COMINCO LTD.

EXPLORATION

WESTERN DISTRICT

NTS: 82K/1E

GEOPHYSICAL REPORT

ON

UTEM SURVEY ON THE

ECHO 1 to 5 CLAIMS

GOLDEN MINING DIVISION, B.C.

Latitude: 50°01'N
Longitude: 116°12'W

Worked Performed by: Syd J. Visser and Mike H. Rogers
between August 20th and 28th, 1983

Claim Owner and Operator : COMINCO LTD.

OCTOBER 1983

SYD J. VISSER

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LIST OF CLAIMS

Cominco Interest - 100%

The claims listed below are covered or partly covered by the grid:-

Name	# of Units	Record Number	Assessment Work Due
ECHO 1	9	99	September 29, 1984
2	9	100	September 29, 1984
3	6	149	July 26, 1985
4	4	150	July 26, 1984
5	18	285	April 9, 1984

INTRODUCTION

The ECHO claims are located one km south of Doctor Peak (see Plate 253-83-1). Access is off Highway 93 about 40 km by logging road, southwest of Canal Flats. The logging road follows Findlay Creek for about 20 km, then turns south up Doctor Creek for another 20 km to its headwaters where a rough cat road cuts across the grid.

The ECHO claims are underlain by the clastic sediments of the Middle and Lower Aldridge formation of Proterozoic age. The sediments of the Aldridge formation are known to host the Sullivan orebody near Kimberley, B.C.

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 varied due to topography and accessibility (see Plate 253-83-2). 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 or horizontal 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 form 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 eight channels of data at each station. The later number channels (7-9) 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 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" x 15") graphics plotter. Data are portrayed as profiles of each of the eight channels, shown for each survey line of each transmitter loop. These profiles, and an interpretive plan are appended to this report.

FIELD WORK

The UTEM survey described in this report, covers an area of about 3,250 m by 800 m. A line spacing of 250 metres with station spacing of 50 metres was used for the majority of the grid.

A total of 11.25 km of lines were surveyed for a total of 224 stations. The vertical component (Hz) was acquired at every station. Nine channels of information were acquired and plotted at each station for a total of 2,016 readings.

All surveying was done in the period from August 20 to 28, 1983, from a camp located on the grid.

DATA PRESENTATION

The results of the survey are presented in one location map, one compilation map and 14 data sections.

The maps are listed as follows:-

Plate 253-83-1 (in envelope)	Location Map Scale 1:50,000
Plate 253-83-2 (in envelope)	UTEM Compilation Sheet Scale 1:10,000

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

The data sections are arranged in order of loop number (Loop 500, 501)

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 8)

INTERPRETATION

All the field results are displayed in the data sections on 14 diagrams, with a compilation of all relative points on Plate 253-83-2. The transmitter loops are positions on the south side of the lines as shown on Plate 253-83-2.

A few weak crossover type anomalies, down to Channel 7, were observed in the data (D.S. 1 to 4, 6 and 11), and are probably due to a change in local geology or overburden thickness. No strong crossover type anomalies indicating a mineralized conductive zone, were noted in the data.

CONCLUSIONS

A few weak (> Ch 7) anomalies indicating a change in geology or overburden thickness were observed. The UTEM survey described in this report, indicates no further work is warranted on this grid.

Report by:

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

Endorsed by:

C. Harden, Ph.D., P.Eng.
Manager, Exploration
Western District
Cominco Ltd.

Approved for Release:

John M. Hamilton, P.Eng.
Chief Geologist, Cominco Ltd.
Kimberley

SJV/jel

DISTRIBUTION:

Mining Recorder	(2)
Kootenay Exploration	(2)
Western District, Expl.	(1)
Geophysics Group	(1)

REFERENCES

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

APPENDIX I

LEGEND

UTEM DATA SECTIONS

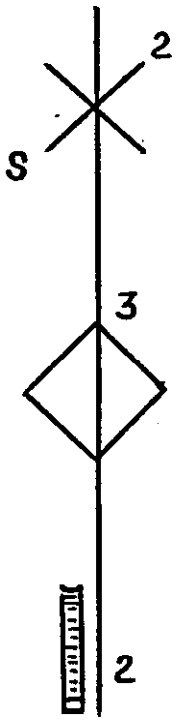
ORDINATE: Amplitude scale is given in %

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	0.025

LEGEND

UTEM COMPILATION MAPS

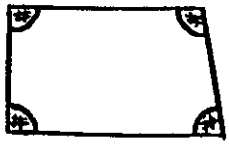


Axis of a crossover anomaly. The number indicates the latest anomalous channel.

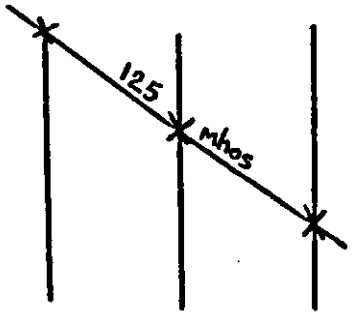
Depth indicated by: S - Shallow (< 50m)
M - Moderate (50-100m)
D - Deep (> 100m)

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.



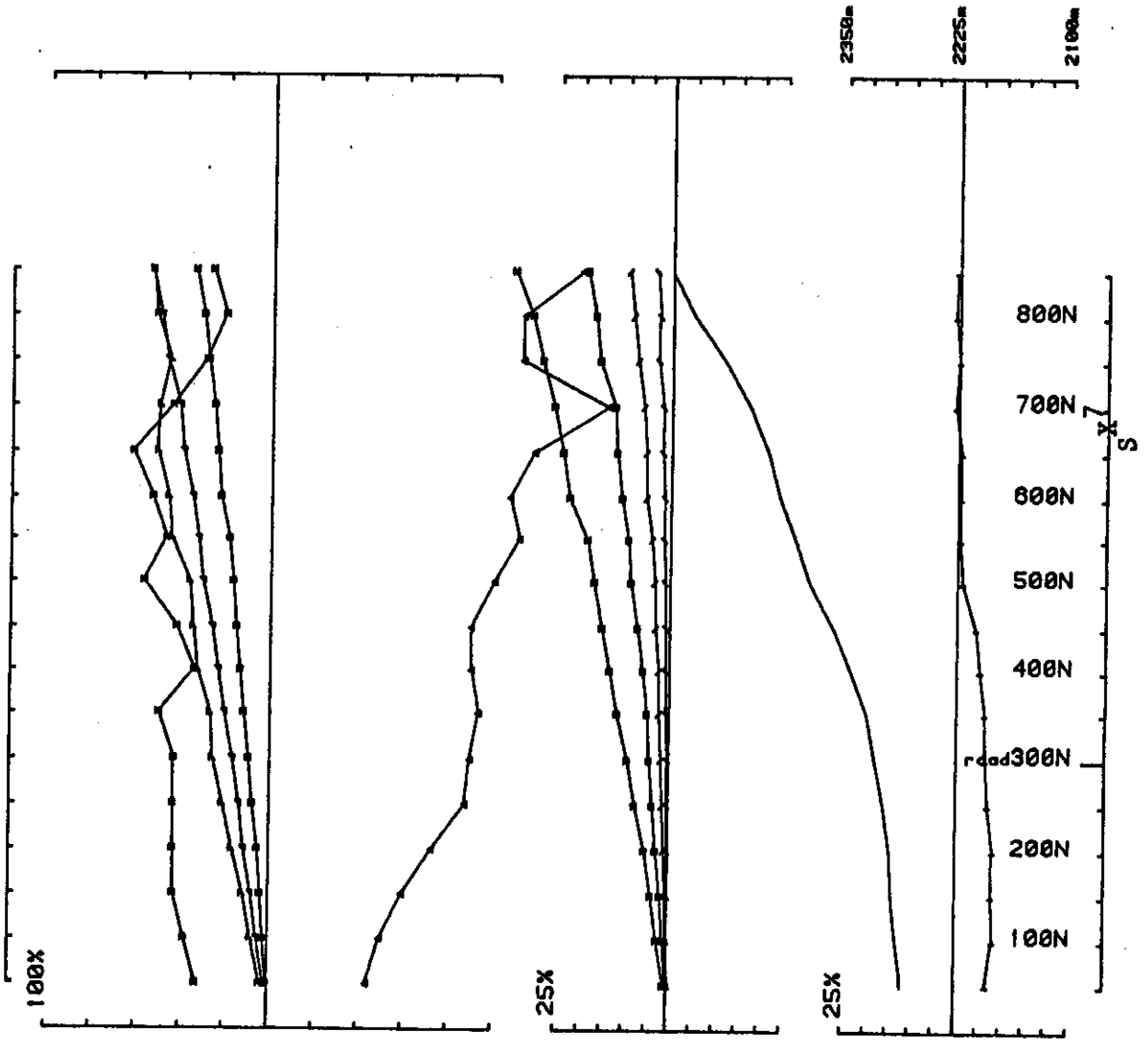
Conductor axis located by crossover anomalies with a conductance determination. The conductance is the interpreted conductivity x thickness of the conductor in mhos (same as Siemens).

