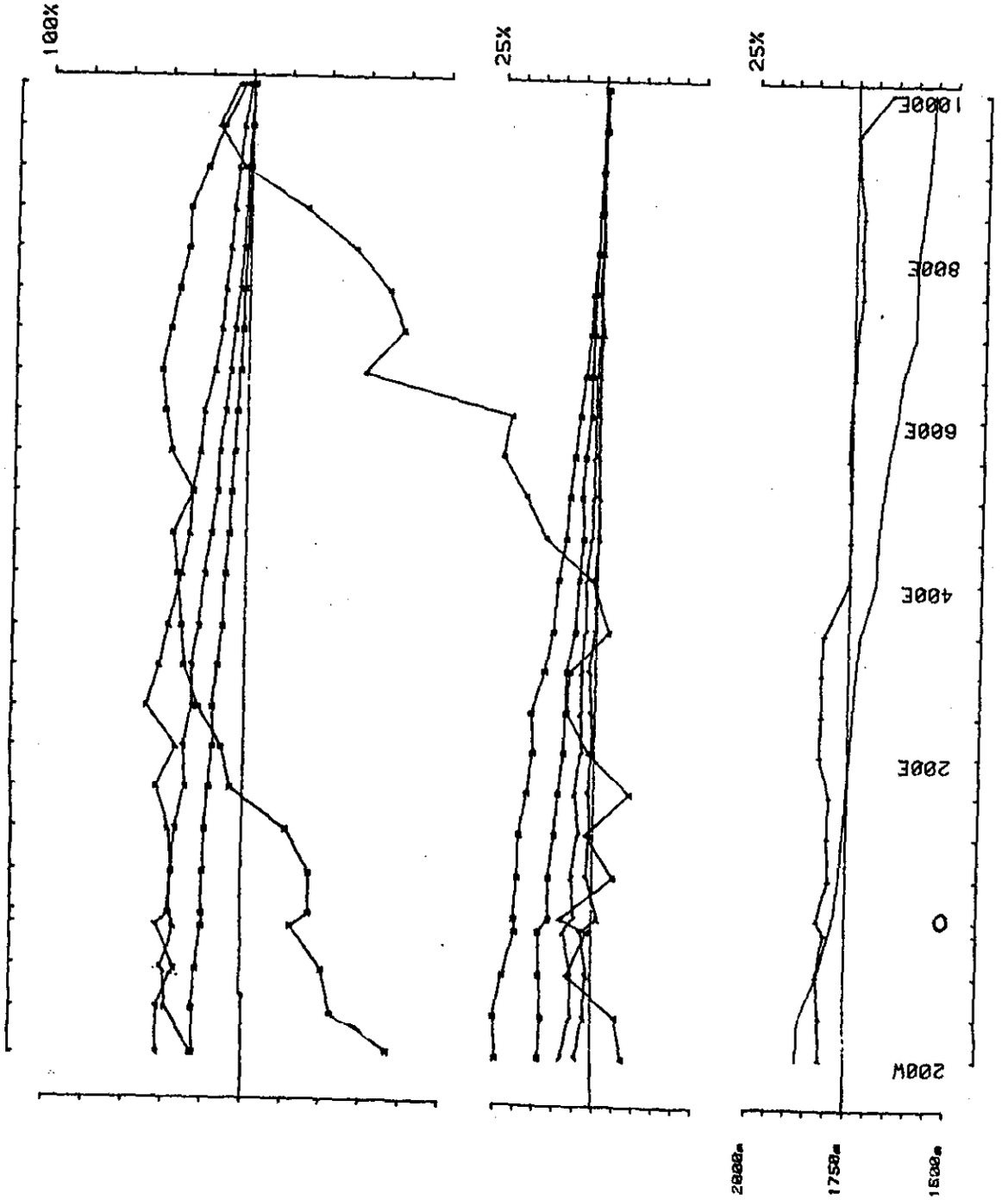
Loop# 0852 Line 3000N component Hz secondary Ch 1 normalized



Area Lew north Cominco operator T&S&B freq(hz) 30.496

Loopno 0852 Line 3500N component Hz secondary Ch 1 normalized

D.S. 2



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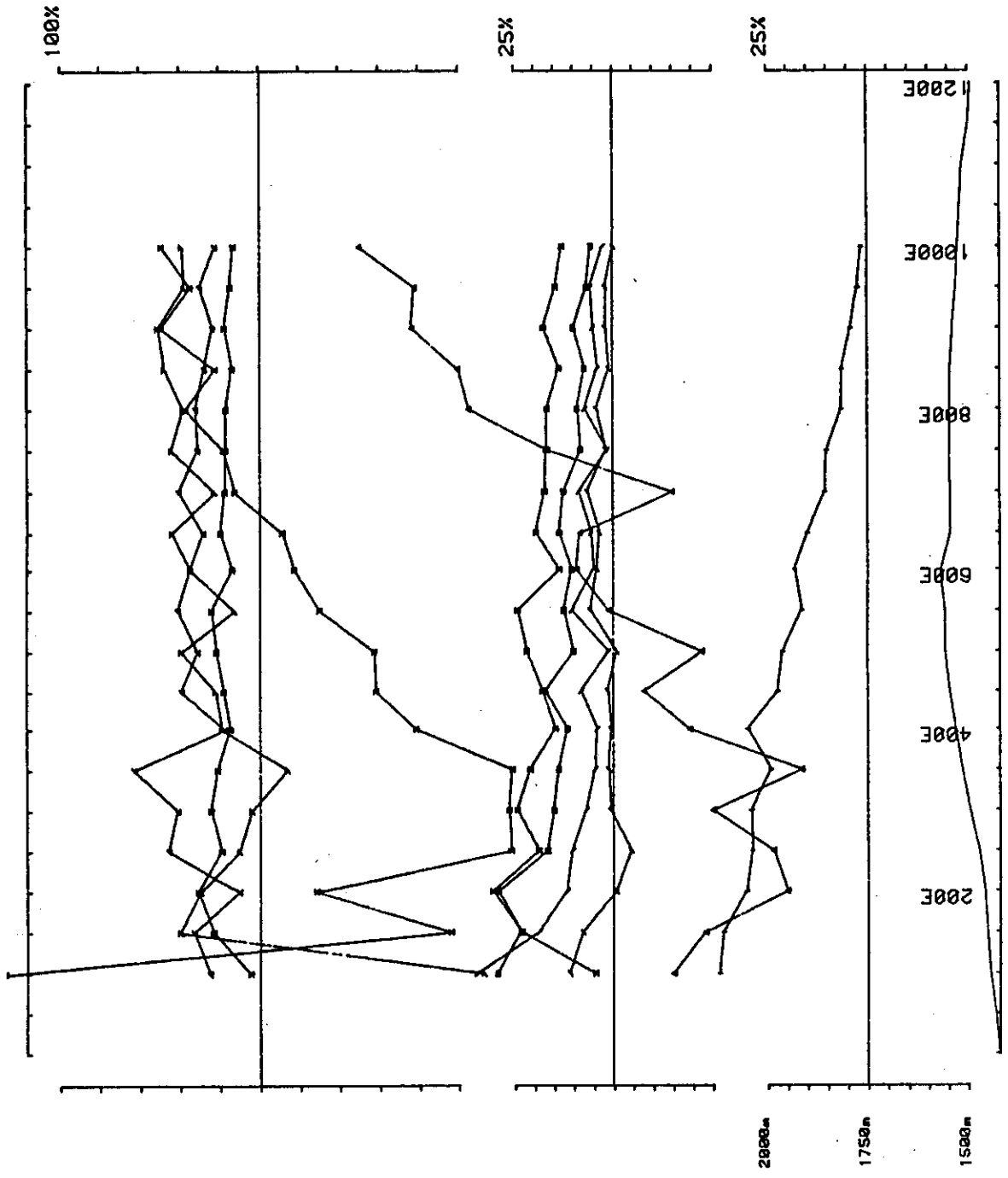
Loupne 0852 Line 4000N component Hz secondary Ch 1 normalized

D.S. 3



Area Lew North Cominco operator TSB freq(hz) 30.496

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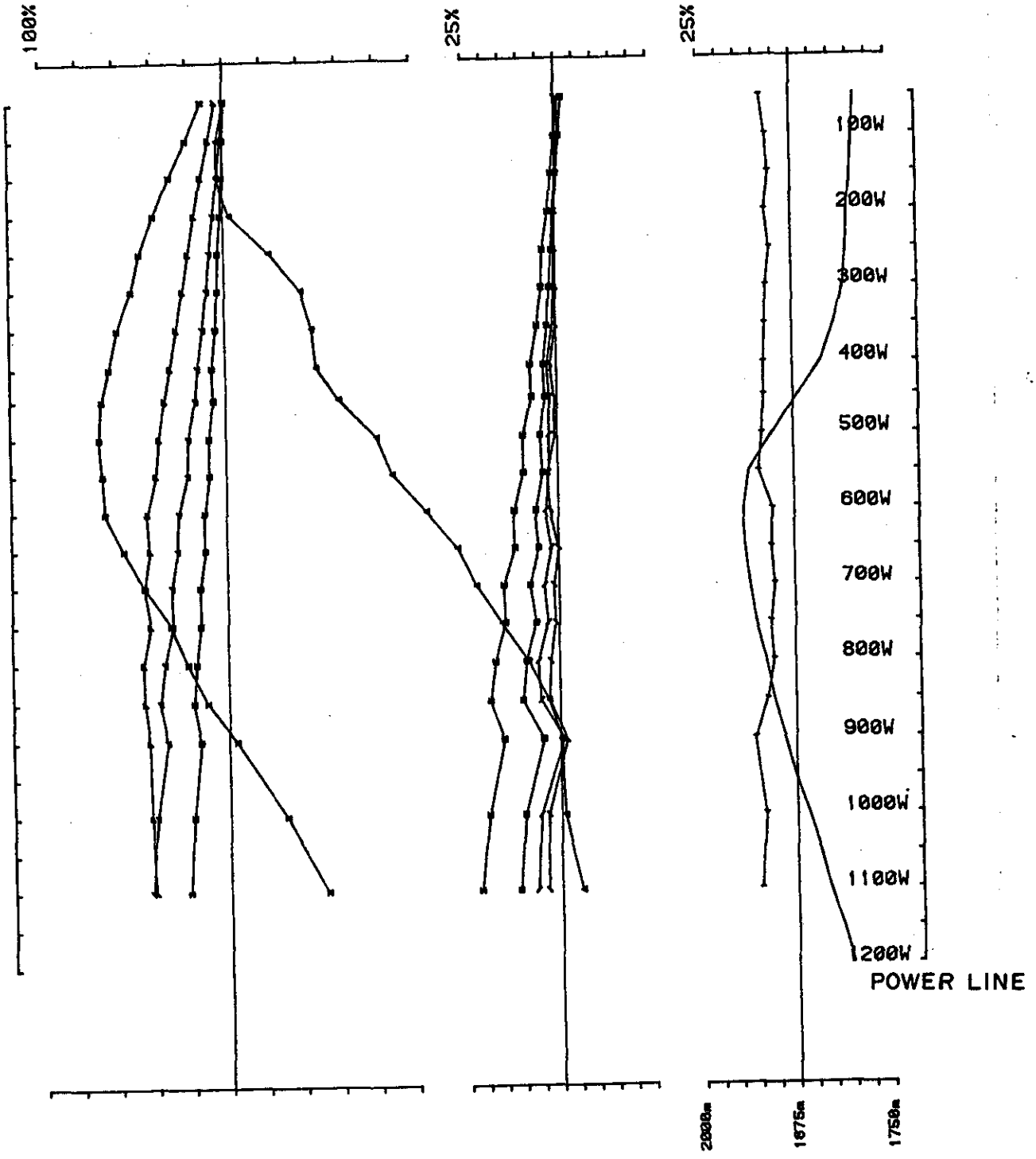

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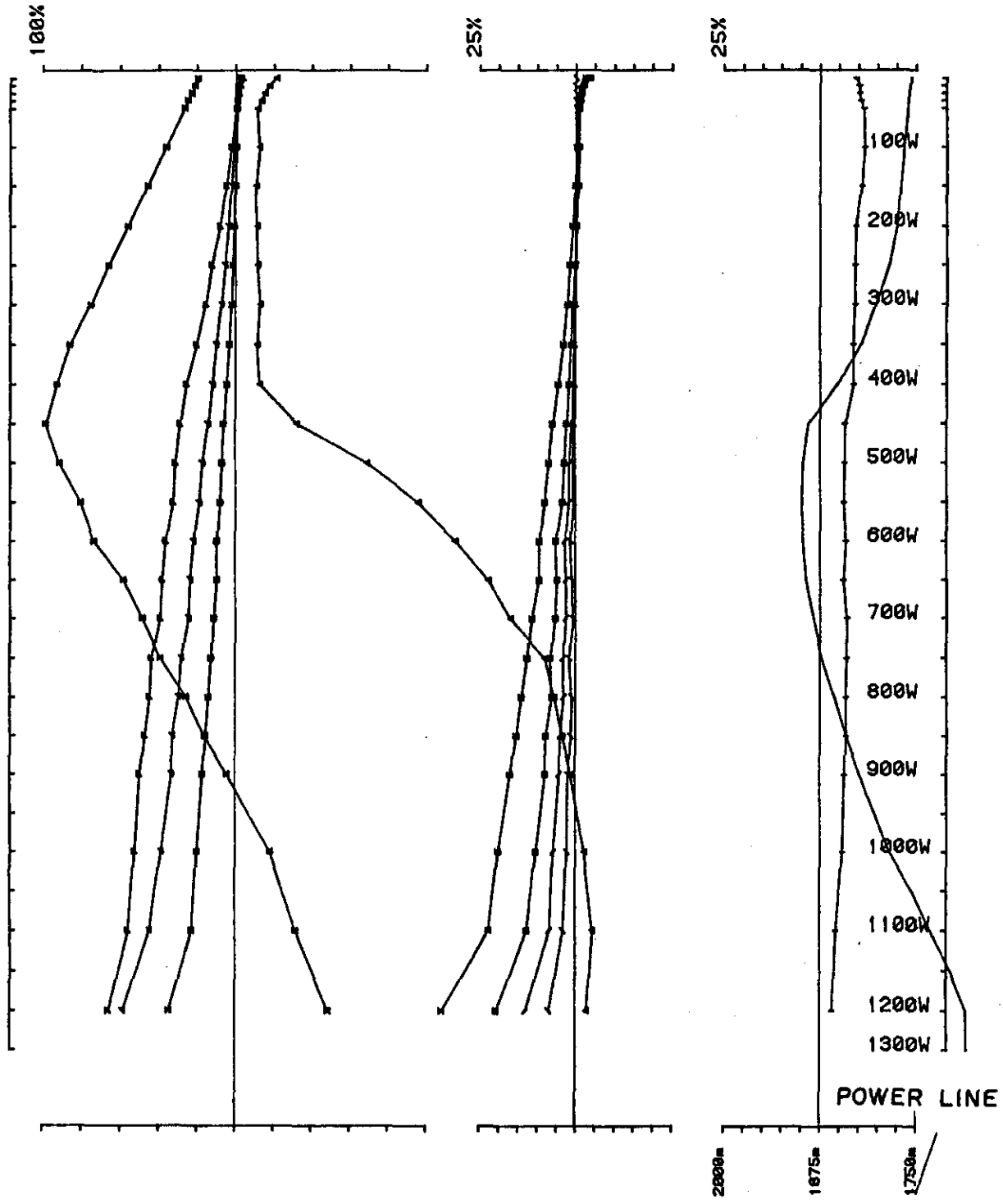
Loopno 1 Line 3000N component Hz secondary Ch 1 normalized .

D.S. 5



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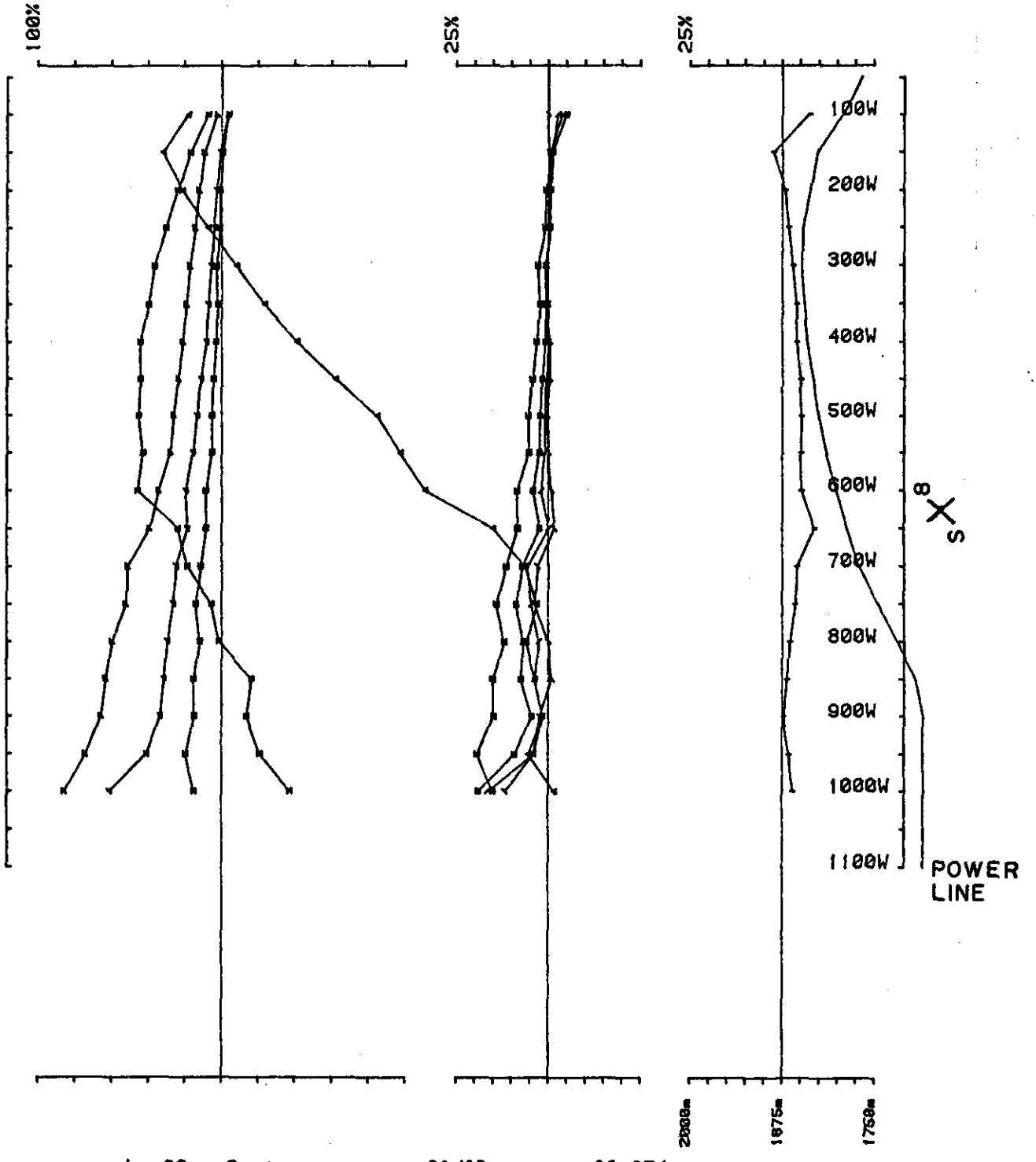
Loopno 1 Line 3500N component Hz secondary Ch 1 normalized

D.S. 6



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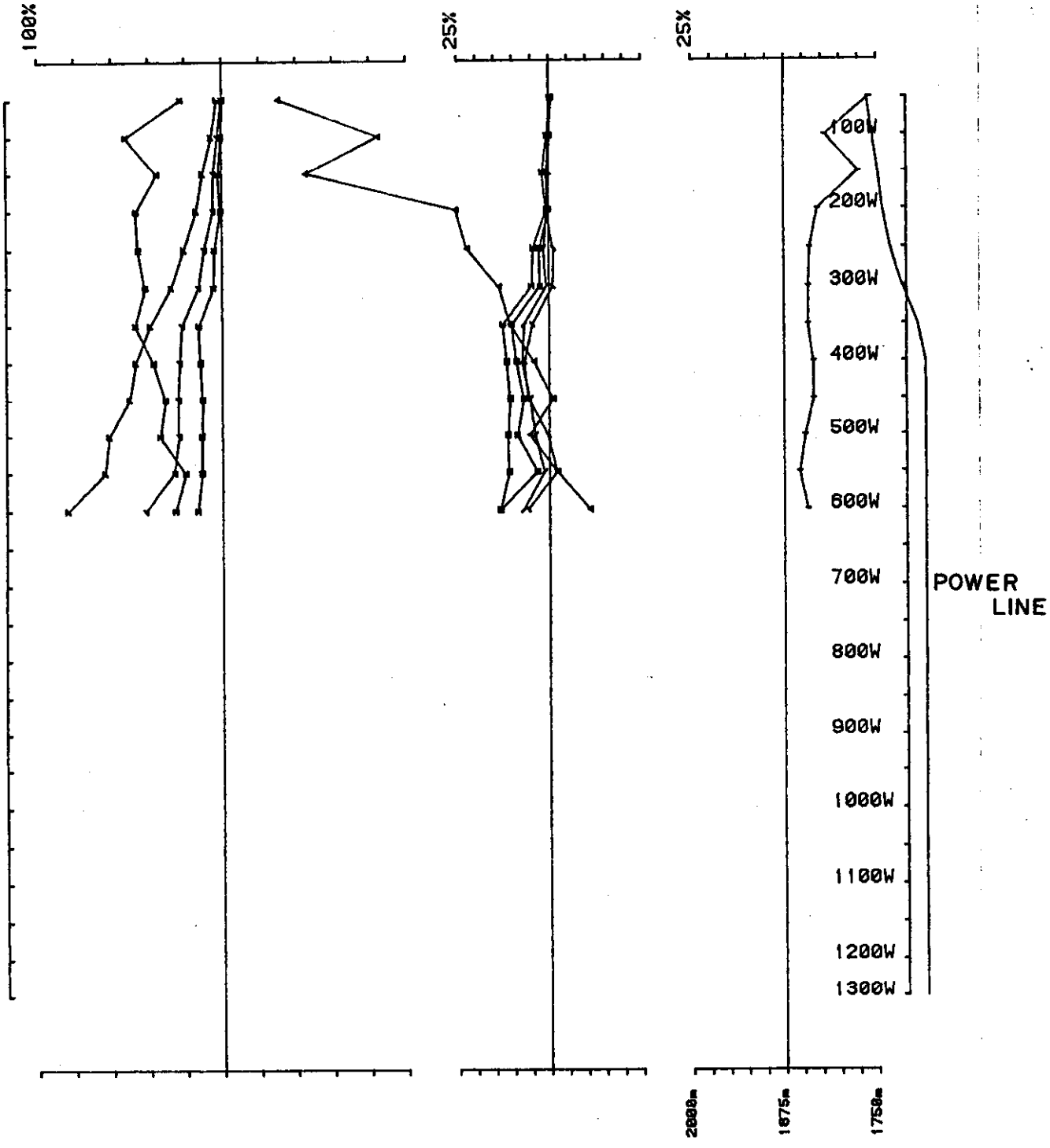

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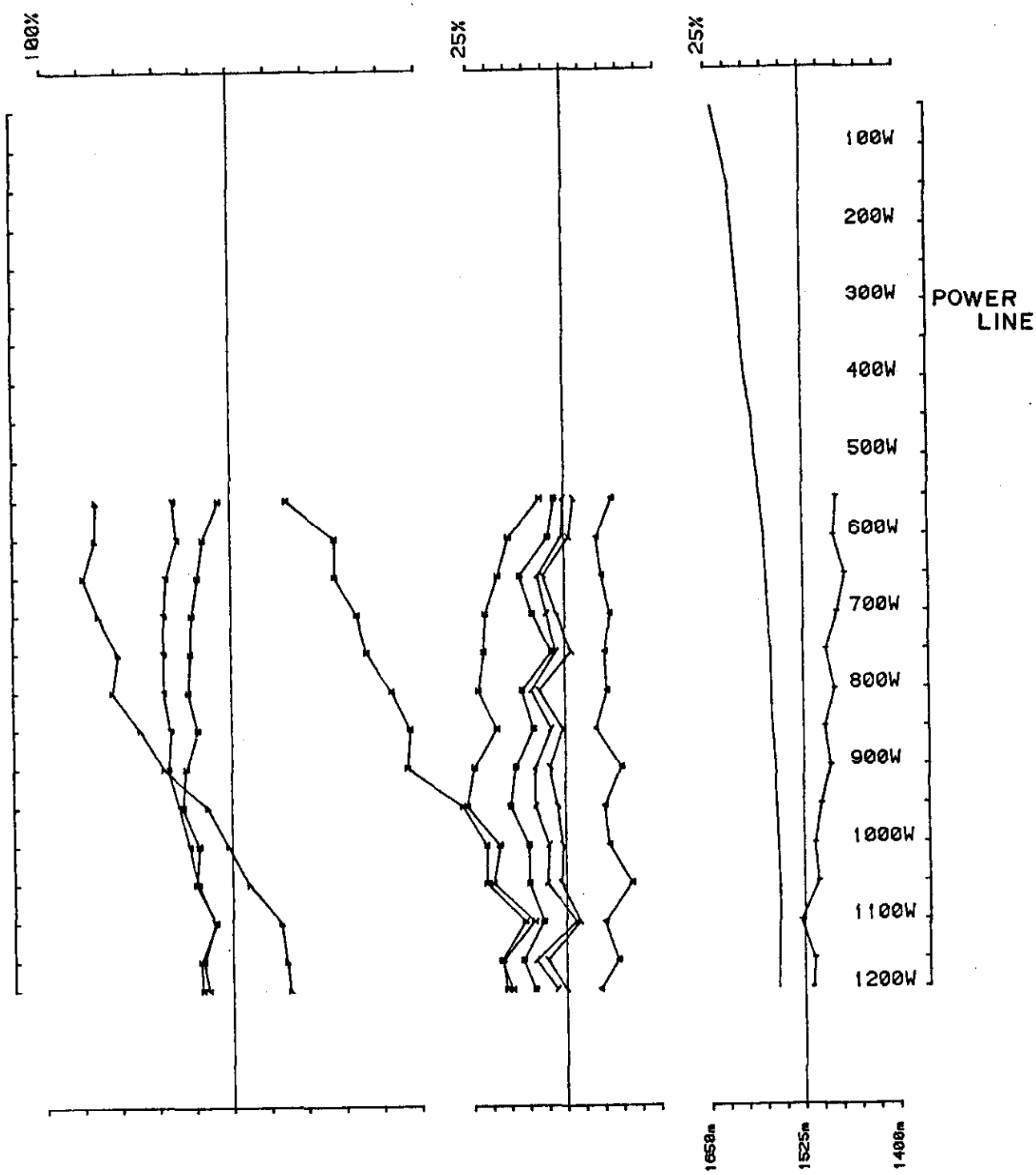

