COMINCO LTD.

EXPLORATION

WESTERN DISTRICT

NTS: 82F/8
& 82G/5

GEOPHYSICAL REPORT

UTEM SURVEY ON THE

L E W C L A I M S LAT: 49°18'N LONG: 116°00'W

V I N E C L A I M S LAT: 49°20'N LONG: 115°57'W

Fort Steele Mining Division

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

Claim Owner and Operator: COMINCO LTD.

OCTOBER 1982

SYD J. VISSER

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COMINCO LTD.

EXPLORATION WESTERN DISTRICT

GEOPHYSICAL REPORT

UTEM SURVEY ON THE LEWIS CREEK AND VINE CLAIMS

List of Claims

Cominco Interest = 100%

Lew: 4 claims (74 units)

Vine: 5 claims (77 units)

Name	Number of Units	Record Numbers	Date Recorded	Assessment Work Due
LEW 8	20	913	May 5, 1980	May 5, 1983
LEW 9	20	914	May 5, 1980	May 5, 1983
LEW 11	16	916	May 5, 1980	May 5, 1983
LEW 21	18	1001	July 28, 1980	July 28, 1983
VINE 3	16	103	Oct. 26, 1976	Oct. 26, 1982
VINE 28	20	127	Oct. 26, 1976	Oct. 26, 1982
VINE 30	15	129	Oct. 26, 1976	Oct. 26, 1982
VINE 33	6	132	Oct. 26, 1976	Oct. 26, 1982
VINE 36	20	1002	July 28, 1980	July 28, 1983

INTRODUCTION

The Lewis Creek and Vine claims are located about 25 km S.W. of Cranbrook, B.C. (see Plate 1). The access is via Highway 3, turning off to go through the Moyie Lake Provincial Park and then following the Lamb Creek and Rabbit Foot Creek roads.

All of the lines are accessible by logging roads.

The Lewis Creek and Vine claims were staked in 1980 & 1977 respectively by Cominco Ltd. 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.

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 meters and 1,500 meters long. In this survey, the loop dimensions were 1,500 x 1,000 meters. 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 UTEM survey, described in this report, is a continuation of the surveys carried out in 1980 and 1981 on the grid cut during the same years (Tom Eadie, 1980 and Visser 1981). The area covered by the survey is 7.5 km by 3.2 km, with lines every 500 m (Plate 1). A total of 28 km of wire was laid out and retrieved in 6 transmitter loops (1.5 km by 1.0 km).

In total 34.5 kms of line was covered. The station interval was 50 m for a total of 690 stations. Eight channels of information were acquired and plotted at each station for a total of 5,520 data entries.

The transmitter loop is energized with a triangular current at a carefully controlled frequency (30.496 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 wave form 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) corresponds 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 mini computer at the base camp. The mini computer processes the data and controls the plotting on a small (11"x15") 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 in Appendix I. All surveying was done in the period from July 29 to August 21, 1982.

The grid is in the metric system. Therefore, 30N, 20E means for example 3,000 meters north, and station 2,000 meters east.

DATA PRESENTATION

The results of the survey are presented on one location map (Plate 1) and one grid compilation map (Plate 2) and 30 data sections.

The maps are listed as follows:

Plate 1	Location Map and Utem compilation sheet
Plate 2	Utem Survey 1982 Scale 1:10,000

Legends for both the UTEM compilation map and the data sections are also attached.

The data sections are arranged in order of loop number (Loop 1, 2, 3-6).

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:

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

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

b) For 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

All of the field results are displayed in the data section on 30 diagrams, with a compilation of all of the relative points on Plate 1. The transmitter loop is positioned on the south side of the lines for all of the diagrams, except for loop 6, where it is to the north.

Since the UTEM system measures during the transmitter ON time, the measurements are susceptible to errors in chaining and station location. However, because all readings are normalized to channel 1, the noise from orientation errors is seen only on this channel. Because channel 1 responds only to highly conductive bodies and because there were none of these bodies found in this survey, the extra noise in channel 1 is not a problem in this case.

The data sections show typical background response. This is a gradual increase in response with increasing distance from the loop. Depending on the background conductivity, the early channels (first 9, then 8 and so on) reach a maximum and then begin to decrease and go negative, one by one. The later channels (1 to 4) do not reach this maximum unless the host rock and/or overburden are very conductive. A comparison of the data with model studies indicate the host rock in the survey area is quite resistive with a resistivity of about 400 ohm meters.

A typical anomaly from a steeply dipping conductor is characterized by a crossover type of anomaly with the positive shoulder on the loop side and the negative shoulder on the side away from the loop. All channels affected by the anomaly cross over from the positive to the negative (taking background into account) at the same location. Seven crossover anomalies were found during the course of this survey, the most interesting of which are on lines 0 and 5E at about 19N. The conductance of this zone and all of the others are less than one mho and can therefore be explained by a variety of geological situations such as a fault zone or a weakly mineralized vein.

CONCLUSION

A UTEM electromagnetic survey was completed on the LEW and VINE in 1982. The resistivity of the host rock is estimated to be 400 ohm meters. The conductive zones that were located are all very small and weak. No possibility of massive sulfide mineralization exists.

Report by: _____
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Geophysicist
Cominco Ltd.

Endorsed by: _____
John M. Hamilton, P.Eng.
Chief Geologist
Kimberley

DISTRIBUTION:

Mining Recorder, (2 copies) ✓
Kootenay Exploration
Western District, Exploration
Technical Support Group

REFERENCES

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

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

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

APPENDIX I

UTEM FIELD REPORT FOR

LEW EAST/VINE 1982

SJV DM	Syd Visser) Doug McCollor)	Geophysicist	Cominco Ltd. 853 - 409 Granville St. Vancouver, B.C. V6C 1T2
BH	Bod Holroyd)	Geophysicist	Cominco Ltd. 20 Adelaide St. Toronto, Ontario
GG JS GM MC DK GR BF	Greg Garvin) Jon Sortome) Gary MacSporran) Mike Clarricoates) Dave Keith) Glen Rodgers) Bruce Fisher)	Helpers	c/o Kootenay Exploration Cominco Ltd. 1051 Industrial Road #2 Cranbrook, B.C. V1C 4K7

DATE	LOOP #	LINE	FIELD CREW	COMPUTER	COMMENTS
JULY					
29	-	-	BH,DM,GG,JS,GM		Move camp to Mineral Lake.
30	-	-	"		Set up Camp at " " .
31	-	-	"		Camp day, organizing for next grid
AUGUST					
1	1		DM,JS,GG,GM		Lay out loop #1.
2	1	00E,500E	"	BH	Fix broken loop. BH lvs for Van.
3	1	1500E,1000E	"		
4	1	2000E	"		Loop broken twice. BH rtns from Van.
5	2	00E,500E	BH,JS,GG,GM	DM	
6	2	1000E	DM,JS,GG,GM	BH	Loop brkn in 4 places, late strt.
7	2	1500E,2000E	BH,JS,GG,GM	DM	Get up to date in plotting.
8	3	3000E,2500E	DM,JS,GG,GM	BH	Loop broken.
9	3	4000E,3500E	BH,JS,GG,GM	DM	Fix broken loop in evening.
10	3	4500E,5000E	DM,JS,GG,GM	BH	Continue line 3500E (loop broken previous day)
		3500E			
11	4	5500E	DM,JS,GG,GM	BH	Rx battery drained, suspect charger incorrectly connected.
12	4	6000E	BH,JS,GG,GM	DM	Rain in a.m. DM lvs for Van - holidays. SJV returns to camp.
13	4	6500E,7000E	SJV,JS,GG,GM	BH	Light rain all day.
14	4	7500E	BH,JS,GG,GM	SJV	
	5	7500E			
15	5	6500E,7000E	SJV,JS,GG,GM	BH	

DATE	LOOP #	LINE	FIELD CREW	COMPUTER	COMMENTS
AUGUST					
16	5	5500E,6000E	BH,JS,GG,GM	SJV	Phoned Yves about drift problem. GG sprained ankle in evening delivering some things to Kootenay warehouse. He will go on compensation. BH returns to Toronto.
17			SJV,JS,GG,GM		Packing up camp. DM returns from Van evening. JS,GM last day of work.
18	6	6000E	SJV,DM,BF		Detail (Hx,Hz)
19	6	6500E	DM,BF		Detail (HX,Hz)
20			MC,DK	SJV	Working on the equipment trying to solve some of the w drift problem. Hired MC and DK they are signing on today and taking medicals.
21			MC,DK,SJV	DM	

APPENDIX II

APPENDIX II

LEGEND

UTEM DATA SECTIONS

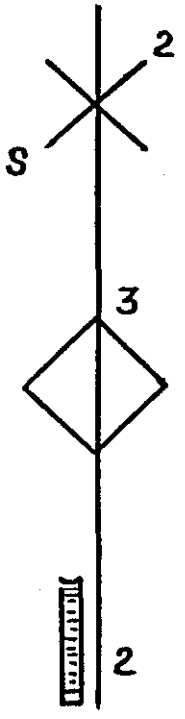
ORDINATE: Amplitude scale is given in %

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	

LEGEND

UTEM COMPILATION MAPS

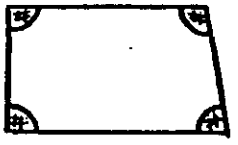


Axis of a crossover anomaly. The number indicates the latest anomalous channel.

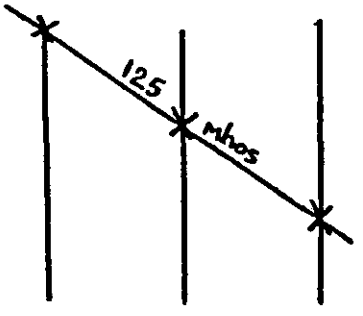
Depth indicated by: S - Shallow (30m)
M - Moderate (30-75m)
D - Deep (75m)

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.



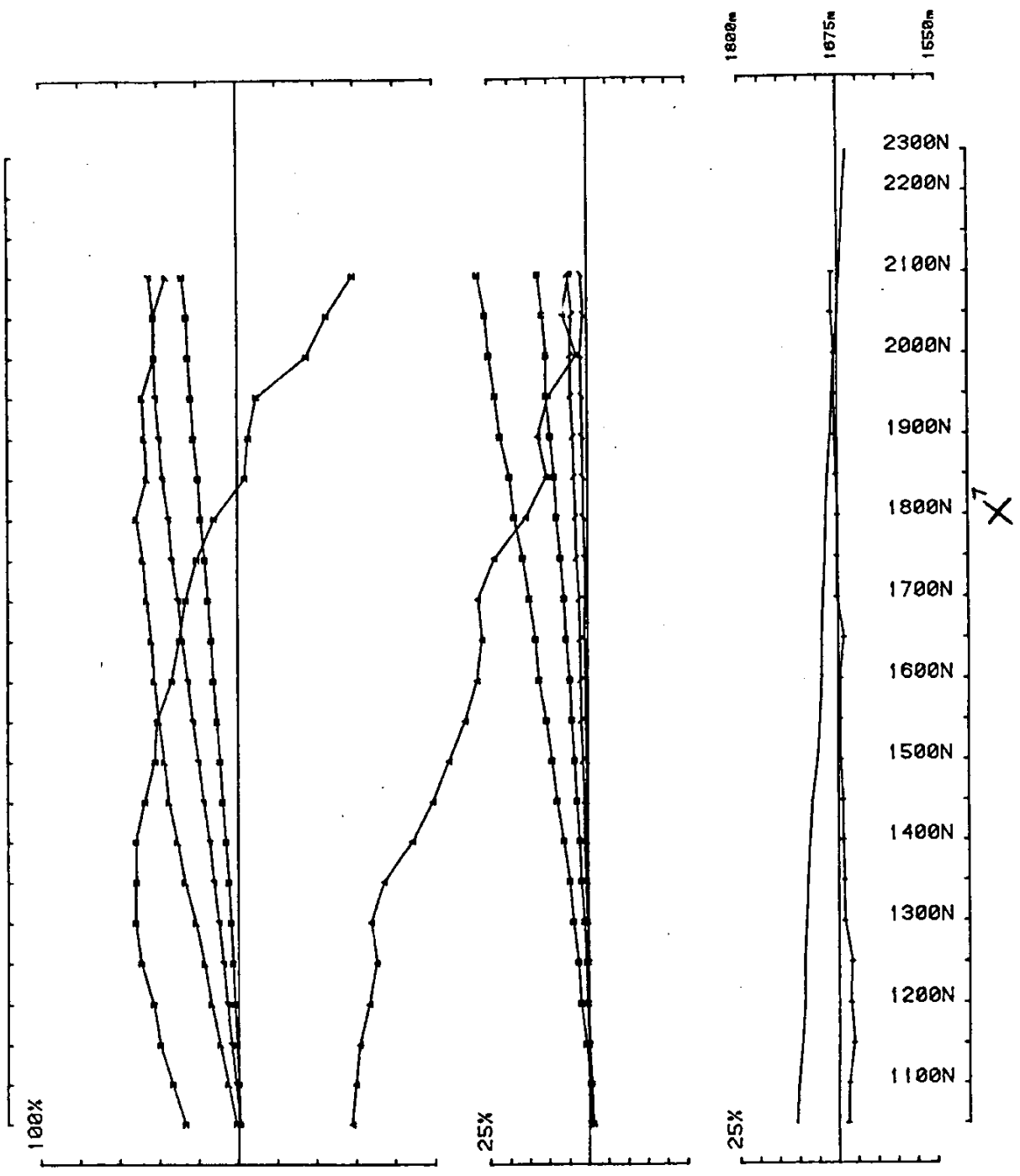
Conductor axis located by crossover anomalies with a conductance determination. The conductance is the interpreted conductivity x thickness of the conductor in mhos (same as Siemens).

Only the principal crossovers are indicated.

