

86-690-15239

COMINCO LTD.

EXPLORATION

WESTERN DISTRICT

NTS: 82F/16W

MINISTRY OF ENERGY, MINES  
AND PETROLEUM RESOURCES

Rec'd NOV 18 1986

SUBJECT \_\_\_\_\_  
FILE \_\_\_\_\_  
VANCOUVER, B.C.

GEOPHYSICAL REPORT  
ON A  
UTEM SURVEY ON THE  
VULCAN 3, 12 & 13 CLAIMS  
FORT STEELE MINING DIVISION, B.C.

FILMED

- ASSESSMENT REPORT -

Latitude : 49°~~46'N~~ 47'

Longitude : 116°~~23'W~~ 21.8'

Work Performed by : J.J. Lajoie, S.J. Visser & J. Vyselaar  
between August 15 and 20, 1986

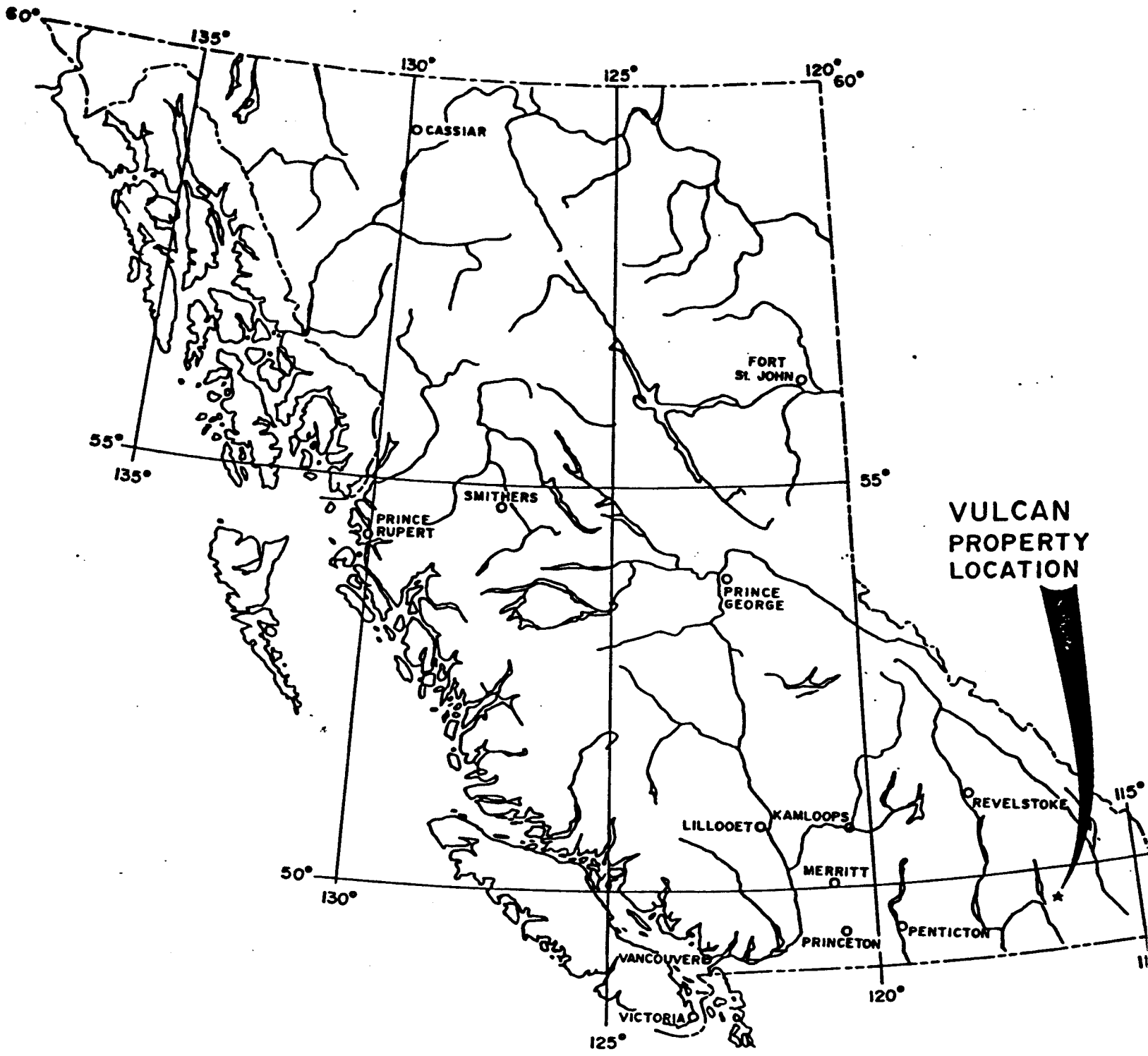
Claim Owner & Operator : COMINCO LTD.

GEOLOGICAL BRANCH  
ASSESSMENT REPORT

15,239

NOVEMBER 1986

S. J. Visser



**VULCAN  
PROPERTY  
LOCATION**

0 100 200 300 400 Kilometres

0 100 200 Miles

# VULCAN PROPERTY GENERAL LOCATION MAP

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COMINCO LTD.