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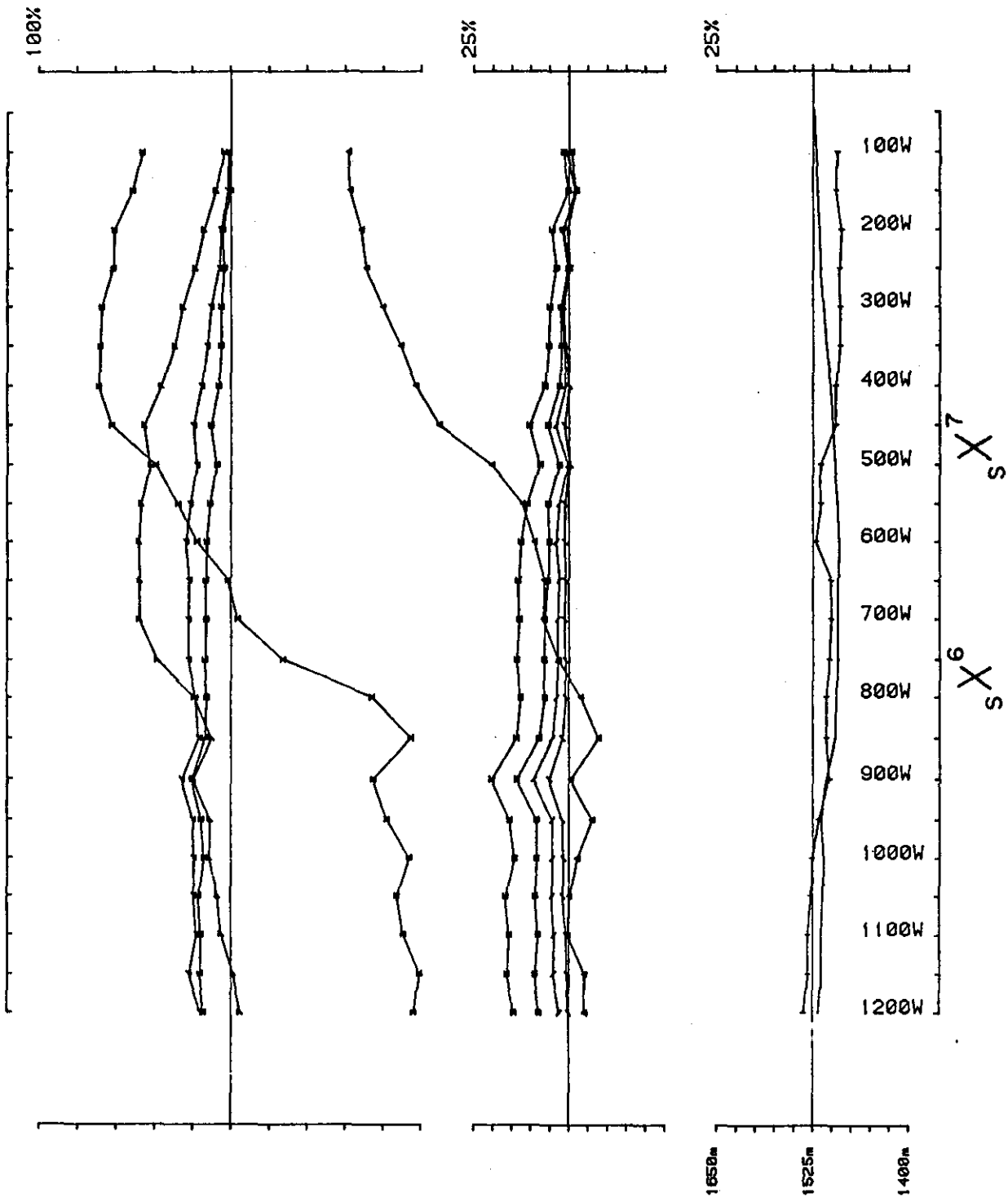

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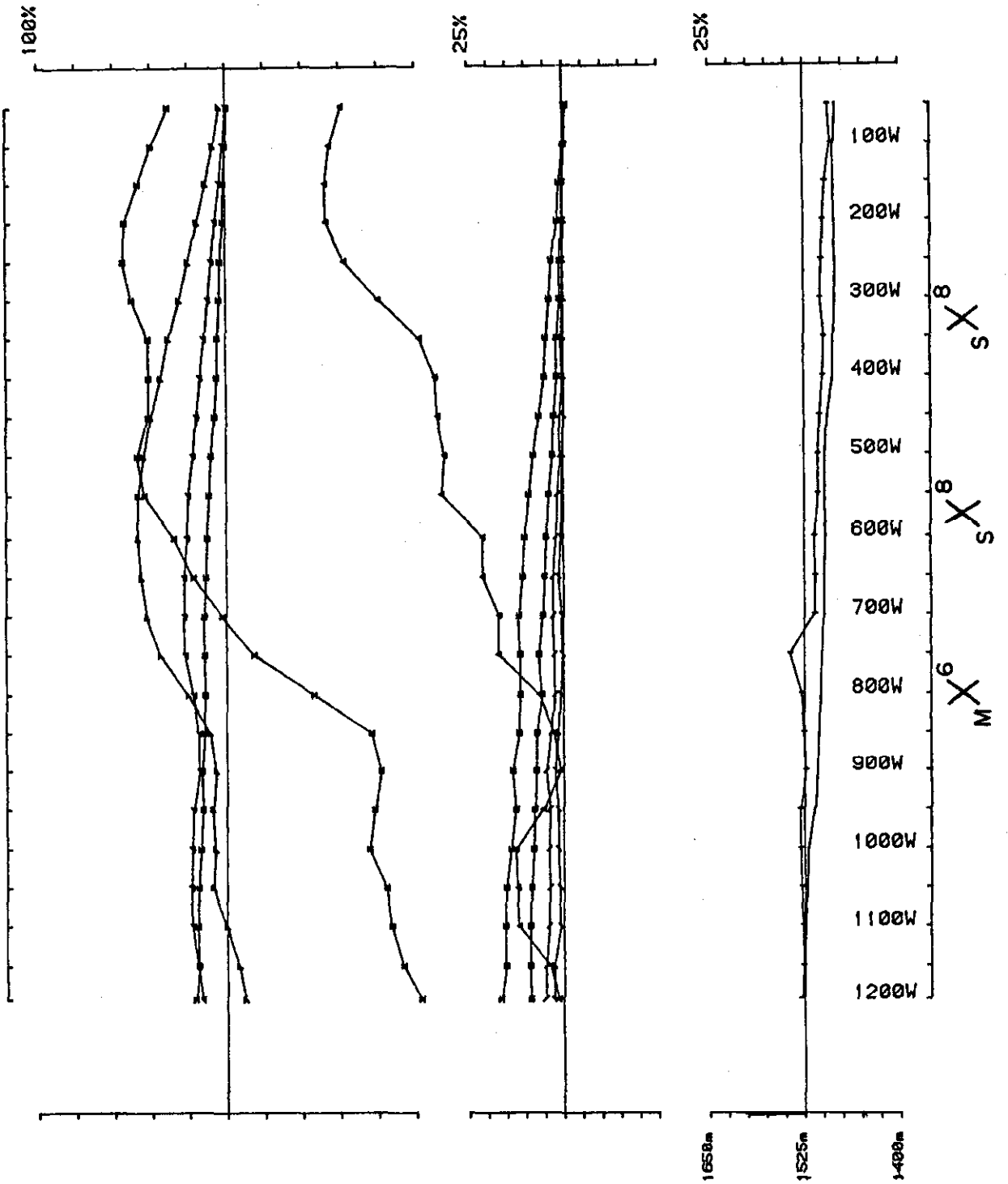

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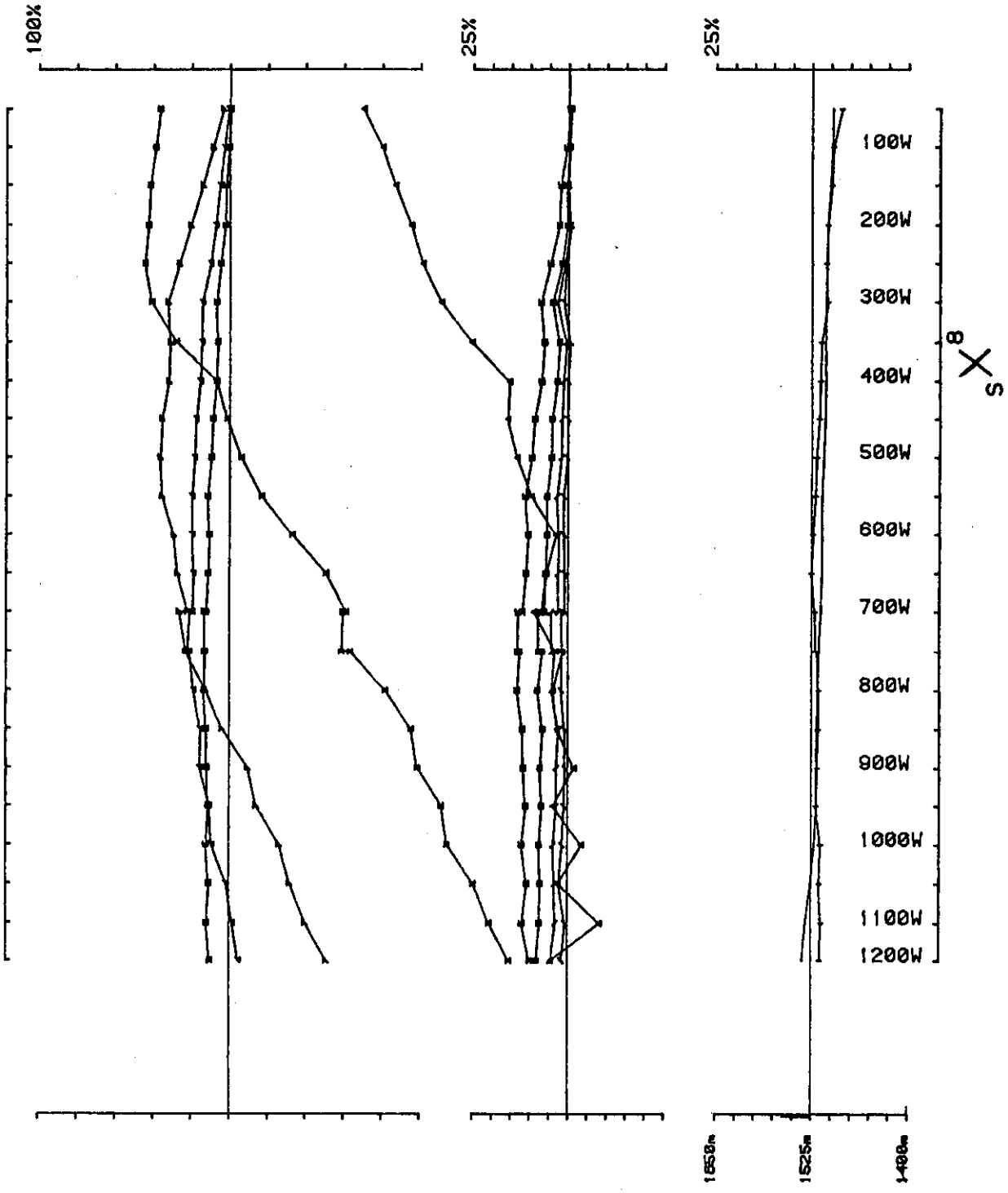

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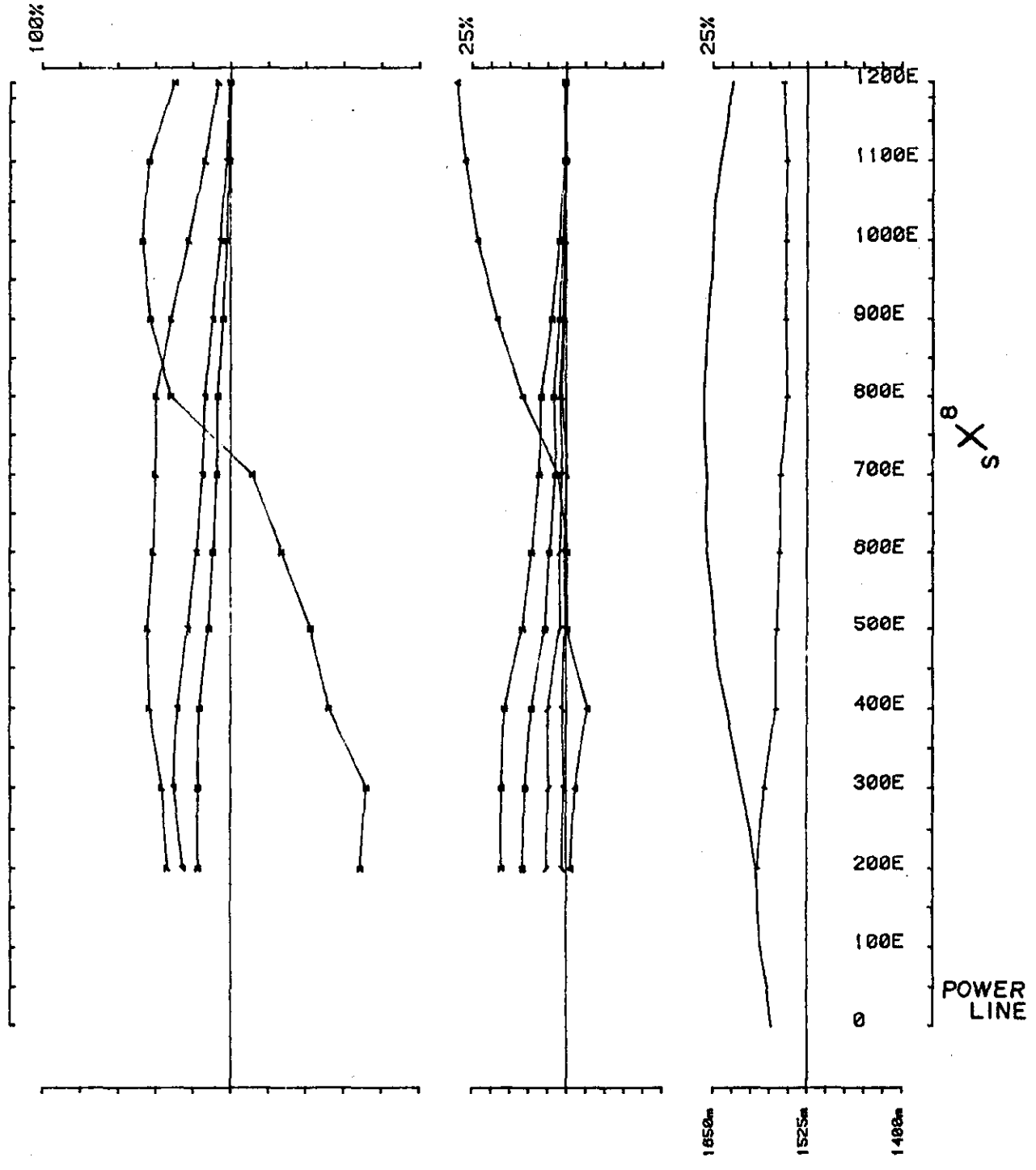

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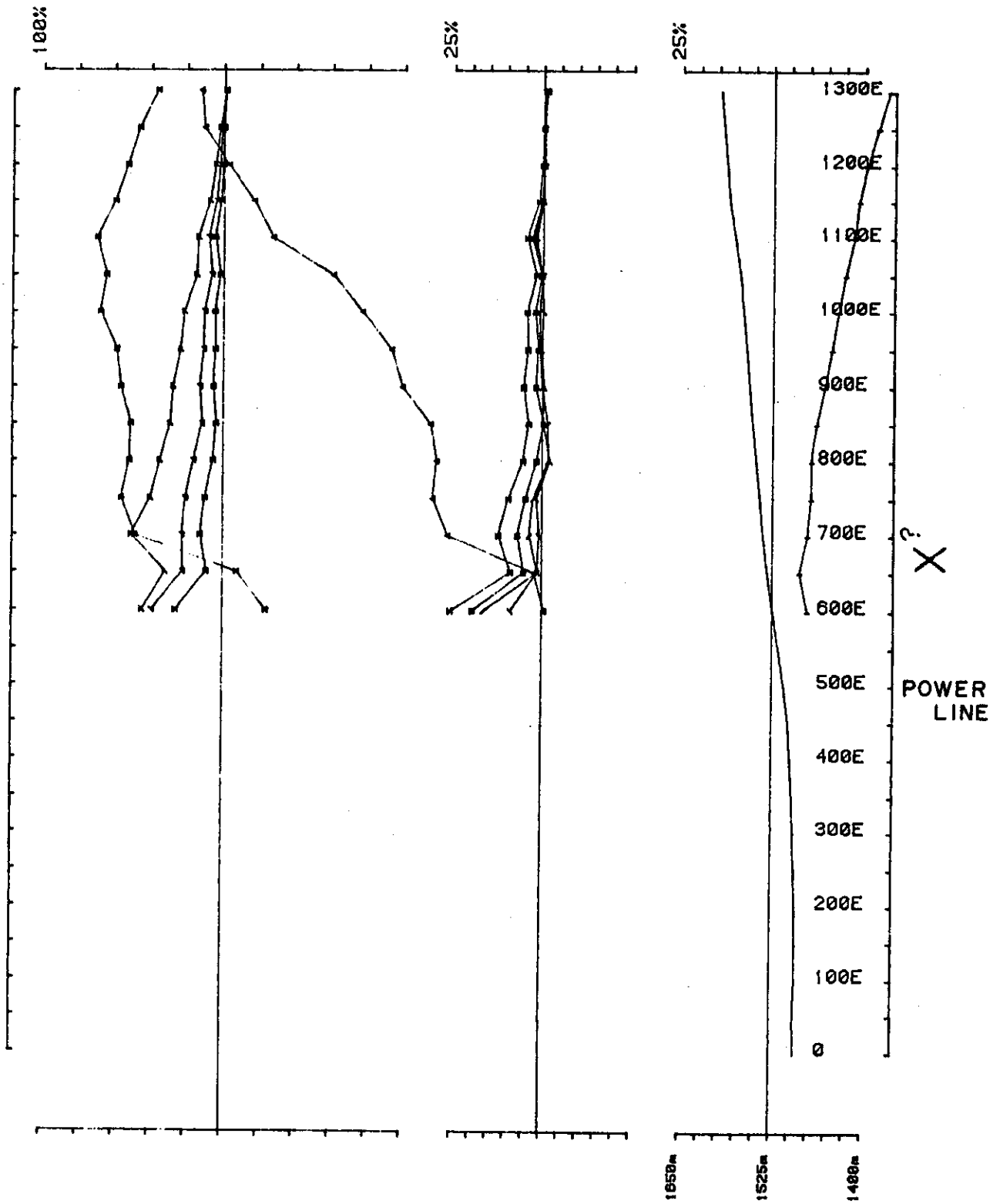

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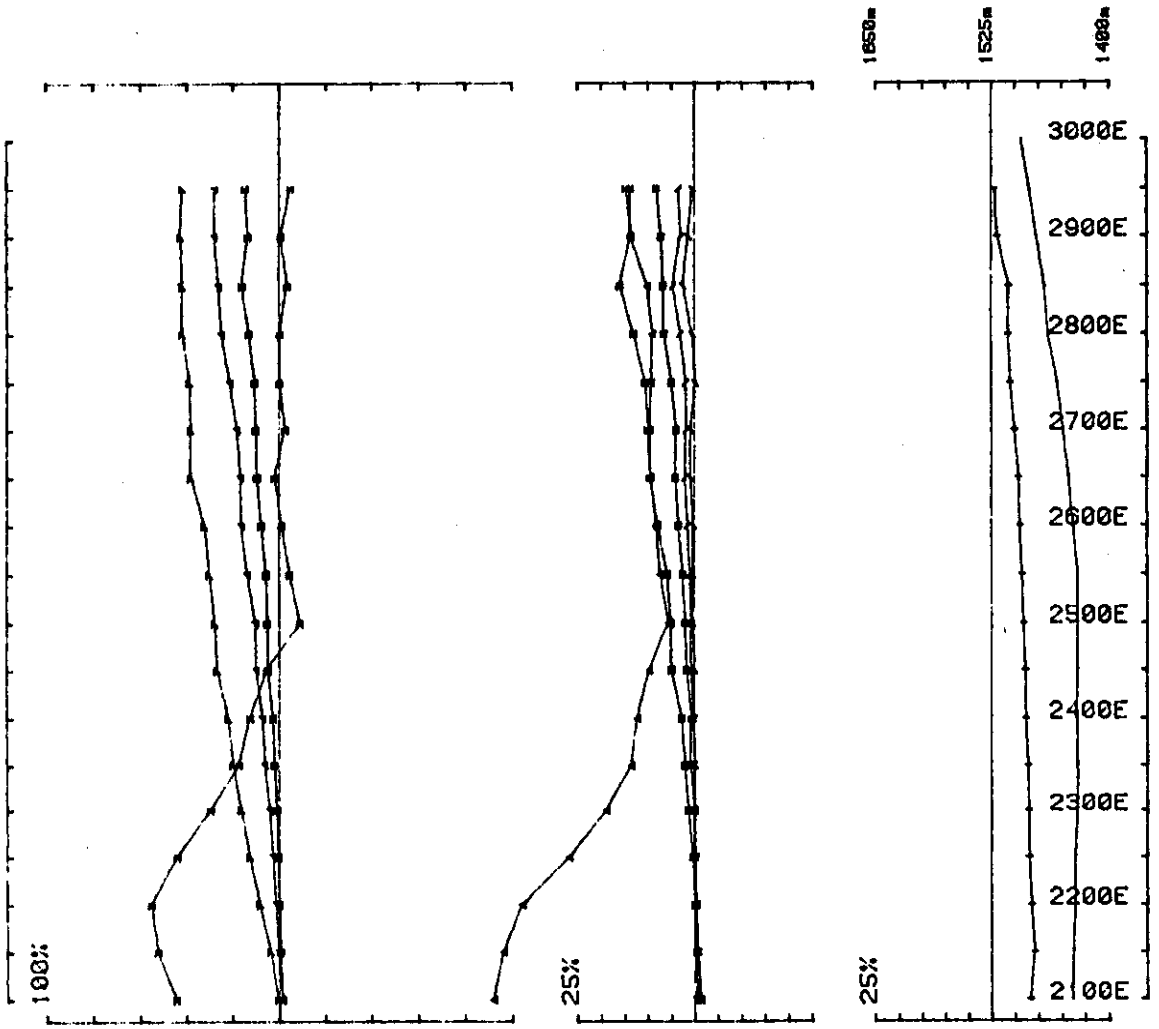

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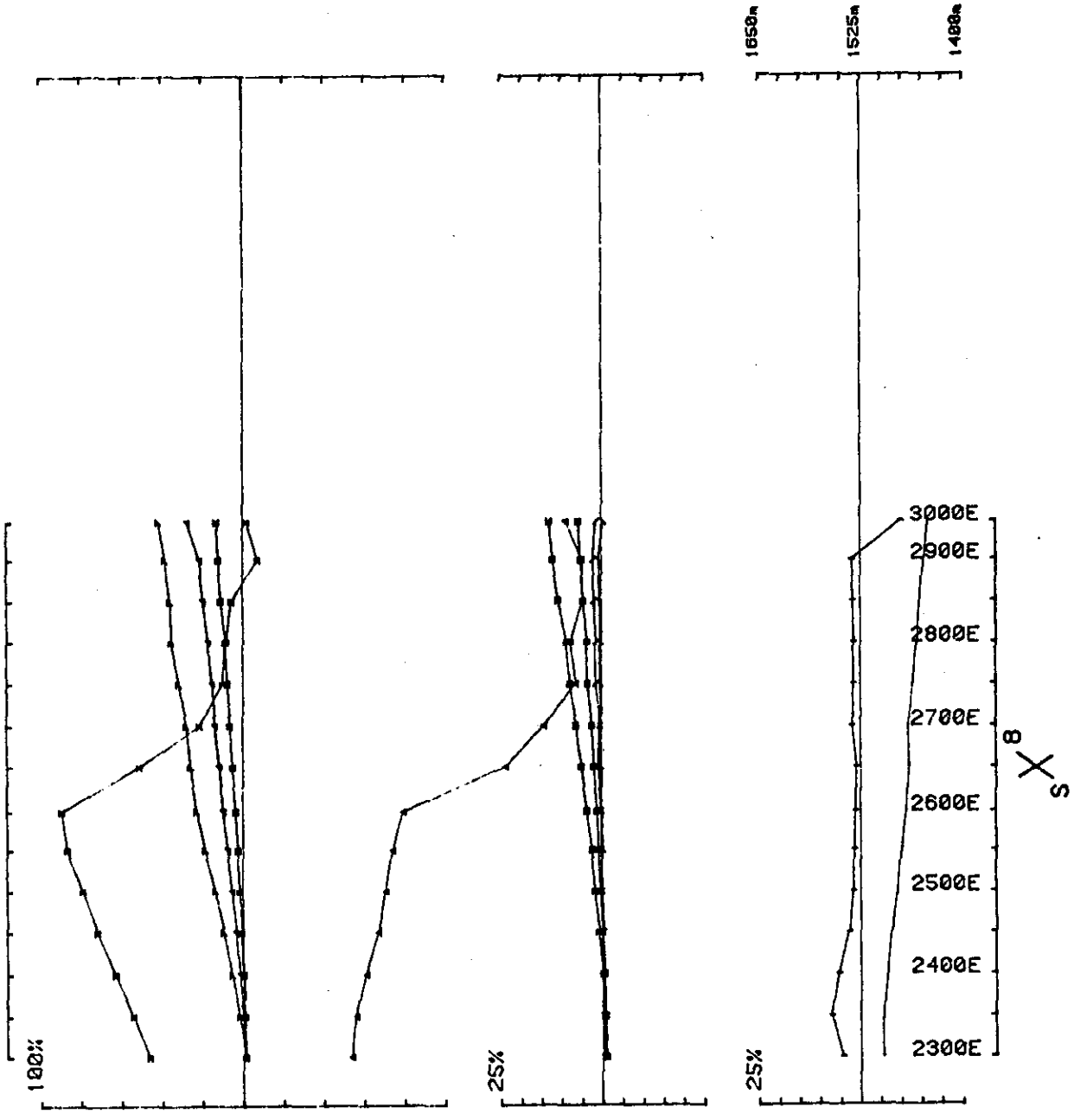

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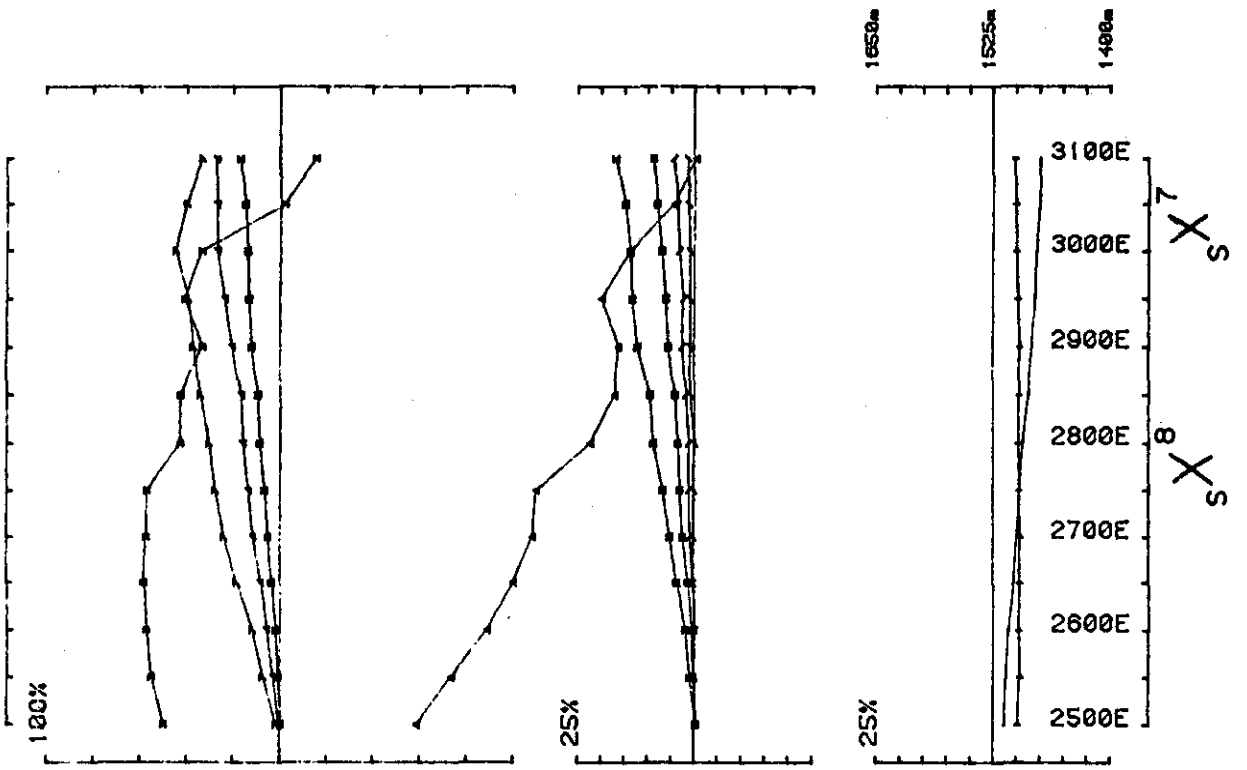