A P P E N D I X III

DATA SECTIONS

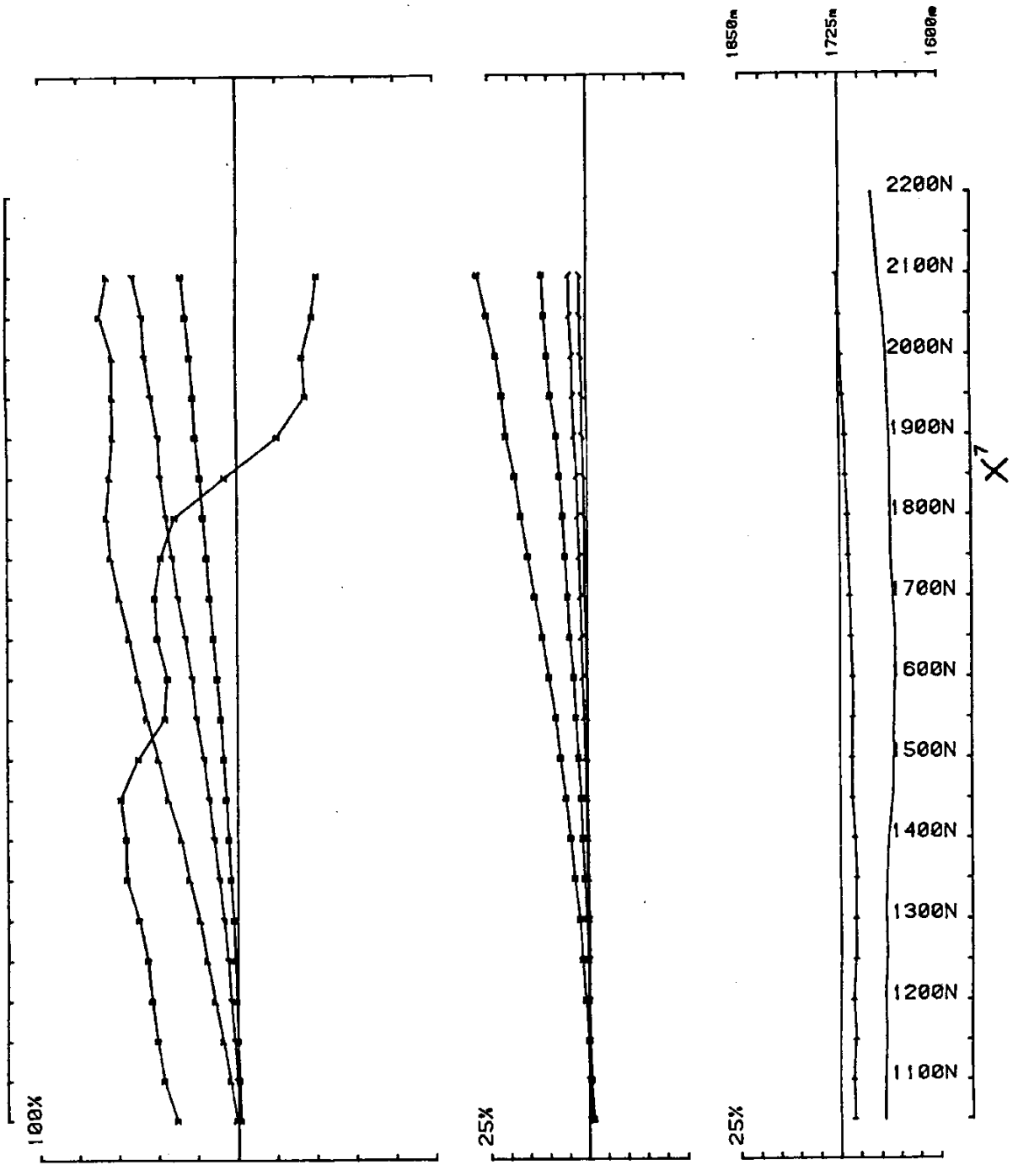
D.S. 1 - 30



Area LewEast82 Cominco operator Bob&Doug freq(hz) 30.974

Loopno 1 Line 0E component Hz secondary Ch 1 normalized

d.s. 1



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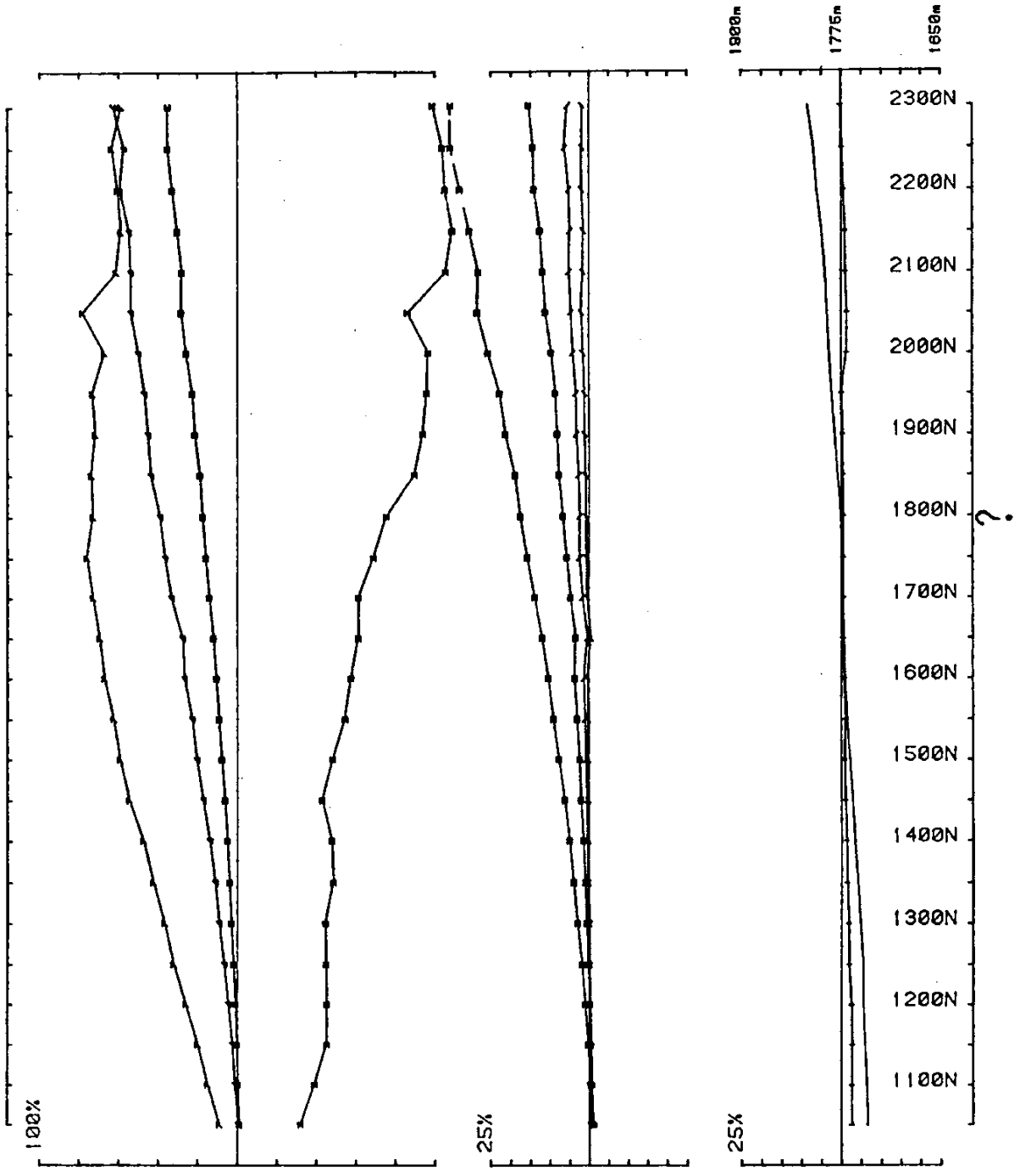
Loopno 1 Line 500E component Hz secondary Ch 1 normalized

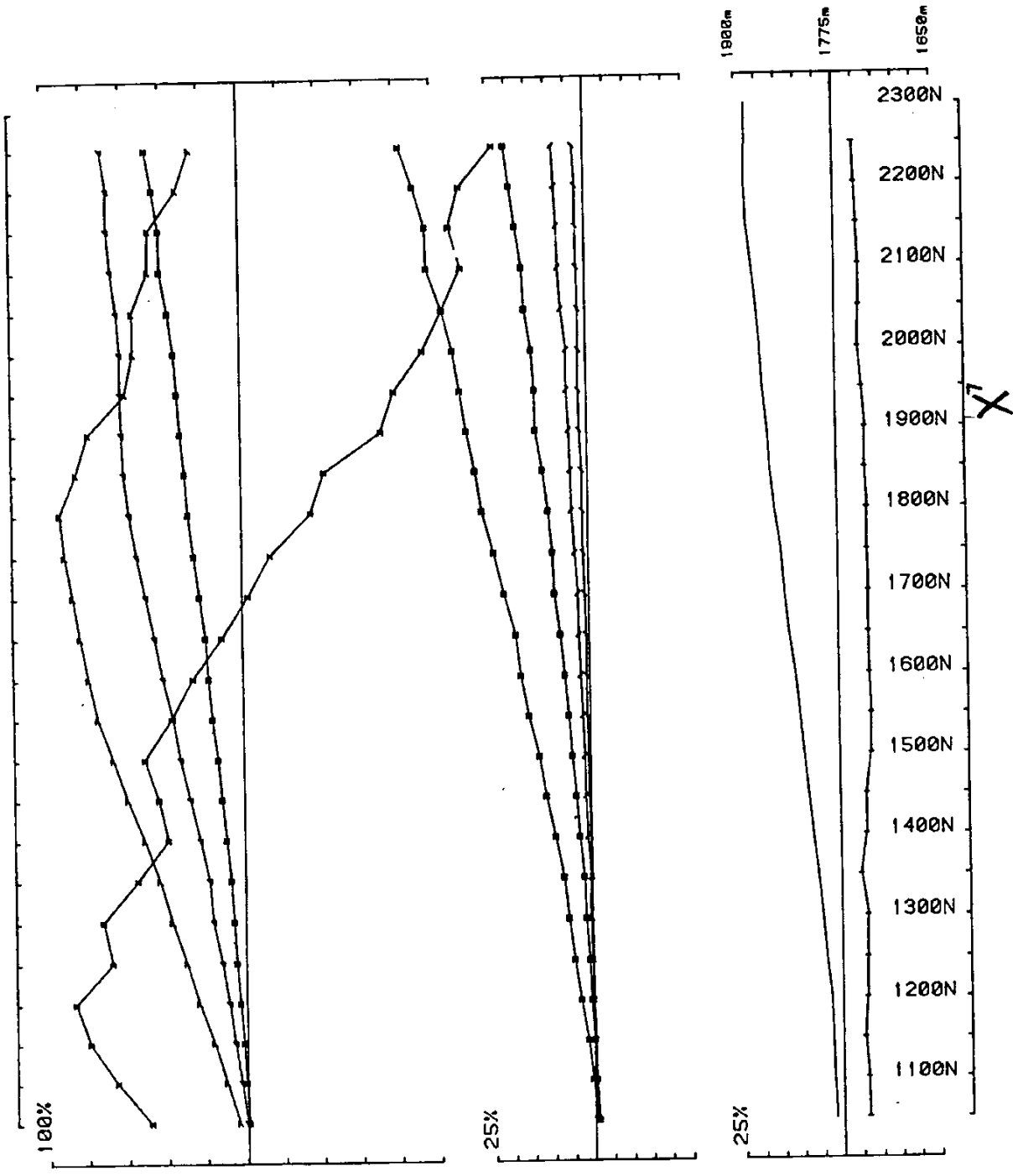
d.s. 2



Area LewEast82 Cominco operator Bob&Doug freq(hz) 30.974

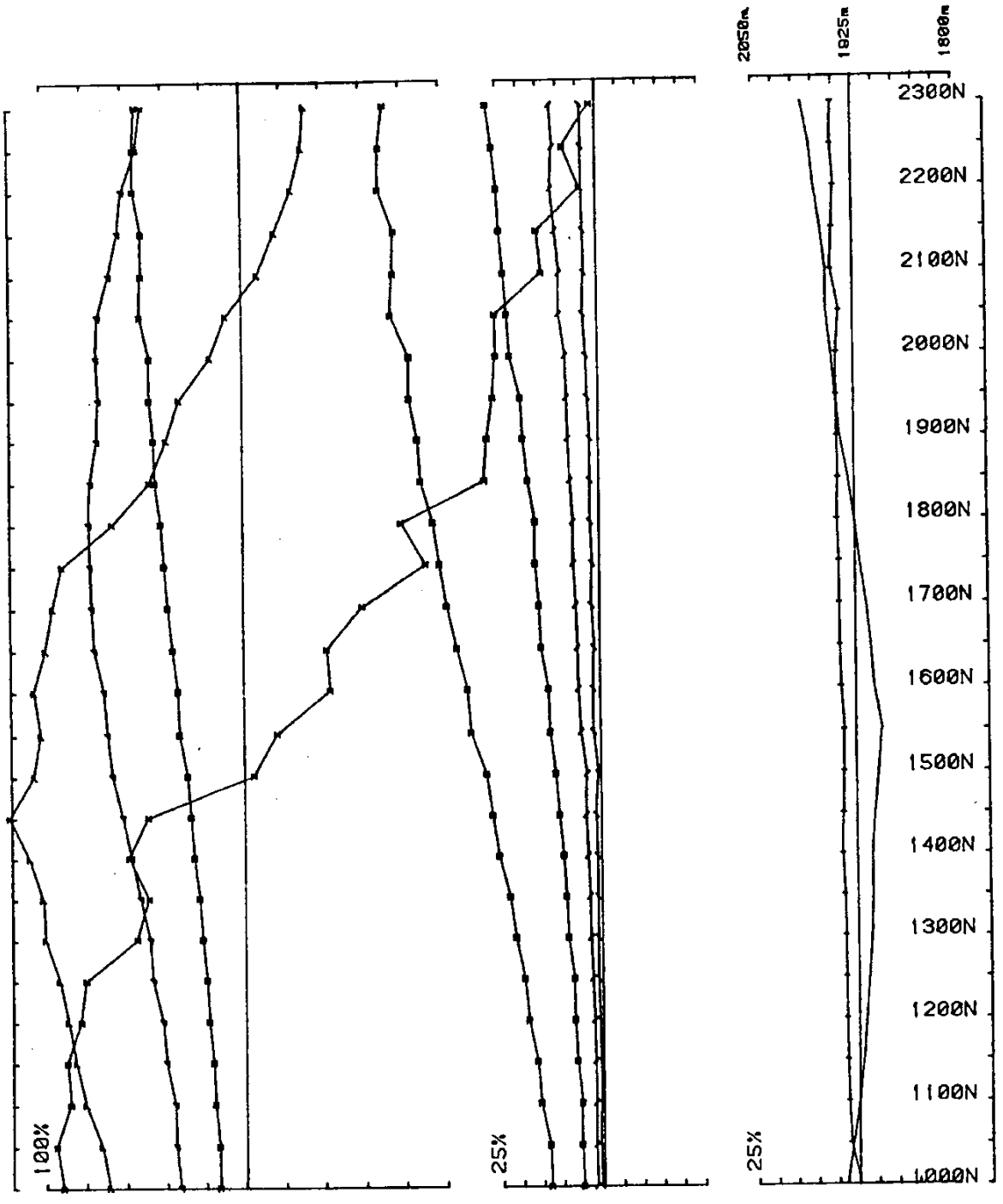
Loopno 1 Line 1000E component Hz secondary Ch 1 normalized

d.s. 3



Area LewEast82 Cominco operator Bob&Doug freq(hz) 30.974
Loopno 1 Line 1500E component Hz secondary Ch 1 normalized

d.s. 4



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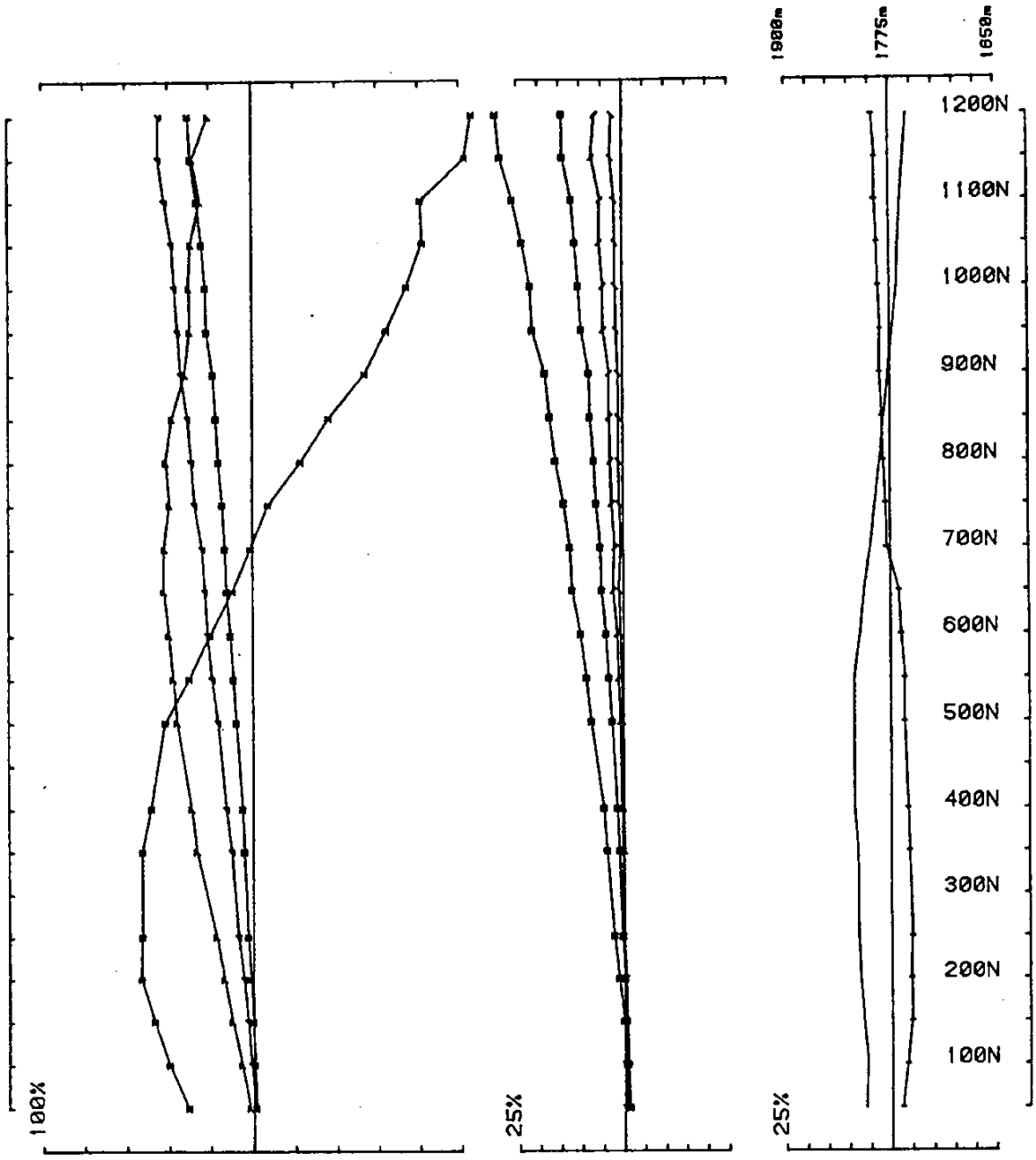
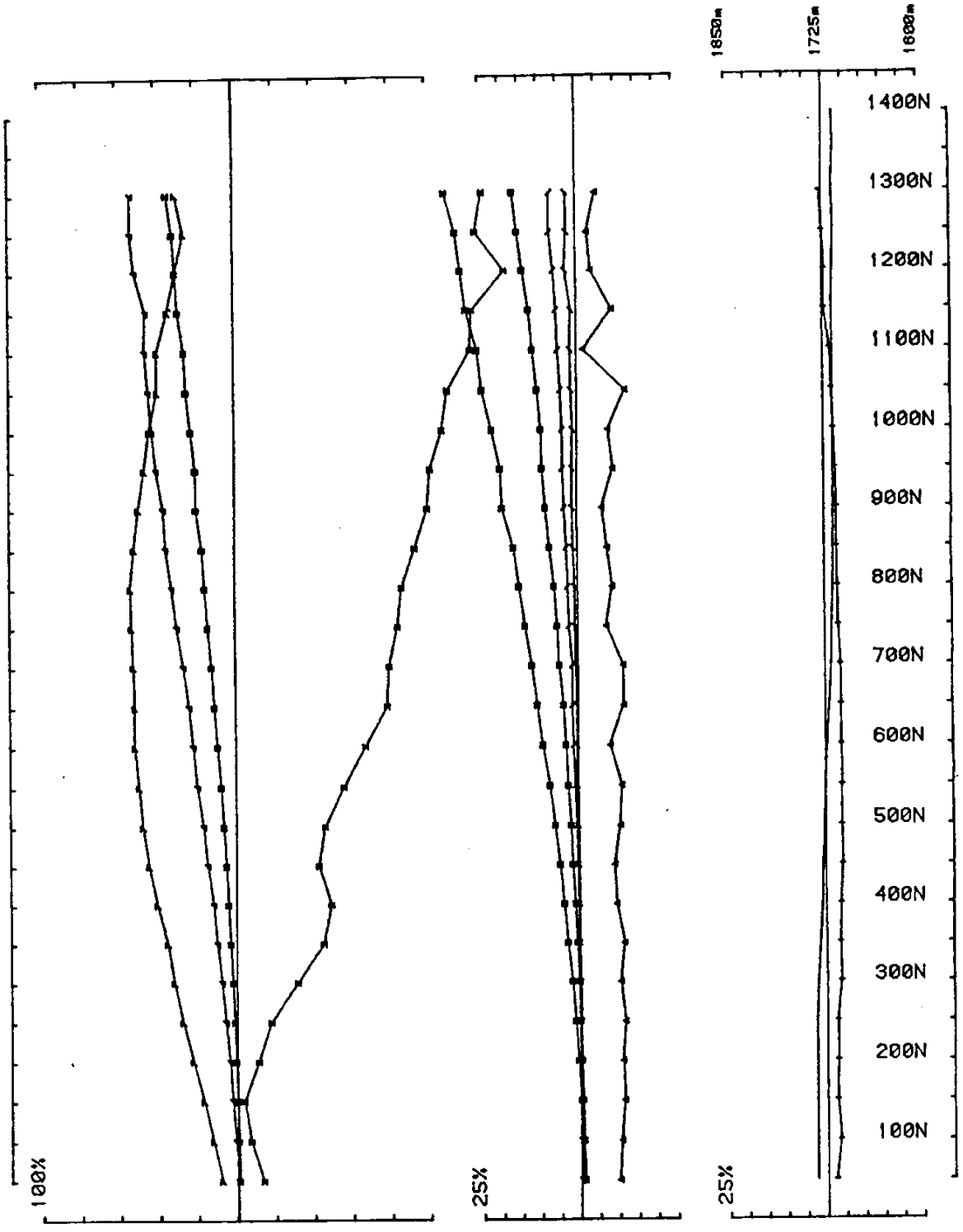
Loopno 1 Line 2000E component Hz secondary Ch 1 normalized