Only the principal crossovers are indicated.

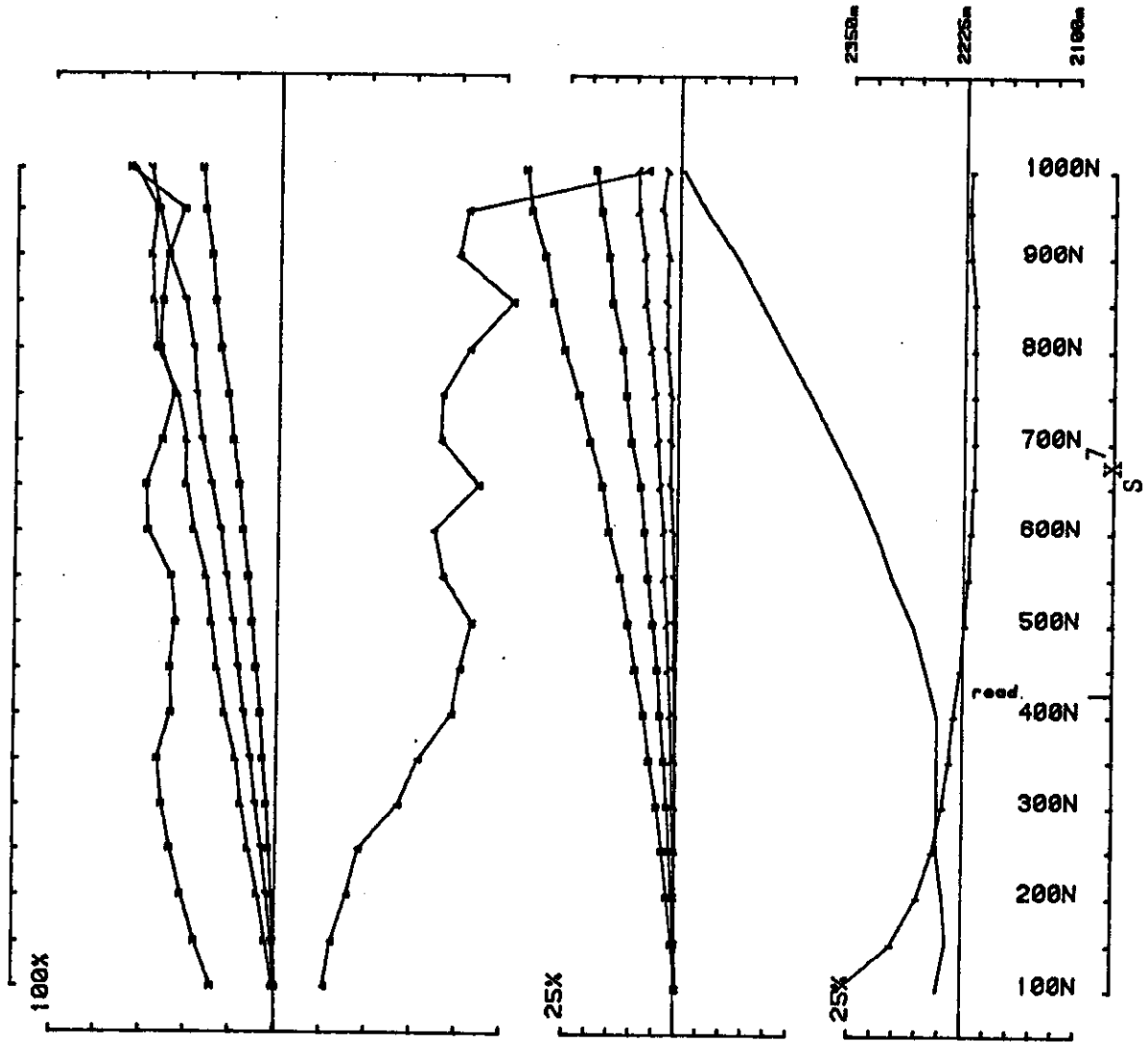
A P P E N D I X II

DATA SECTIONS

D.S. 1 - 14



Area Echo Cominco operator Syd & Mike freq(hz) 30.974
Loopno 500 Line 00 component Hz secondary Ch I normalized Ch I reduced