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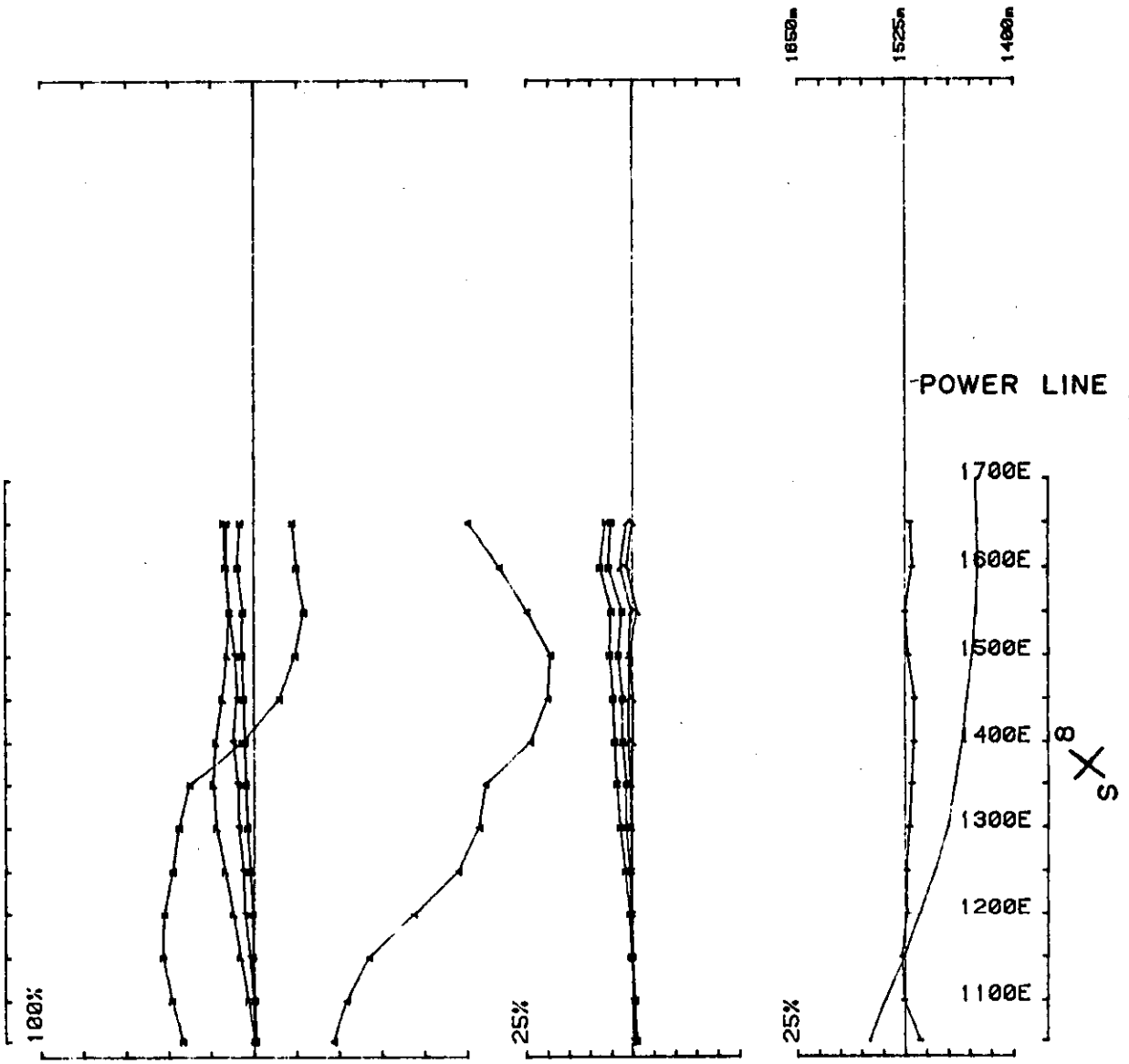

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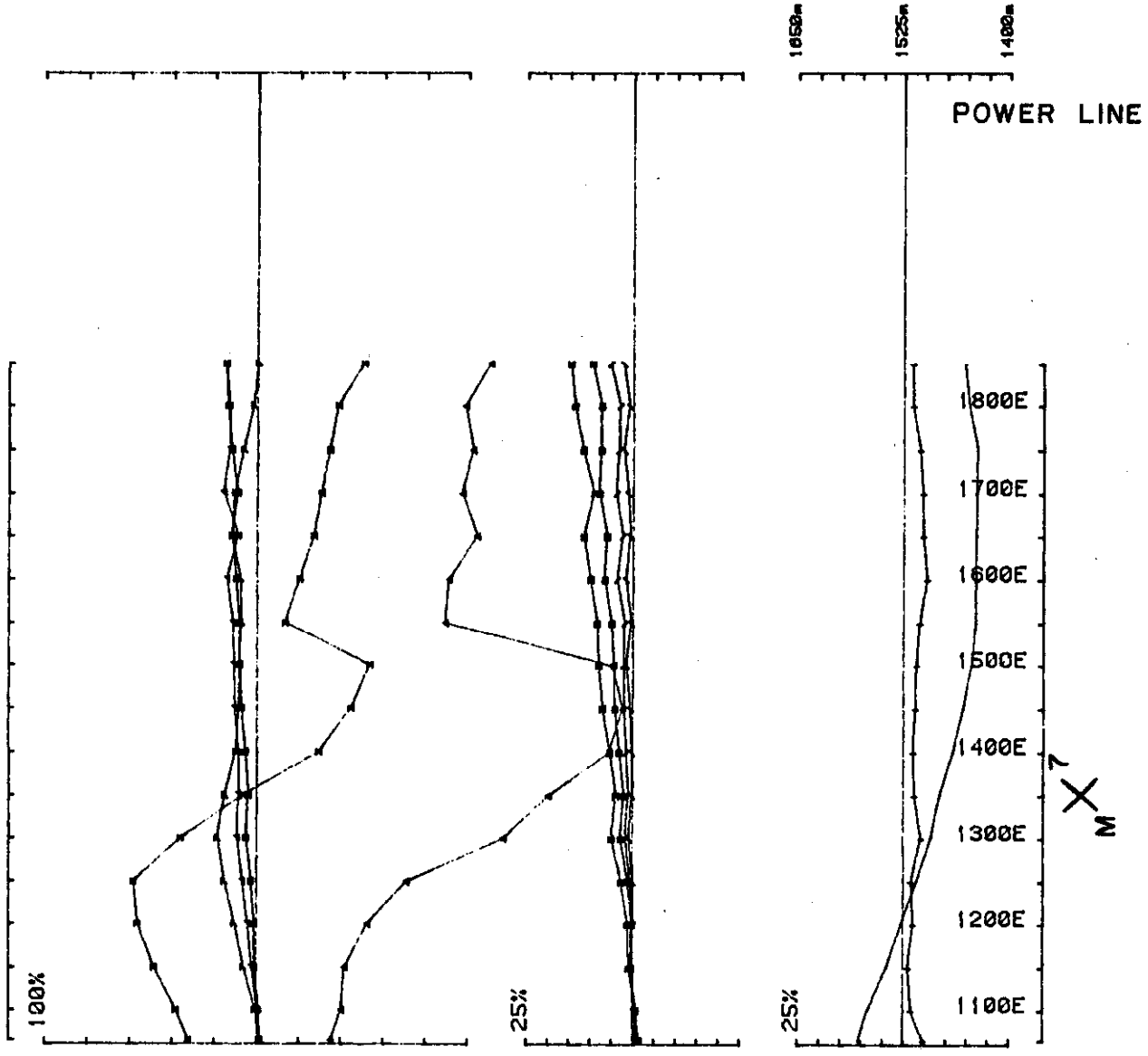

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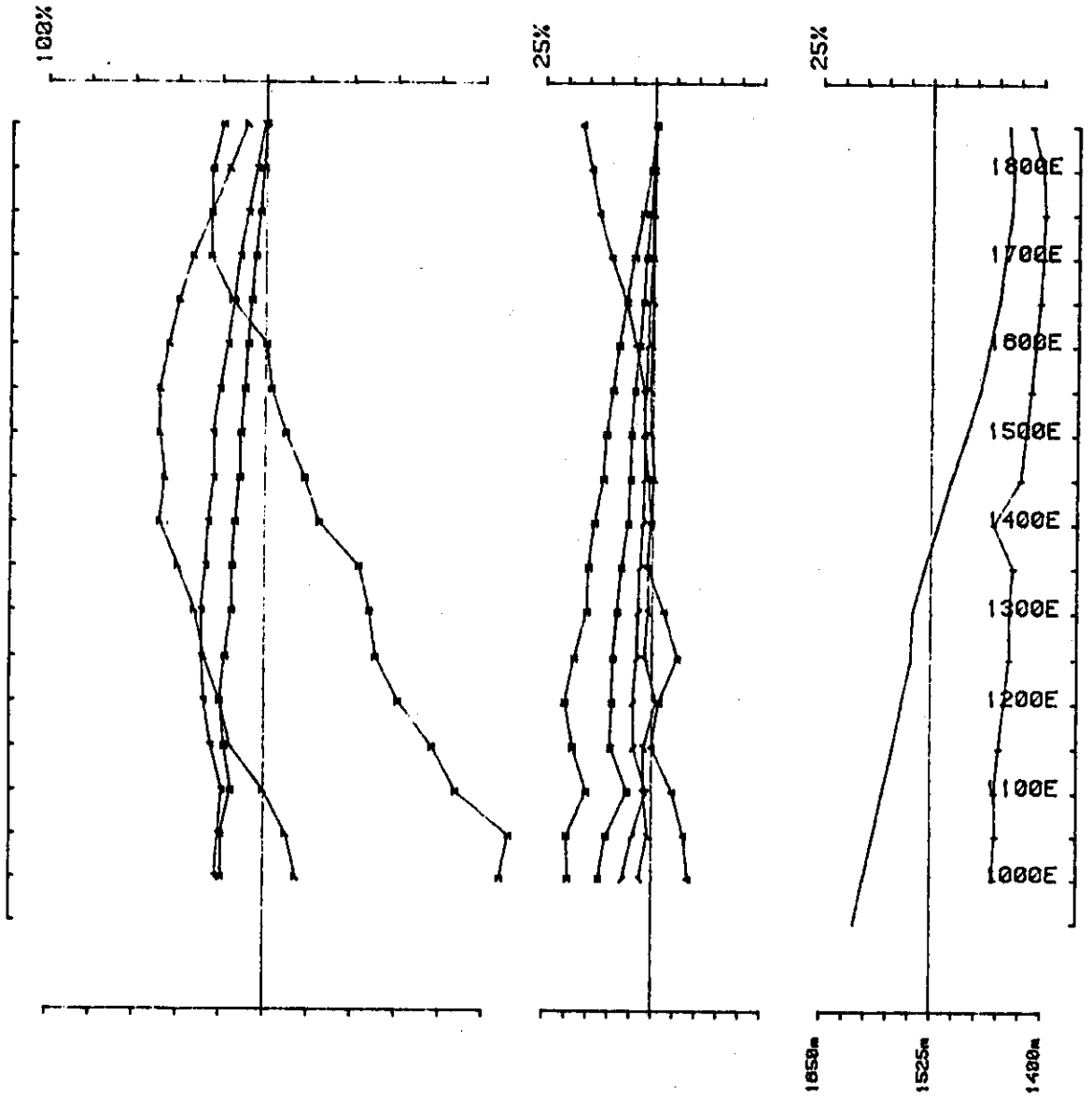

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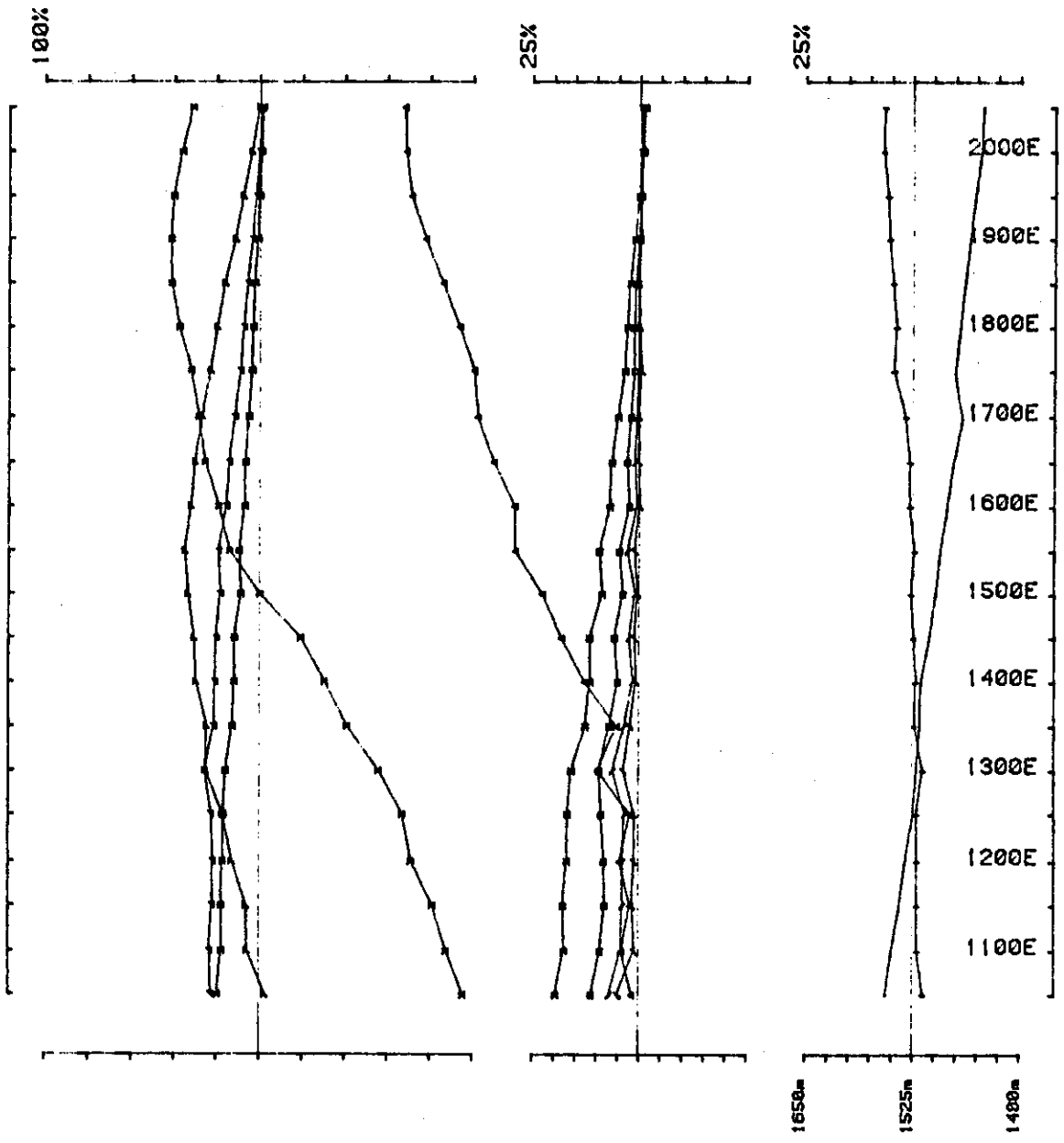

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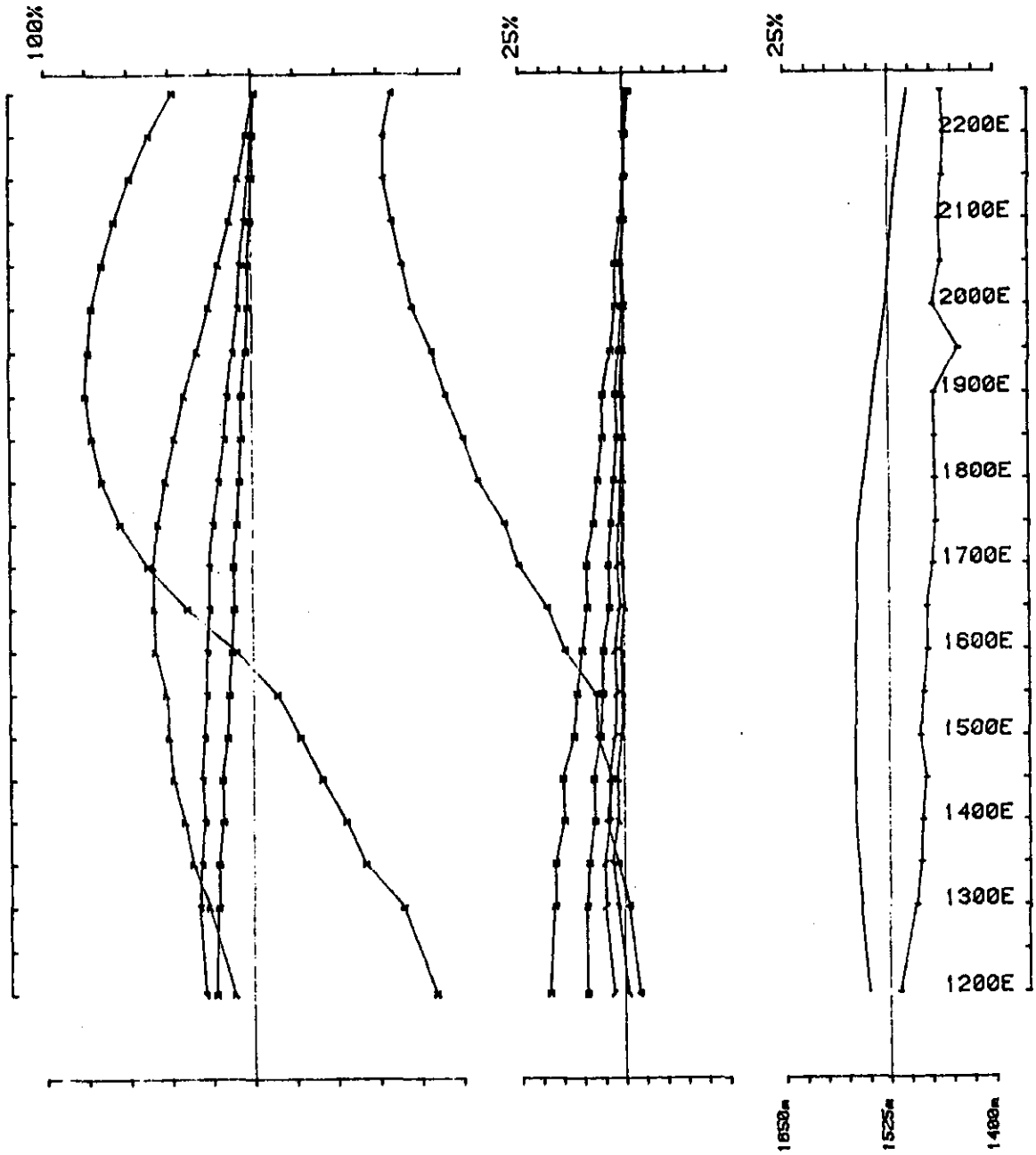

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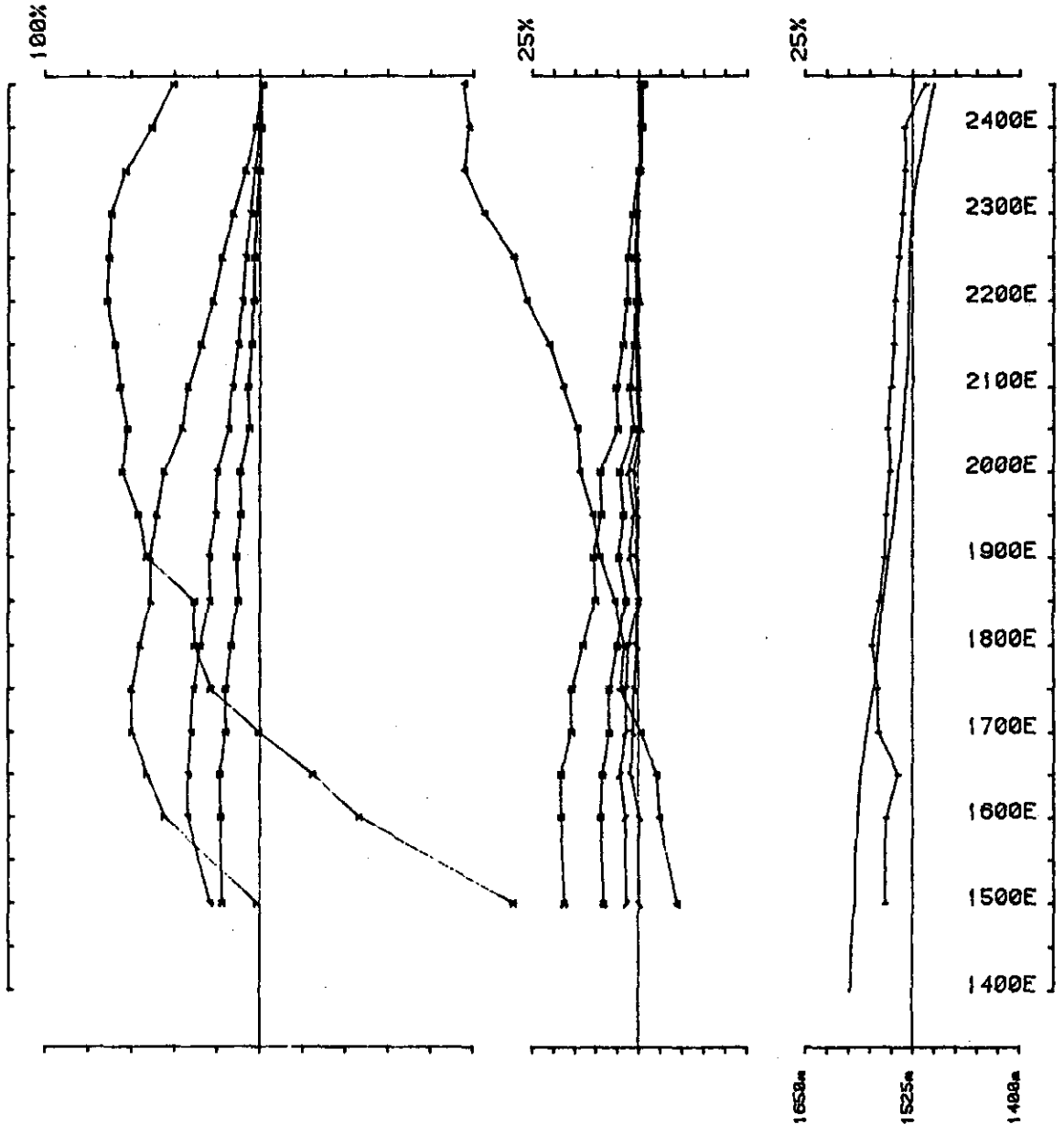
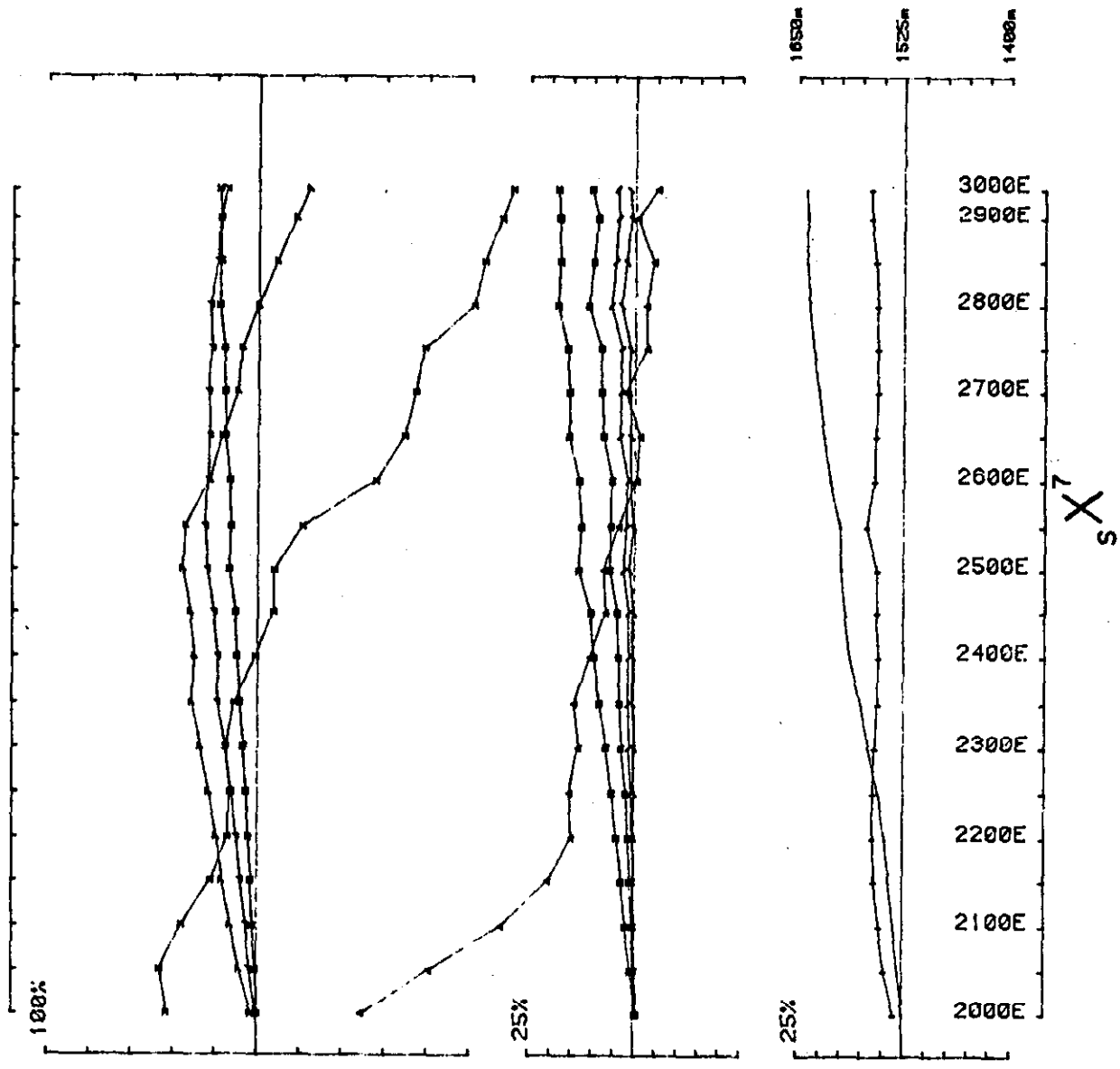
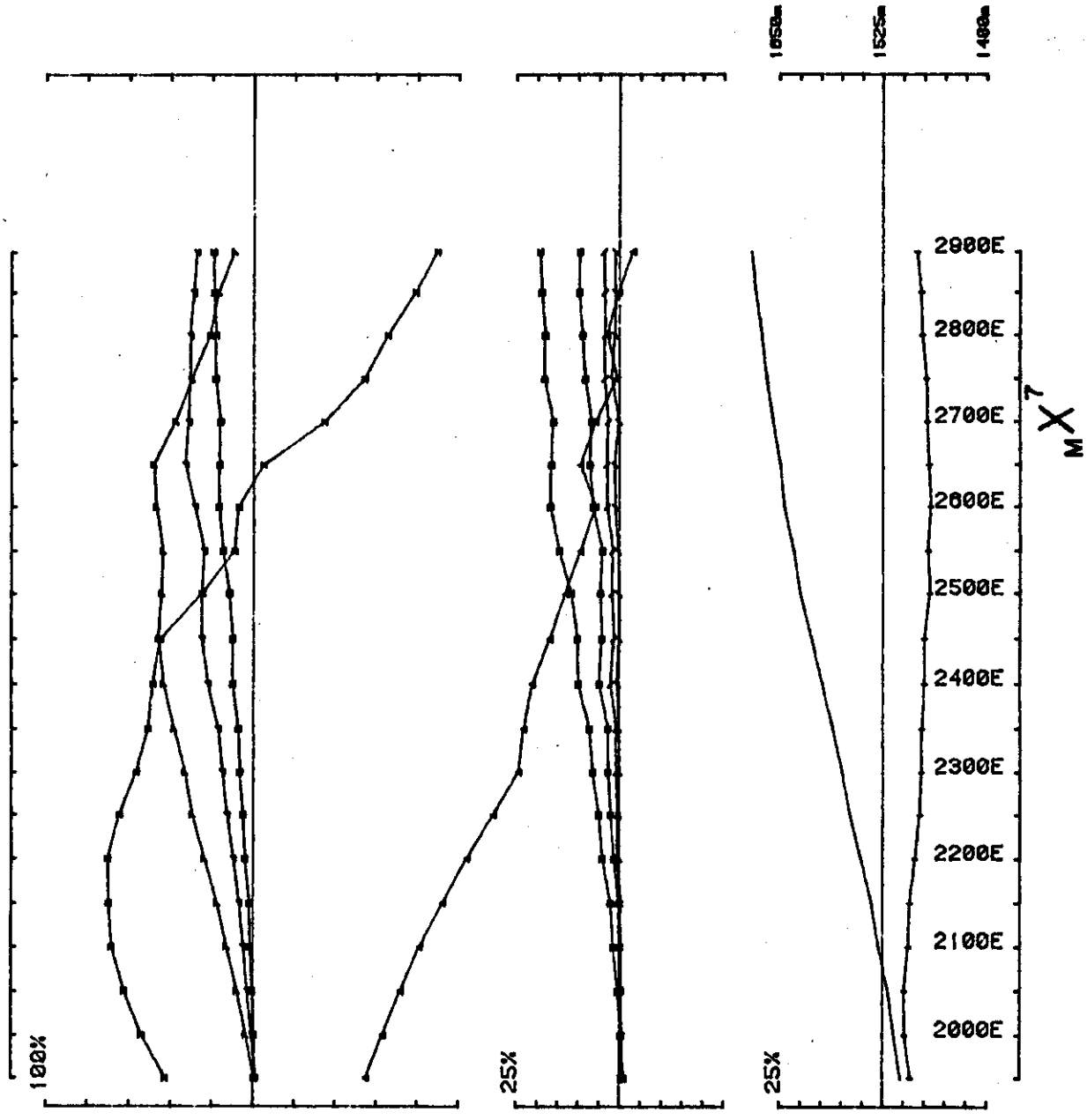