d.s. 5



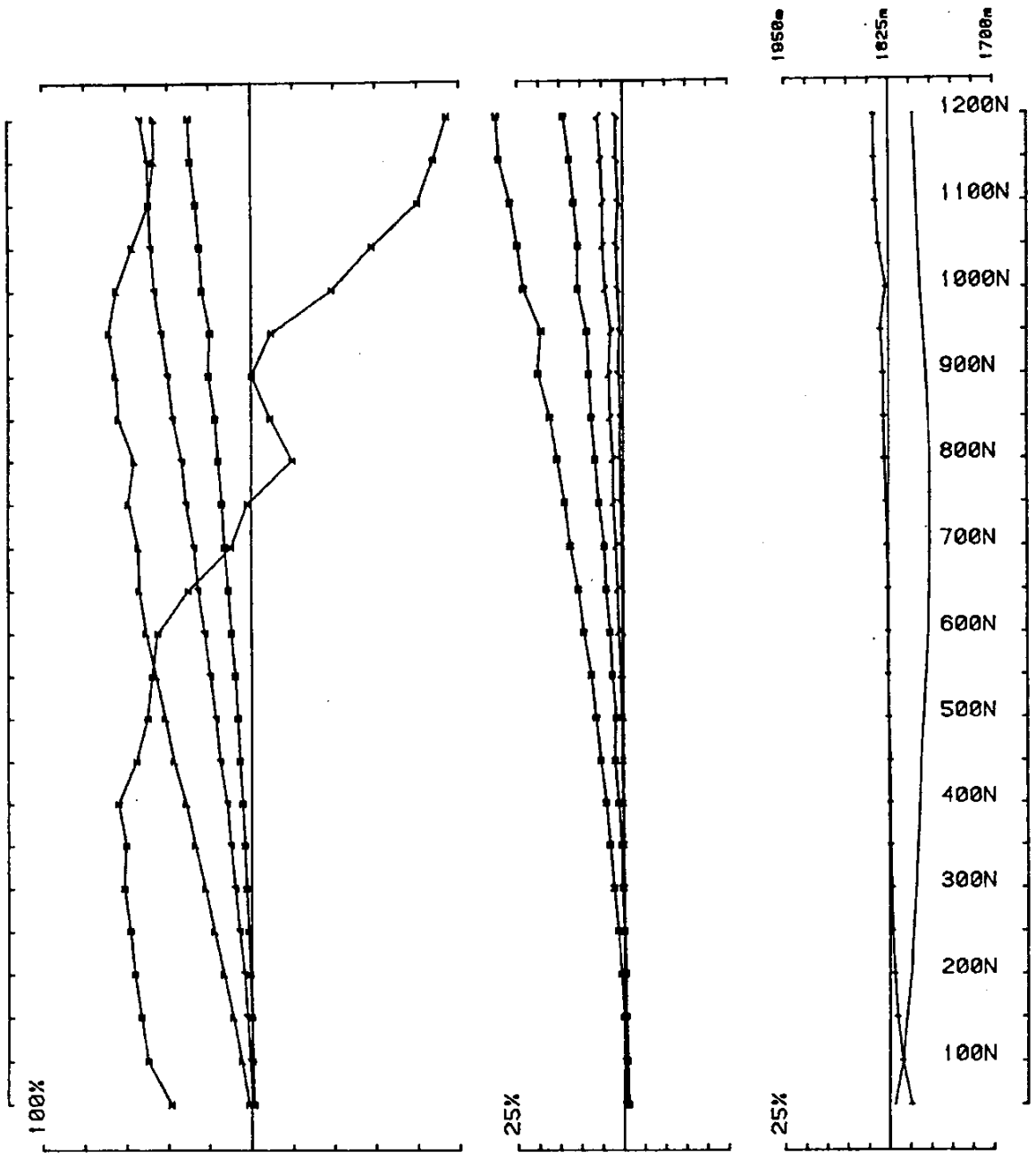
Area LewEast82 Cominco operator Bob&Doug freq(hz) 30.974
Loopno 2 Line 0E component Hz secondary Ch 1 normalized

d.s. 6



Area LewEast82 Cominco operator Bob&Doug freq(hz) 30.974
Loopno 2 Line 500E component Hz secondary Ch 1 normalized

d.s. 7



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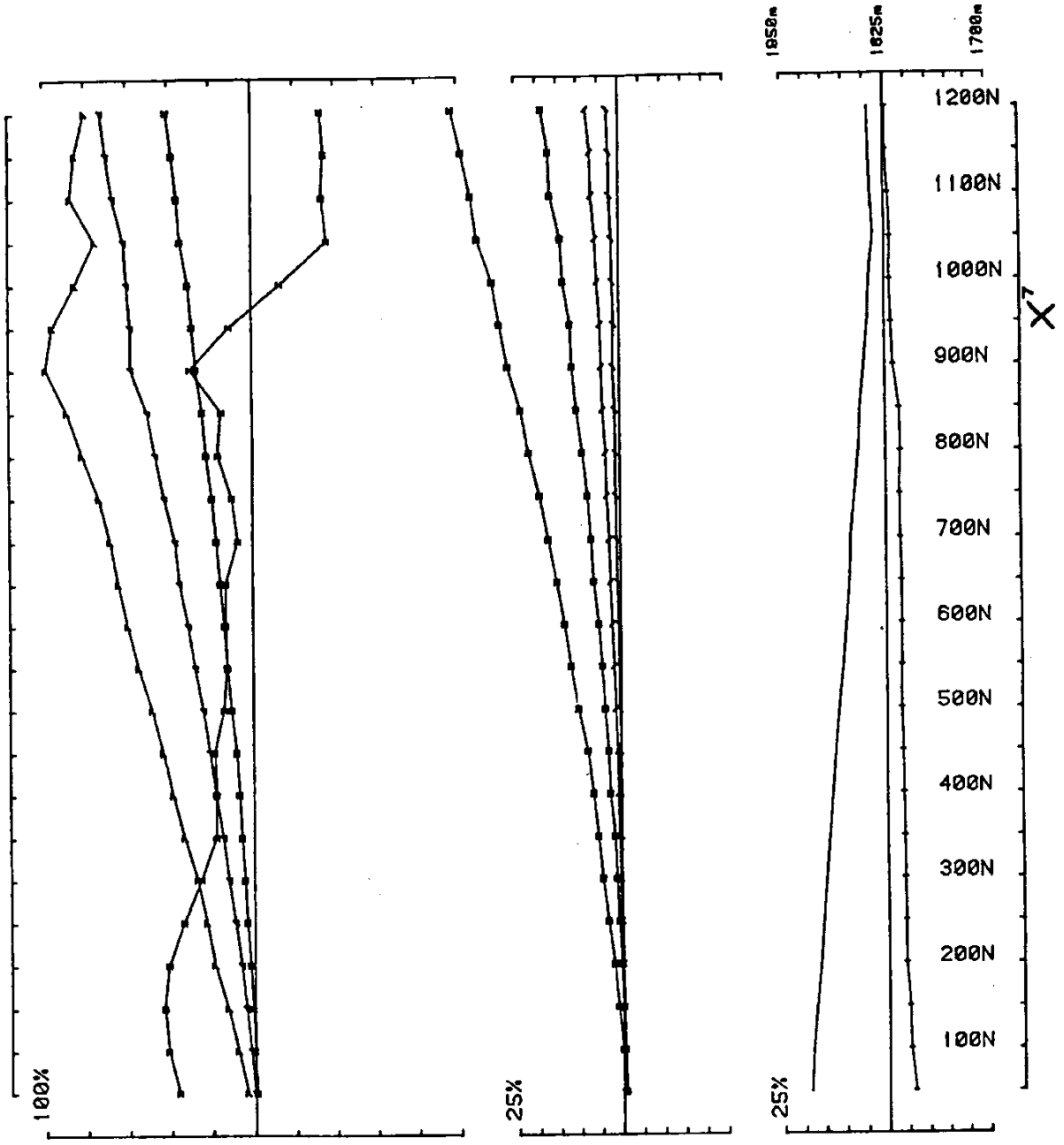
Loopno 2 Line 1000E component Hz secondary Ch 1 normalized

d.s. 8



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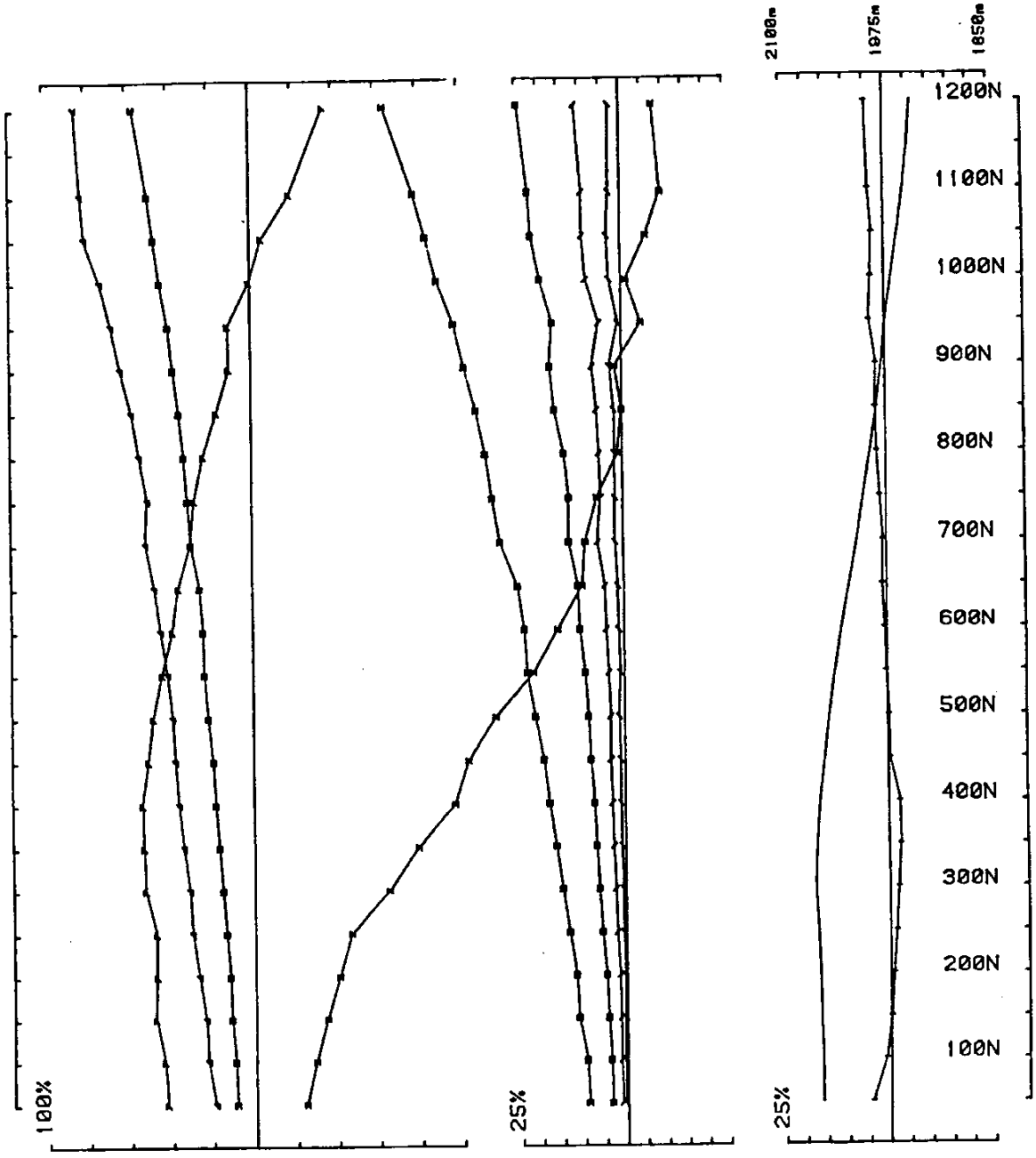
Loopno 2 Line 1500E component Hz secondary Ch 1 normalized