Area Echo Cominco operator Syd & Mike freq(hz) 30.974
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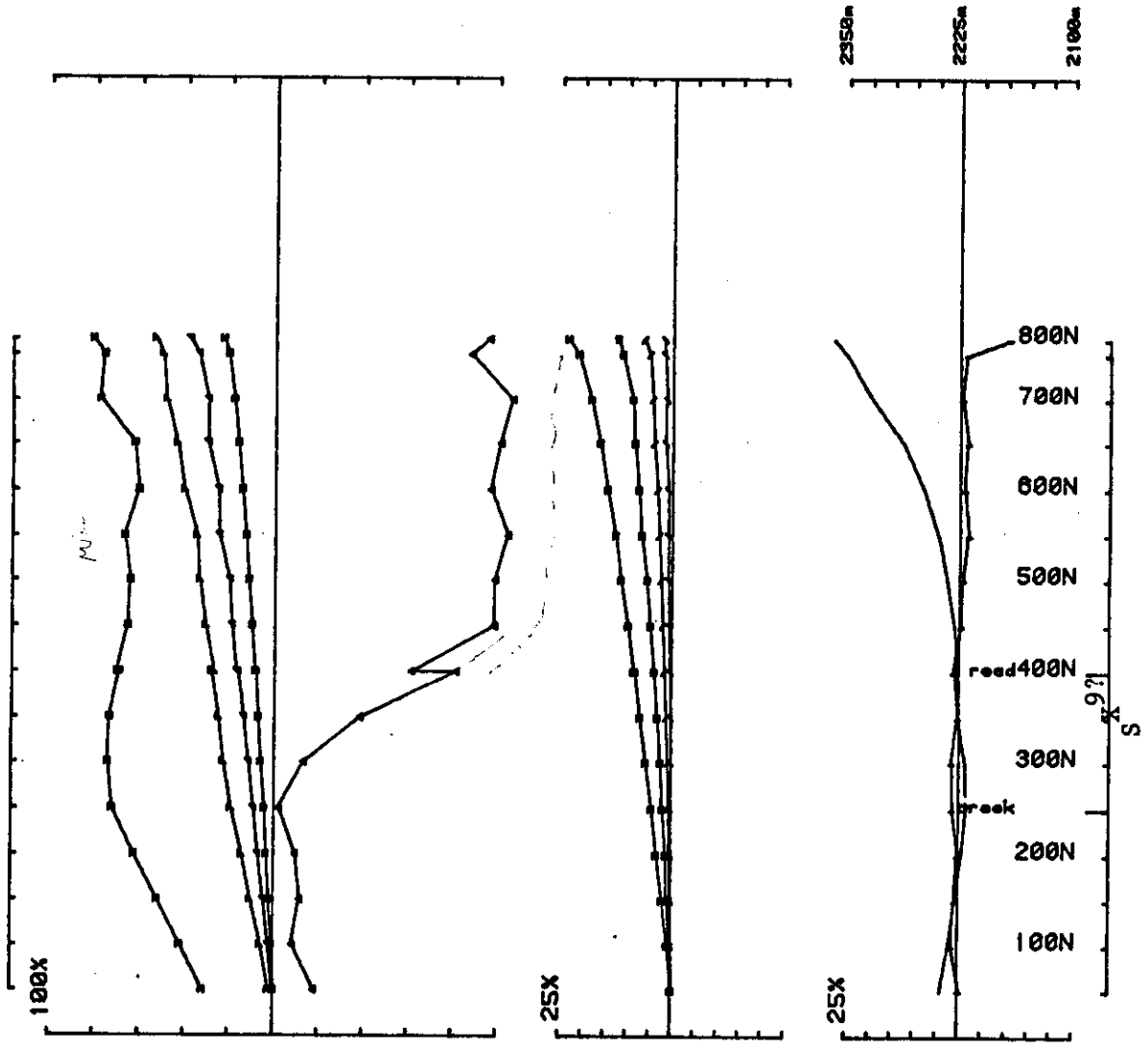
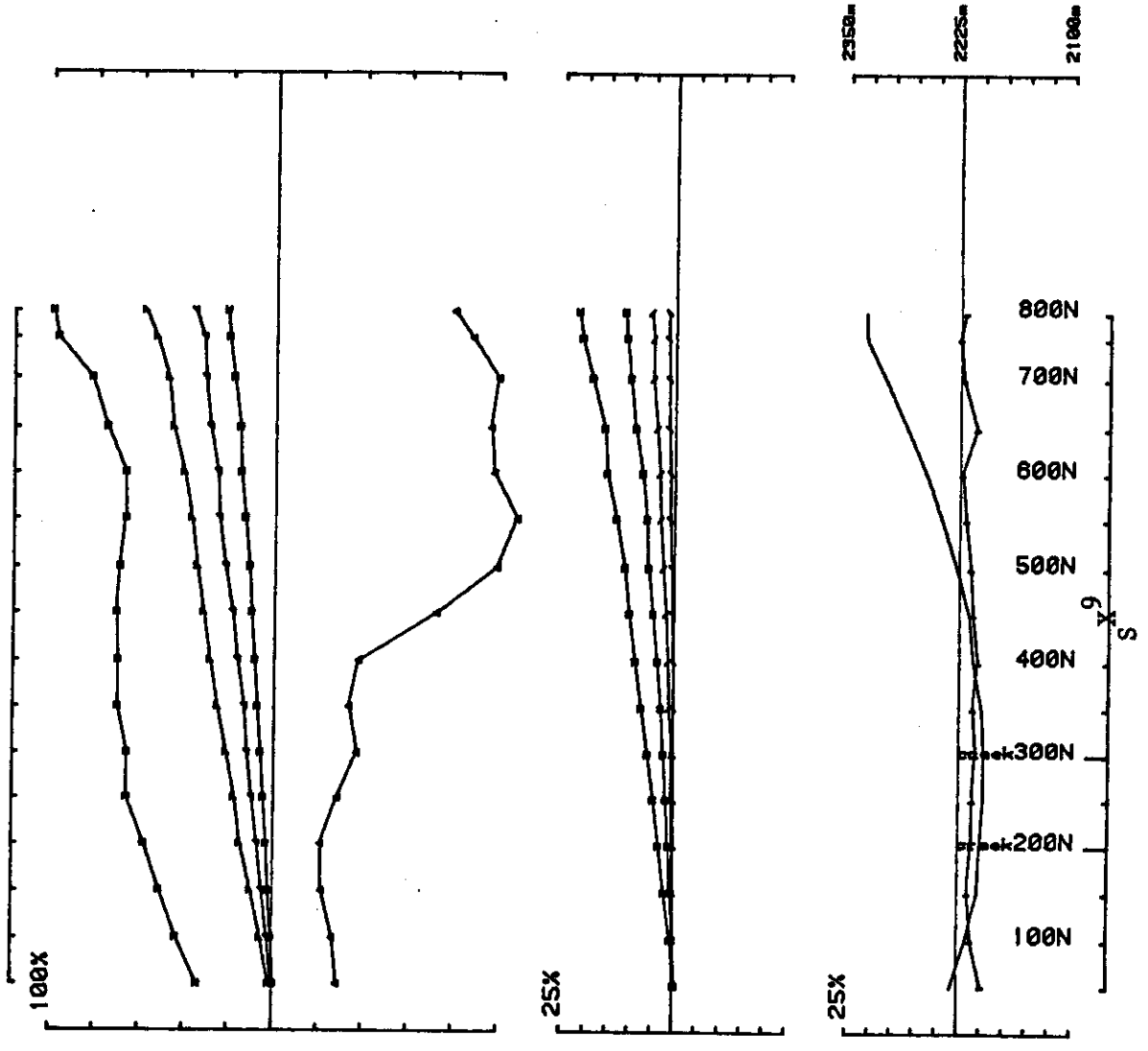
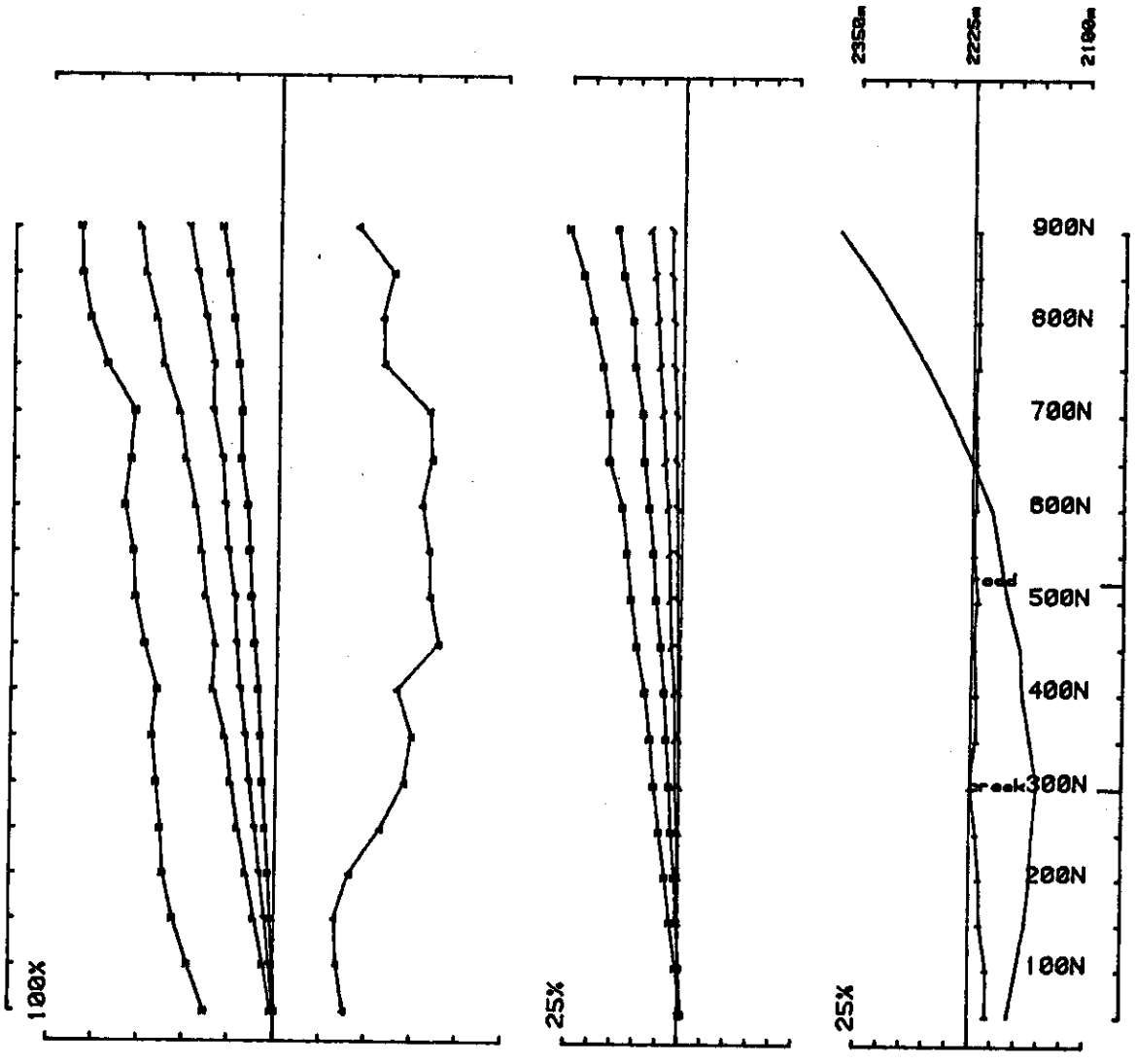


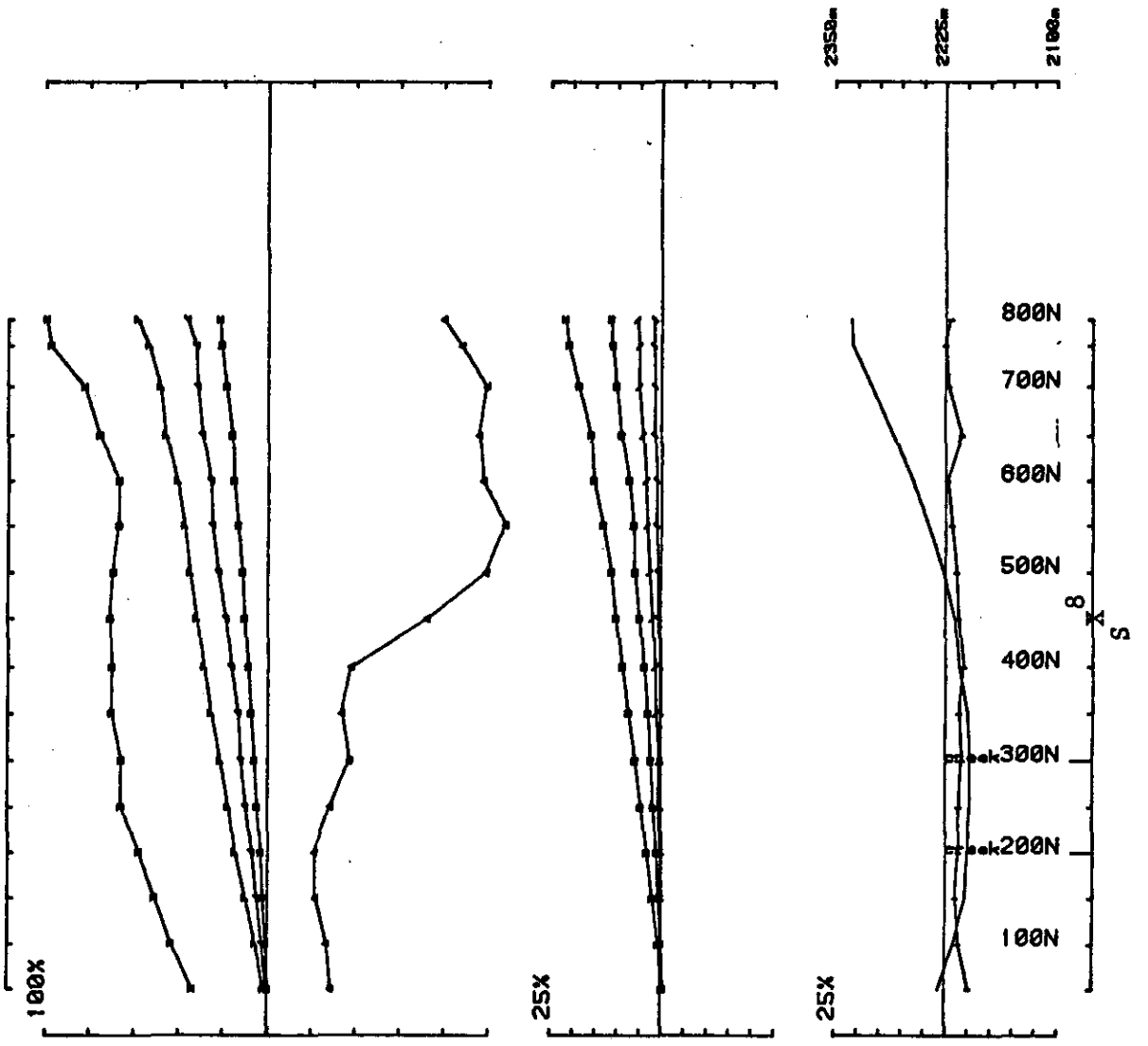
Area Echo Cominco operator Syd & Mike freq(hz) 30.974
Loopno 500 Line 500E component Hz secondary Ch I normalized Ch I reduced