Area Lew82 Cominco operator S&J&D freq(hz) 30.974

Loopno 6 Line 6500N component Hz secondary Ch 1 normalized



Area Lew82 Cominco operator S&D freq(hz) 30.974
Loopno 7 Line 3000N component Hz secondary Ch 1 normalized



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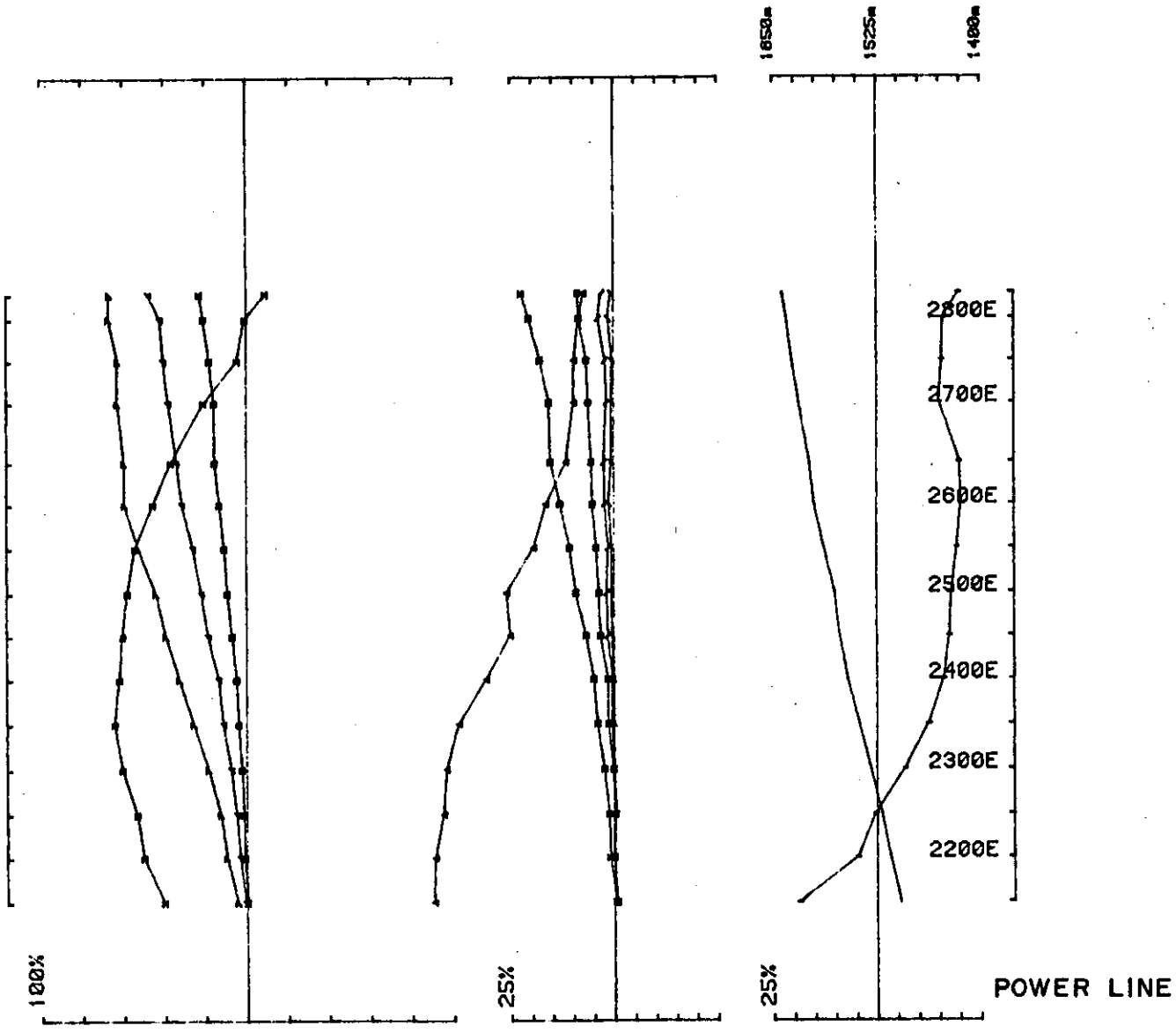

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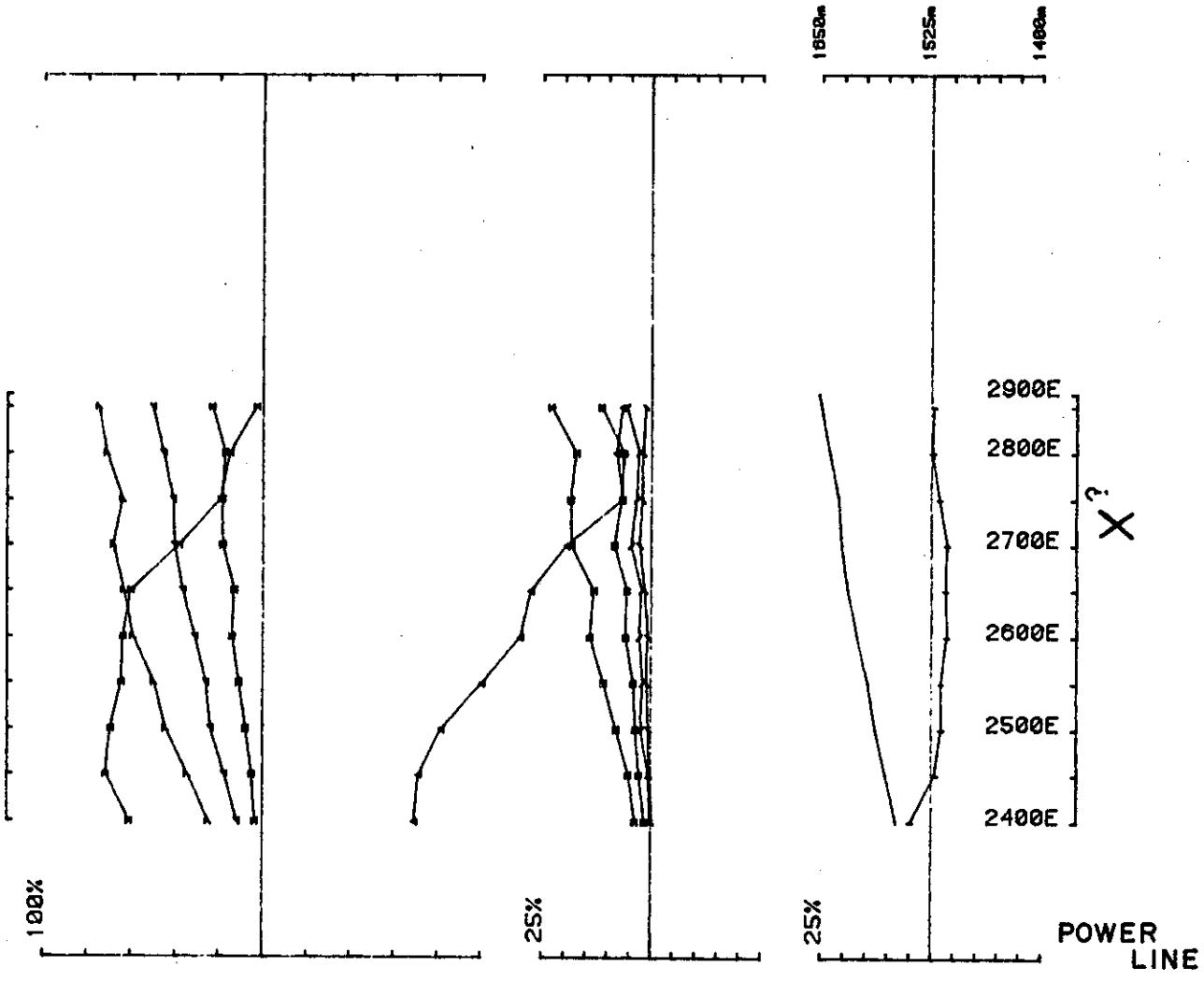

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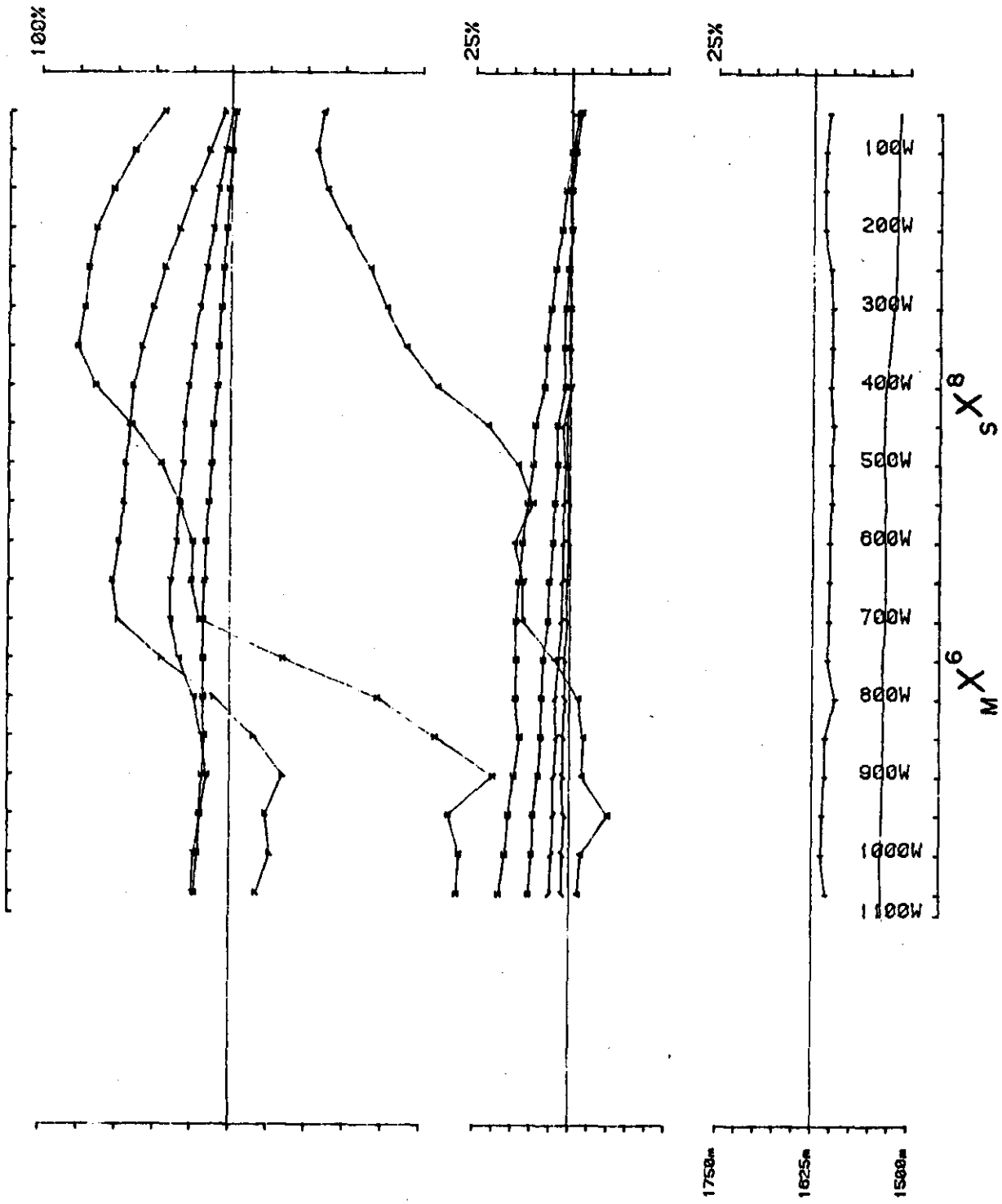

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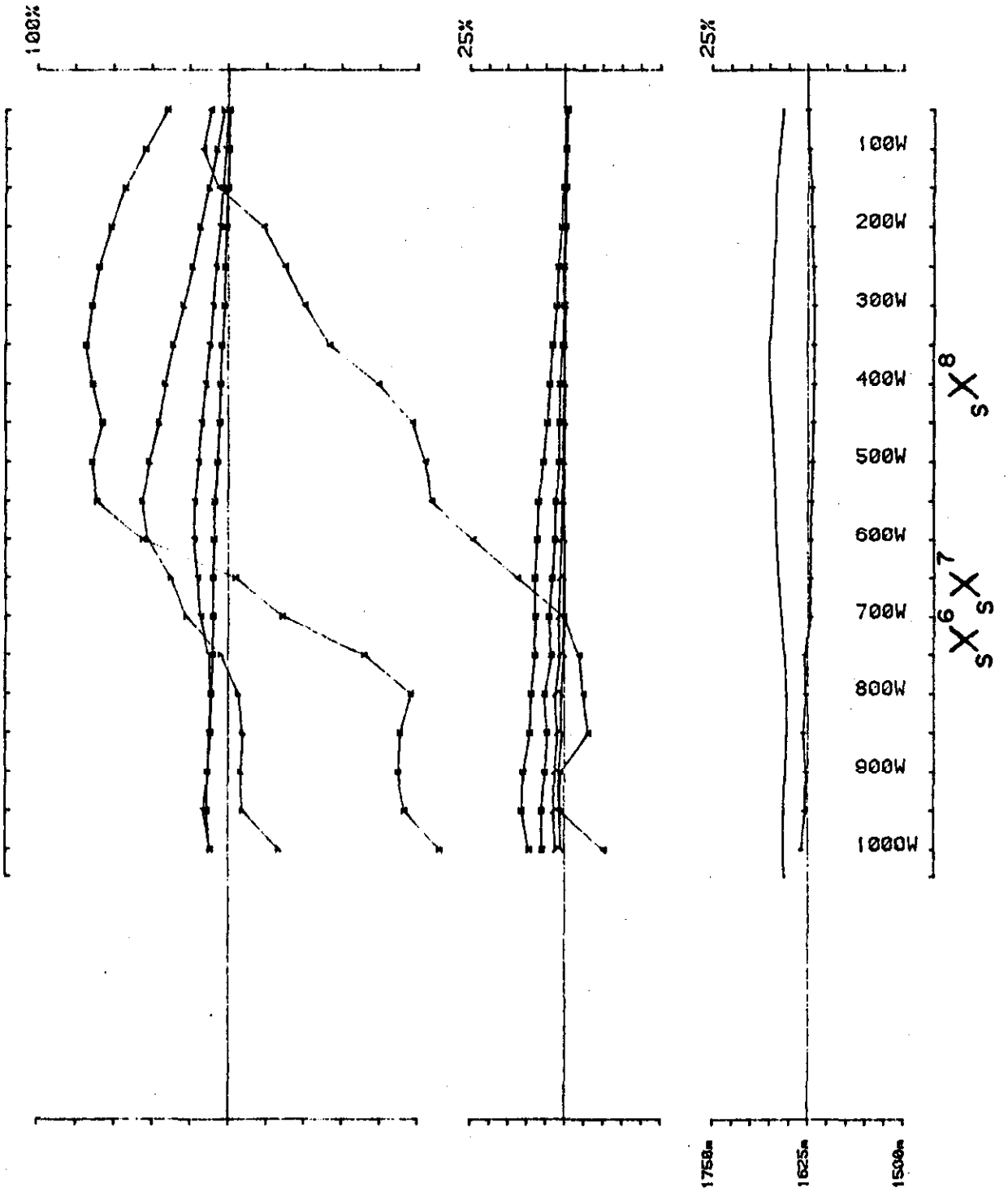
Loopno 8 Line 7000N component Hz secondary Ch 1 normalized .



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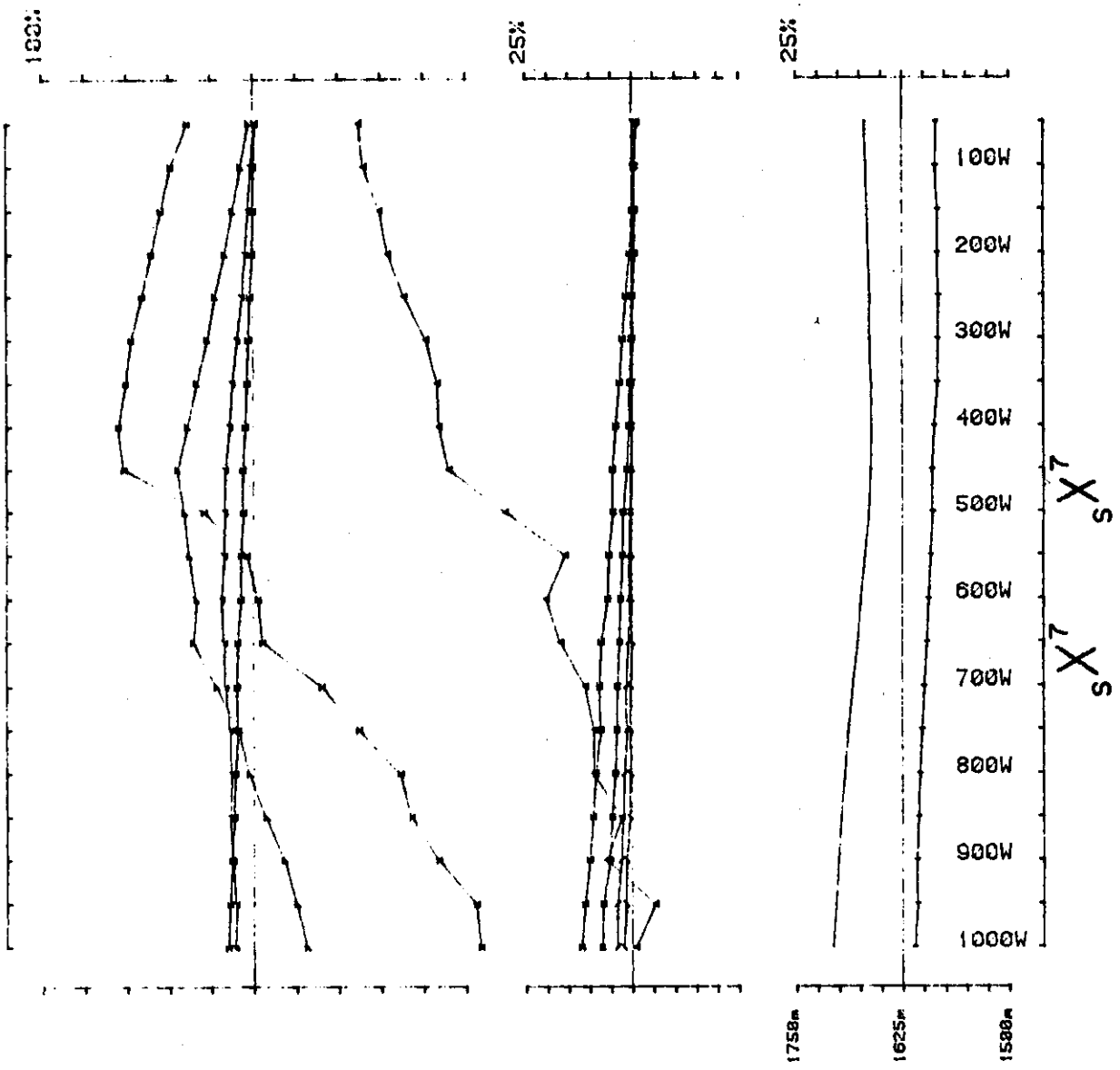

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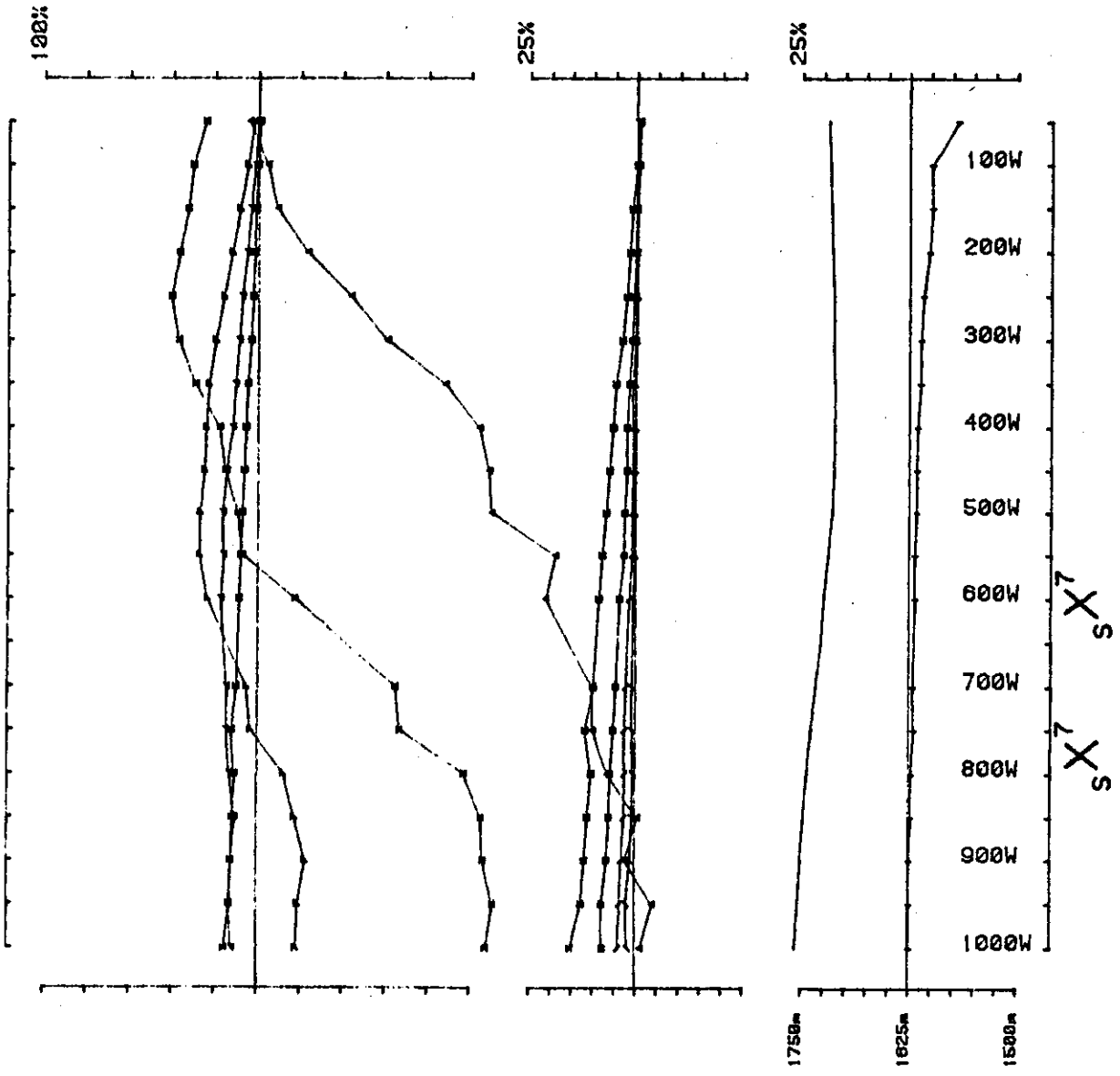

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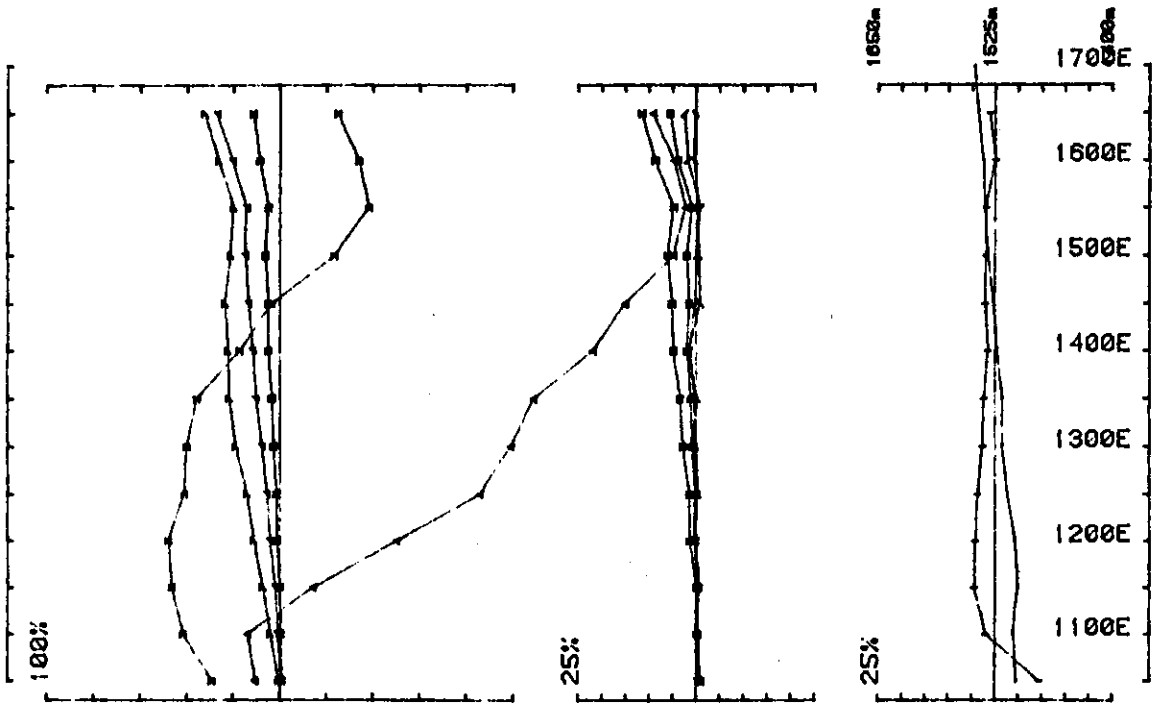

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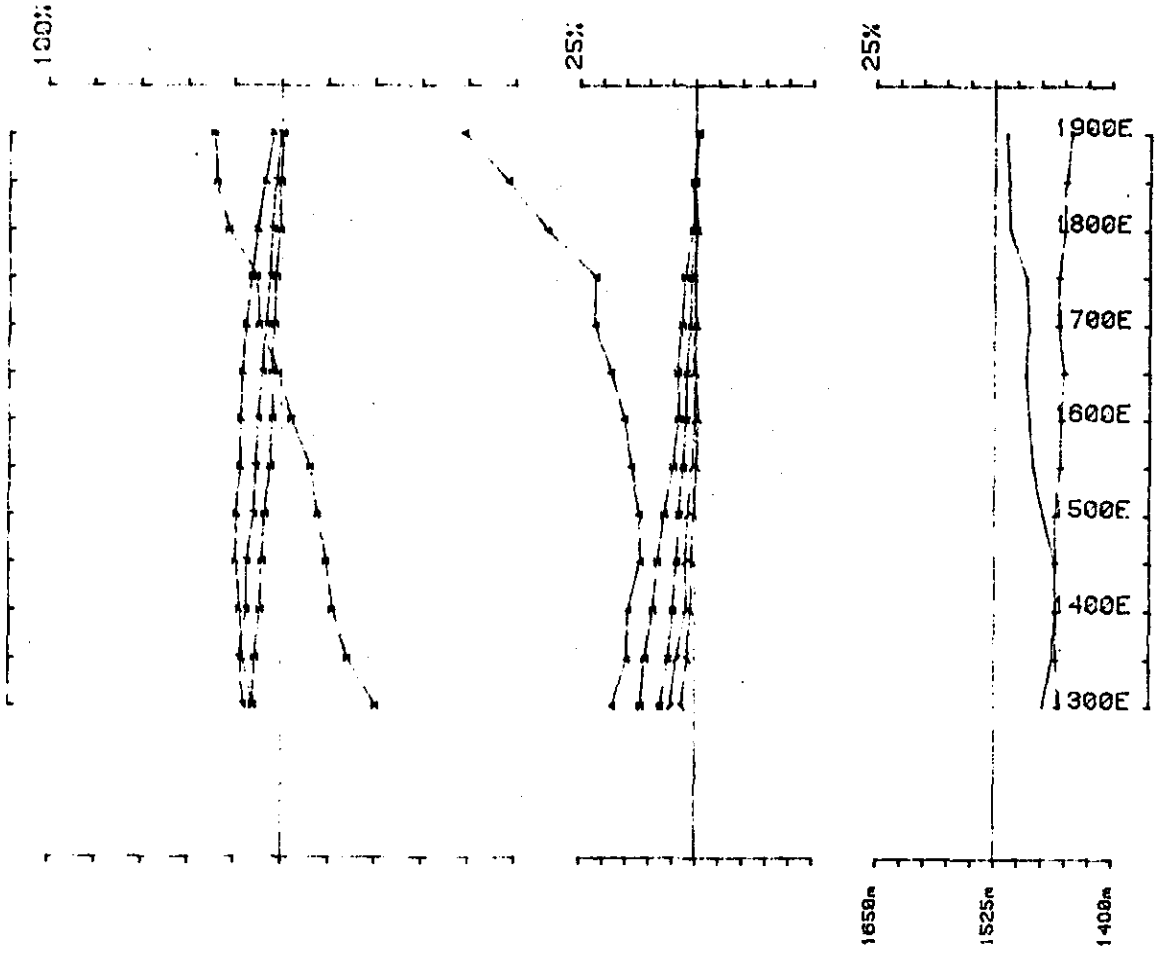