d.s. 9



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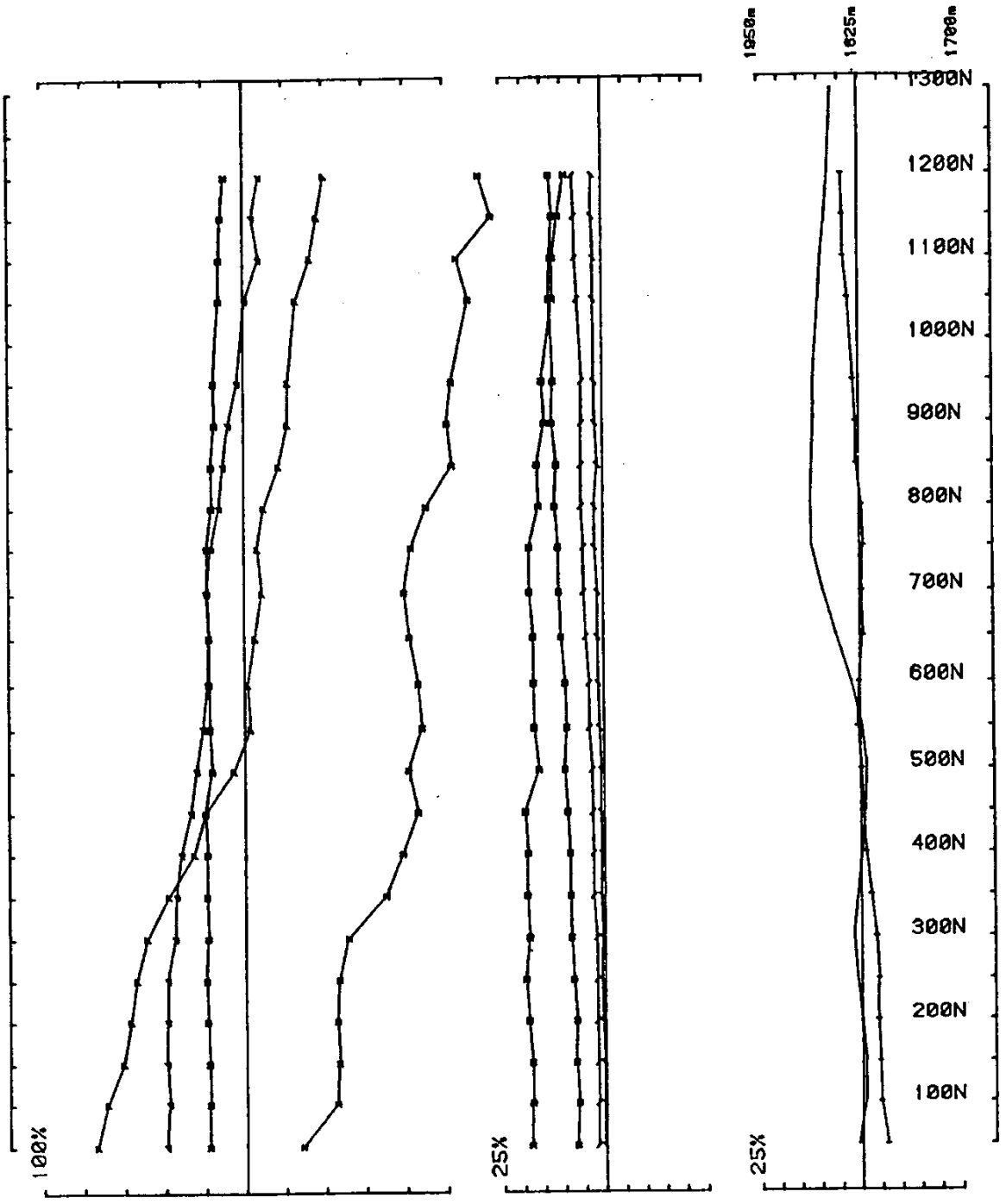
d.s. 10



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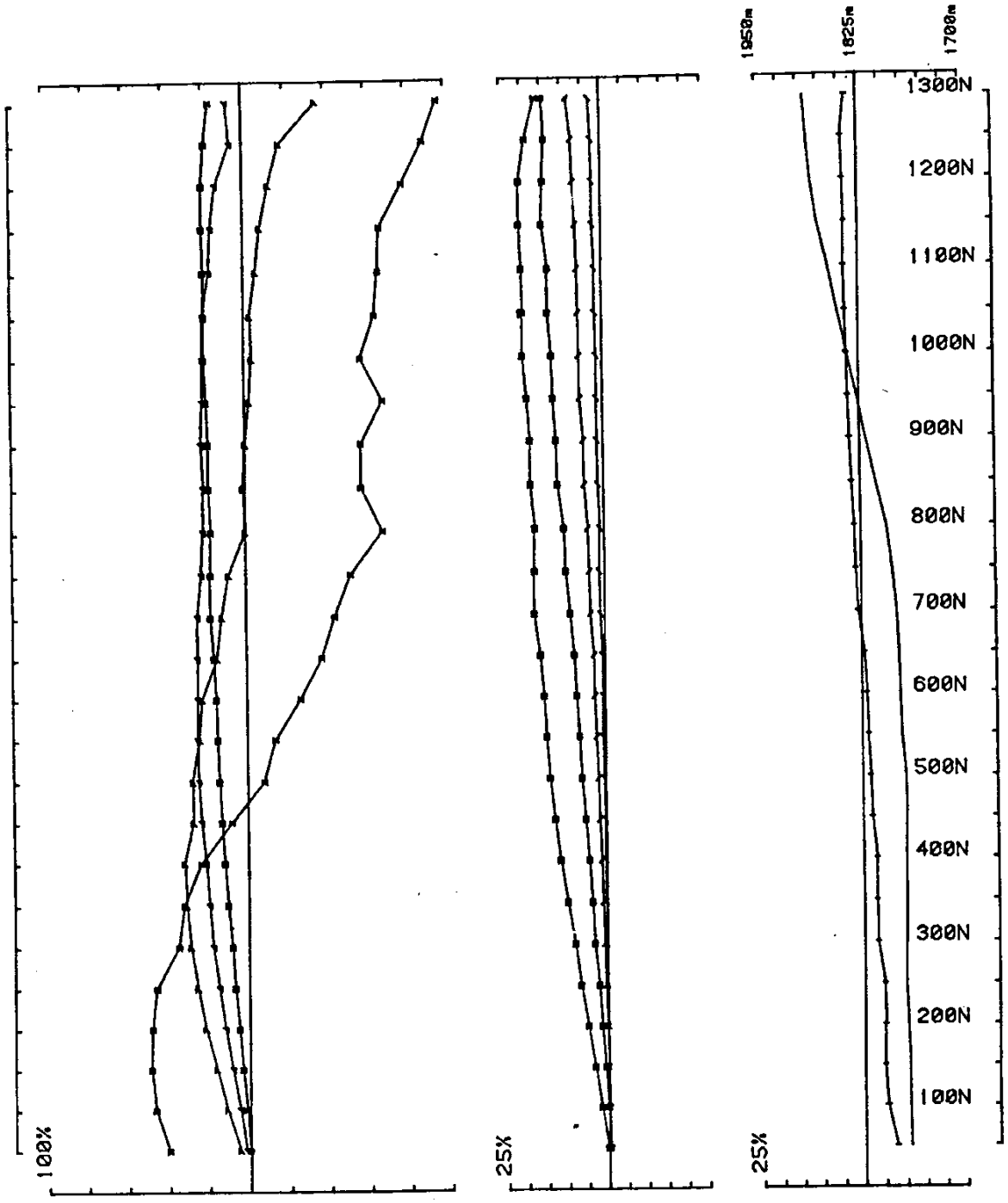
Loopno 3 Line 2500E component Hz secondary Ch 1 normalized .

d.s. 11



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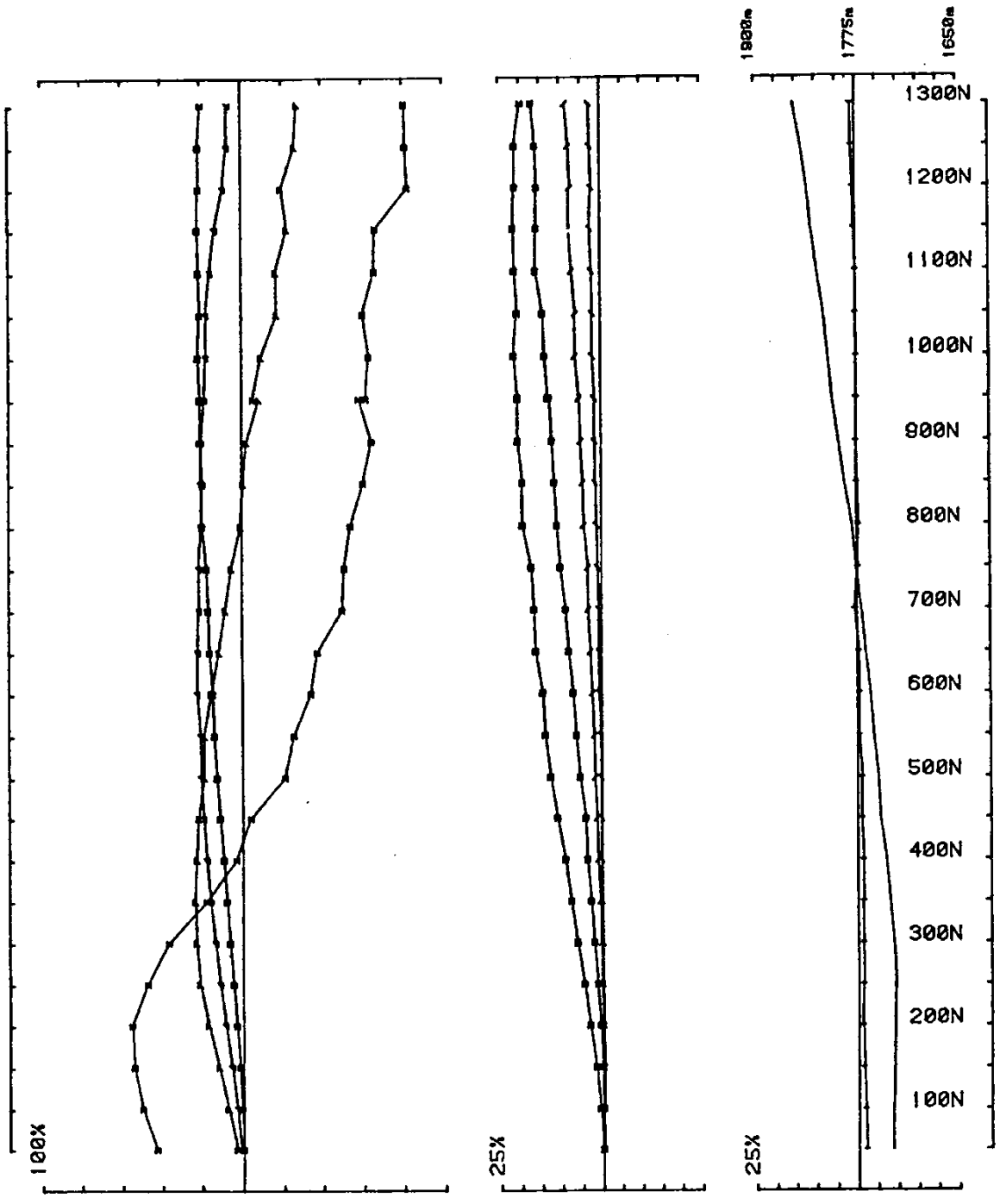

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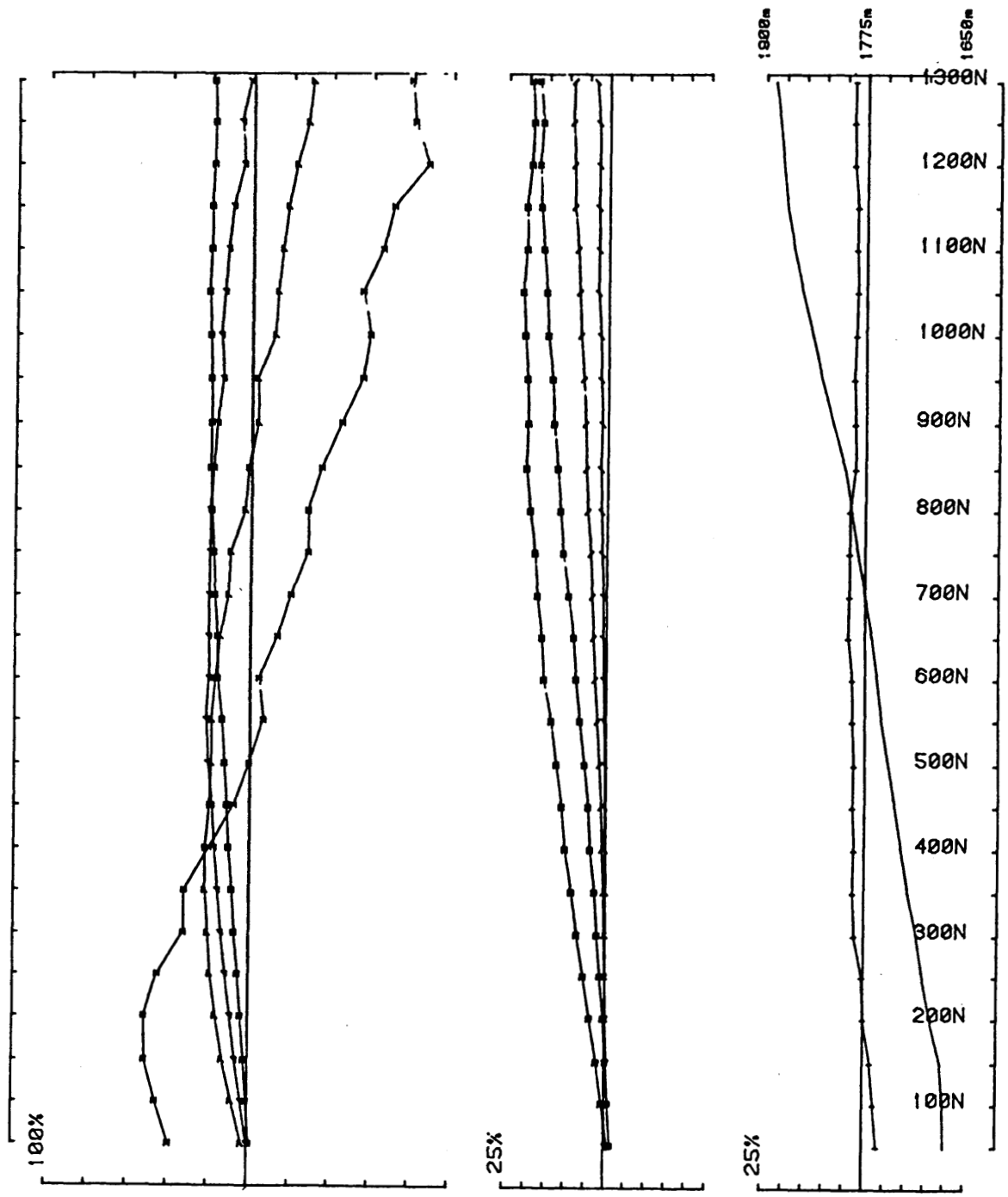

Area LewEast82· Cominco operator Bob&Doug freq(hz) 30.974
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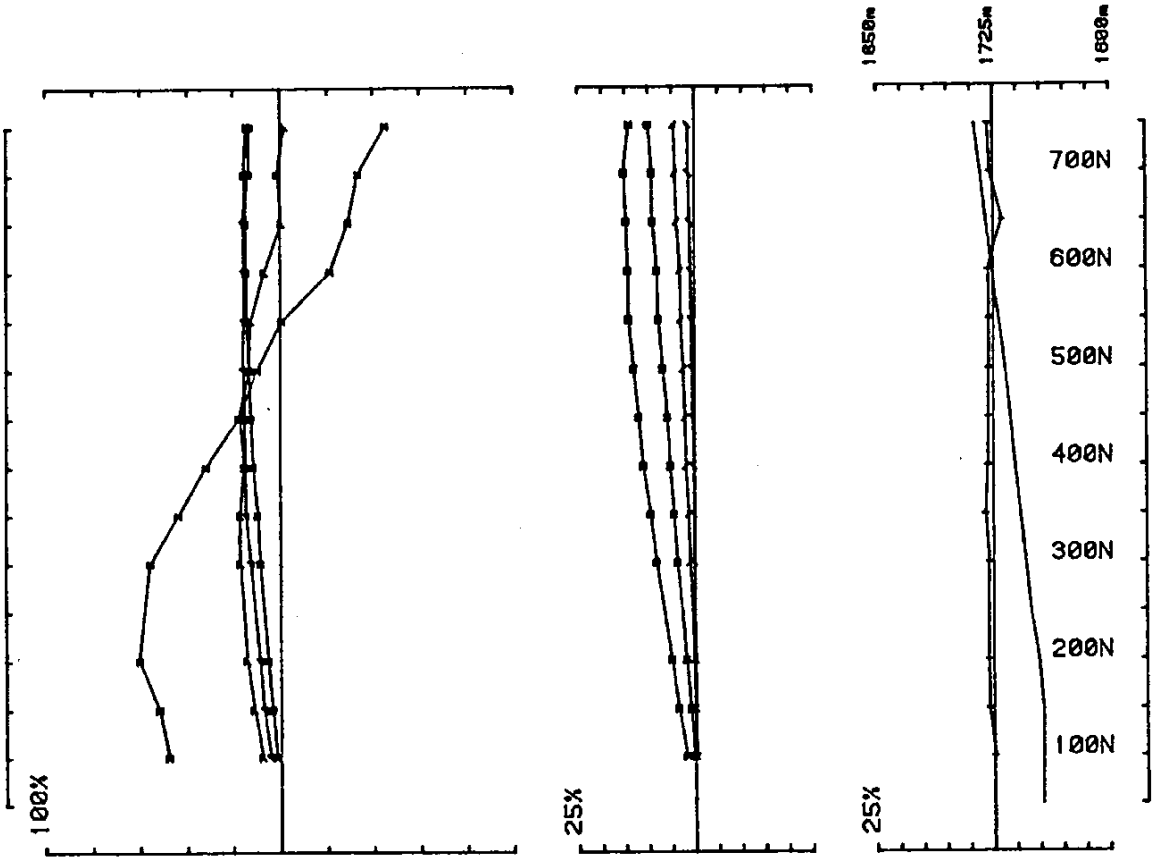