EXPLORATION

WESTERN DISTRICT

NTS: 82F/16

GEOPHYSICAL REPORT  
ON  
UTEM SURVEY ON THE  
VULCAN 3, 12 & 13 CLAIMS  
FORT STEELE MINING DIVISION, B.C.

LIST OF CLAIMS

Cominco Interest - 100%

The claims listed below are partially covered by the grid or adjoin those claims partially covered by the grid.

<u>GRID NAME</u>	<u># OF UNITS</u>	<u>RECORD #</u>	<u>ASSESSMENT WORK DUE</u>
Vulcan 3	15	71	September 27, 1987
12	15	2452	September 3, 1986
13	18	2453	September 3, 1986

INTRODUCTION

The Vulcan 3, 12 and 13 claims are located approx 45 km west of Kimberley B.C. Access from Kimberley is via paved road to St. Mary's Lake, then by logging road along the St. Mary's River and Dewar Creek (Plate 309-86-1).

The UTEM survey described in this report is an extension of the 1985 UTEM survey (Silic, 1985).

The Vulcan 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 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. Survey lines are generally oriented perpendicular to one side of the loop and surveying can be performed both inside and outside the loop. The field procedure is similar to Turam, a better known electromagnetic surveying method.

The transmitter loop is energized with a precise triangular current waveform at a carefully controlled frequency (30.974 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 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 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.

It was mentioned above that the UTEM receiver records data digitally on a cassette. This tape is played back into a computer at the base camp. The computer processes the data and controls the plotting on an 11" x 15" graphics plotter. Data are portrayed on data sections (D.S.) as profiles of each of the nine channels, one section for each survey line.

## FIELD WORK

The UTEM survey, completed between August 15th and 20th, 1986, covers an area of approx. 2 km x 3 km. Five lines varying in length from 1.4 km to 1.8 km, for a total of 8.2 km, were surveyed from one loop. The station spacing on the lines is 50 metres.

Eight channels of the vertical component was acquired at every station. The data were plotted on data sections with the aid of a computer.

Helicopter support was used in surveying Lines 2000S and 1500S.

## DATA PRESENTATION

The results of the survey are presented on one claim & grid location map, one compilation map and 10 data sections.

The maps are listed as follows:-

Plate 309-86-1 (in text)	Location Map Scale 1:50,000
Plate 309-86-2 (in envelope)	UTEM Compilation Map Scale 1:10,000

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

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:

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

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)

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

where Ch.n is the observed amplitude of Channel n (2 to 8)

- $N_i$  = Ch.1 for Ch1 normalized
- $N_j$  = P for primary field normalized
- $i$  is the data station for continuous normalized  
(each reading normalized by different primary field)
- $i$  is the station below the arrow on the data sections  
for point normalized  
(each reading normalized by same primary field)

### INTERPRETATION

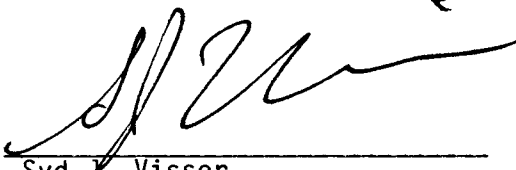
A Channel 1 crossover at 2500E on Line 4000S is due to an extensive (larger than the dimension of the loop) weak conductor also recognized in last year's data (J. Silic, 1985). The northern extension of this conductor can be seen on the east end of Lines 1500S and 2000S (D.S. 2, 29, 3 & 3a), where it appears to be somewhat deeper.

The higher channel crossovers (Channel 8-4) seen on the grid are probably due to the change in the conductivity structure of local geology.

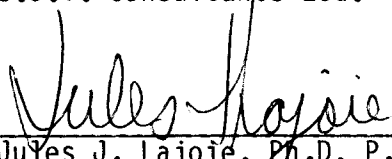
### CONCLUSION

A large, weak extensive conductor recognized in the 1985 UTEM data extends north to Line 1500S, then probably continues in a northerly direction, east of the present grid.

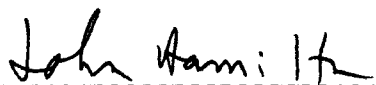
Report by :

  
 Syd J. Visser  
 Geophysicist  
 S.J.V. Consultants Ltd.

Approved by :

  
 Jules J. Lajoie, Ph.D, P.Eng.  
 Geophysicist, Cominco Ltd.