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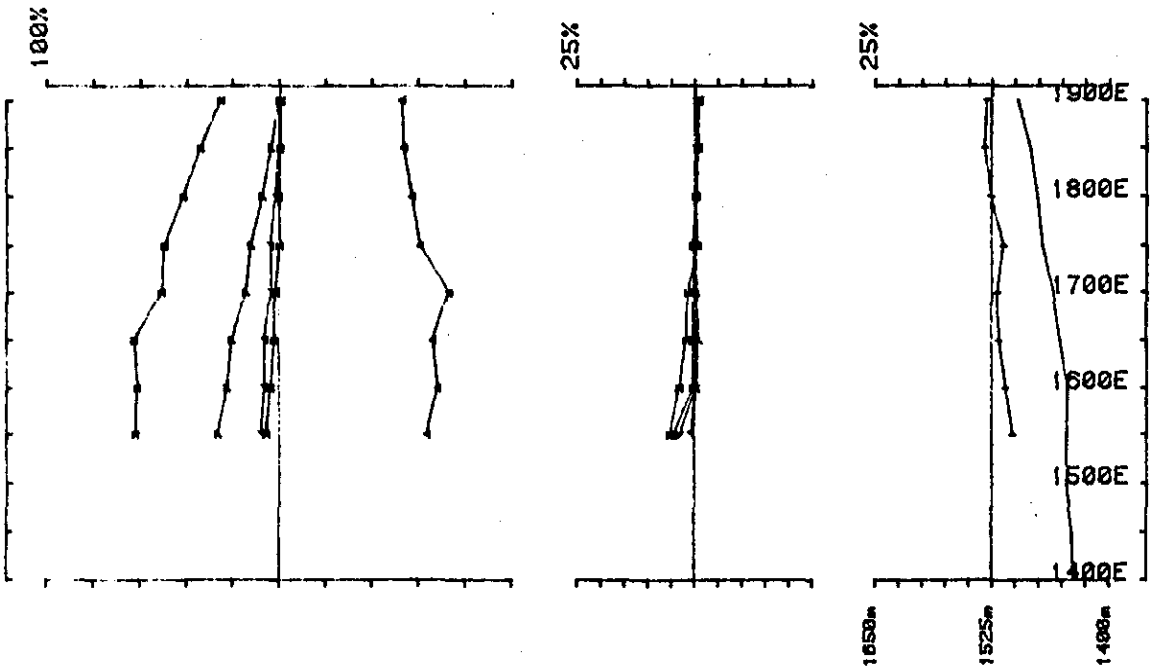

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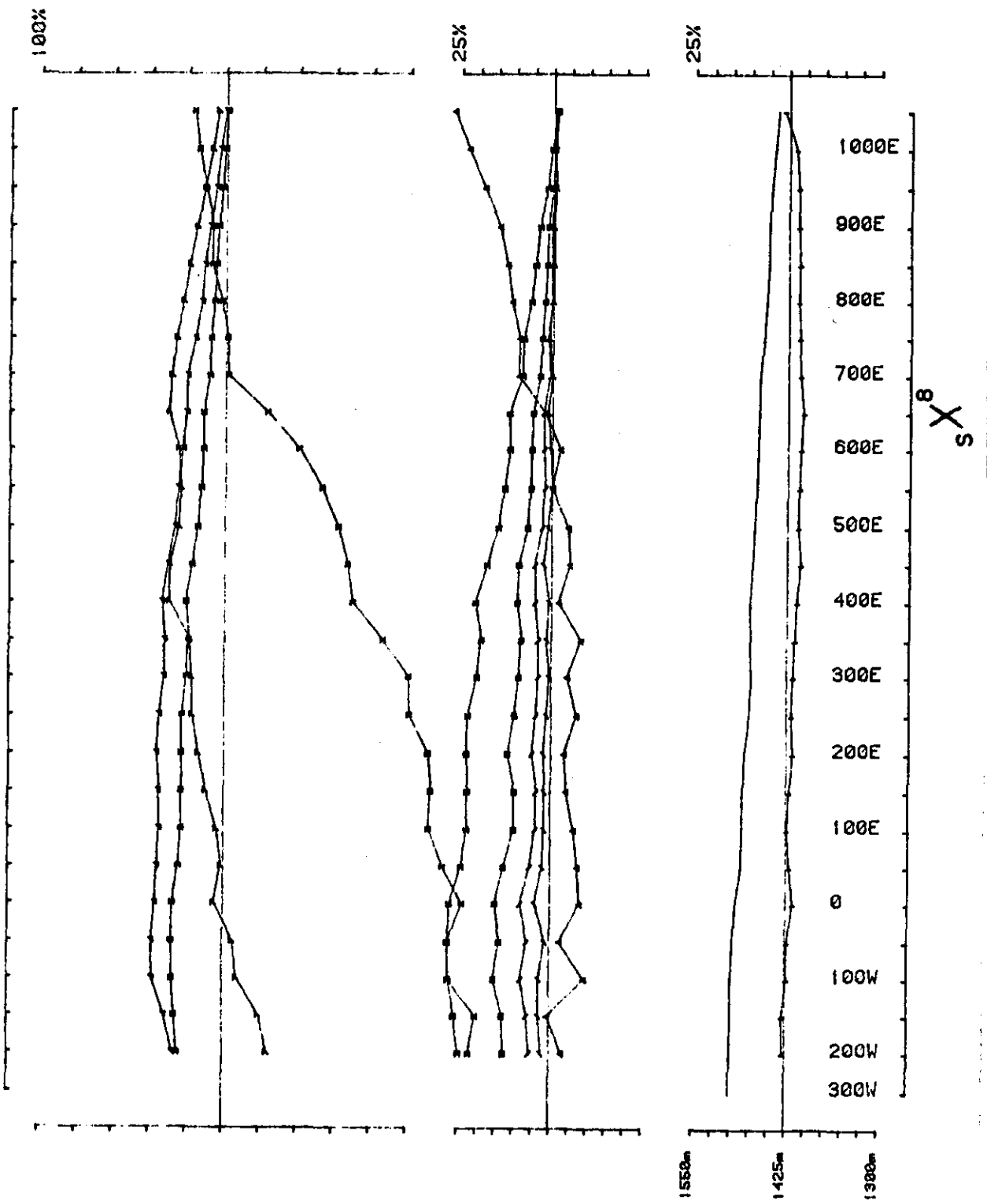

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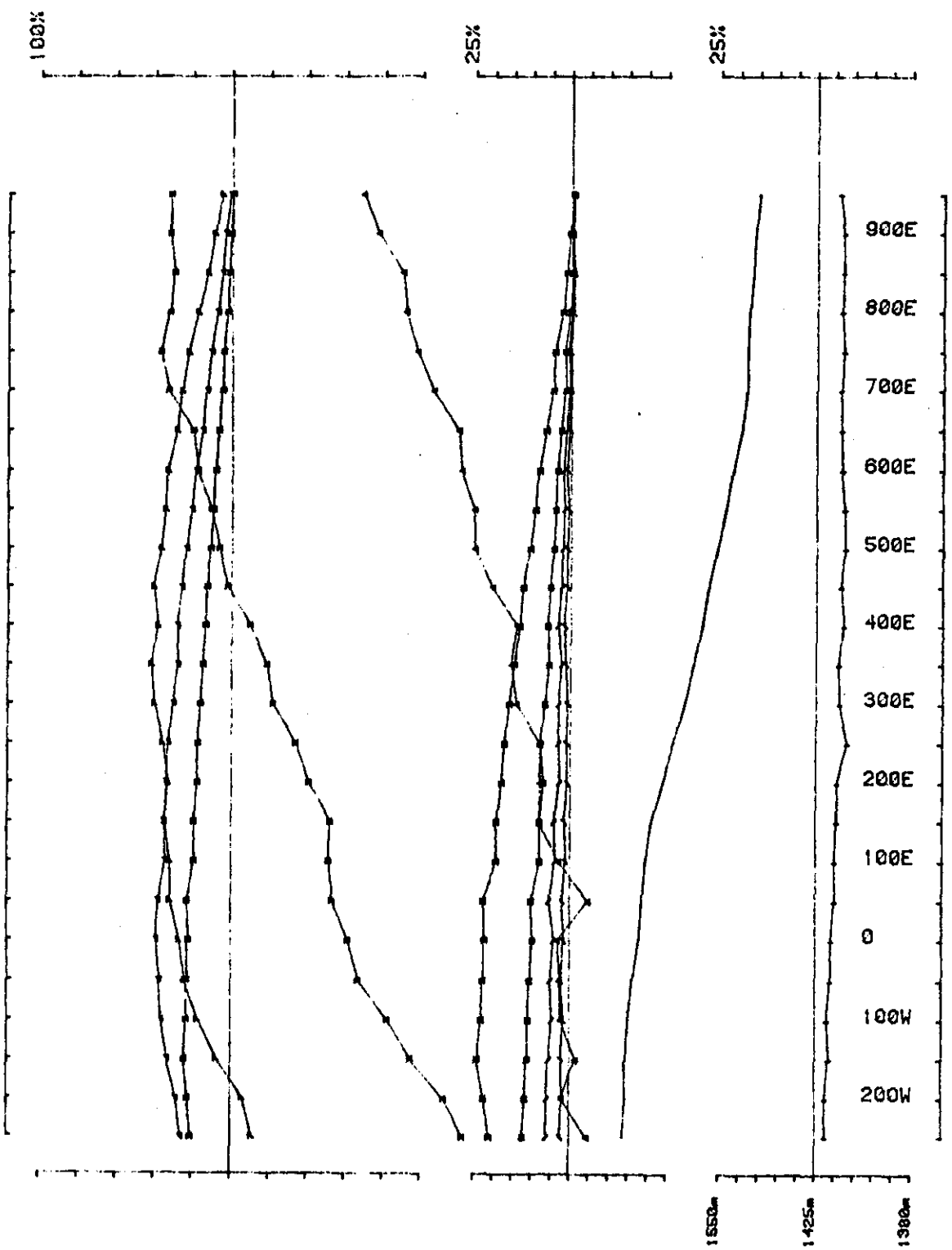

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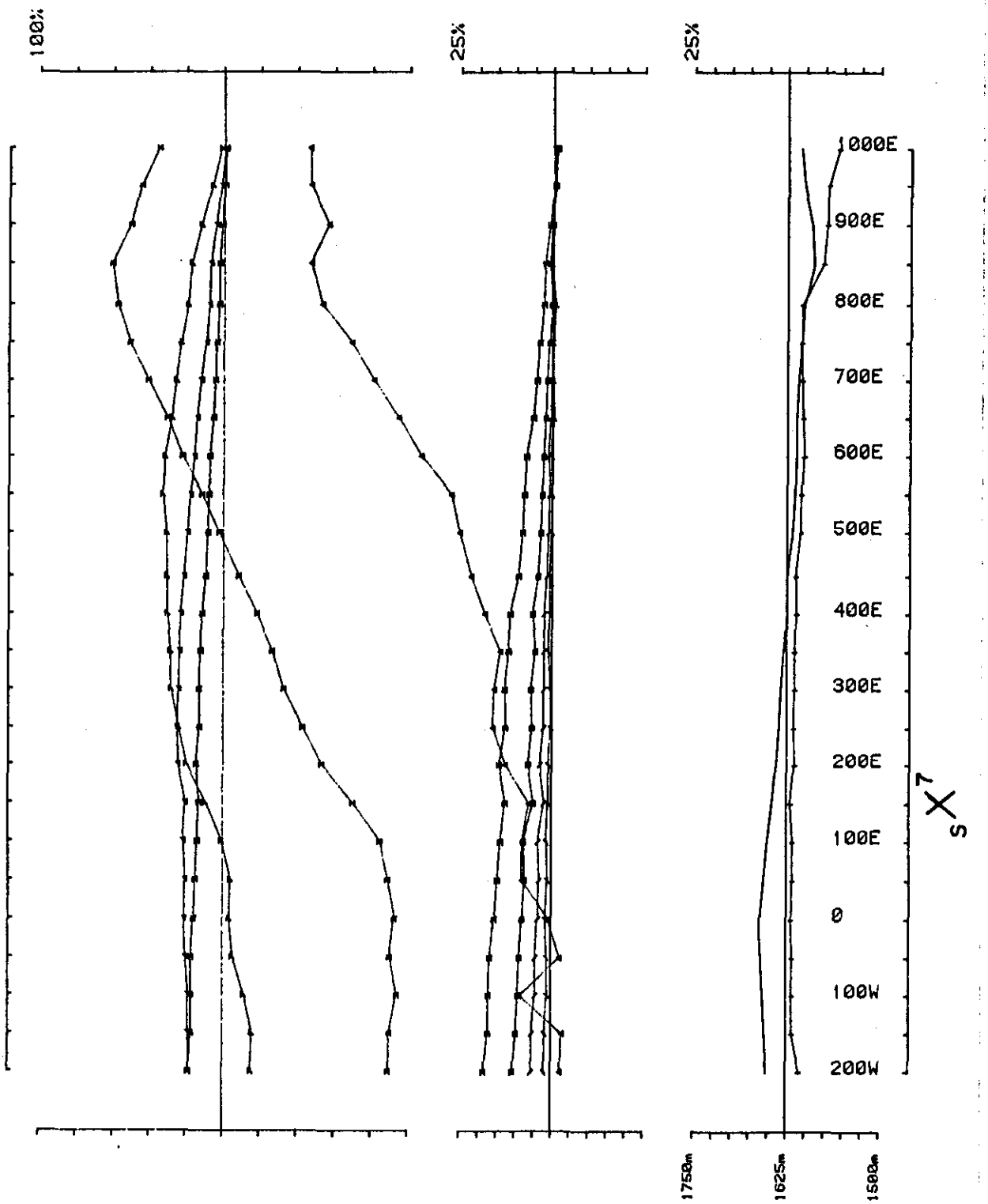

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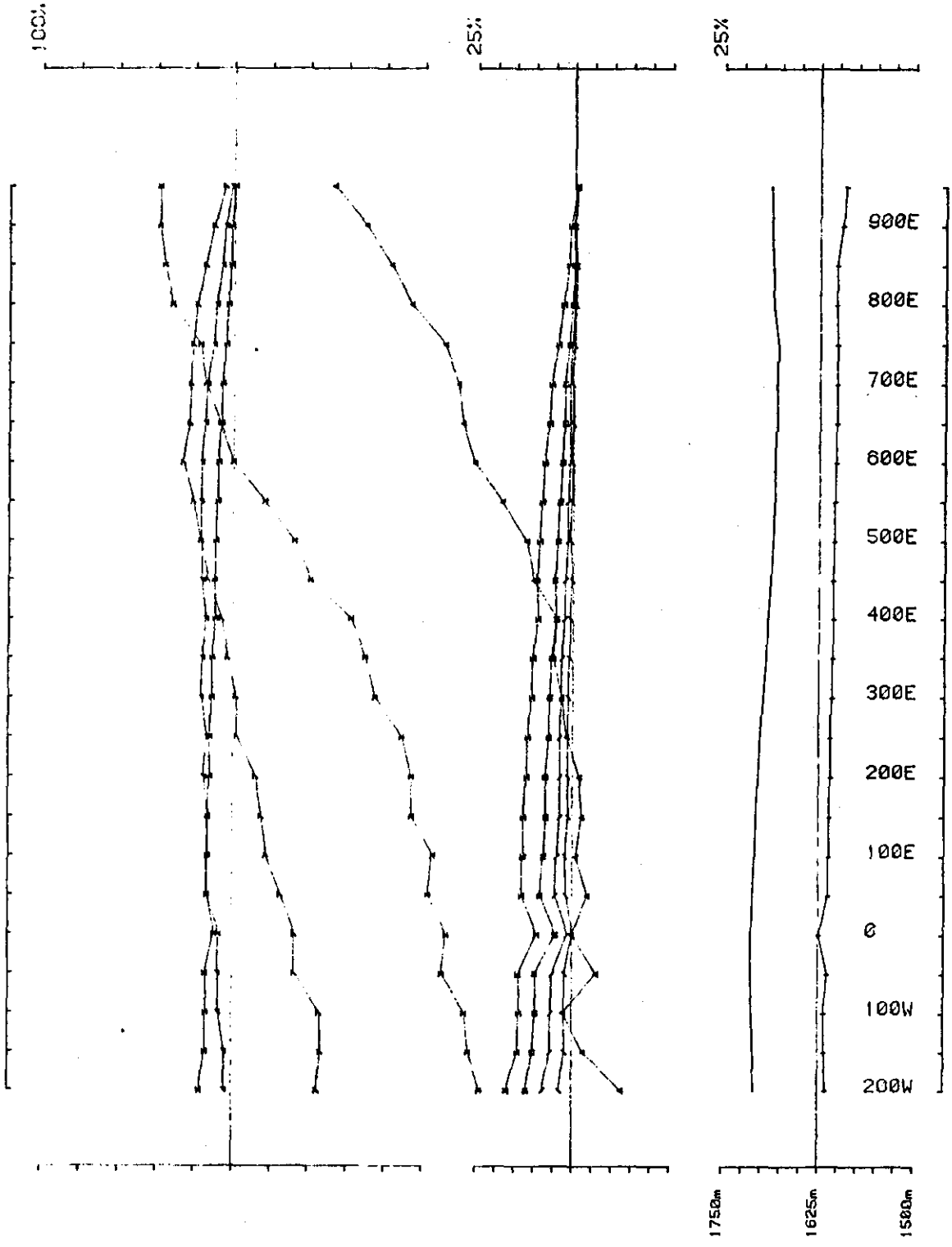
Loopno 11 Line 8000N component Hz secondary Ch 1 normalized

D.S. 37



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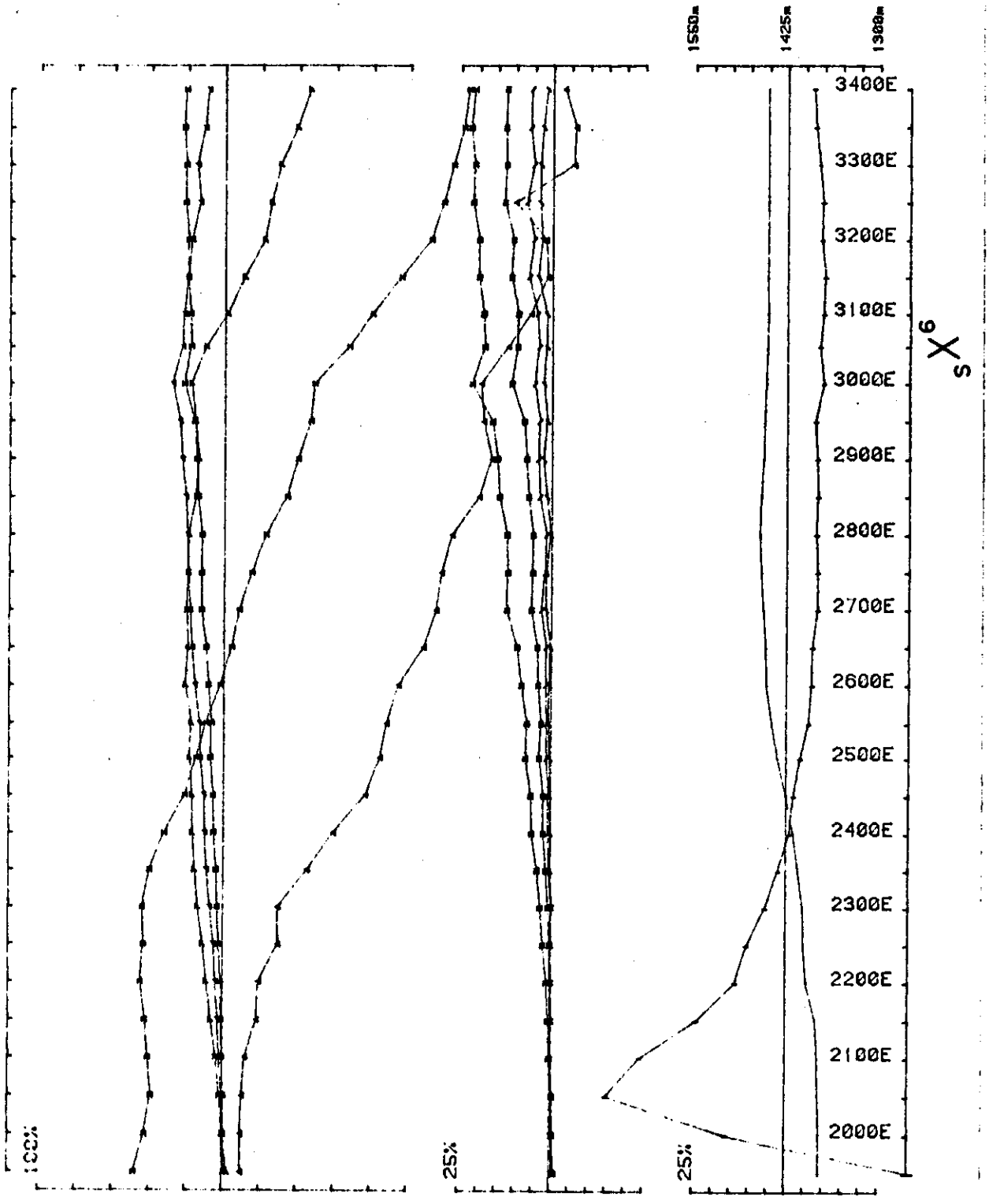

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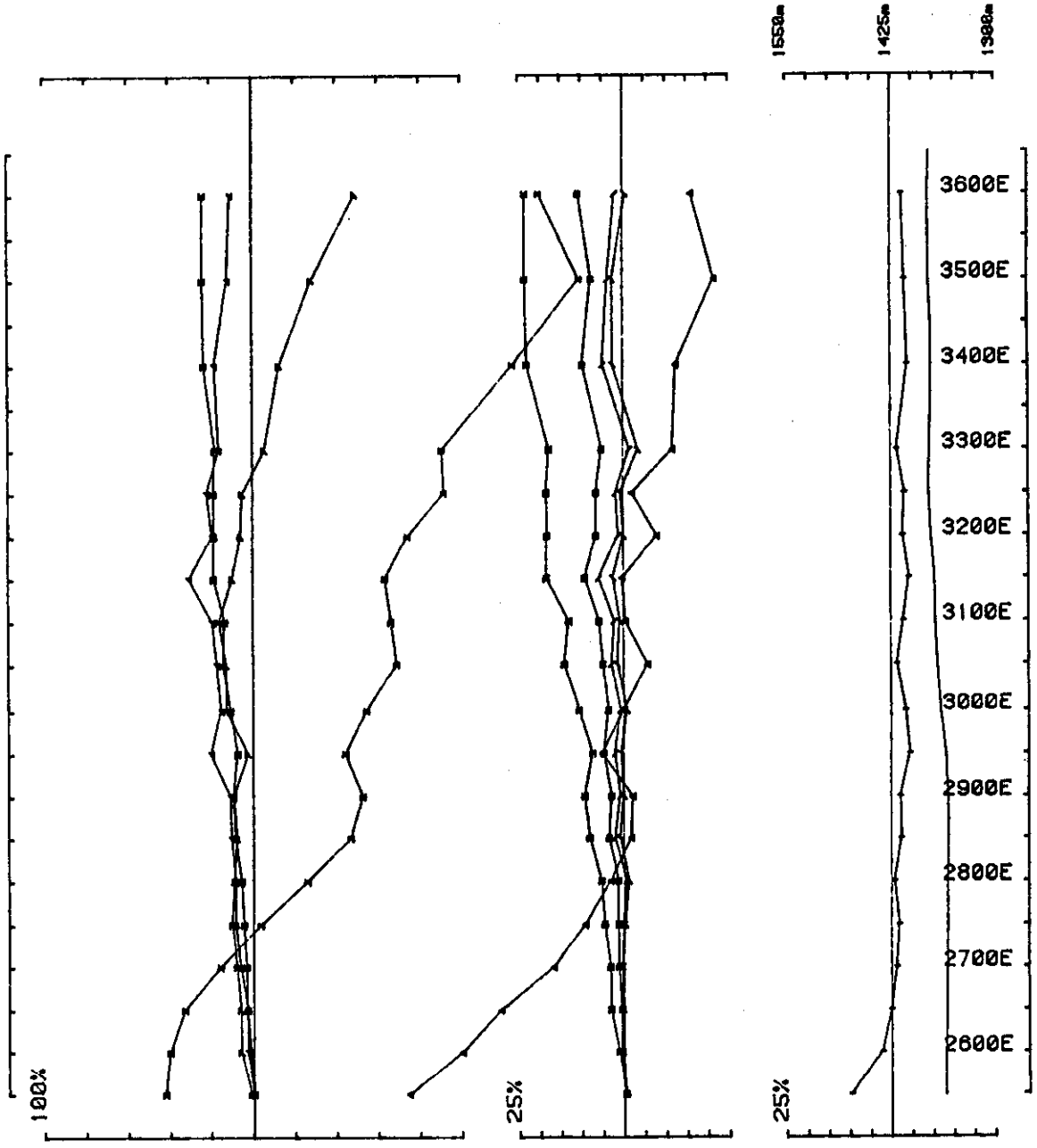
Loopno 12 Line 7000N component Hz secondary Ch 1 normalized .