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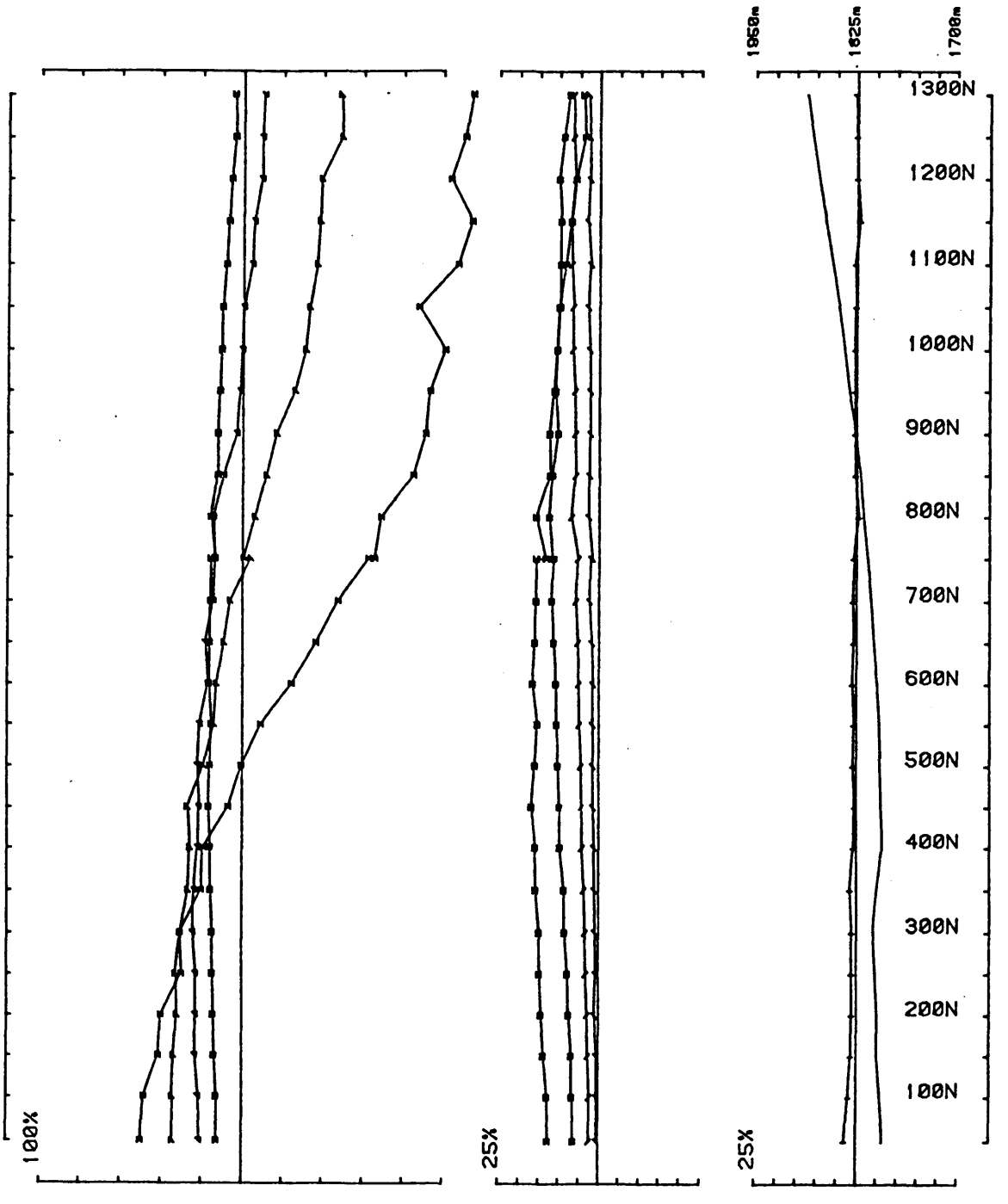
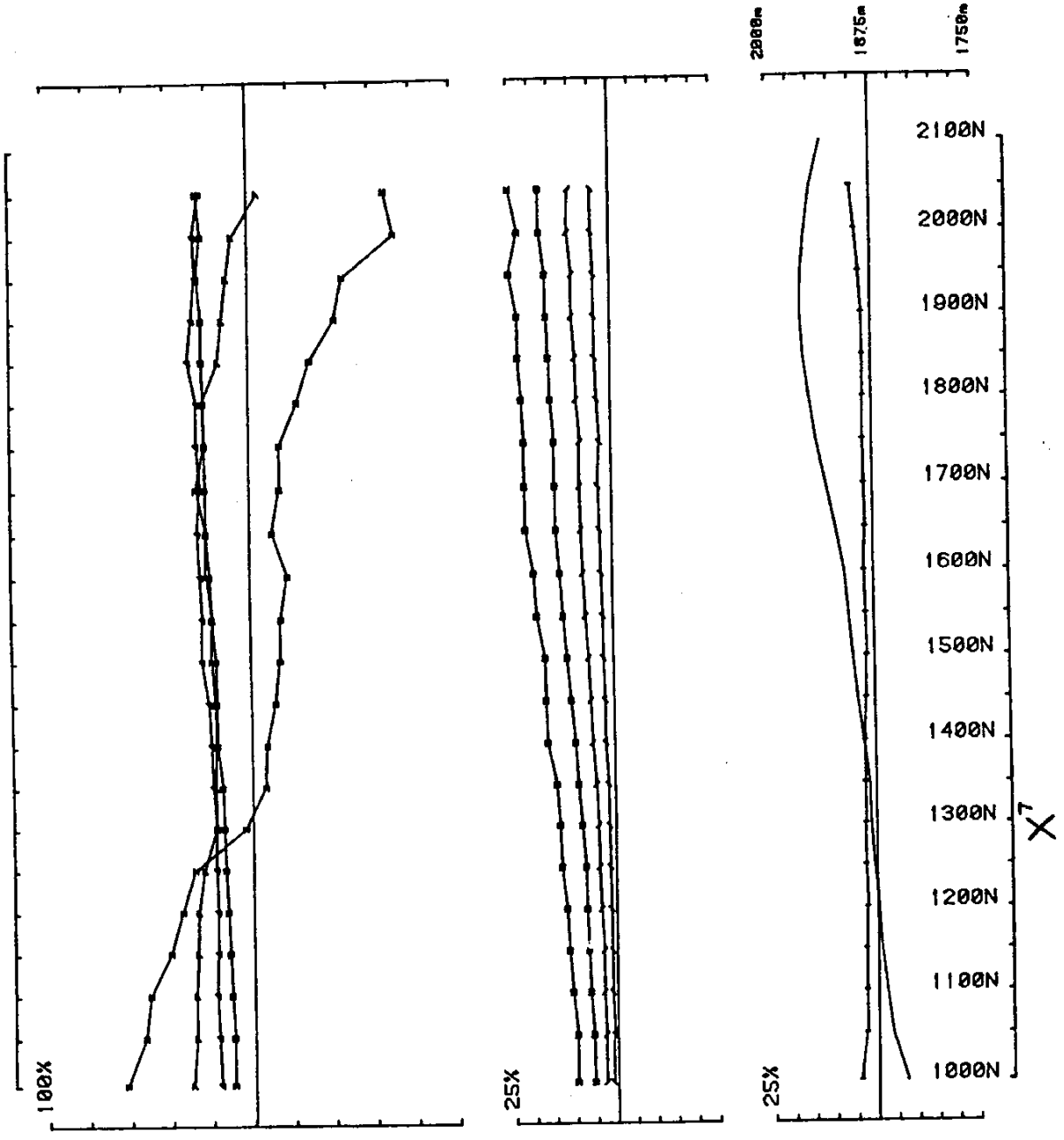
d.s. 15



Area LewEast82 Cominco operator Bob&Doug freq(hz) 30.974
Loopno 3 Line 5000E component Hz secondary Ch 1 normalized

d.s. 16



Area Vine82 Cominco operator Bob&Doug freq(hz) 30.974
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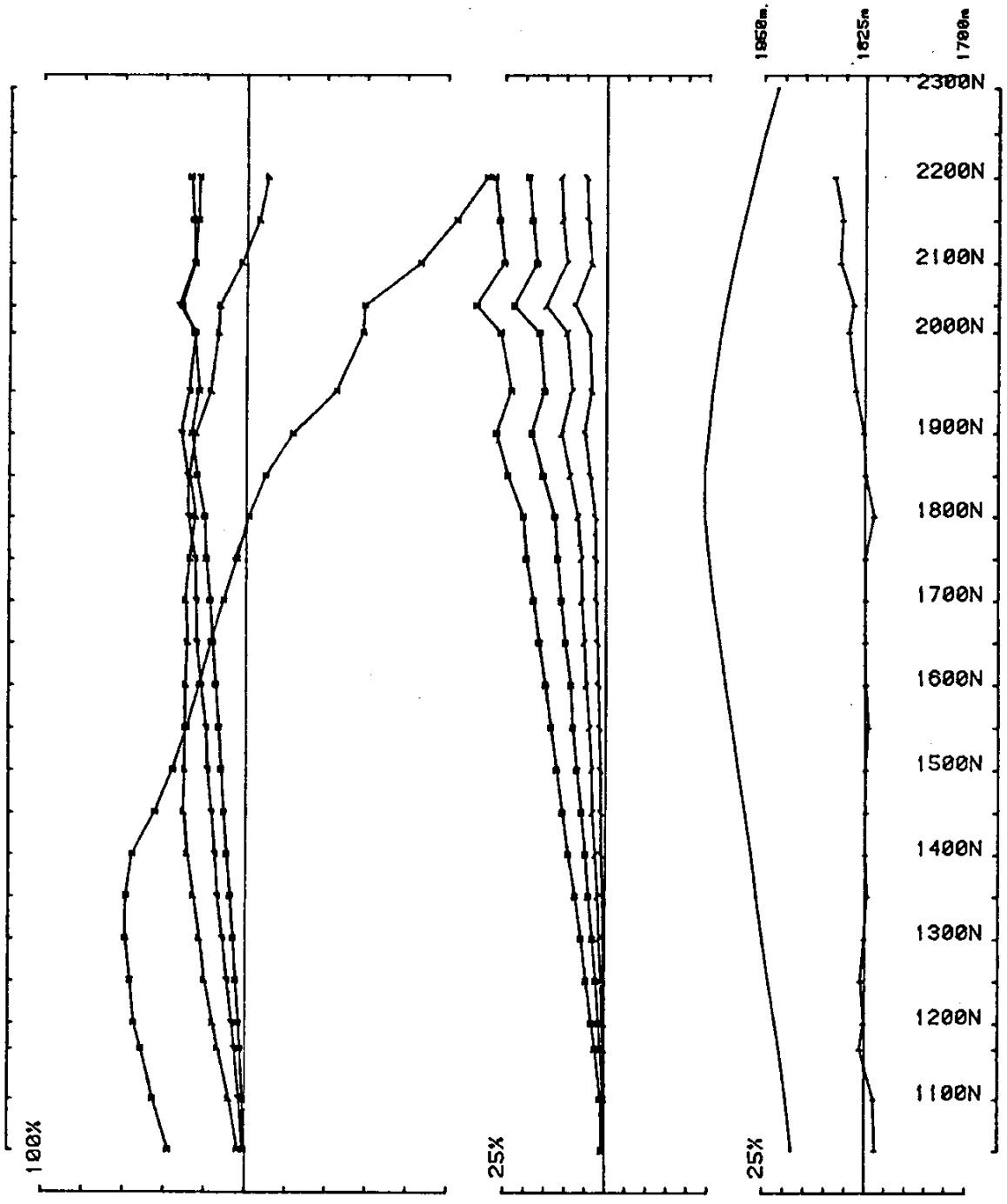

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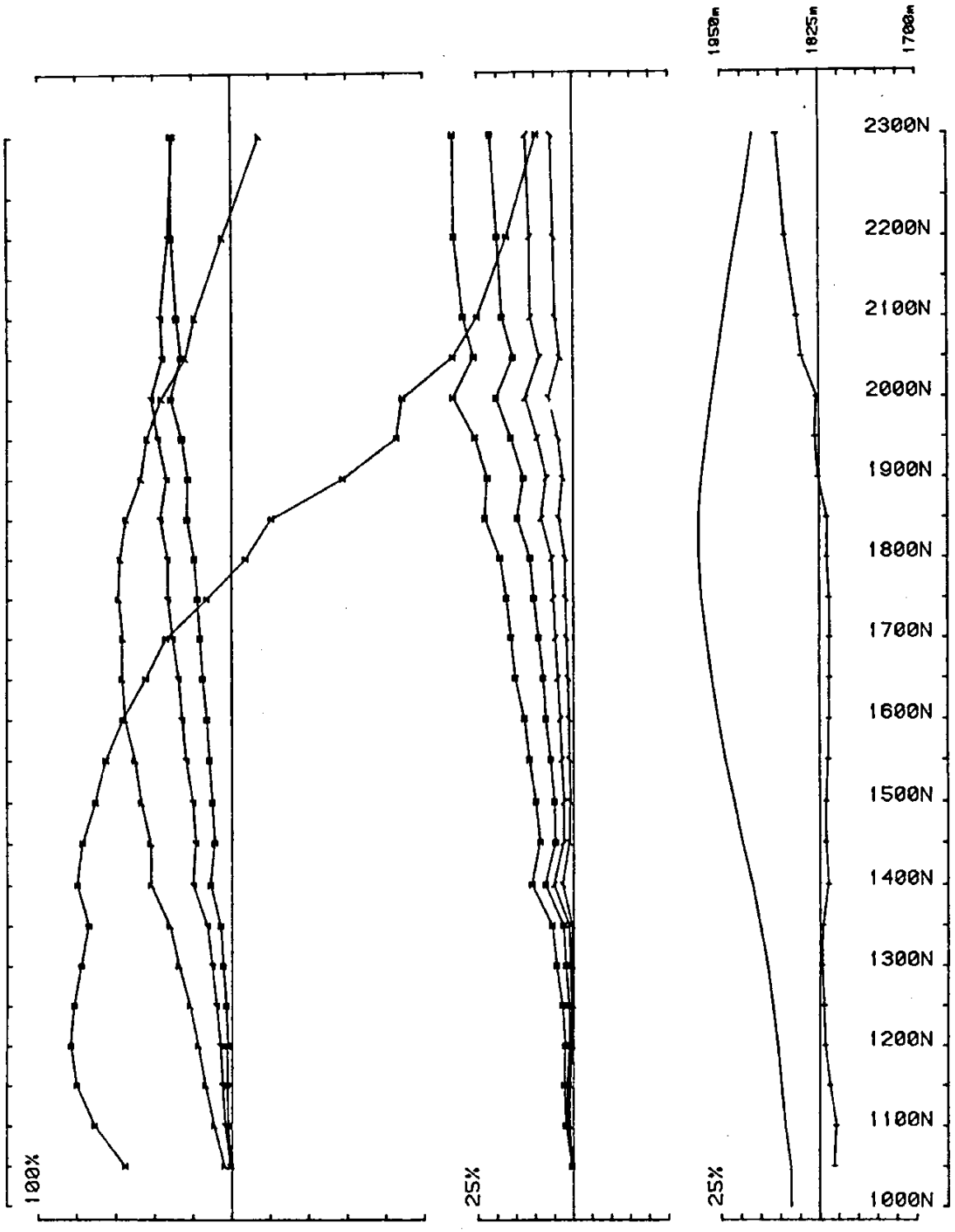