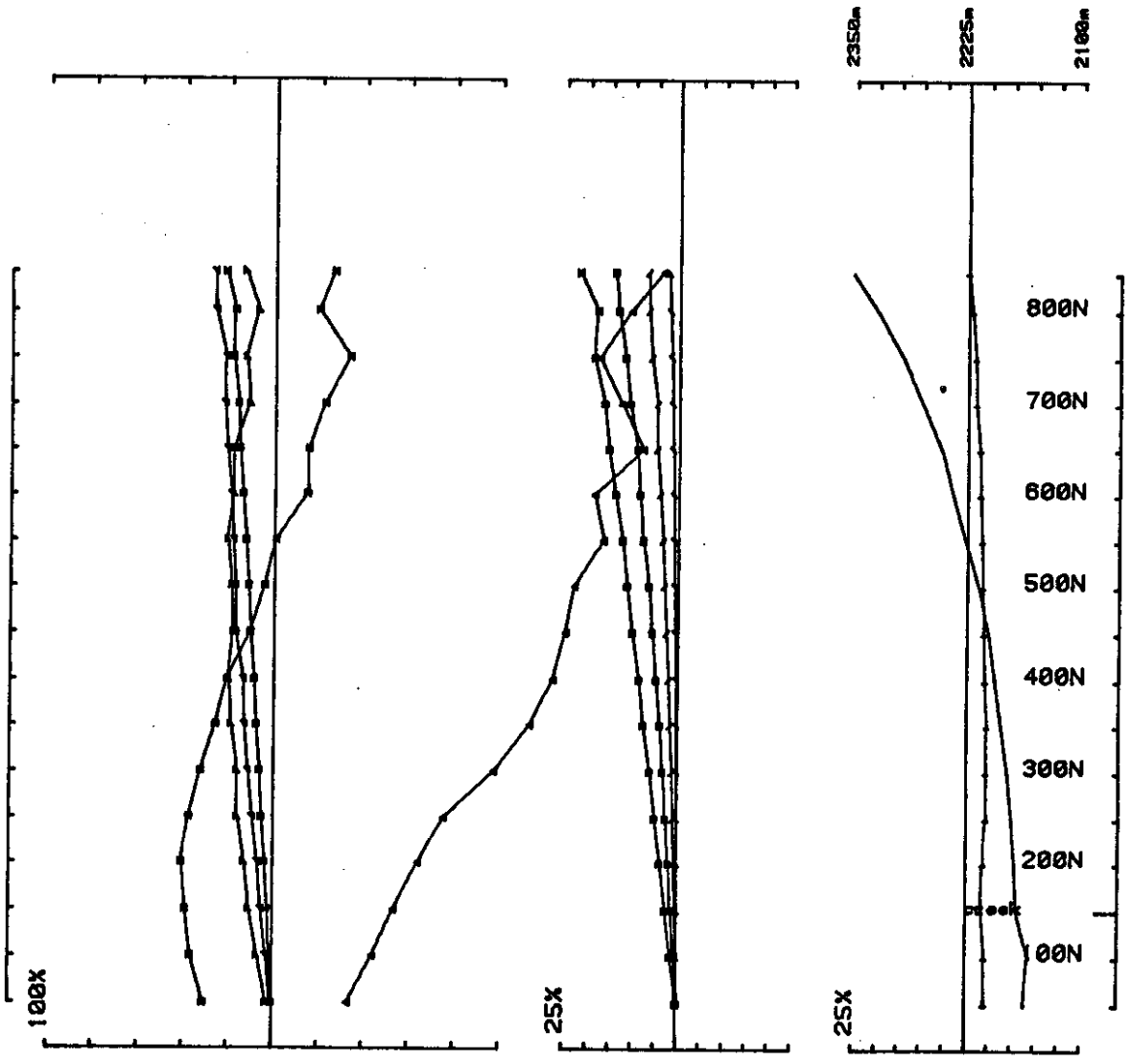
Area Echo Cominco operator Syd & Mike freq(hz) 30.974
Loopno 500 Line 750E component Hz secondary Ch I normalized Ch I reduced



Area Echo Cominco operator Syd & Mike freq(hz) 30.974
Loopno 500 Line 1000E component Hz secondary Ch I normalized Ch I reduced



Area Echo Cominco operator Syd & Mike freq(hz) 30.974
Loopno 500 Line 1250E component Hz secondary Ch I normalized Ch I reduced



Area Echo Cominco operator Syd & Mike freq(hz) 30.974
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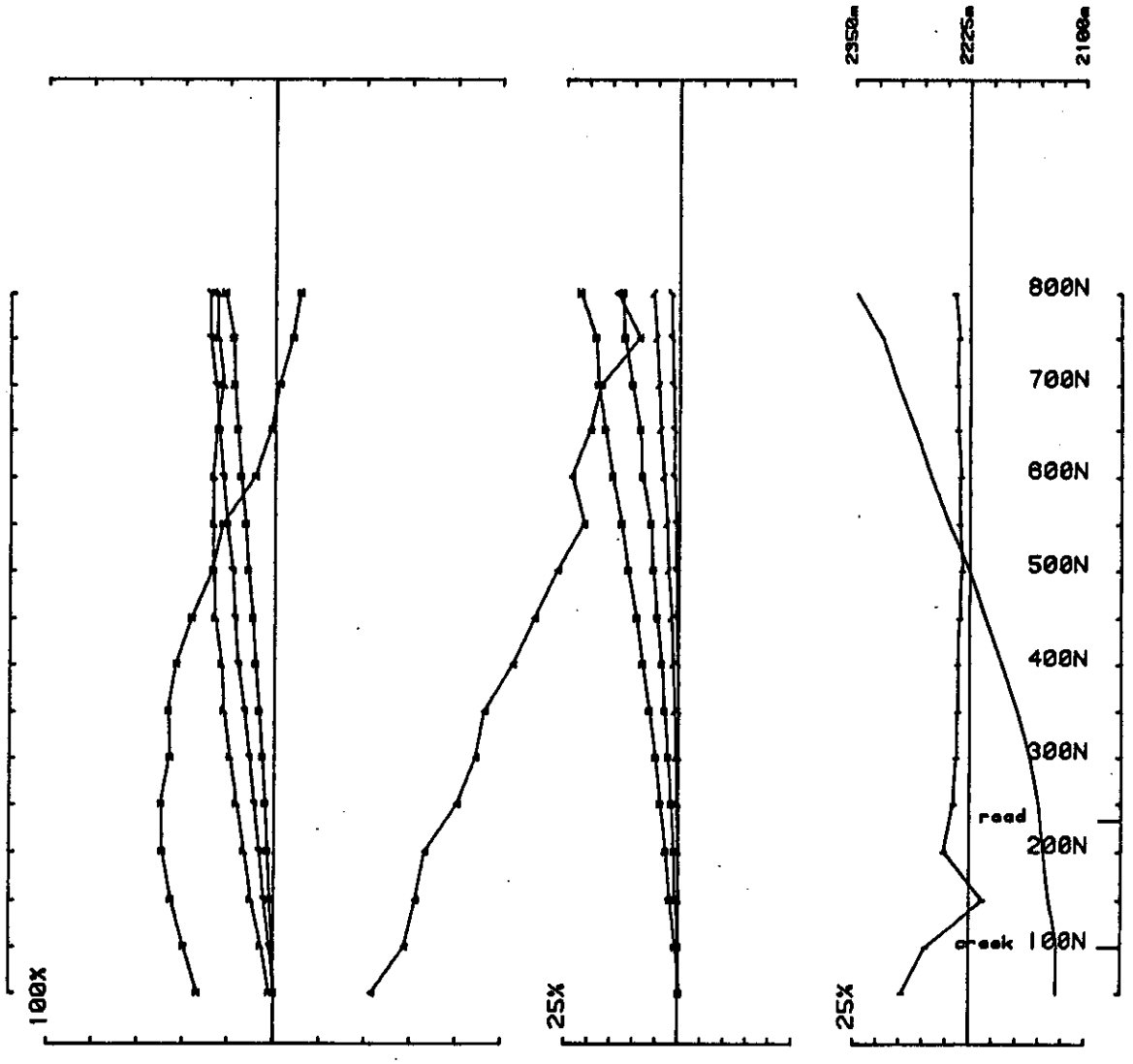