Approved for  
Release :

  
 J. M. Hamilton, P.Eng.  
 Manager, Exploration  
 Western Canada  
 Cominco Ltd.

## DISTRIBUTION:

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



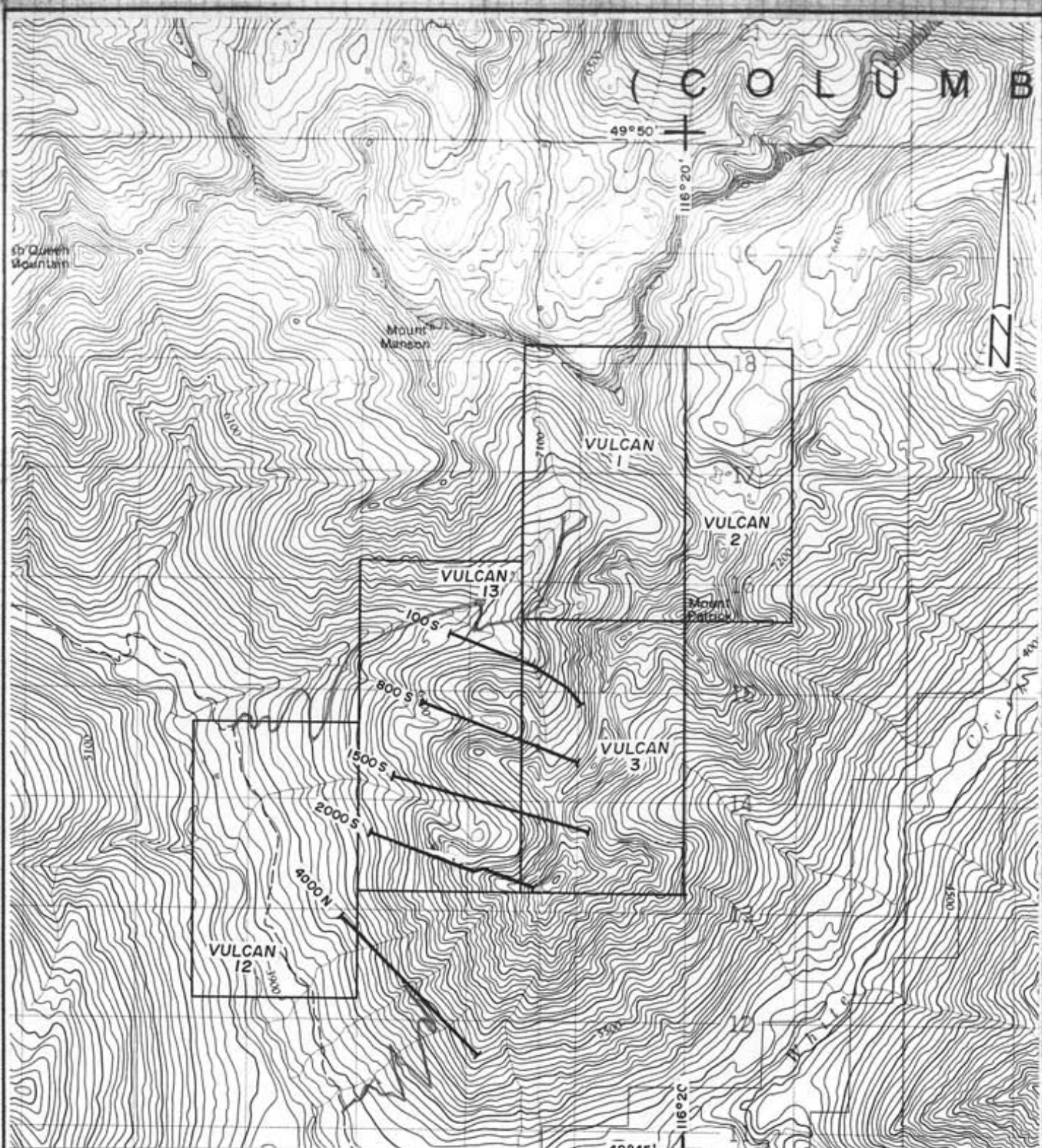
REFERENCES

Lamontagne, Y., 1985

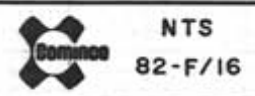
Application of Wideband, Time Domain EM Measurements in Mineral Exploration: Doctoral Thesis, University of Toronto

Silic, J., 1985

Geophysical Report on UTEM Survey on the Vulcan 1 to 4 and REDD 1 to 3 Claims - Assessment Report



# VULCAN PROPERTY (South Grid)



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

**CLAIM and GRID LOCATION MAP**  
**VULCAN CLAIMS 1,2,3,12 & 13**

FORT STEELE M.D.; B.C.

Scale: 1: 50,000      Date: NOVEMBER 1986      Plate: 309-86-1

APPENDIX I

LEGEND

UTEM DATA SECTIONS

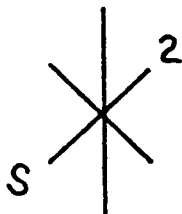
ORDINATE: Amplitude scale is given in %

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
Σ	5	1.6	0.8
△	6	0.8	0.4
7	7	0.4	0.2
X	8	0.2	0.1
△	9	0.1	0.05
◇	10	0.05	0.025

LEGEND

UTEM COMPILATION MAPS

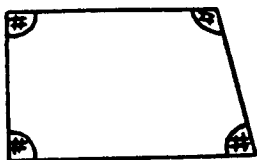


Axis of a crossover anomaly. The number indicates the latest anomalous channel.