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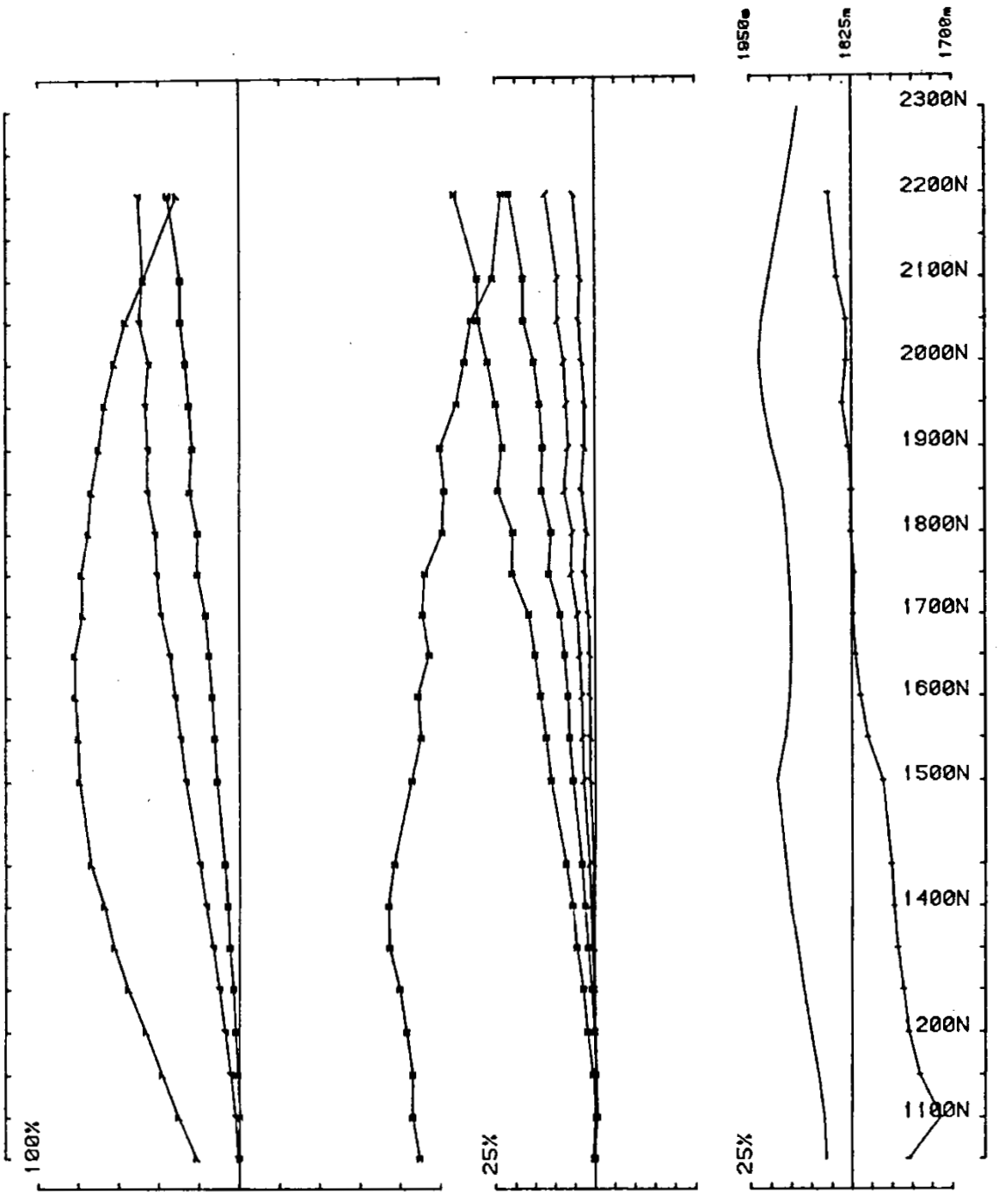

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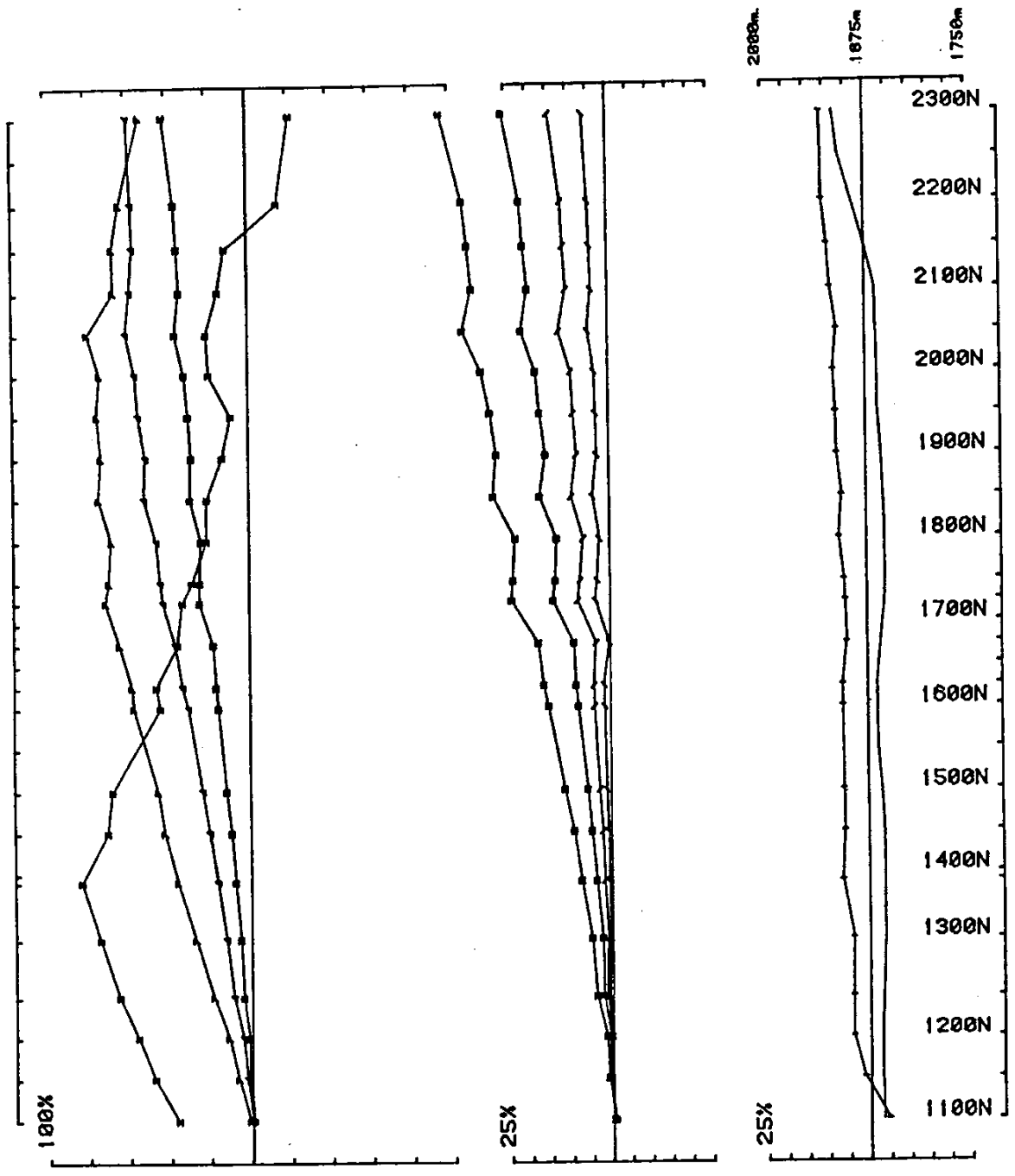

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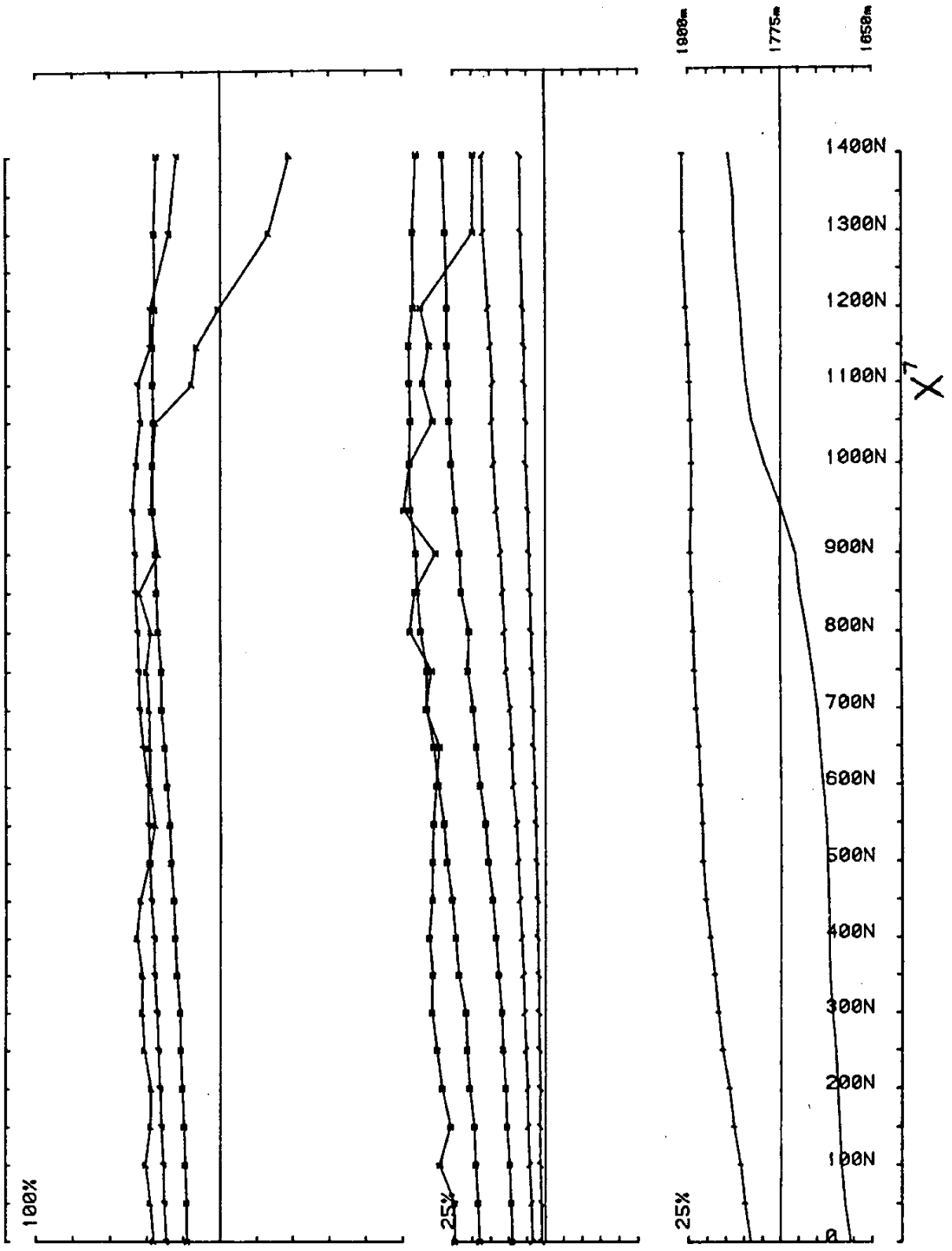

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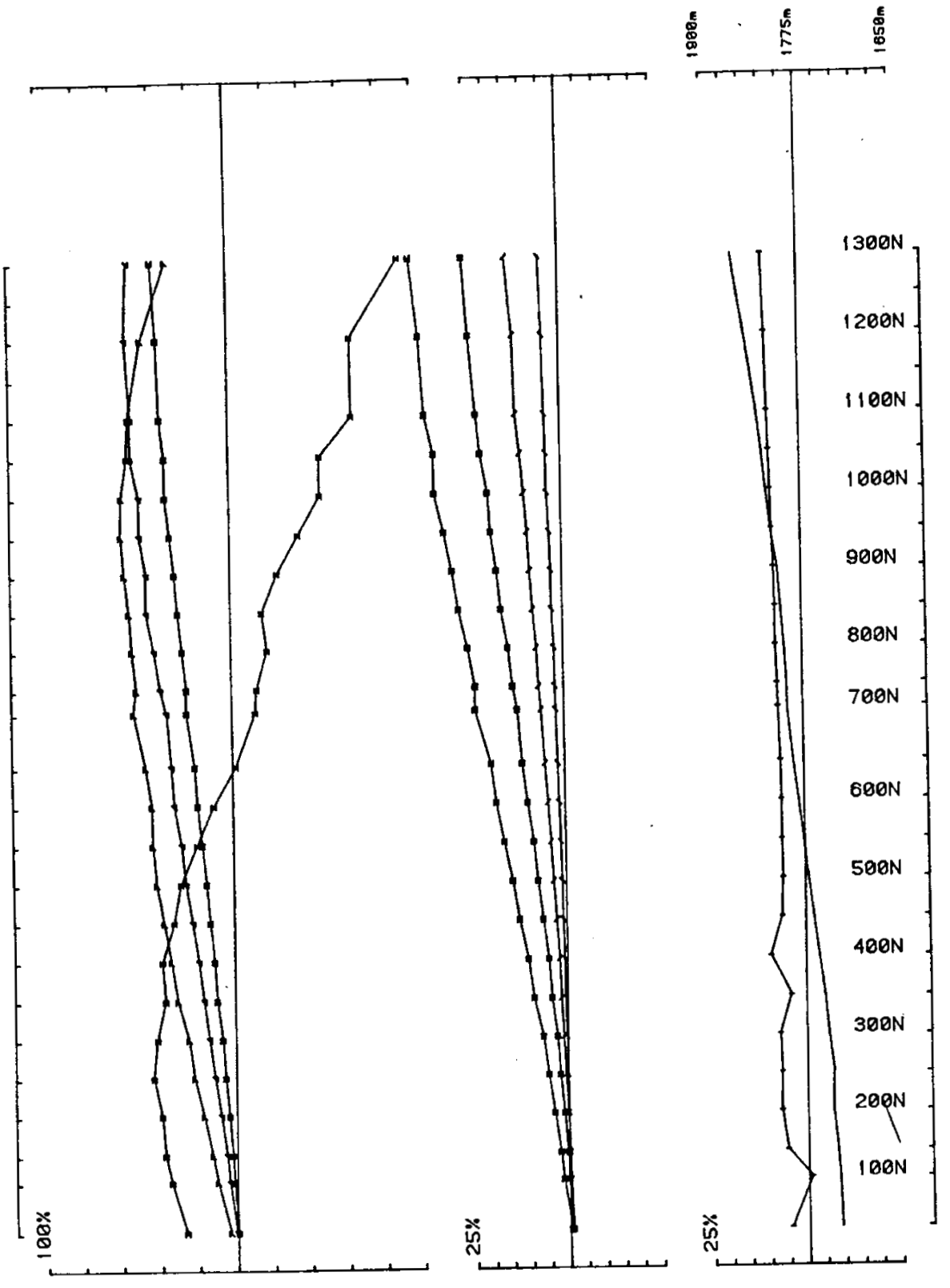