Area Echo Cominco operator Syd & Mike freq(hz) 30.974
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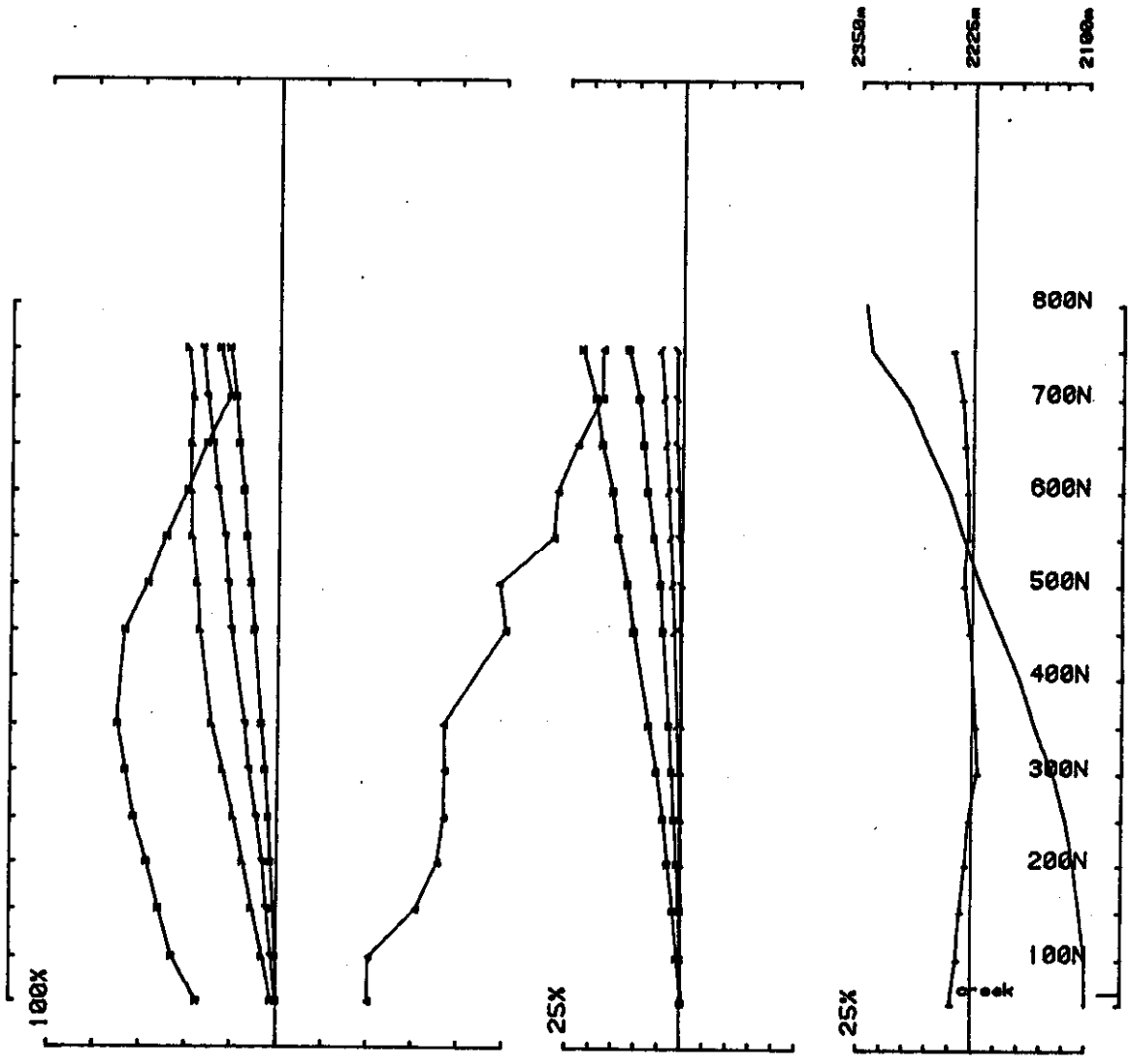
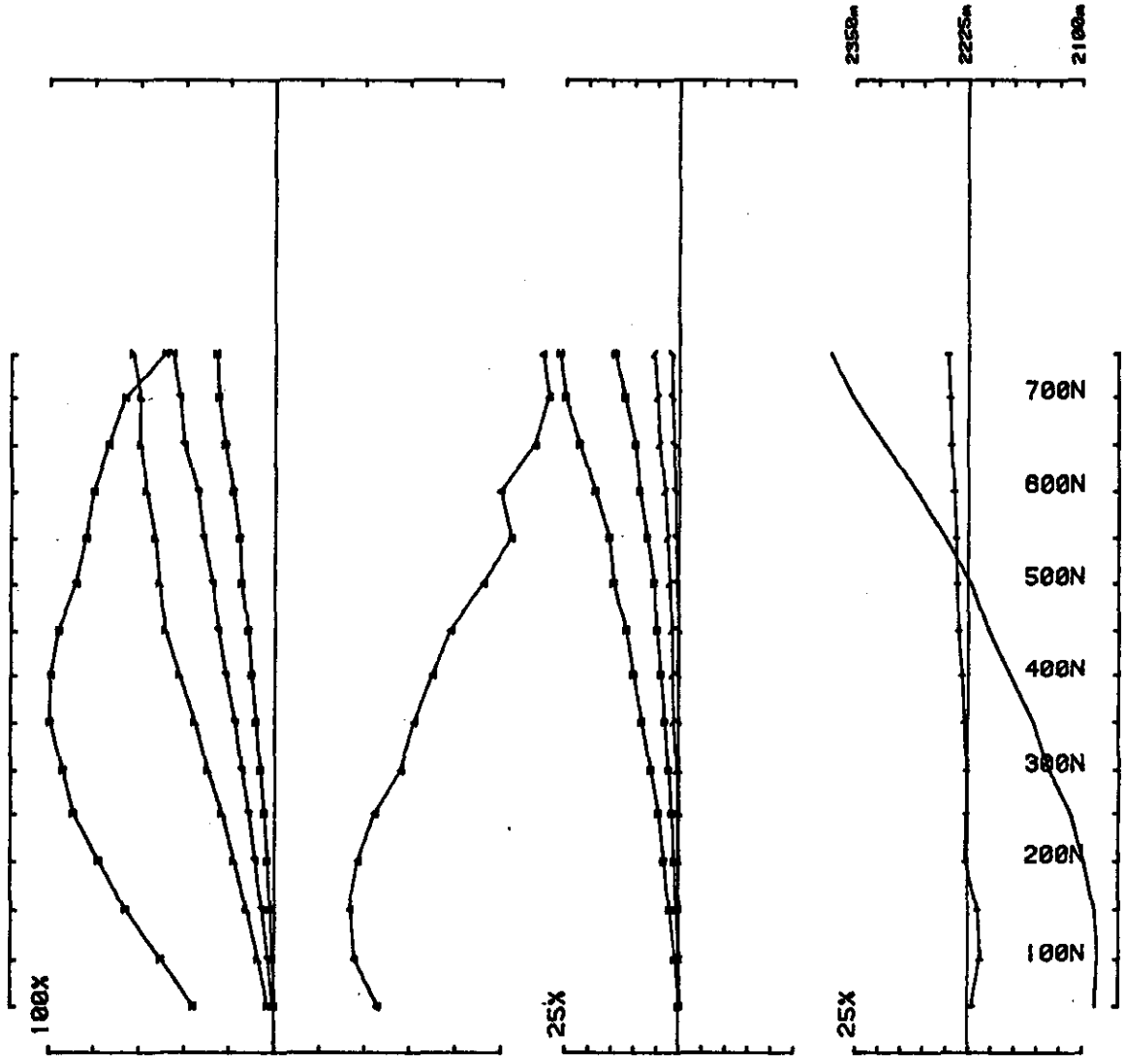
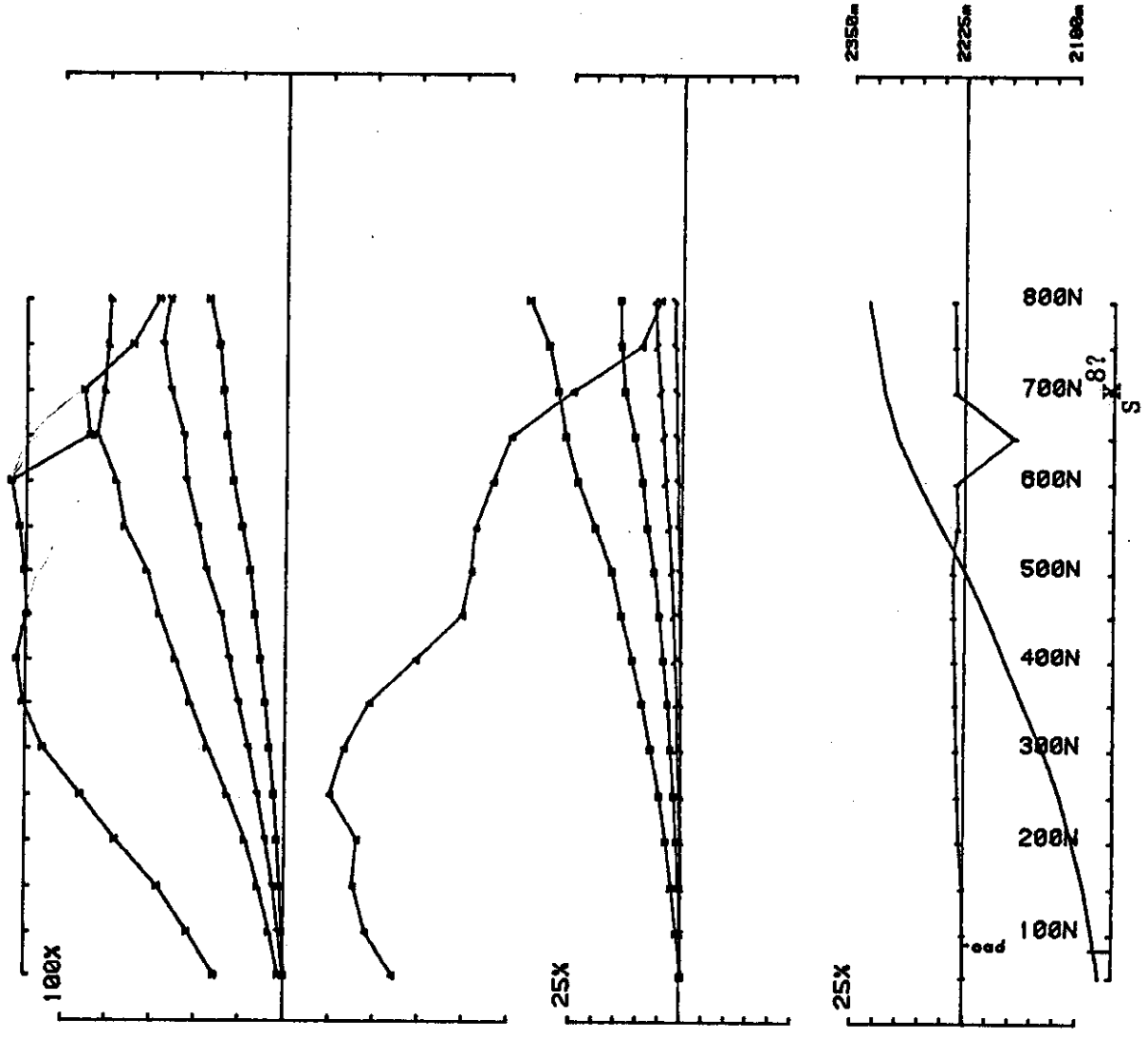