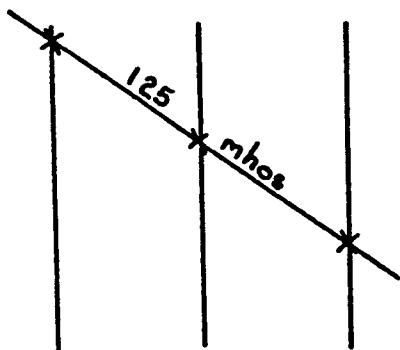


Area where conductivity is higher than average background.

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



Outline of a transmitter loop.

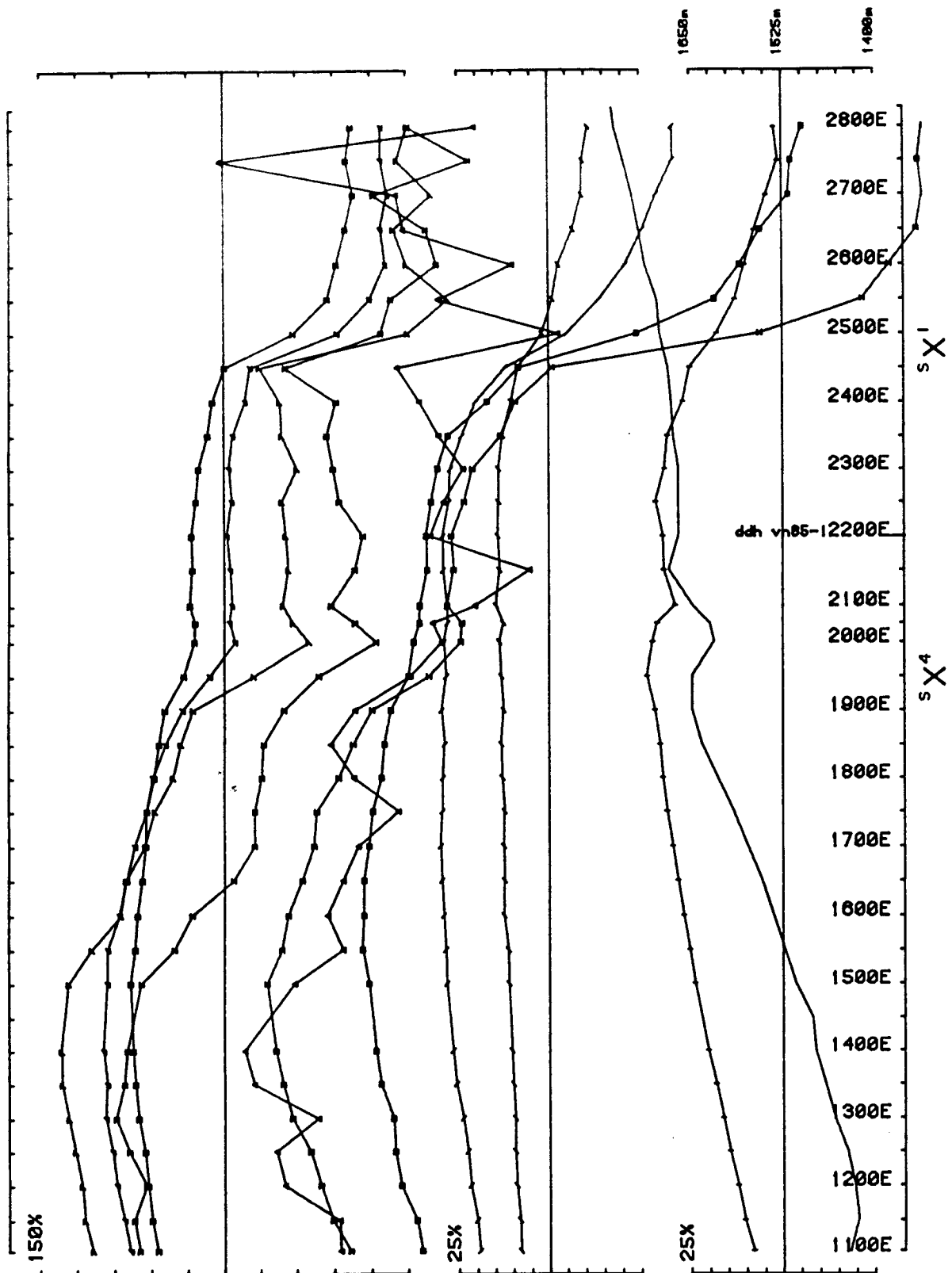


Conductor axis located by crossover anomalies with a conductance determination. The conductance is the interpreted conductivity x thickness of the conductor in mhos (same as Siemens).