Area Vine82 Cominco operator Bob&Syd freq(hz) 30.974
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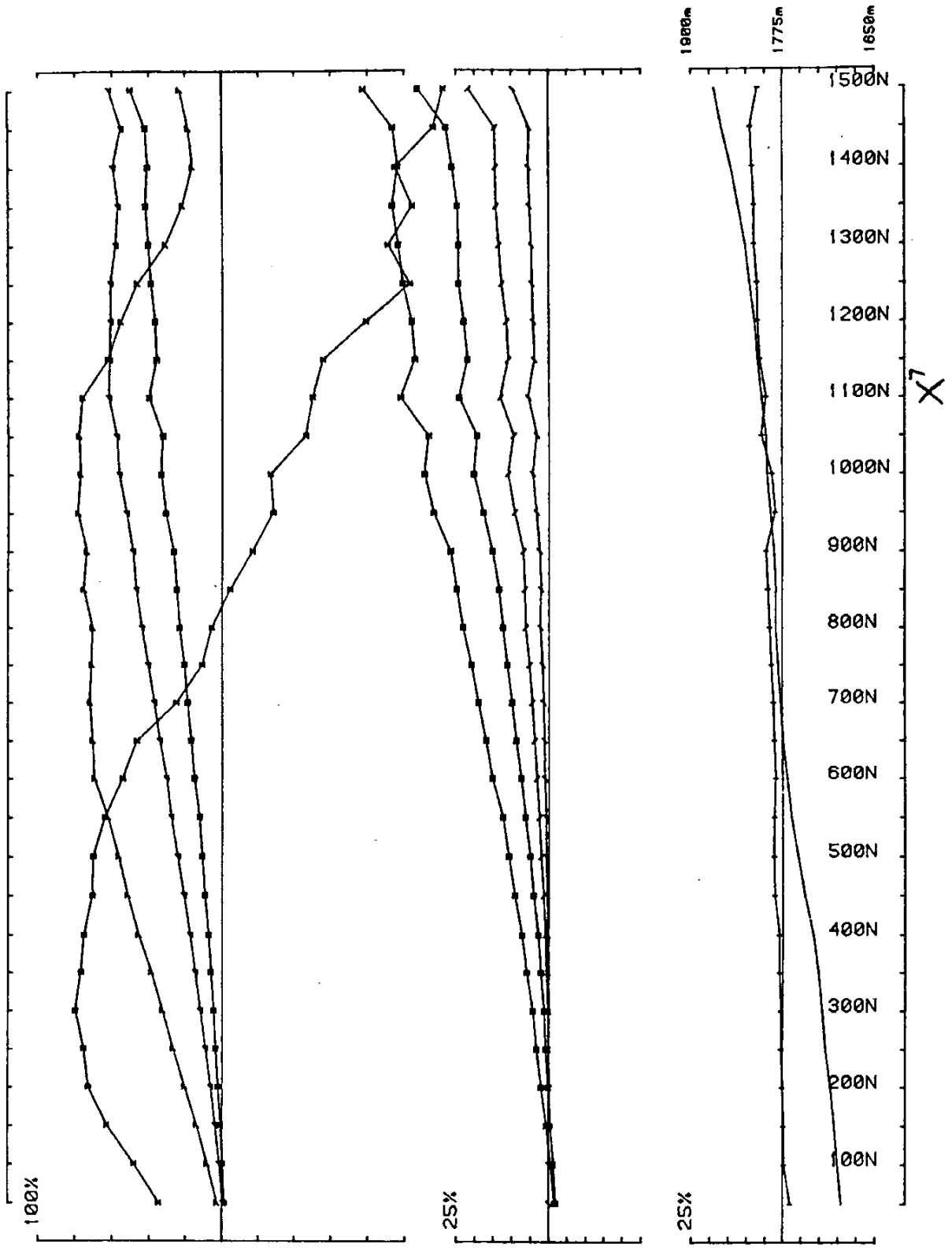
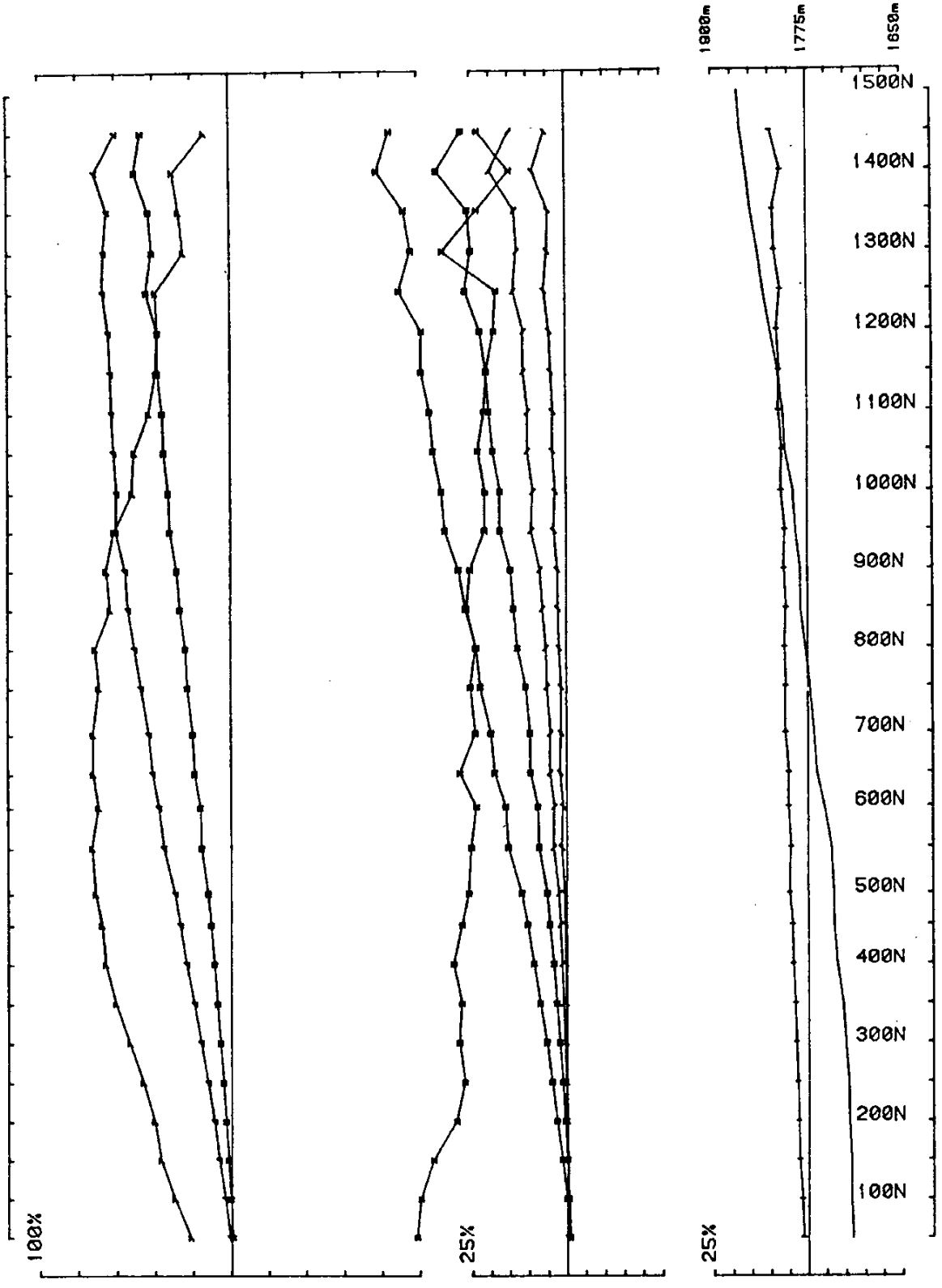


Area Vine82 Cominco operator Bob&Cyd freq(hz) 30.974

Loopno 5 Line 6500E component Hz secondary Ch 1 normalized

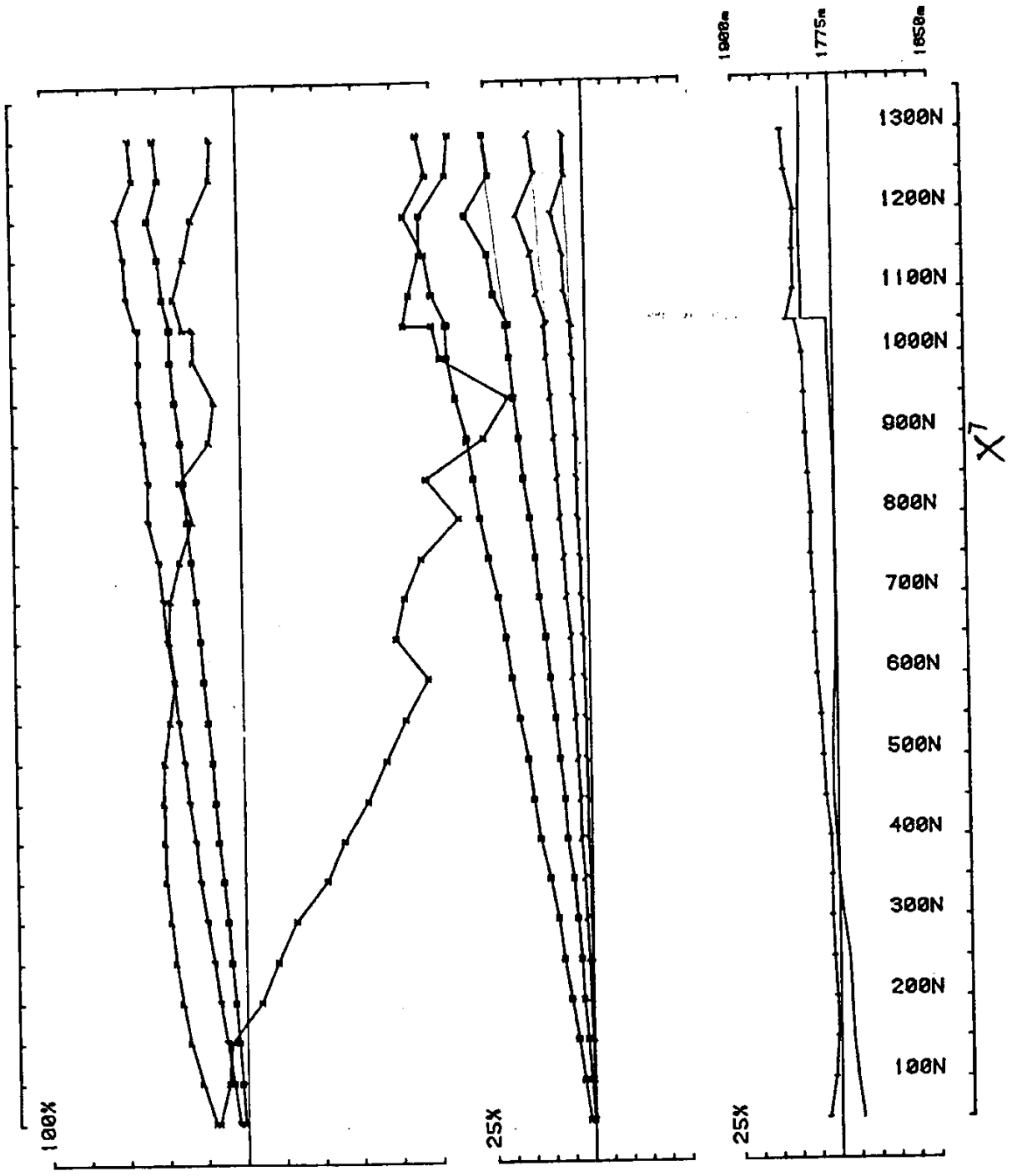
d.s. 24



Area Vine82 Cominco operator Bob&Syd freq(hz) 30.974

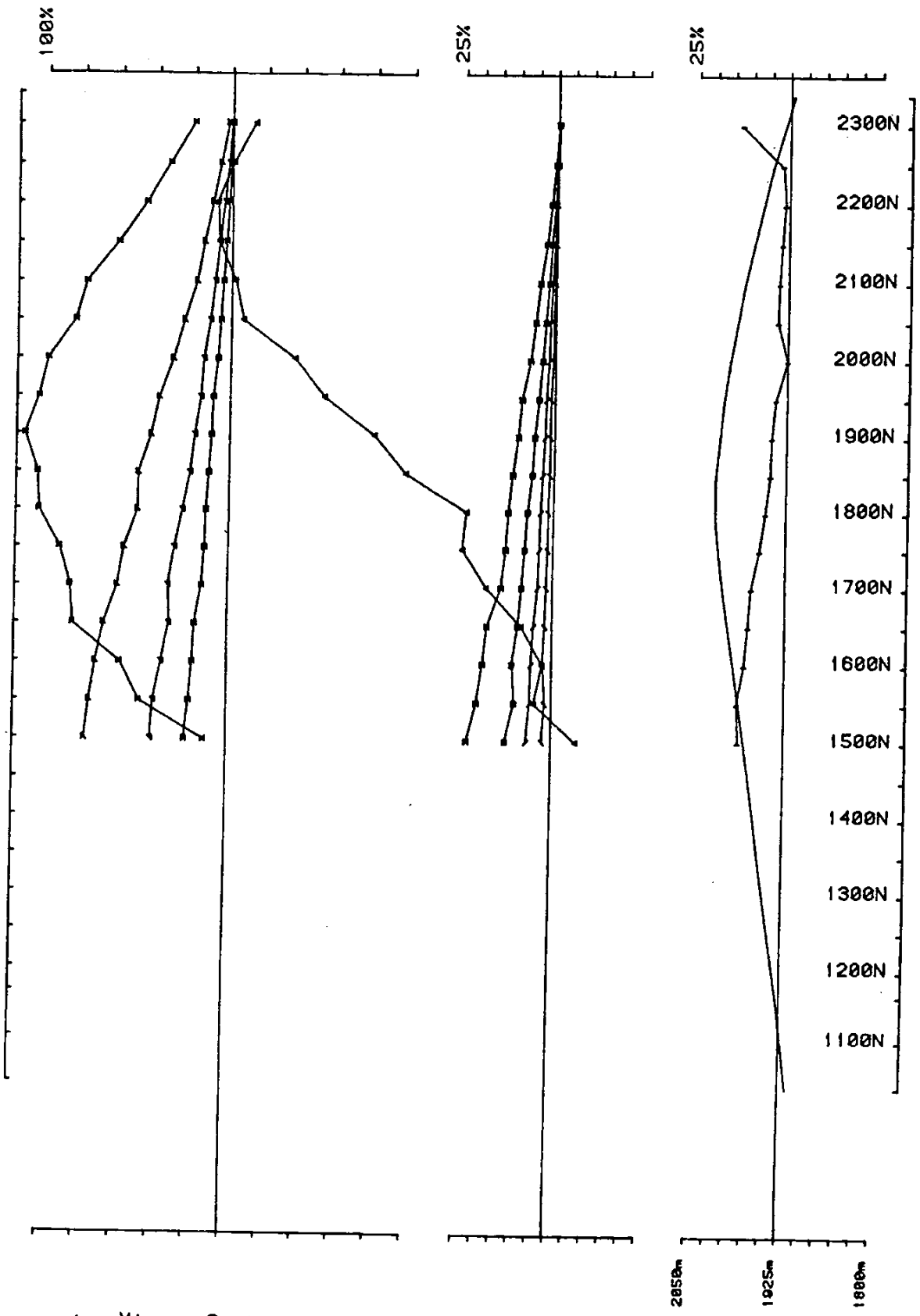
Loopno 5 Line 7000E component Hz secondary Ch 1 normalized

d.s. 25



Area Vine82 Cominco operator Bob&Syd freq(hz) 30.974
Loopno 5 Line 7500E component Hz secondary Ch 1 normalized