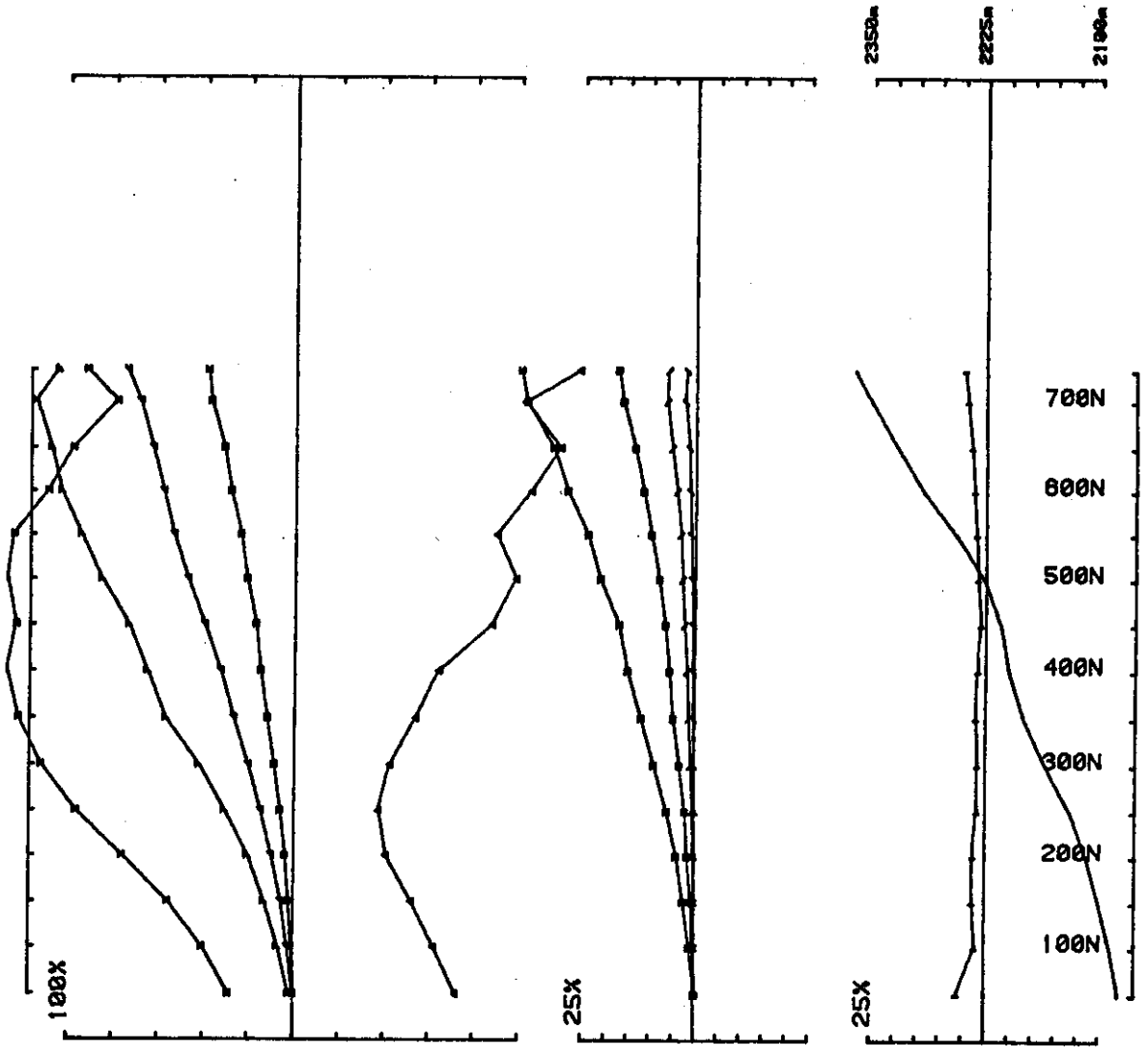
Area Echo Cominco operator Syd & Mike freq(hz) 30.974
Loopno 501 Line 2000E component Hz secondary Ch I normalized Ch I reduced