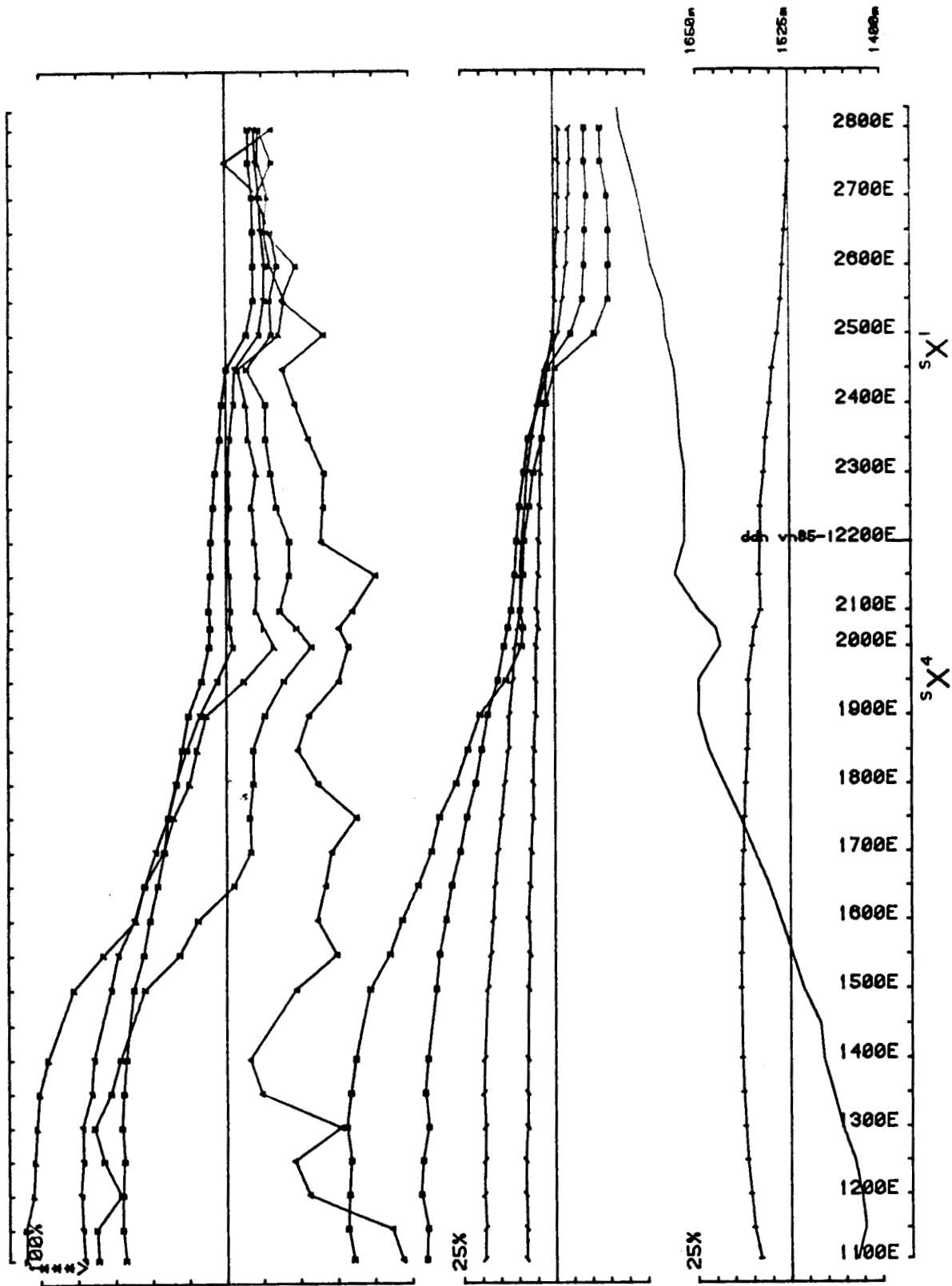
Only the principal crossovers are indicated.