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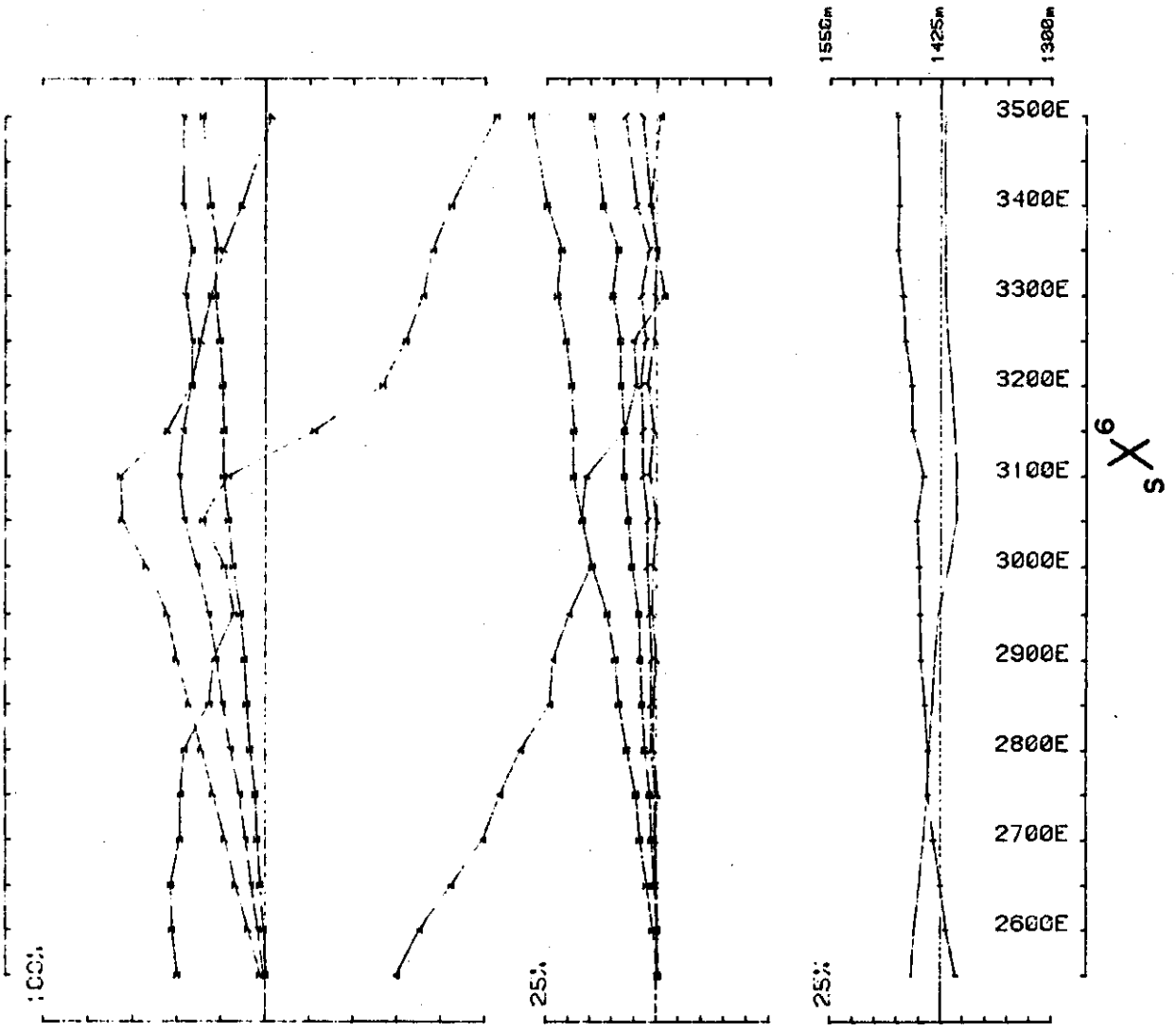
D.S. 40



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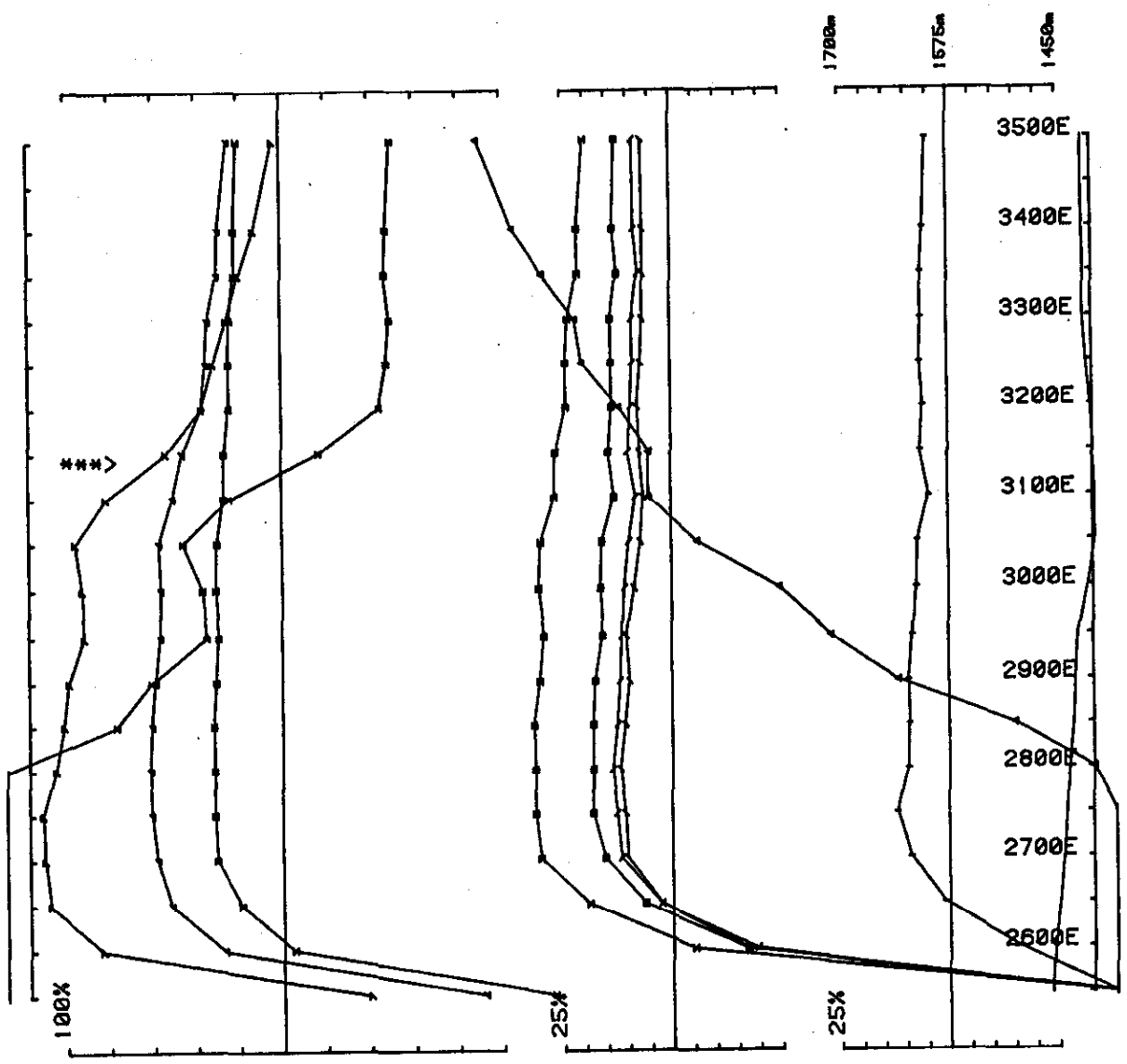

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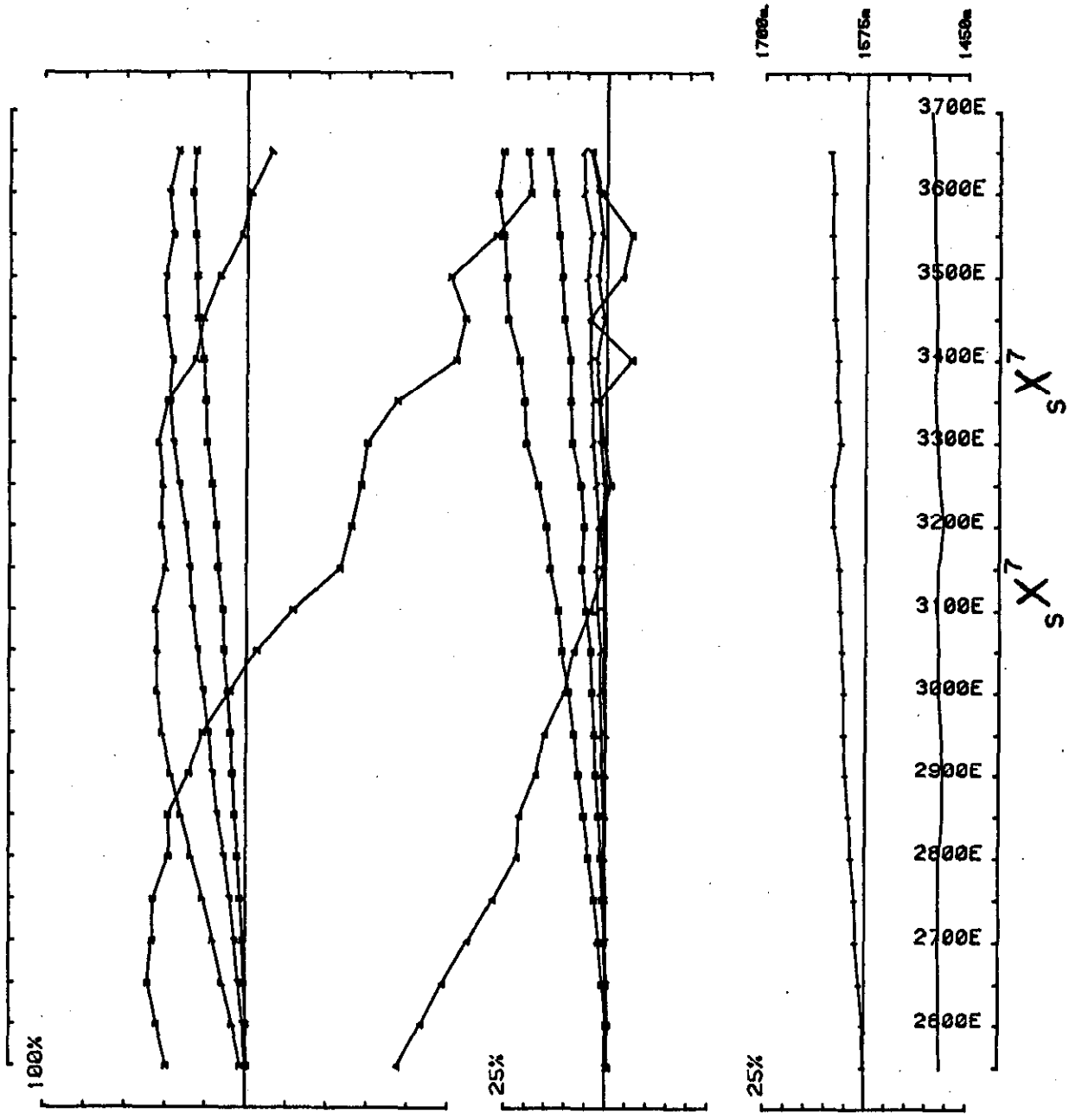

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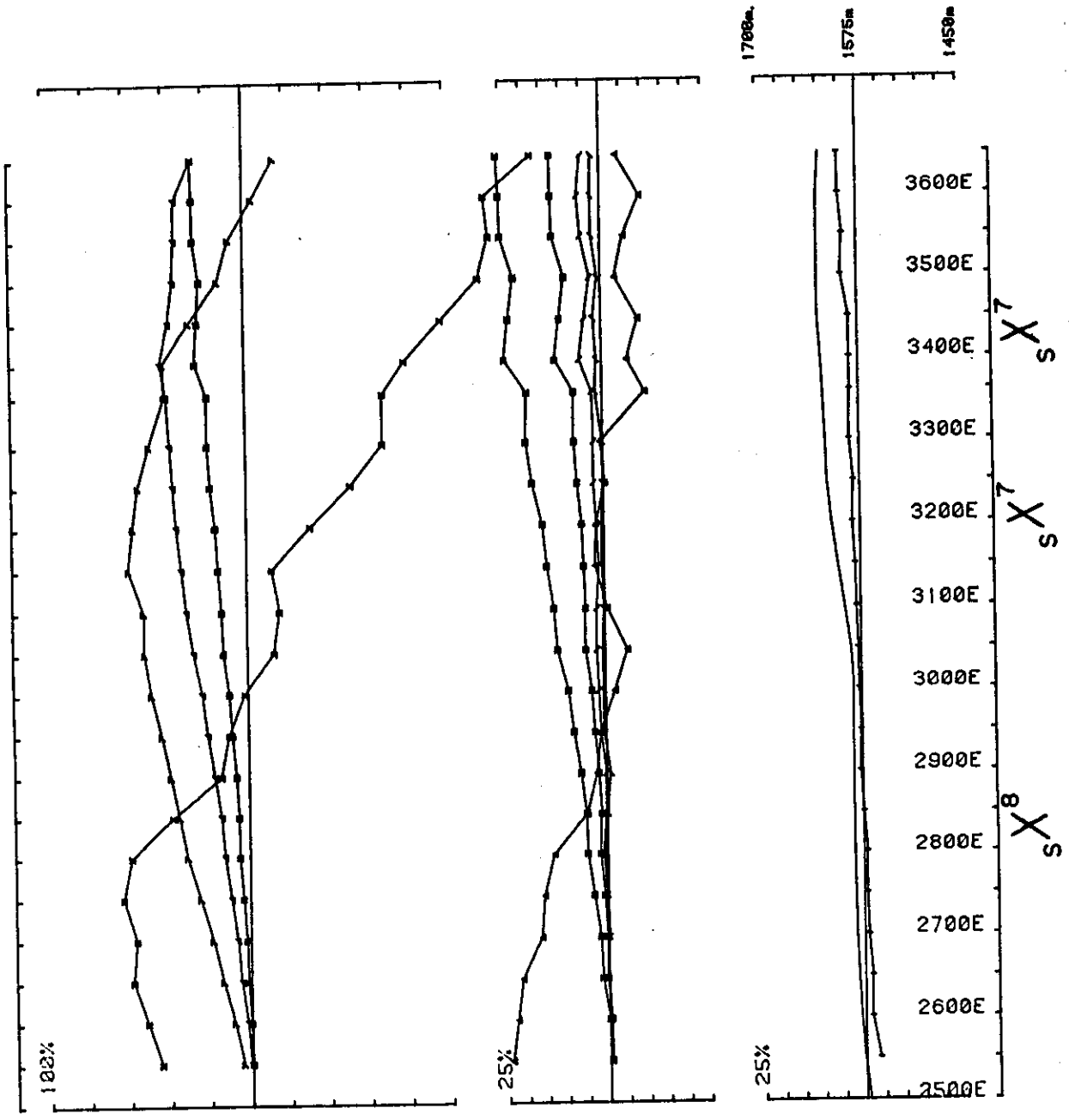

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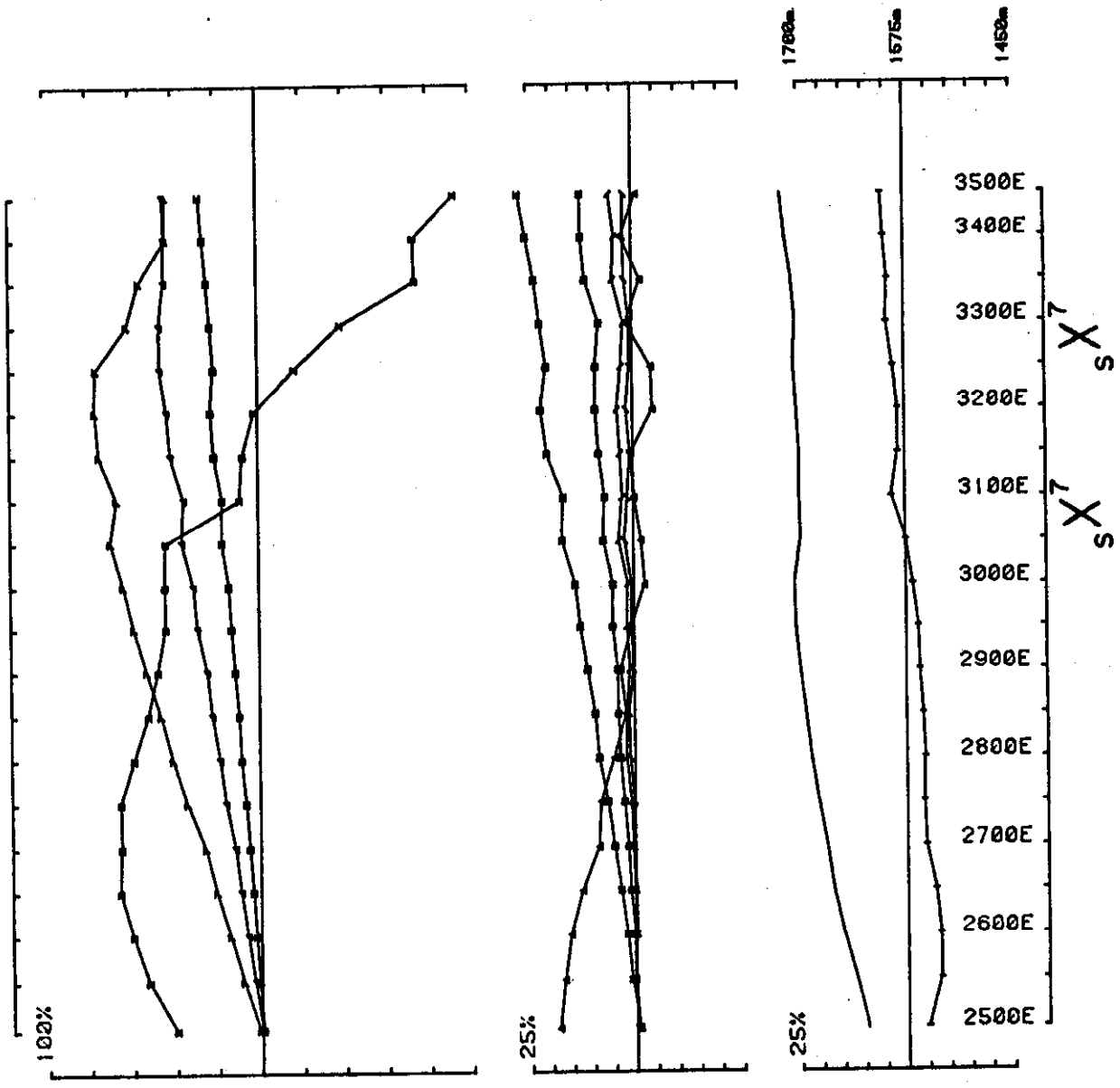

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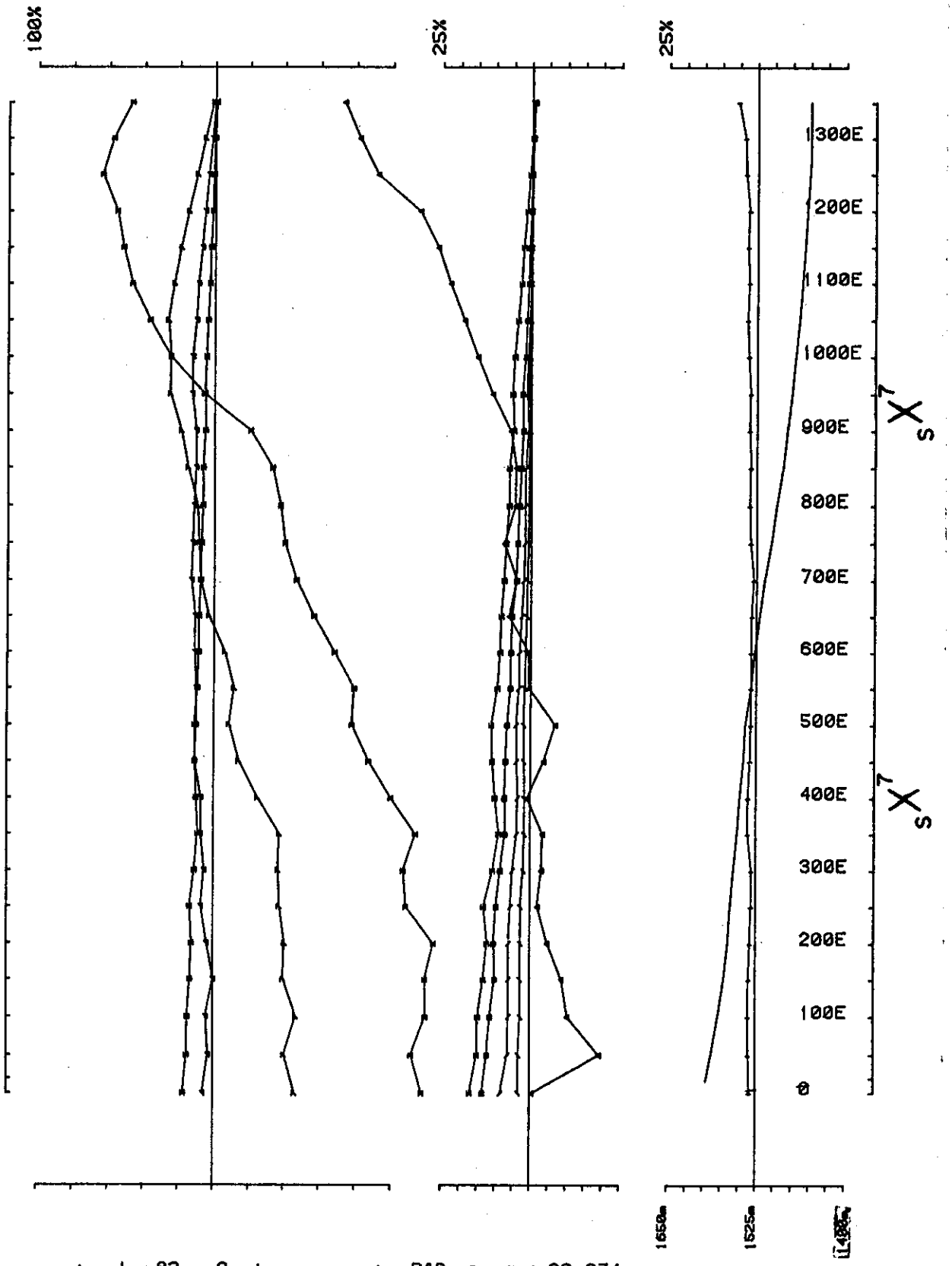
Loopno 13 Line 10000N component Hz secondary Ch 1 normalized



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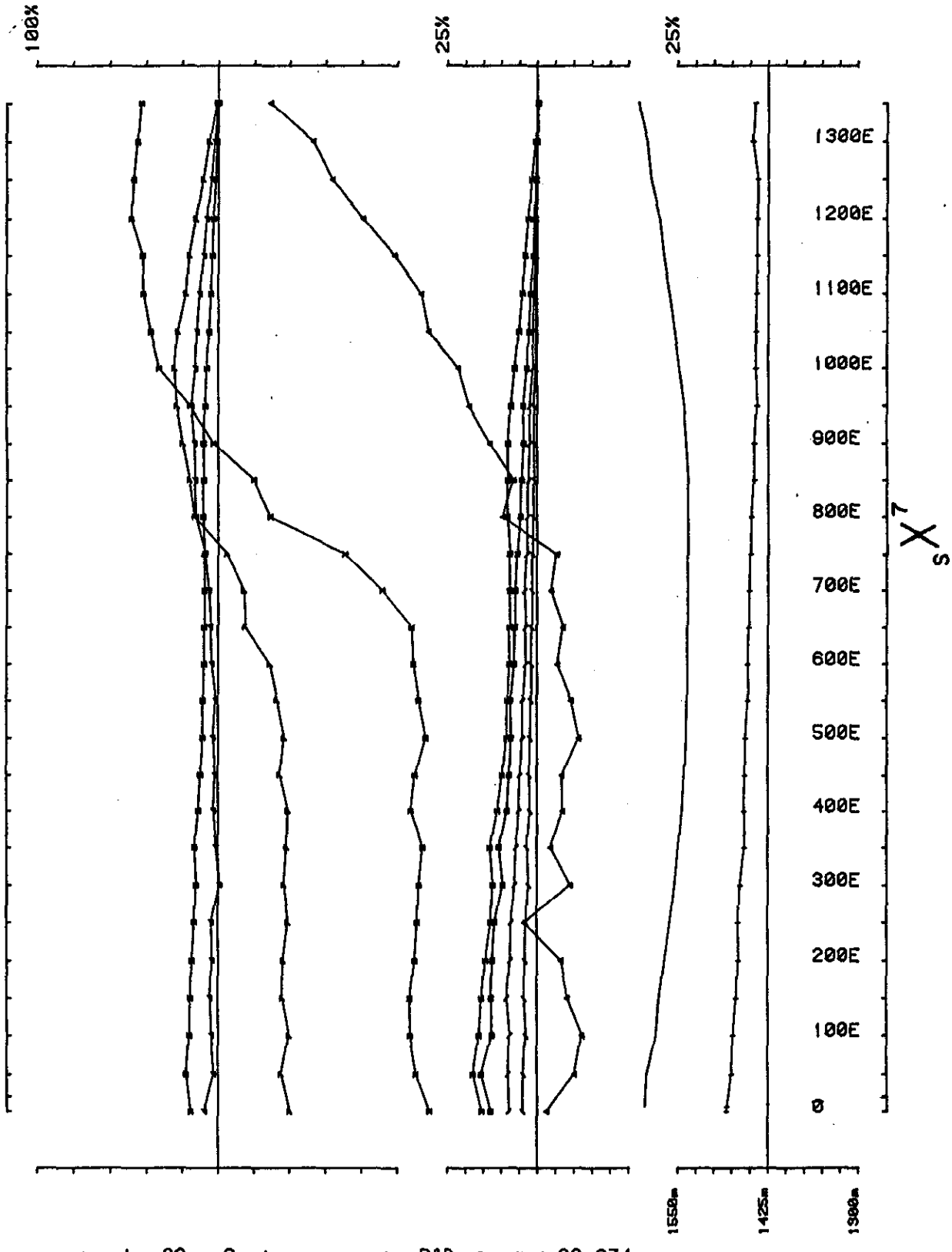
Loopno 14 Line 9500N component Hz secondary Ch 1 normalized

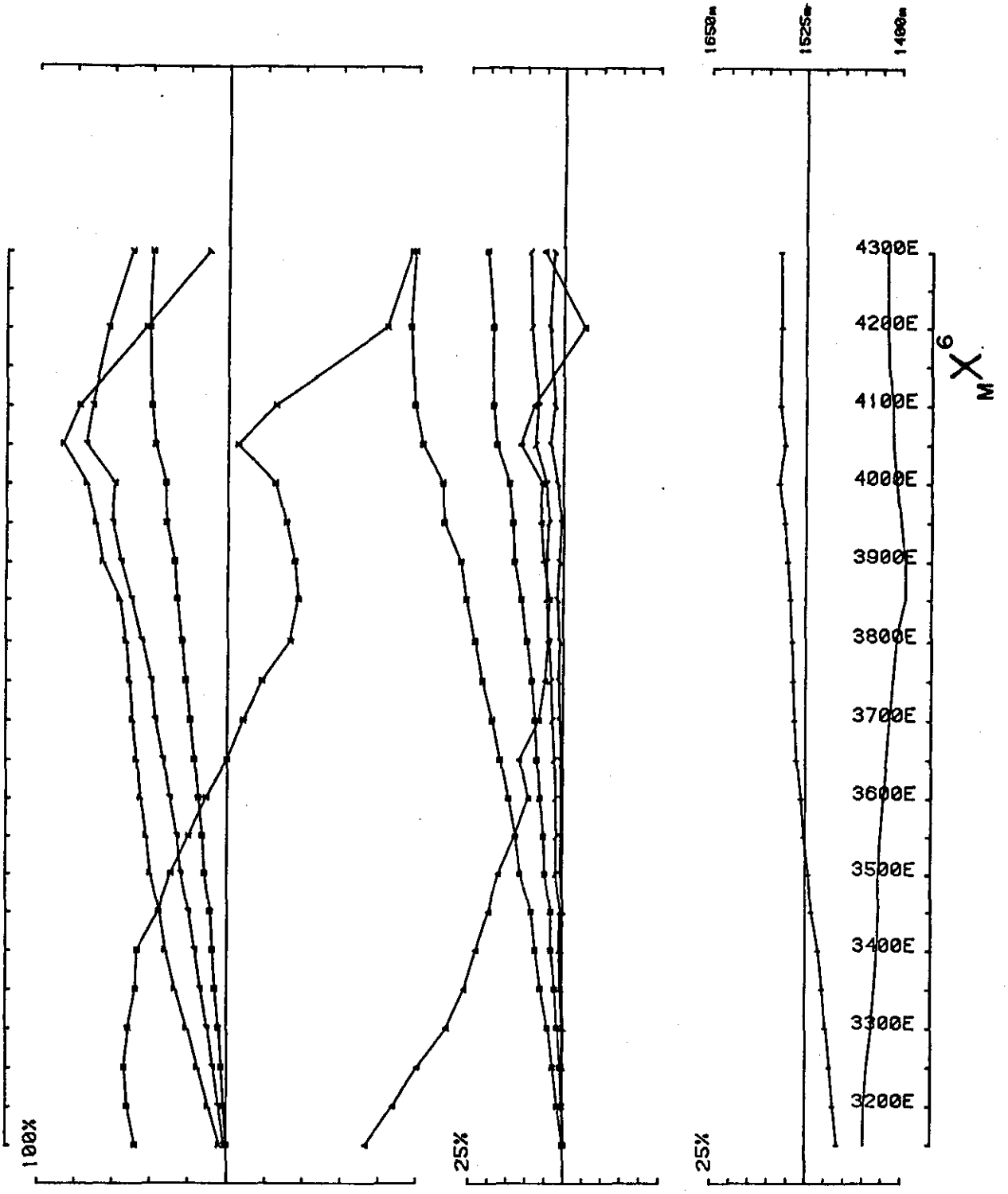
D.S. 47



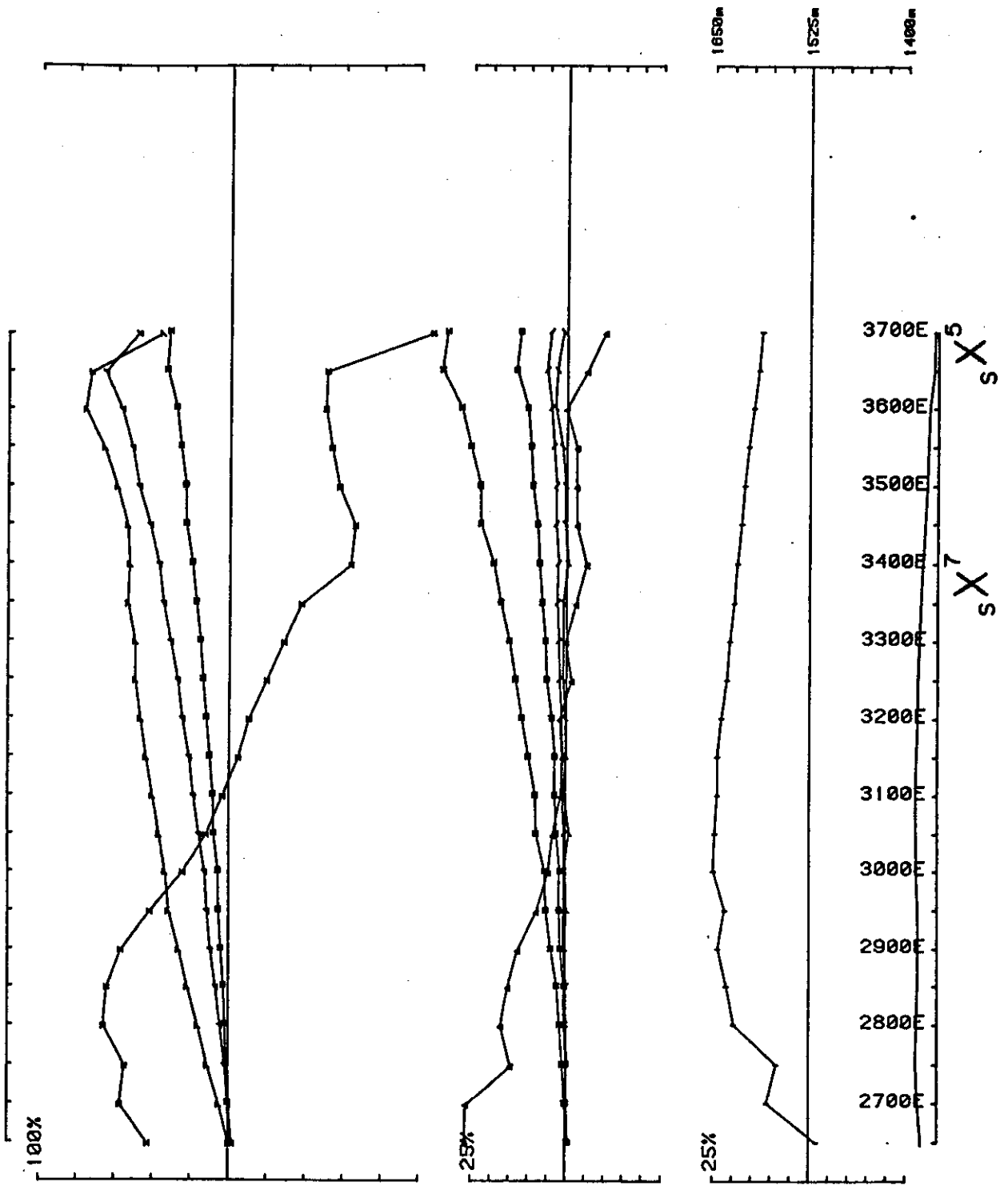
Area Lew82 Cominco operator B&D freq(hz) 30.974