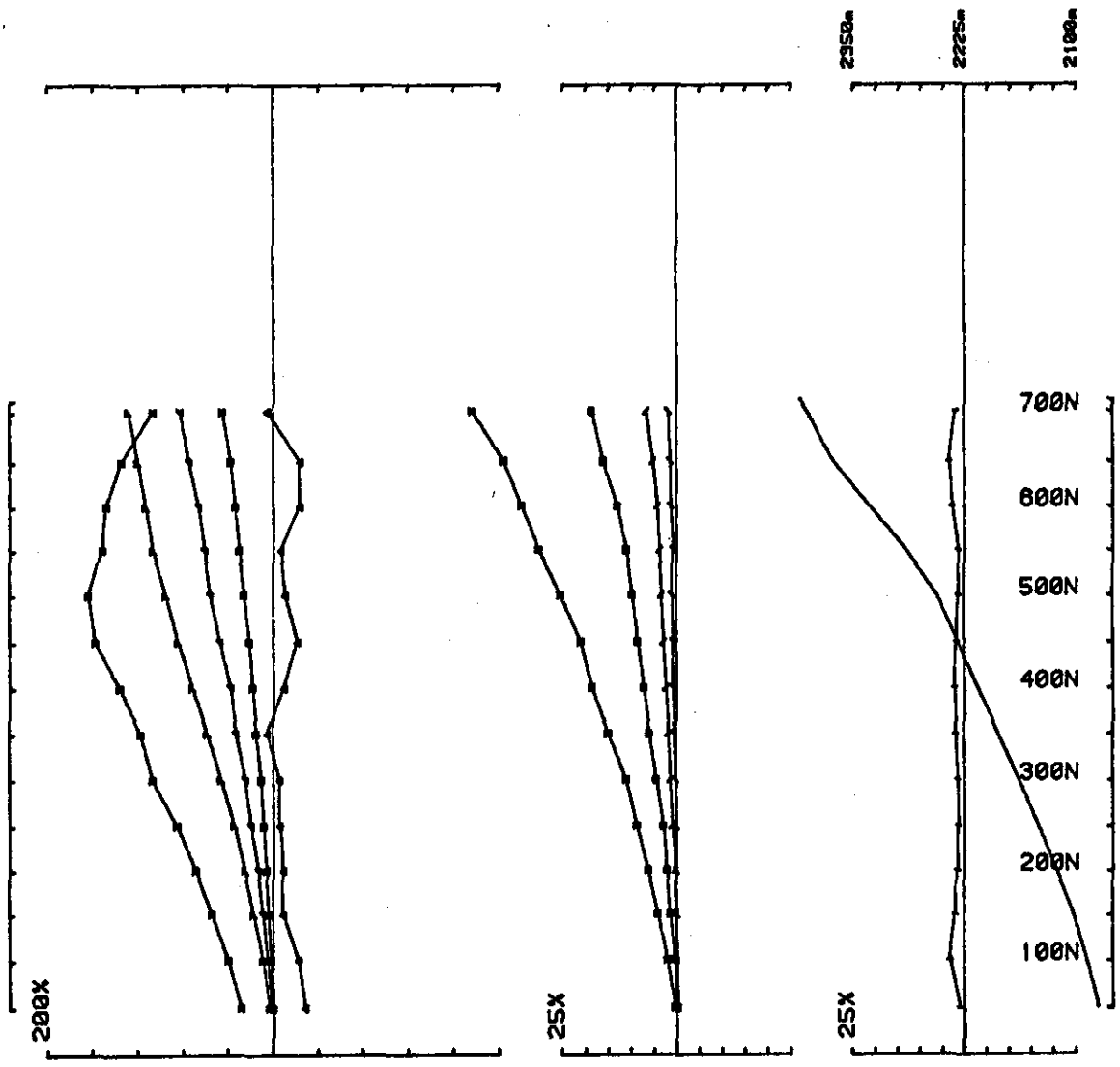
Area Echo Cominco operator Syd & Mike freq(hz) 30.974
Loopno 501 Line 2250E component Hz secondary Ch 1 normalized Ch 1 reduced



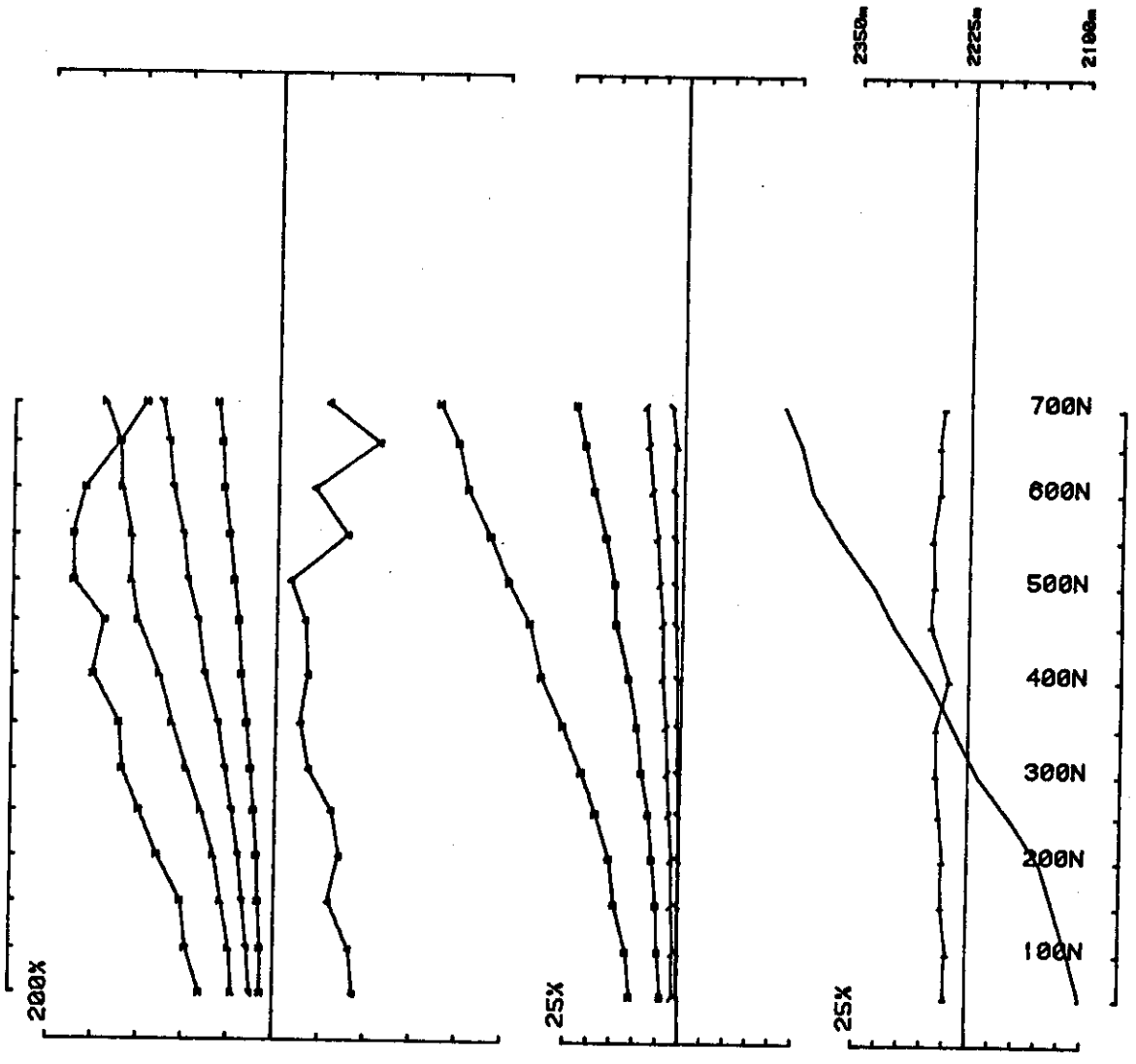
Area Echo Cominco operator Syd & Mike freq(hz) 30.974
Loop# 501 Line 2500E component Hz secondary Ch I normalized Ch I reduced



Area Echo Cominco operator Syd & Mike freq(hz) 30.974
Loopno 501 Line 2750E component Hz secondary Ch I normalized Ch I reduced



Area Echo Cominco operator Syd & Mike freq(hz) 30.974
Loopno 501 Line 3000E component Hz secondary Ch I normalized Ch I reduced



Area Echo Cominco operator Syd & Mike freq(hz) 30.974
Loopno 501 Line 3250E component Hz secondary Ch I normalized Ch I reduced

APPENDIX III

A P P E N D I X III

IN THE MATTER OF THE B.C. MINERAL ACT

AND IN THE MATTER OF A GEOPHYSICAL PROGRAMME

CARRIED OUT ON THE ECHO CLAIMS

LOCATED 40 KM S.W. OF CANAL FLATS, B.C.

IN THE GOLDEN MINING DIVISION OF THE

PROVINCE OF BRITISH COLUMBIA, MORE PARTICULARLY

N.T.S. 82K/1

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 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 geophysical survey on the ECHO mineral claims;

3. THAT the said expenditures were incurred between August 20 and August 28, 1983, 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 - 1983

ECHO CLAIMS

(1)	SALARIES	
	Preparation, Field Work, Mob/Demob, Interpretation, etc	$ 5,447.50
	Geophysicists - Syd J. Visser	
	M.H. Rogers	
	Assistants - E. Rickett	
	S. Kemp	
	C. Pelto	
(2)	EQUIPMENT AND TRUCK RENTAL	1,830.00
(3)	EXPENSE ACCOUNTS (hotels, meals, etc)	1,061.53
	Total Cost	$ 8,339.03

I certify this to be a true statement of expenditures for the geophysical survey on the ECHO 1, 2, 3, 4 and 5 claims in 1983.

Syd J. Visser
Geophysicist
Cominco Ltd.