A P P E N D I X II

D A T A S E C T I O N S



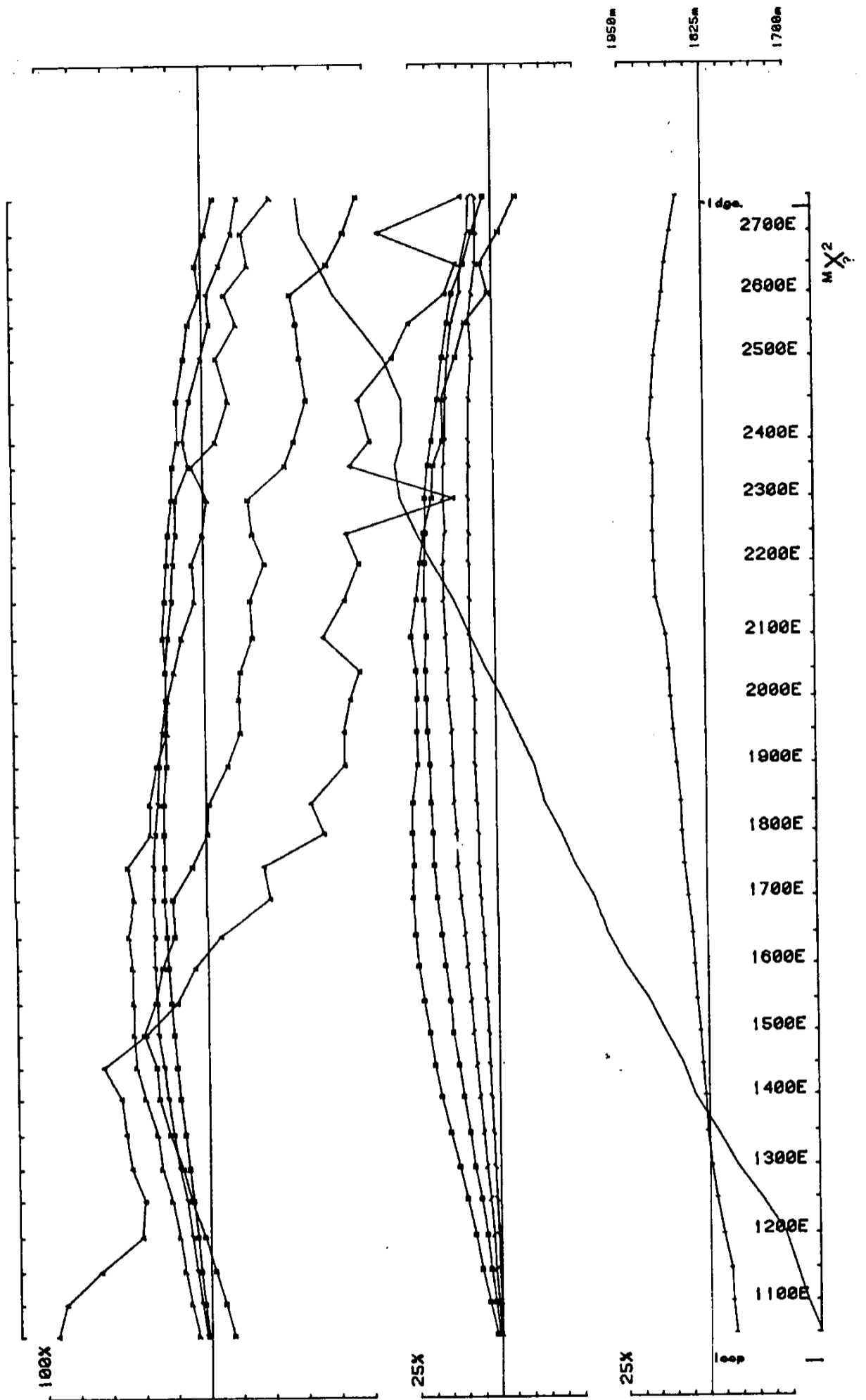
Area VULCAN Cominco operator SJV & JV freq(hz) 30.974  
 Loopne 1 Line 4000N component Hz secondary Ch 1 normalized Ch 1 reduced