Loopno 14 Line 10000N component Hz secondary Ch 1 normalized

D.S. 48



Area Lew82 Cominco operator B&D freq(hz) 30.974
Loopno 15 Line 7000N component Hz secondary Ch 1 normalized



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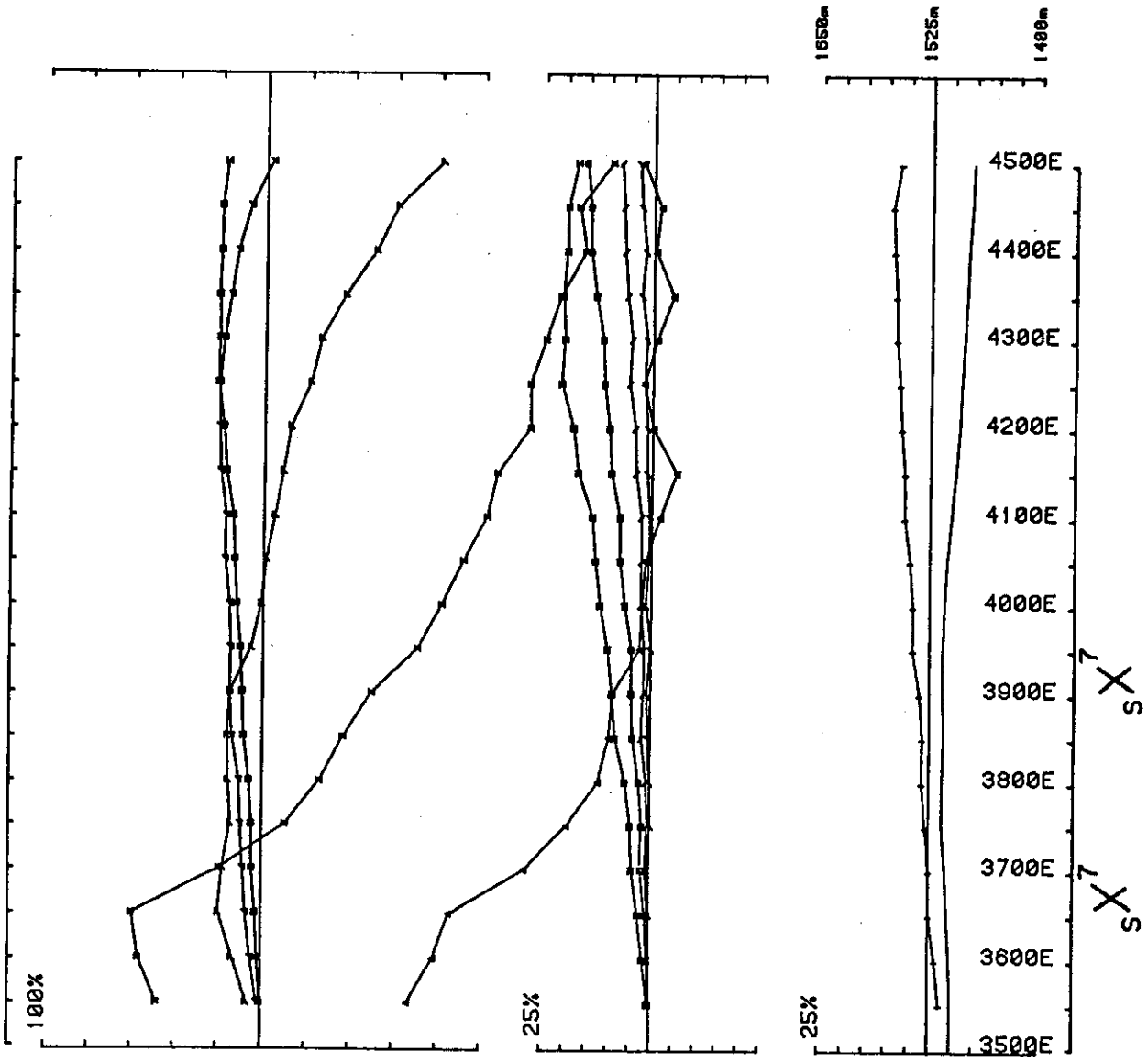

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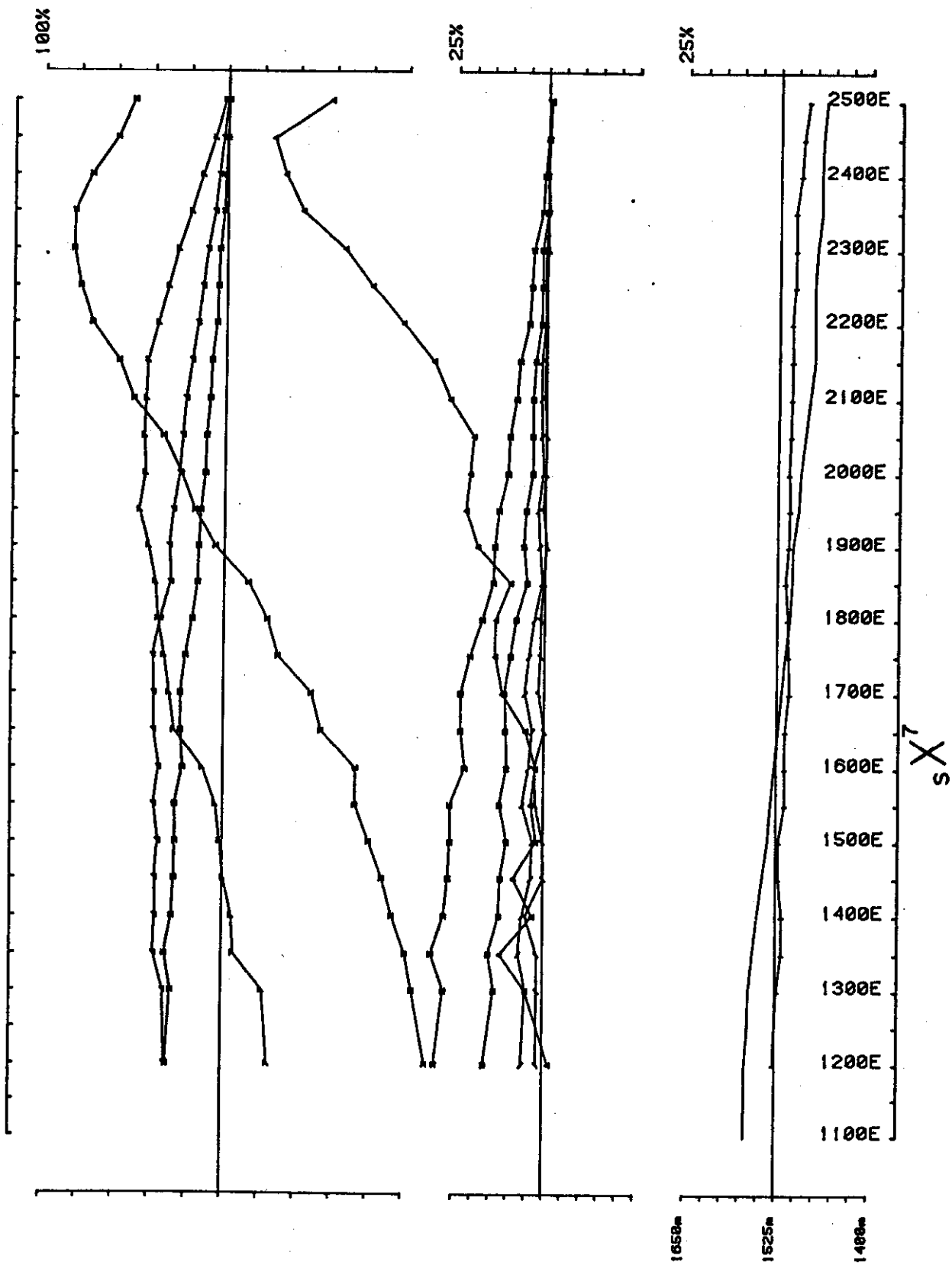
Loopno 15 Line 9000N component Hz secondary Ch 1 normalized .



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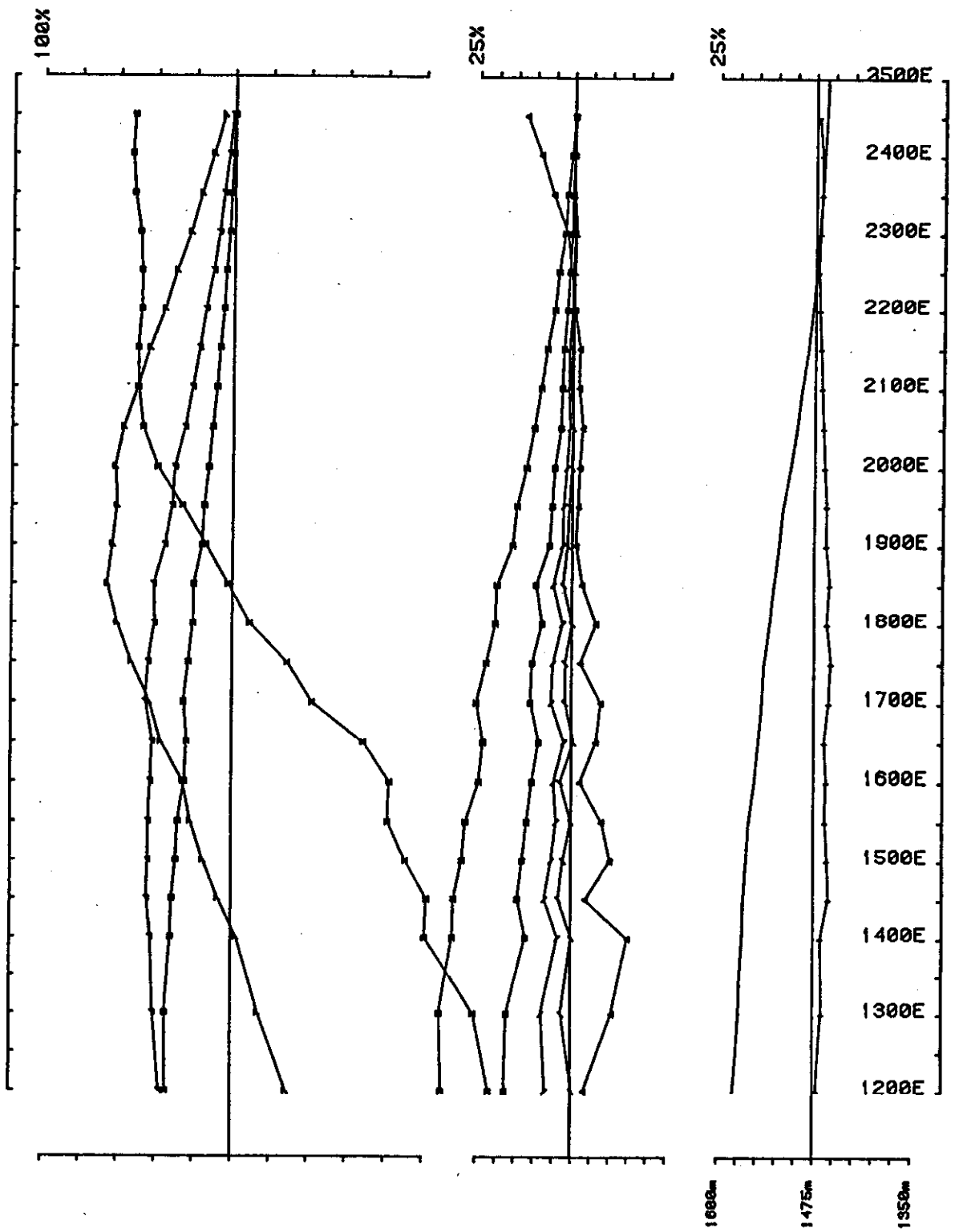

Area Lew82 Cominco operator B&D freq(hz) 30.974

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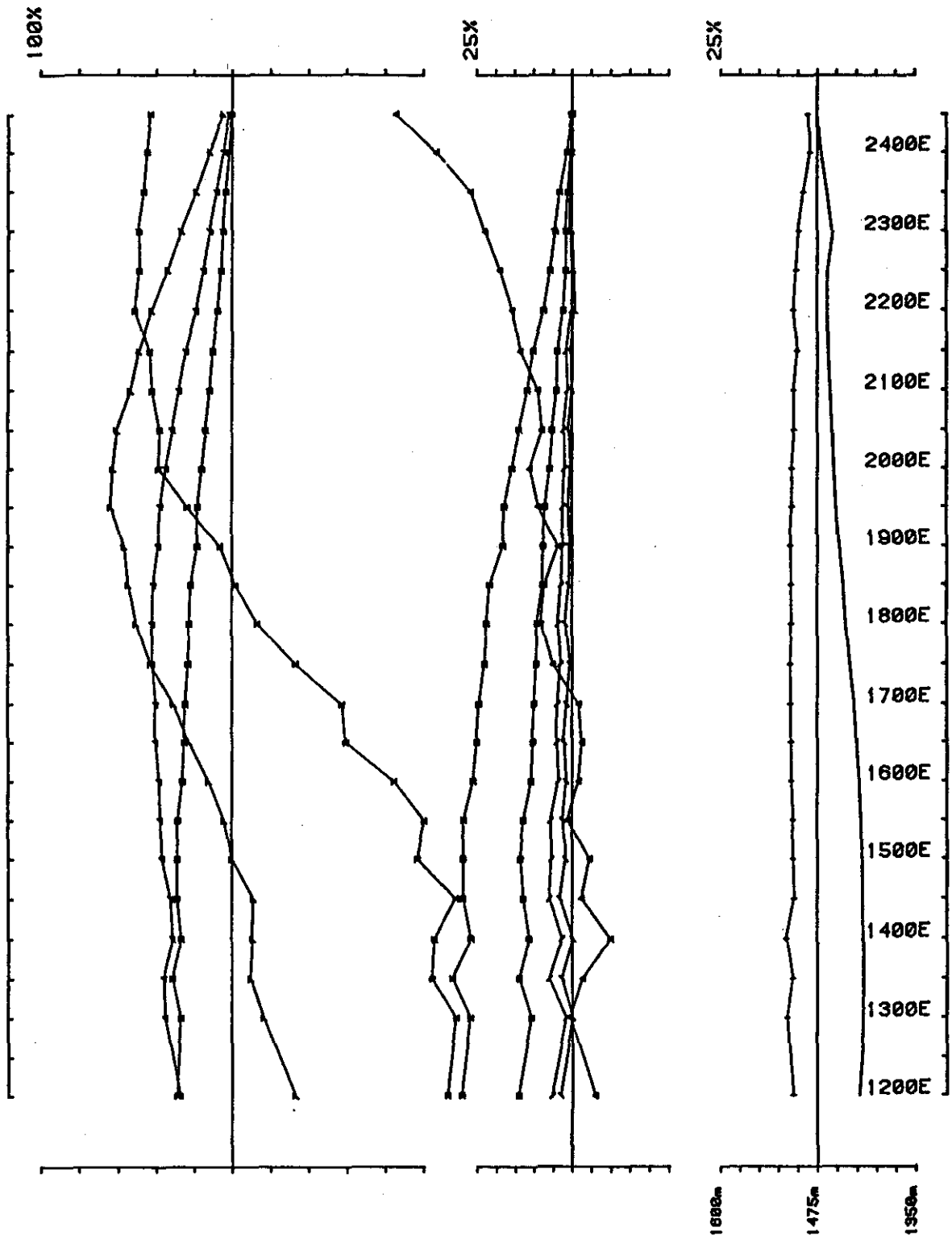

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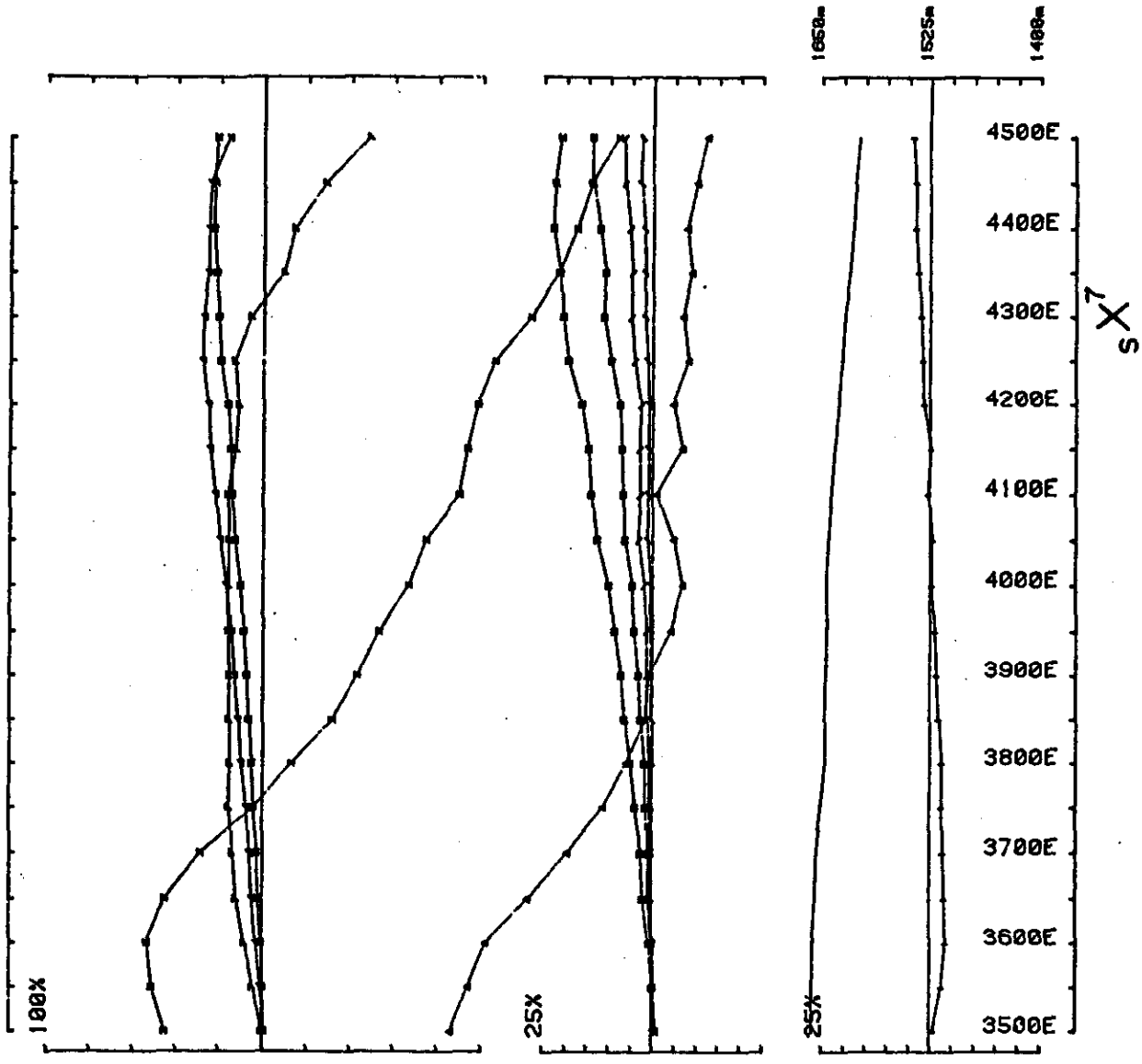
Loopno 16 Line 9000N component Hz secondary Ch 1 normalized



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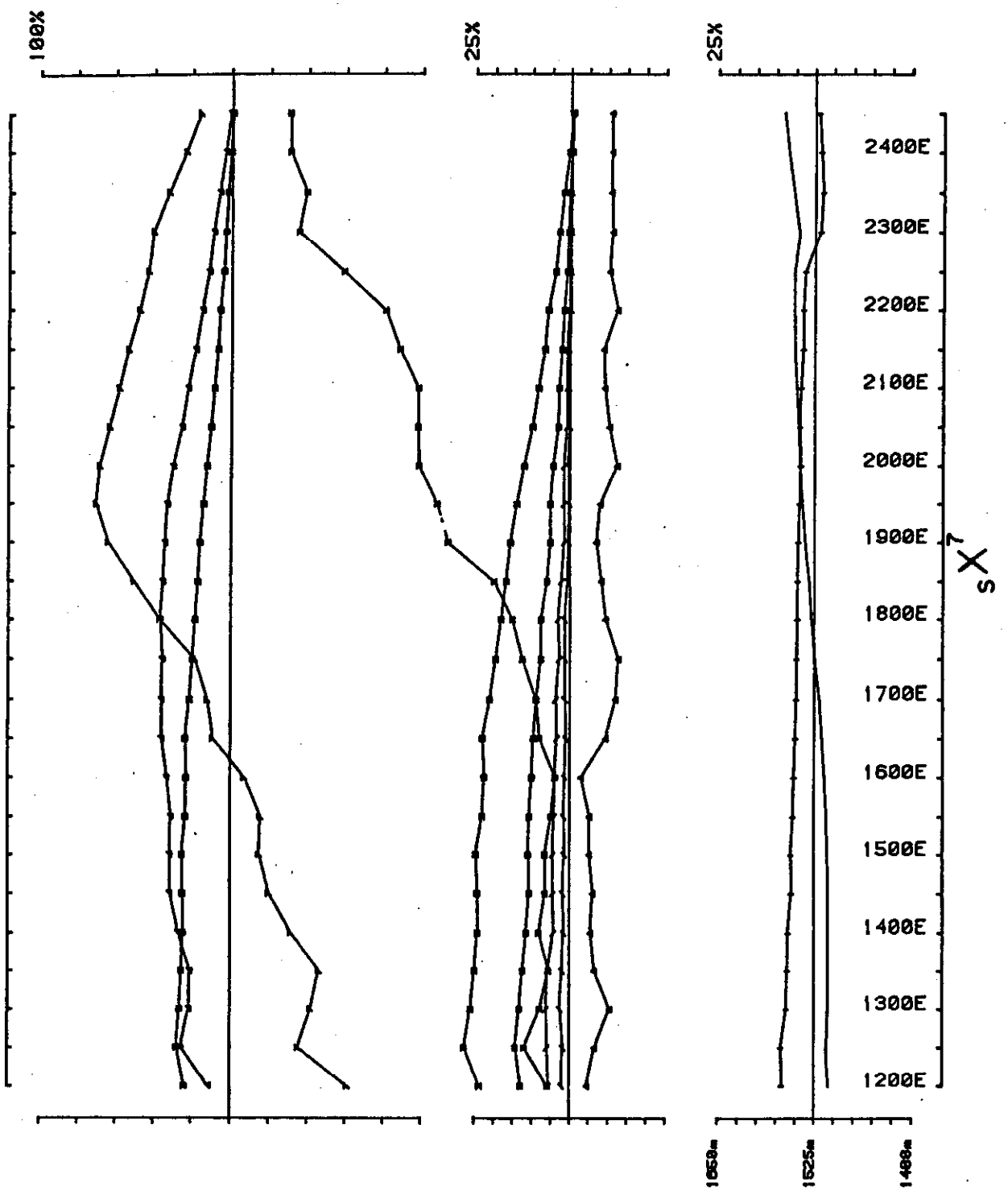
Loopno 17 Line 9500N component Hz secondary Ch 1 normalized



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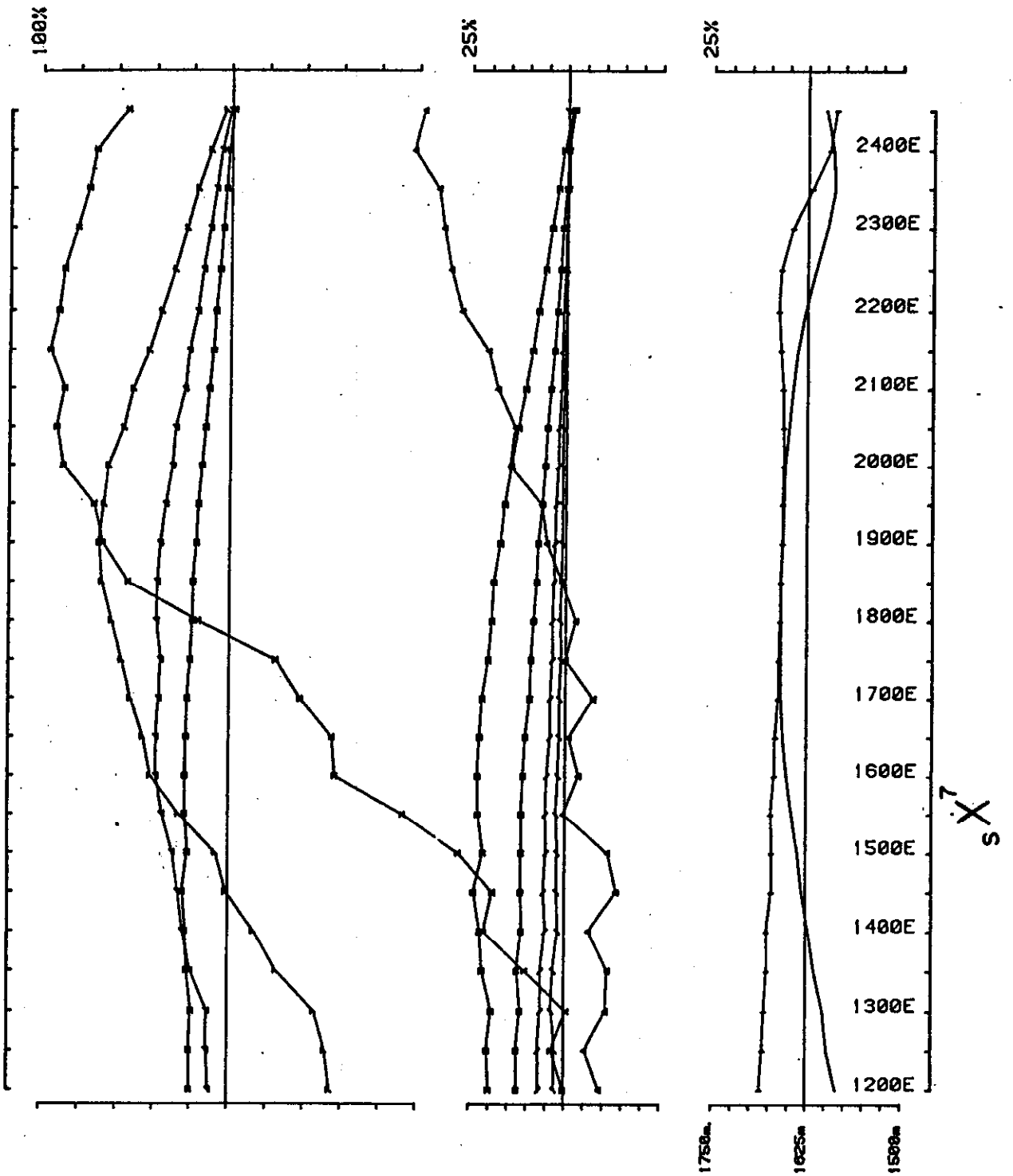