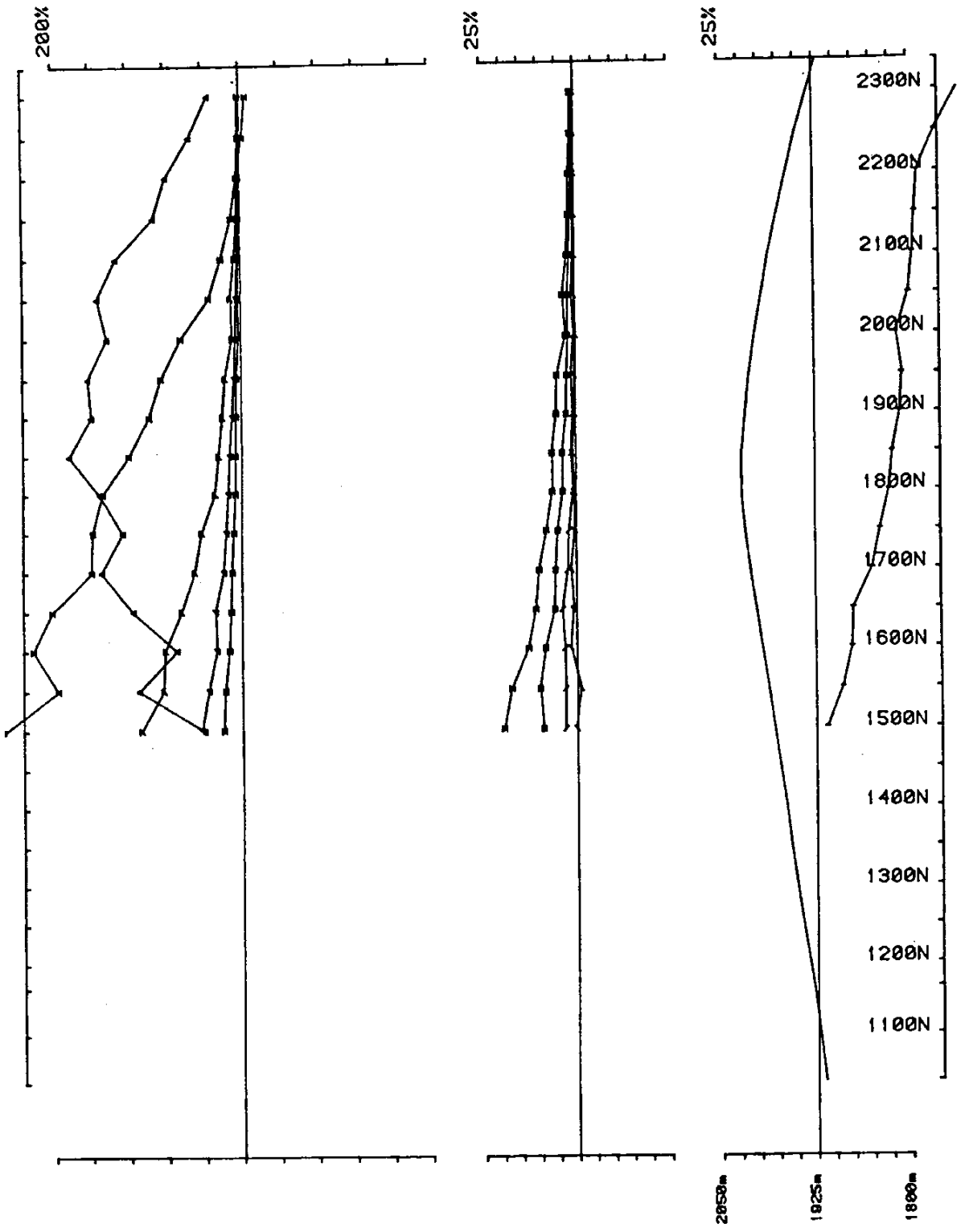
d.s. 26



Area Vine Cominco operator S&D freq(hz) 30.974

Loopno 6 Line 6000E component Hz secondary Ch 1 normalized

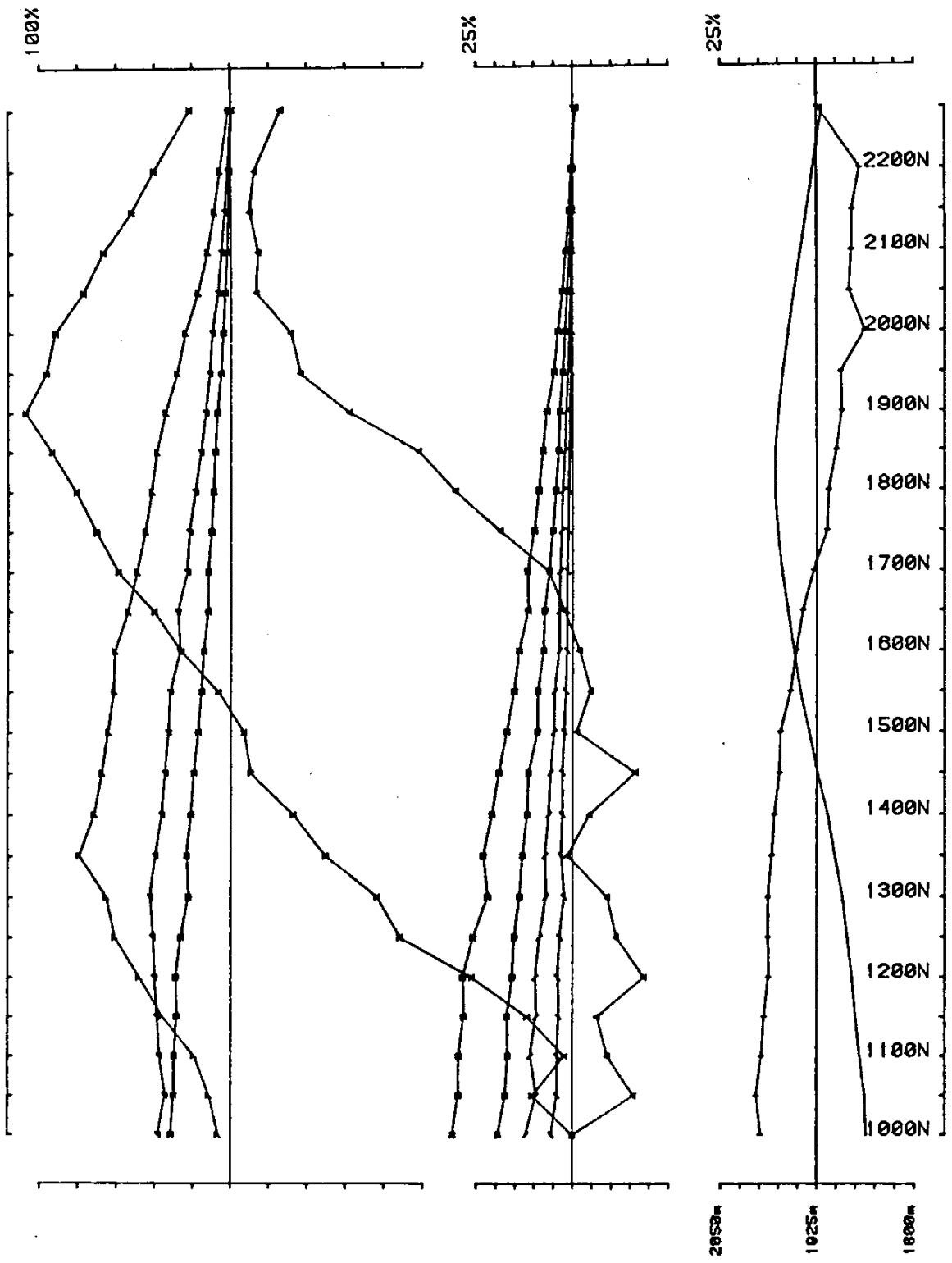
d.s. 27



Area Vine Cominco operator S&D freq(hz) 30.974

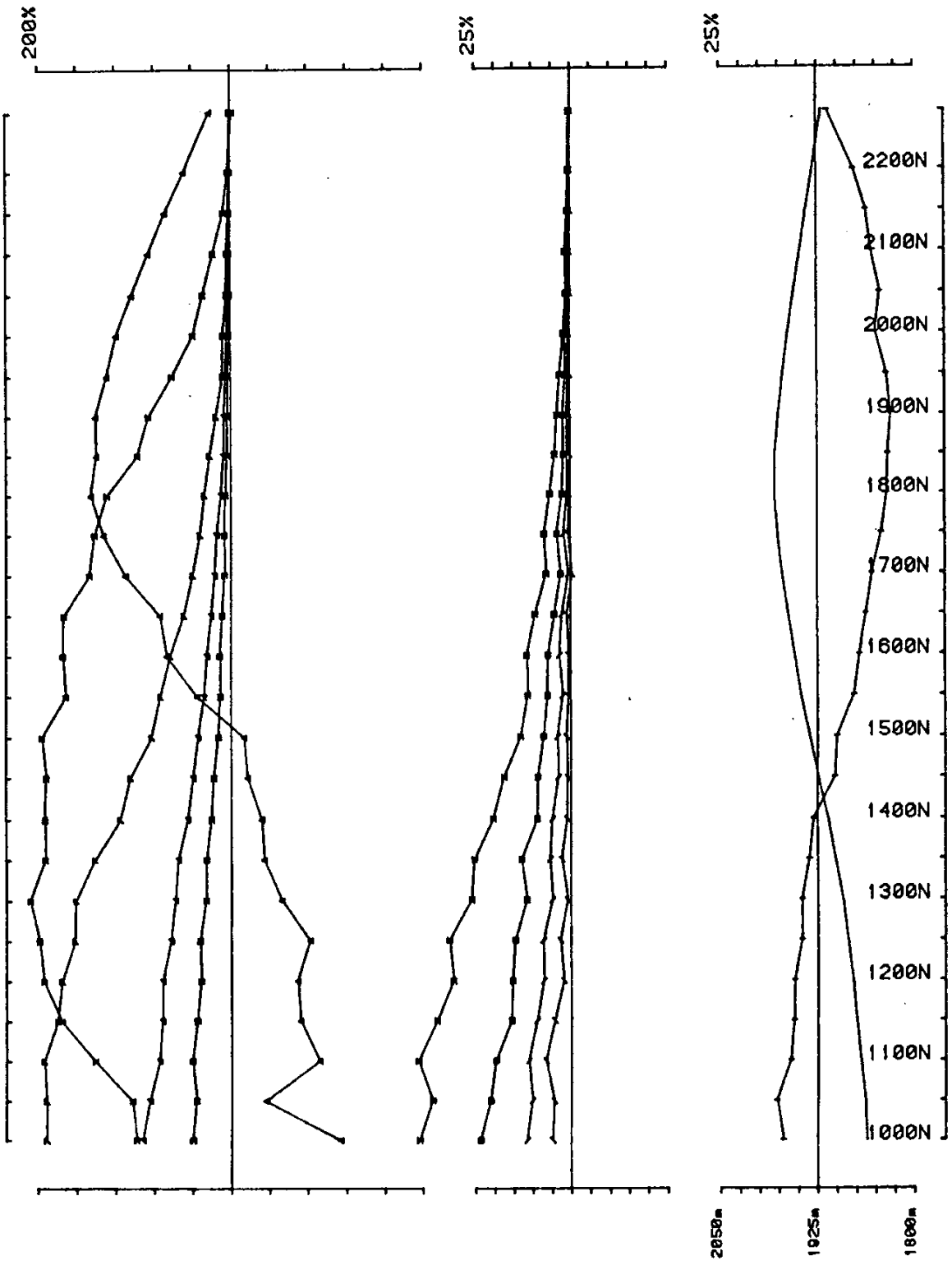
Loopno 6 Line 6000E omponent Hx secondary Ch 1 normalized

d.s. 28



Area Vine Cominco operator S&D freq(hz) 30.974

Loopno 6 Line 6500E component Hz secondary Ch 1 normalized



Area Vine Cominco operator S&D freq(hz) 30.974

Loopno 6 Line 6500E component Hx secondary Ch 1 normalized

A P P E N D I X IV

IN THE MATTER OF THE B.C. MINERAL ACT

AND IN THE MATTER OF A GEOPHYSICAL PROGRAMME

CARRIED OUT ON THE LEW AND VINE 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. 82F/8 and 82G/5

S T A T E M E N T

I, SYD J. VISSER, of the City of Surrey in the Province of British Columbia, make oath and say:

1. That I 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 geophysical survey on the LEW and VINE mineral claims;

3. That the said expenditures were incurred between July 29 and August 21, 1982 for the purpose of mineral exploration of the above-named claims.

Syd J. Visser, B.Sc.
Geophysicist
Cominco Ltd.

"EXHIBIT A"

STATEMENT OF GEOPHYSICAL EXPENDITURES 1982

LEWIS CREEK EAST AND VINE CLAIMS

1.	STAFF TIME		
	S.J. Visser Aug. 13-21 9 days @ $175/day	$ 1,575.00	
	R.W. Holroyd July 29-31; Aug 1-2, 5-16 17 days @ $175/day	2,975.00	
	D. McCollor July 29-31; Aug 1-12, 18-21 19 days @ $135/day	2,565.00	
	Assistants (3)		
	i) July 29-31; Aug 1-16 19 days x 3 men x $71/day*	4,047.00	
	ii) Aug 17-21 5 days x 2 men x $71/day*	710.00	$ 11, 872.00
	* includes loading & holiday pay		
2.	UTEM RENTAL		
	a. Standby July 29-31; Aug 1 4 days @ $75/day	300.00	
	b. Operating Aug 2-16; 18-19 17 days @ $150/day	2,550.00	2,850.00
3.	OPERATING DAY CHARGE		
	Aug 2-16; 18-19 17 days @ $250/day		4,250.00
4.	EXPENSE ACCOUNTS		
	S.J. Visser	255.00	
	R.W. Holroyd	1,065.00	
	D.C. McCollor	72.00	1,392.00
5.	MISCELLANEOUS		
	Wire Usage 1 Spool @ $175	175.00	
	Truck Rental 2/3 x $594	396.00	
	Camp Supplies	592.76	
	Truck Repairs	639.47	1,803.23
	TOTAL		$ 22,167.23

Syd J. Visser, B.Sc.
Geophysicist

APPENDIX V

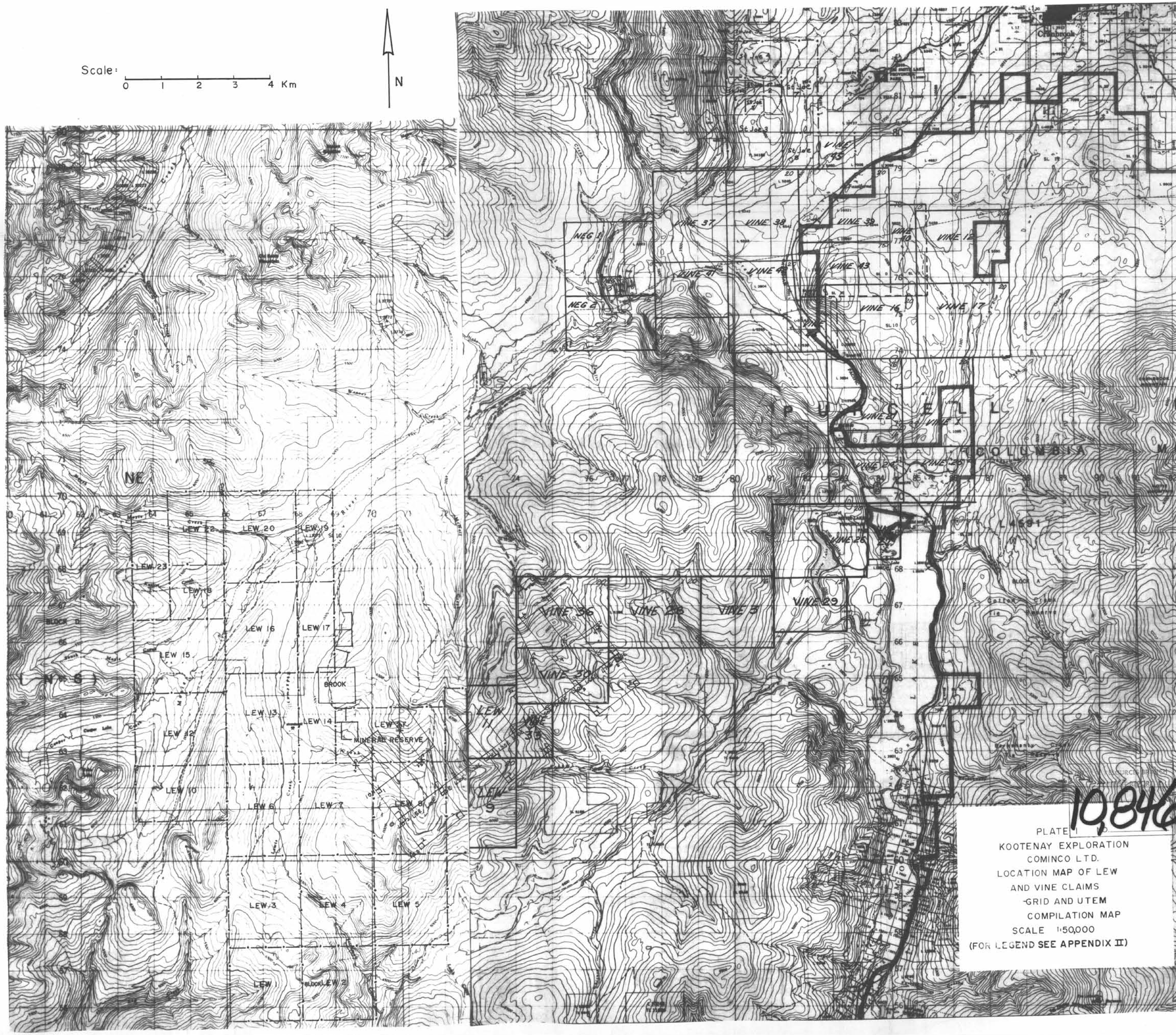
CERTIFICATION

I, Syd J. Visser, of 12627 - 98th Avenue in the City of Surrey, in the Province of British Columbia, do hereby certify that:-

1) I graduated from Haileybury School of Mines in 1971 as a Mining Technician and from the University of British Columbia in 1981 with Honours B.Sc. in Geophysics and Geology.

2) I have worked in mineral exploration since 1968.

SYD J. VISSER
Geophysicist


Scale:
0 1 2 3 4 Km
N
10,846
PLATE 1
KOOTENAY EXPLORATION
COMINCO LTD.
LOCATION MAP OF LEW
AND VINE CLAIMS
-GRID AND UTEM
COMPILATION MAP
SCALE 1:50,000
(FOR LEGEND SEE APPENDIX II)
Cranbrook
PURCELL
COLUMBIA
LAKE
NEG 1
NEG 2
VINE 37
VINE 38
VINE 39
VINE 40
VINE 12
VINE 41
VINE 42
VINE 43
VINE 16
VINE 17
VINE 45
VINE 21
VINE 24
VINE 25
VINE 26
VINE 36
VINE 28
VINE 5
VINE 29
VINE 30
VINE 35
LEW 11
LEW 9
LEW 22
LEW 20
LEW 19
LEW 23
LEW 18
LEW 16
LEW 17
LEW 15
BROOK
LEW 13
LEW 14
LEW 12
MINERAL RESERVE
LEW 10
LEW 6
LEW 7
LEW 8
LEW 3
LEW 4
LEW 5
LEW 1
BLOCK LEW 2
BLOCK D
L 4591
St Joe 3

VINE and LEW Groups

UTEM Survey 1982

Scale: 1:10,000 | Oct. 28, 1982 | PLATE 2