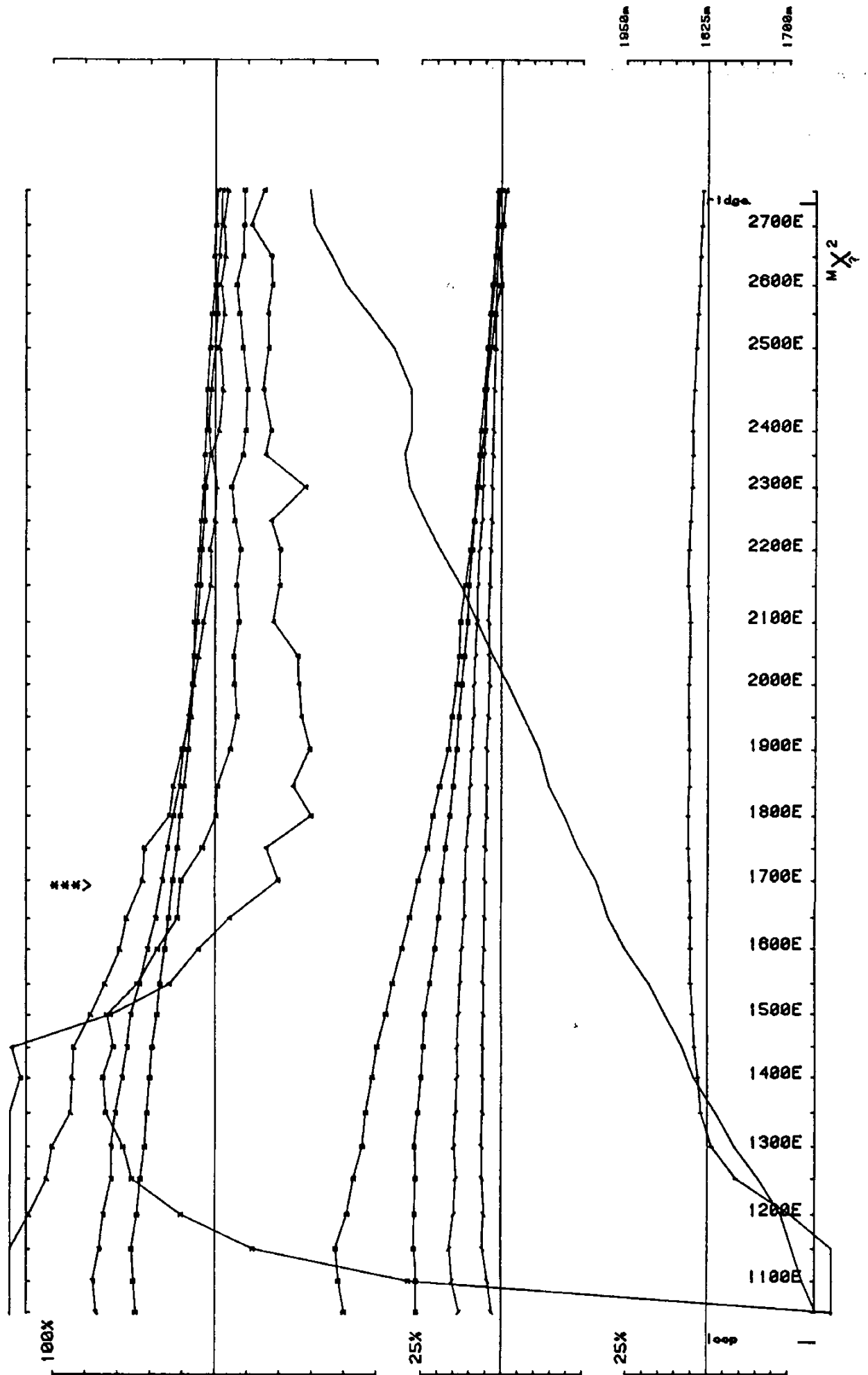
Area VULCAN ComInco operator SJV & JV freq(hz) 30.974  
 Loopne 1 Line 4000N component Hz secondary Ch 1 normalized Ch 1 reduced