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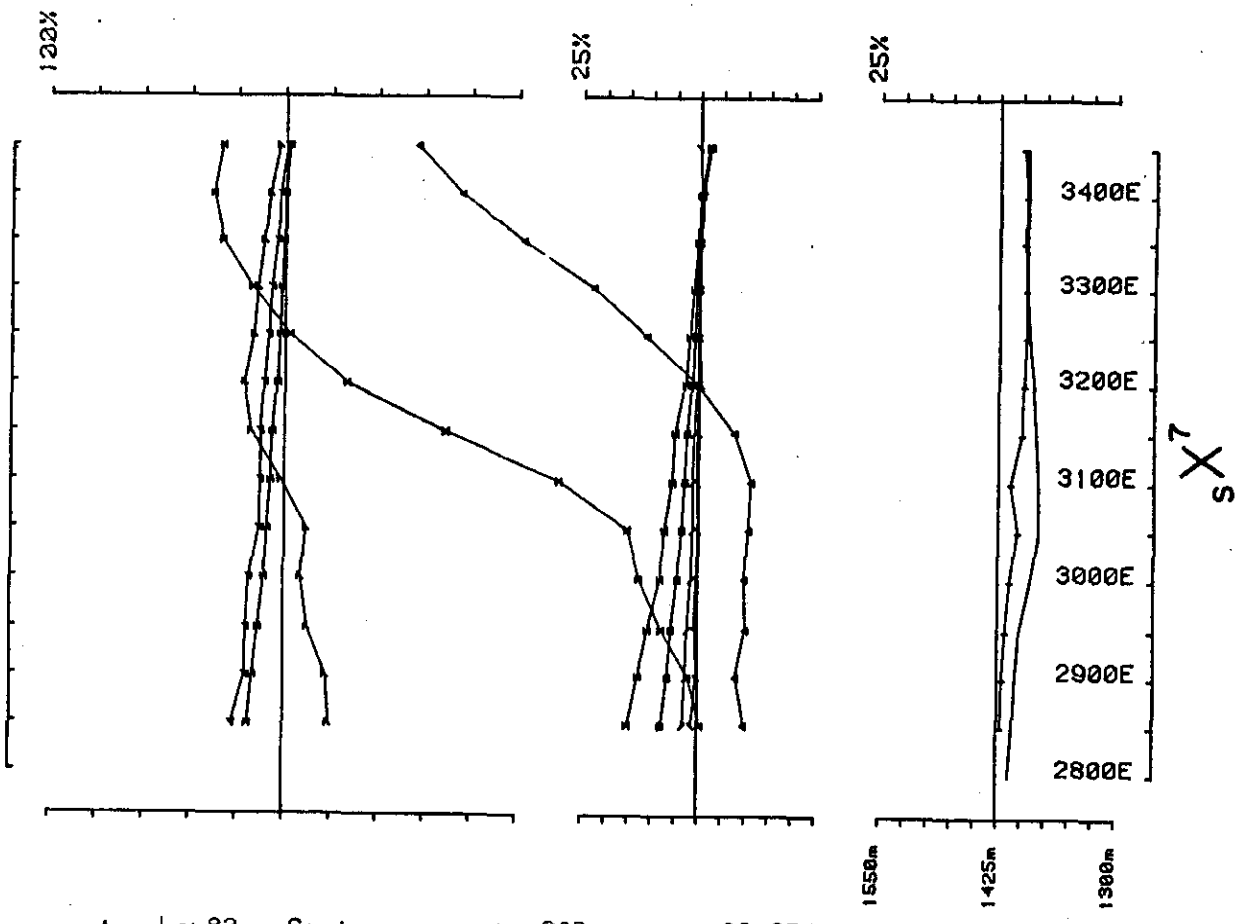

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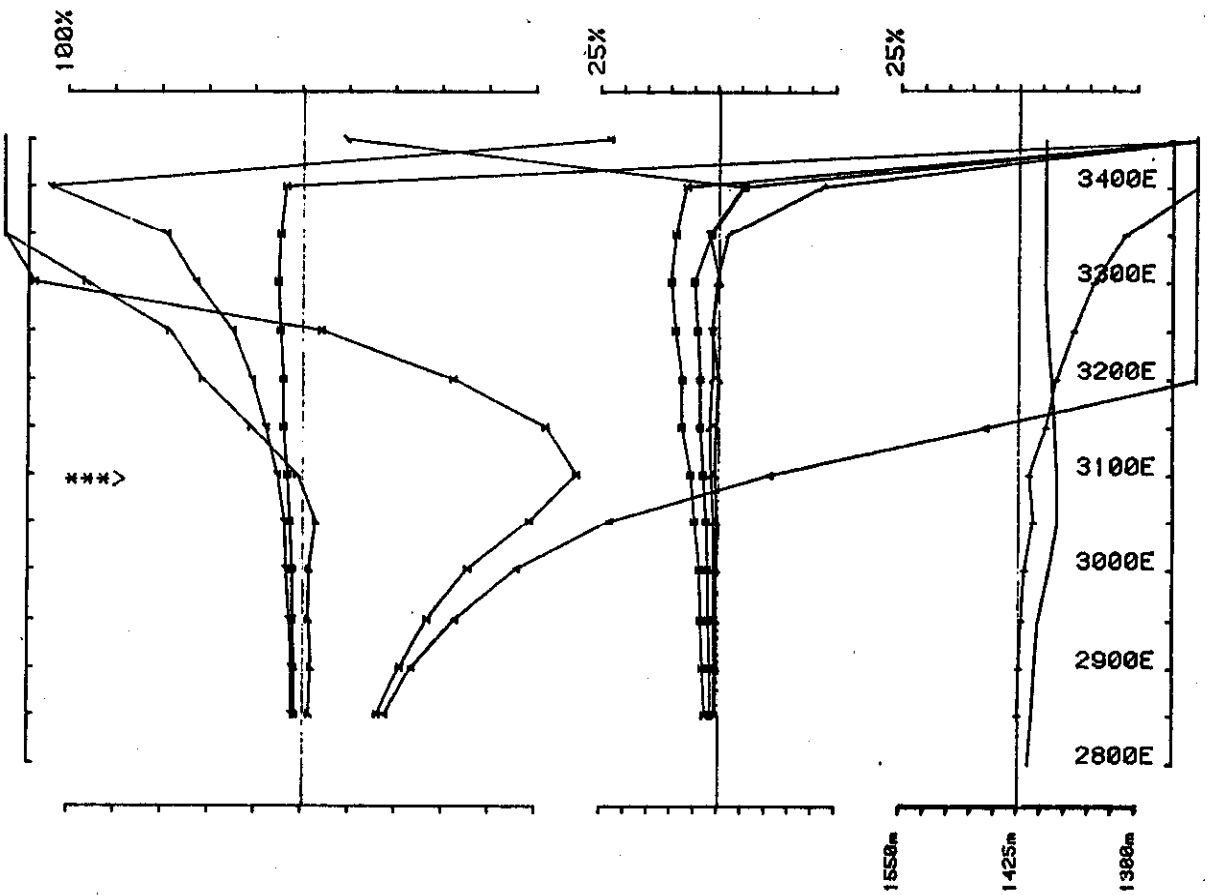

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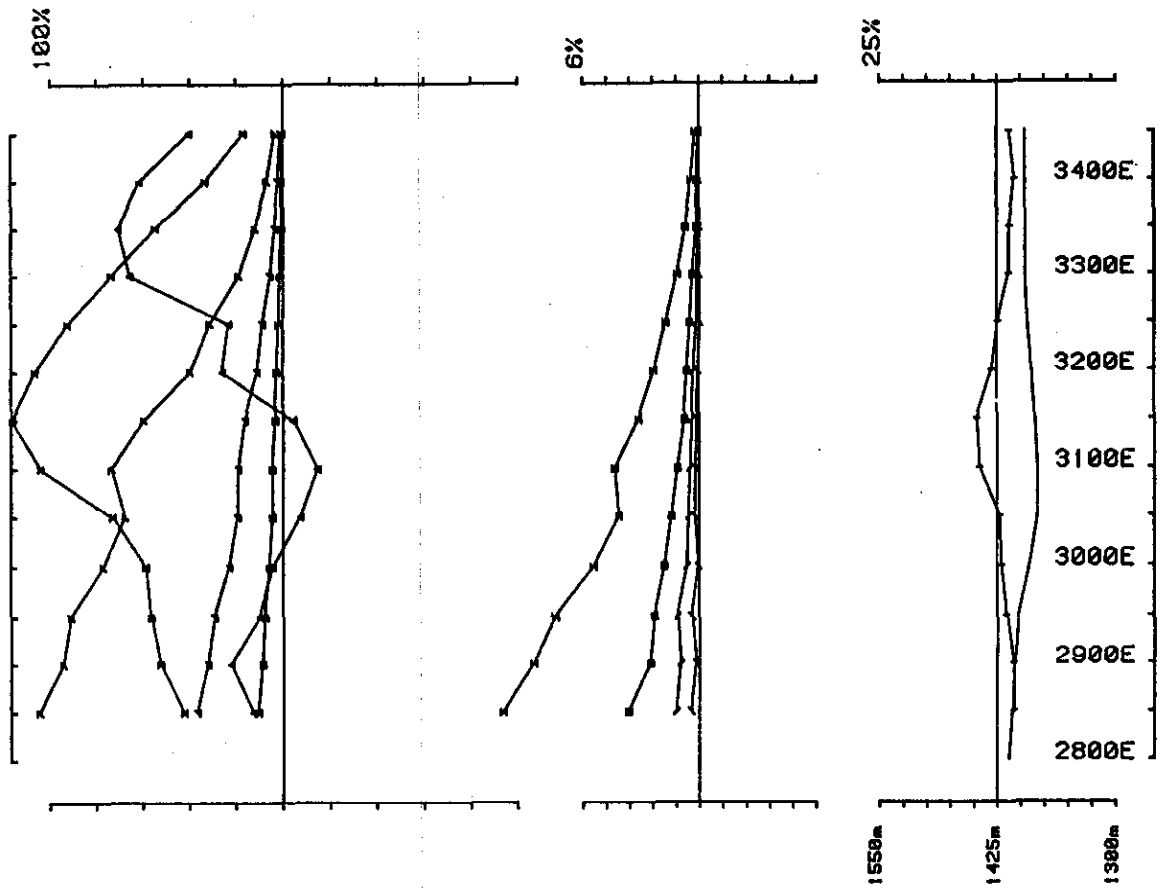

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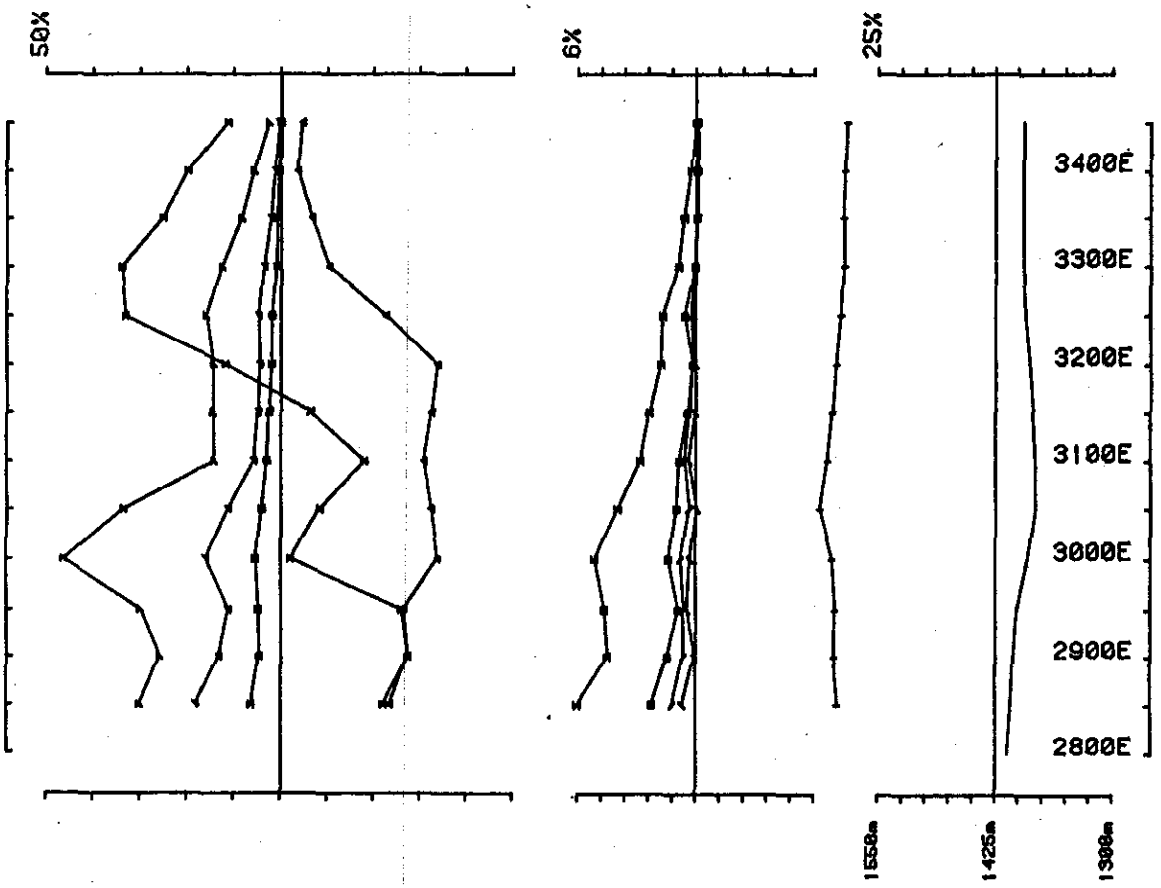


Area Lew82 Cominco operator B&D freq(hz) 30.974
Loopno 19 Line 8500N component Hy secondary Ch 1 normalized

APPENDIX IV

IN THE MATTER OF THE B.C. MINERAL ACT

AND IN THE MATTER OF A GEOPHYSICAL PROGRAMME

CARRIED OUT ON THE LEW CLAIMS

LOCATED 32 KM S.W. OF CRANBROOK, B.C.

IN THE FORT STEELE MINING DIVISION OF THE

PROVINCE OF BRITISH COLUMBIA, MORE PARTICULARLY

N.T.S.: 82 F/8

S T A T E M E N T

I, E.T. Eadie, 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 "Exhibit A", to this statement is a true copy of expenditures incurred on the geophysical survey on the LEW mineral claims;

3. THAT the said expenditures were incurred between May 23rd and July 28th, 1982, for the purpose of mineral exploration of the above-named claims.

Tom Eadie

E. T. Eadie, M.Sc.
Geophysicist III, Cominco Ltd.

MARCH 1983

L E W C L A I M S

STATEMENT OF EXPENDITURES

(U T E M SURVEY)

1.	**SALARIES**		
	J.J. Lajoie — June 14-20, 29-30; July 1-5		
	14 days @ $245/day	$ 3,430.00	
	S.J. Visser — May 23-24; June 12-30; July 1-19		
	40 days @ $175/day	7,000.00	
	D.C. McCollor — June 14-30; July 1-16, 19-28		
	43 days @ $135/day	5,805.00	
	R.W. Holroyd — July 12-28		
	17 days @ $175/day	2,975.00	
	Helpers (G. Garvin, J. Sortome, G. MacSporran) June 15-30; July 1-16, 19-28		
	42 days x 3 men x $71/day	8,946.00	$ 28,156.00
2.	**EQUIPMENT RENTAL** (UTEM)		
	Standby: June 18 (June 20-26: n/c) July 10		
	2 days @ $75/day	150.00	
	Operating: June 19, June 27-30; July 1-9, July 11-14, July 15 (n/c), July 16, July 20-28		
	28 days @ $150/day	4,200.00	4,350.00
3.	**OPERATING DAY CHARGES**		
	June 19, 27-30; July 1-9, 11-14, 16, 20-28		
	28 days @ $250/day		7,000.00
		Balance Forward	39,506.00

Balance Forward		$ 39,506.00

4. EXPENSE ACCOUNTS

J.J. Lajoie	June/July	$ 2,061.00	
S.J. Visser	June	2,094.00	
	July	1,030.00	
D.C. McCollor	June	426.00	
	July	147.00	
R.W. Holroyd	July	2,022.00	7,780.00

5. FREIGHT CHARGES

Toronto - Vancouver	285.00	
Vancouver - Cranbrook (in E/A)		
Other	50.35	335.35

6. MISCELLANEOUS

Camp Equipment Costs - rentals, etc	591.96	
Wire Usage - 2 spools @ $175	350.00	
Truck Rental		
June ($519.25); July ($594.00)	1,113.25	
Truck Repairs & Fuel (not in E/A)	1,509.90	
Communications - phone calls & repairs	612.16	4,177.27
TOTAL		$ 51,798.62

Tom Eadie

E. T. Eadie, M.Sc.
Geophysicist III, Cominco Ltd.

MARCH 1983

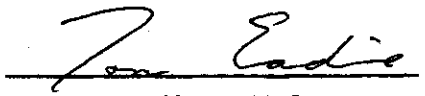
APPENDIX V

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

I, E. T. Eadie of #407 - 1045 Burnaby Street, in the City of Vancouver, in the Province of British Columbia, do hereby certify that:-

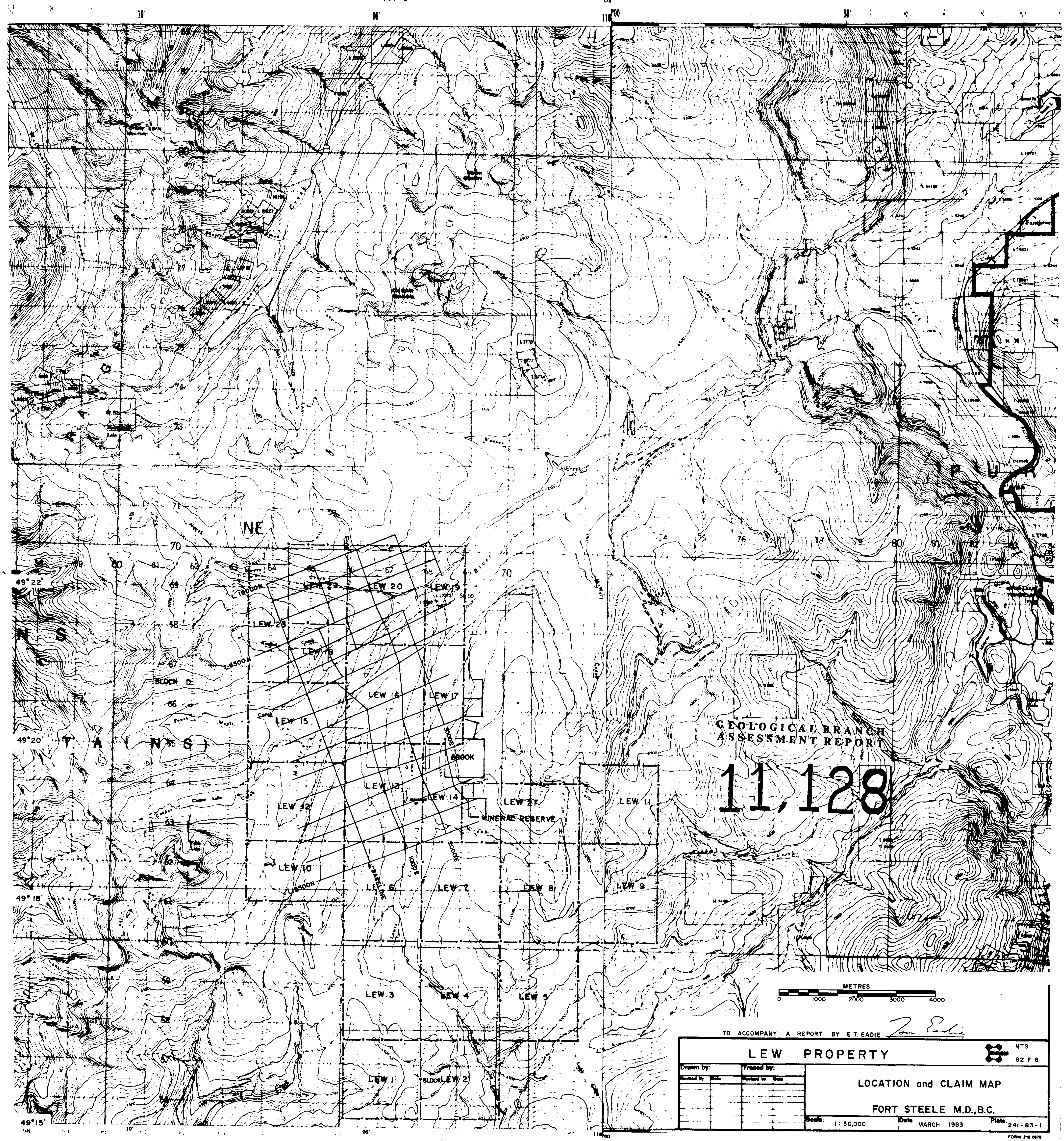
1. I graduated from the University of British Columbia in 1976 with an Honours B.Sc. in Geology and Geophysics, and from the University of Toronto in 1980 with a M.Sc. in Geophysics.

2. I have been closely associated with mineral exploration since 1973, and have worked as a geophysicist with Cominco since 1980.



E. T. Eadie, M.Sc.
Geophysicist III, Cominco Ltd.

MARCH 1983


GEOLOGICAL BRANCH
ASSESSMENT REPORT
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BROOK
MINERAL RESERVE
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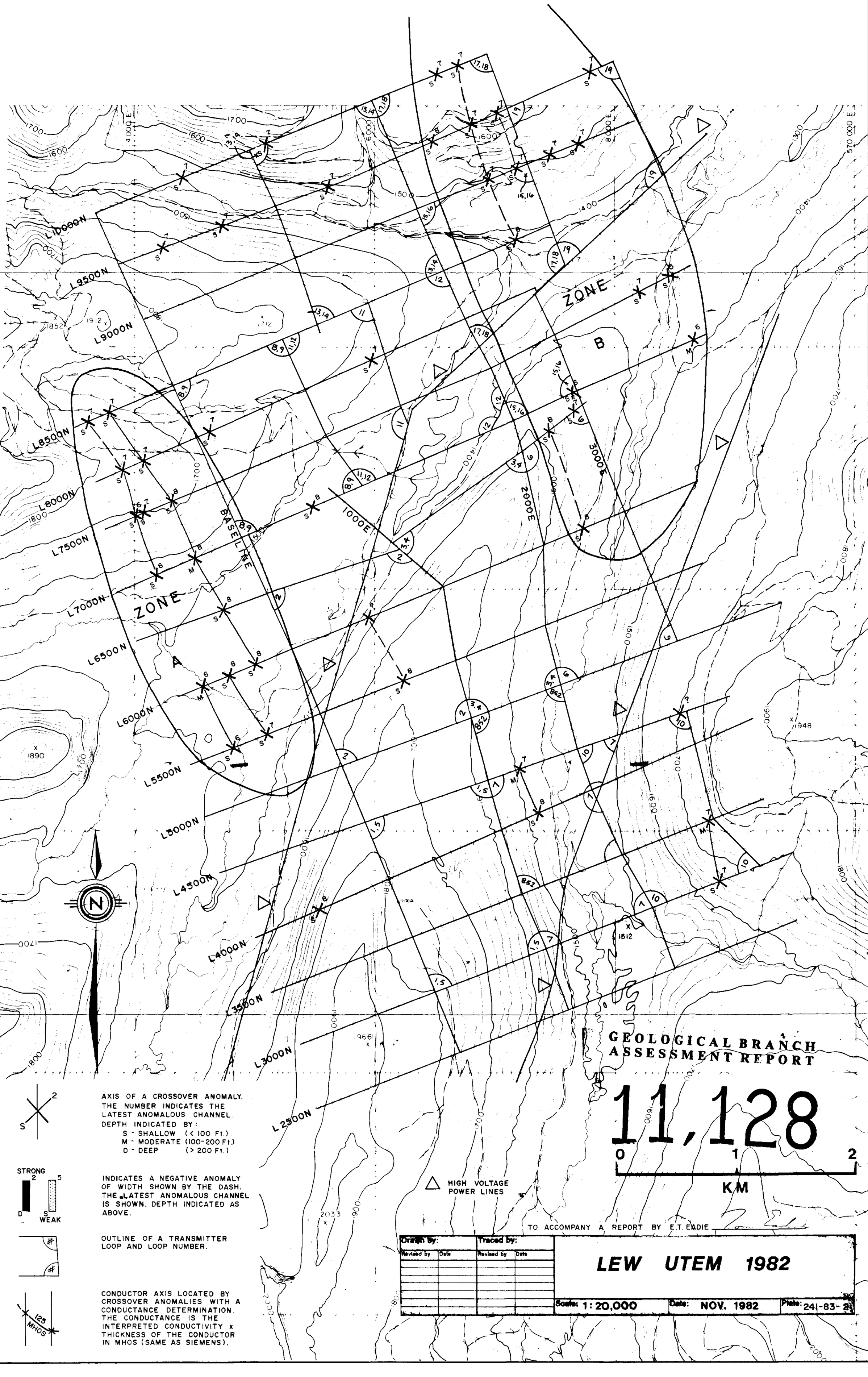
TO ACCOMPANY A REPORT BY E.T. EADIE
LEW PROPERTY
NTS
82 F 8
Drawn by:
Traced by:
Revised by
Date
LOCATION and CLAIM MAP
FORT STEELE M.D., B.C.
Scale: 1: 50,000
Date: MARCH 1983
Plate: 241-83-1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L10000N
L9500N
L9000N
L8500N
L8000N
L7500N
L7000N
L6500N
L6000N
L5500N
L5000N
L4500N
L4000N
L3500N
L3000N
L2500N
BASELINE
1000E
2000E
3000E
ZONE A
ZONE B
N
1700
1600
1500
1400
1300
1800
1900
2000
1852
1912
1890
1948
1512
966
2033
852
AXIS OF A CROSSOVER ANOMALY. THE NUMBER INDICATES THE LATEST ANOMALOUS CHANNEL.
DEPTH INDICATED BY:
S - SHALLOW (< 100 Ft.)
M - MODERATE (100-200 Ft.)
D - DEEP (> 200 Ft.)
STRONG
WEAK
INDICATES A NEGATIVE ANOMALY OF WIDTH SHOWN BY THE DASH. THE LATEST ANOMALOUS CHANNEL IS SHOWN. DEPTH INDICATED AS ABOVE.
OUTLINE OF A TRANSMITTER LOOP AND LOOP NUMBER.
125 MHOS
CONDUCTOR AXIS LOCATED BY CROSSOVER ANOMALIES WITH A CONDUCTANCE DETERMINATION. THE CONDUCTANCE IS THE INTERPRETED CONDUCTIVITY x THICKNESS OF THE CONDUCTOR IN MHOS (SAME AS SIEMENS).
HIGH VOLTAGE POWER LINES
GEOLOGICAL BRANCH
ASSESSMENT REPORT
11,128
0 1 2
KM
TO ACCOMPANY A REPORT BY E.T. EADIE
Drafted by:
Traced by:
Revised by | Date | Revised by | Date
LEW UTEM 1982
Scale: 1:20,000
Date: NOV. 1982
Plate: 241-83-2