APPENDIX IV

APPENDIX IV

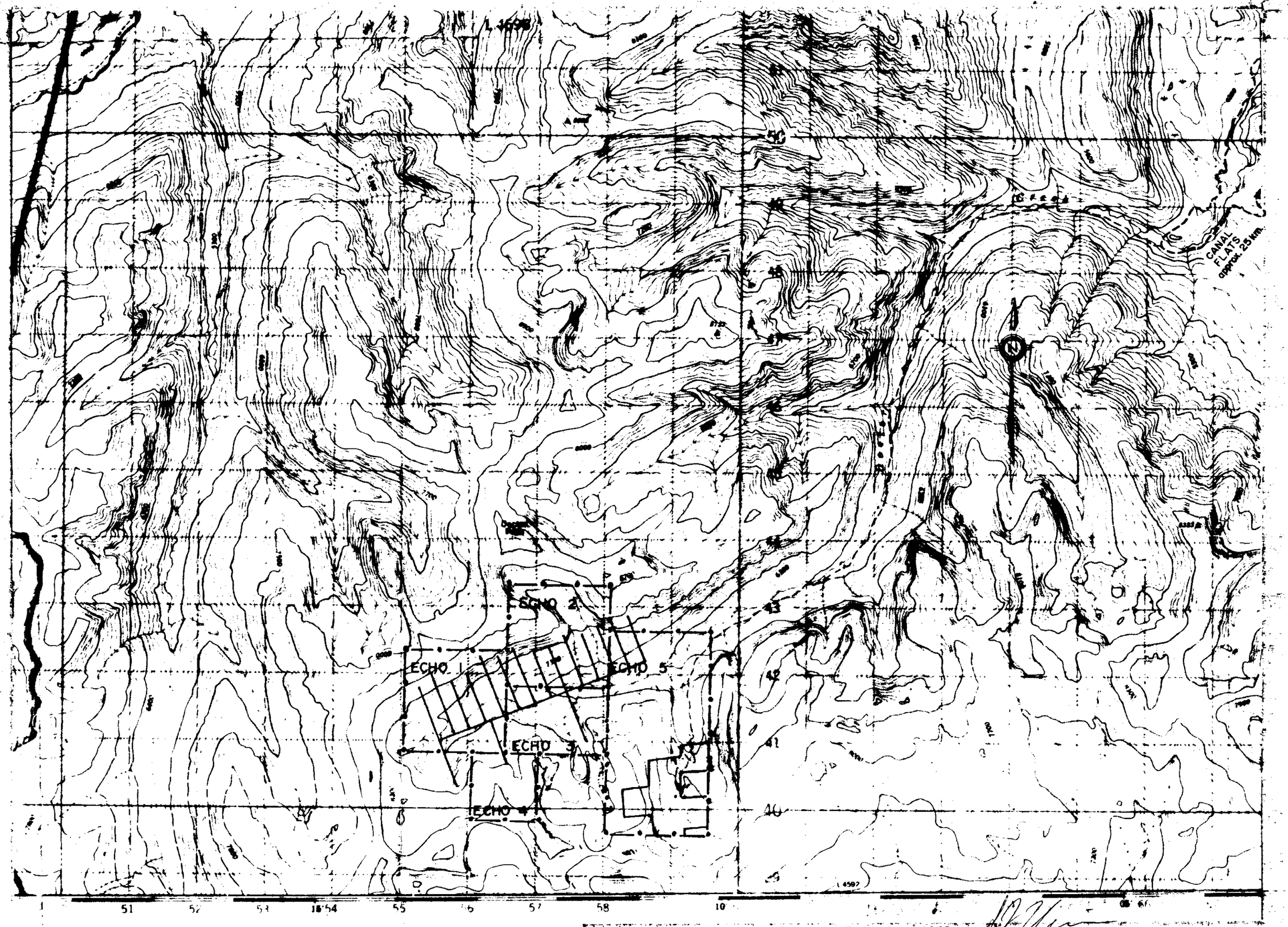
CERTIFICATION

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 Britich Columbia in 1981 with Honours B.Sc. in Geophysics and Geology.

2. I have worked in mineral exploration since 1968.

Syd J. Visser
Geophysicist
Cominco Ltd.



FINDLAY CREEK

KOOTENAY LAND DISTRICT

BRITISH COLUMBIA

Scale 1:50,000 Échelle

TO ACCOMPANY A REPORT BY S.J. VISSER

ECHO GROUP

NTS 82 K/1E

CLAIM AND GRID LOCATION MAP

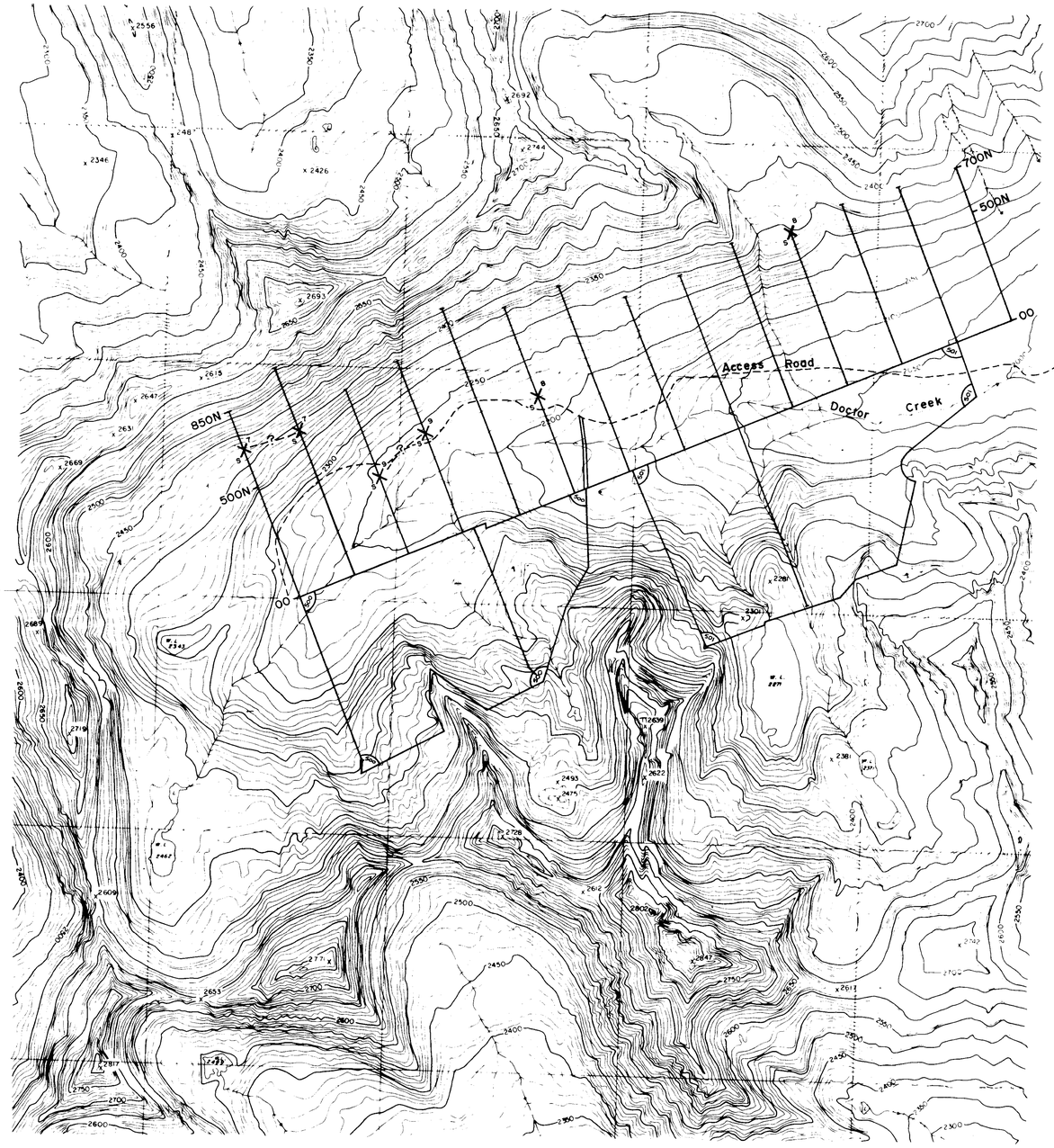
11,737

GOLDEN M.D., B.C.

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

Scale: 1:50,000 | Date: OCTOBER 1983 | Plate: 253-83-1

210-0620



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.

185 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).

0 250 500 1000
METRES

GEOLOGICAL BRANCH
ASSESSMENT REPORT

11,737

TO ACCOMPANY A REPORT BY S.J. VISSER

ECHO GROUP

NTS 82-K/1E

Drawn by:	Traced by:	1982 UTEM GRID
Revised by / Date	Revised by / Date	GOLDEN M.D., B.C.
		Scale: 1:10,000 C.I.: 10' Date: OCTOBER 1983 Plate: 253-83-2