DS 1a

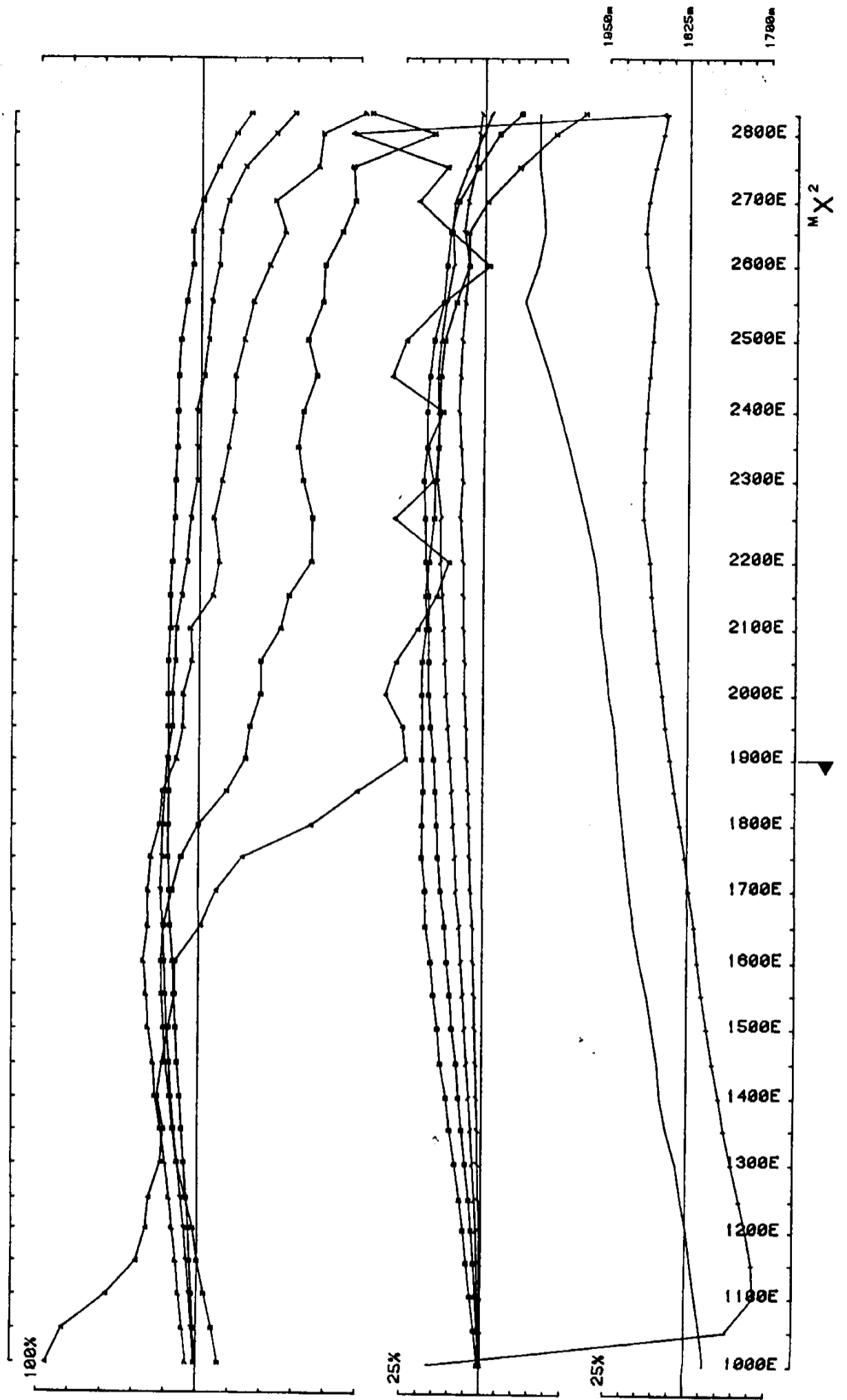




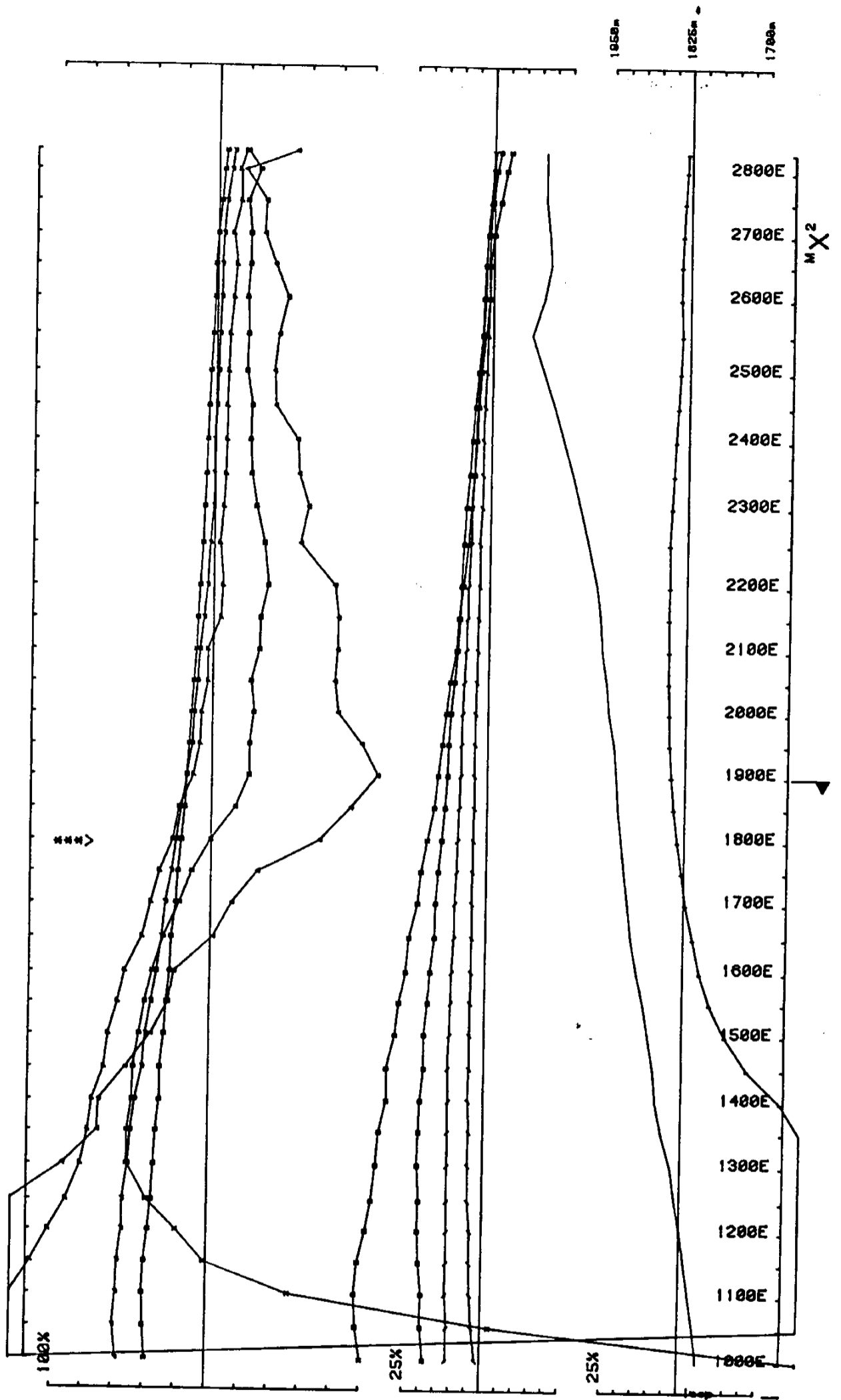
Area VULCAN ComInco operator SJV & JV freq(hz) 30.974  
 Loopno 1 Line 2000S component Hz secondary Ch 1 normalized Ch 1 reduced



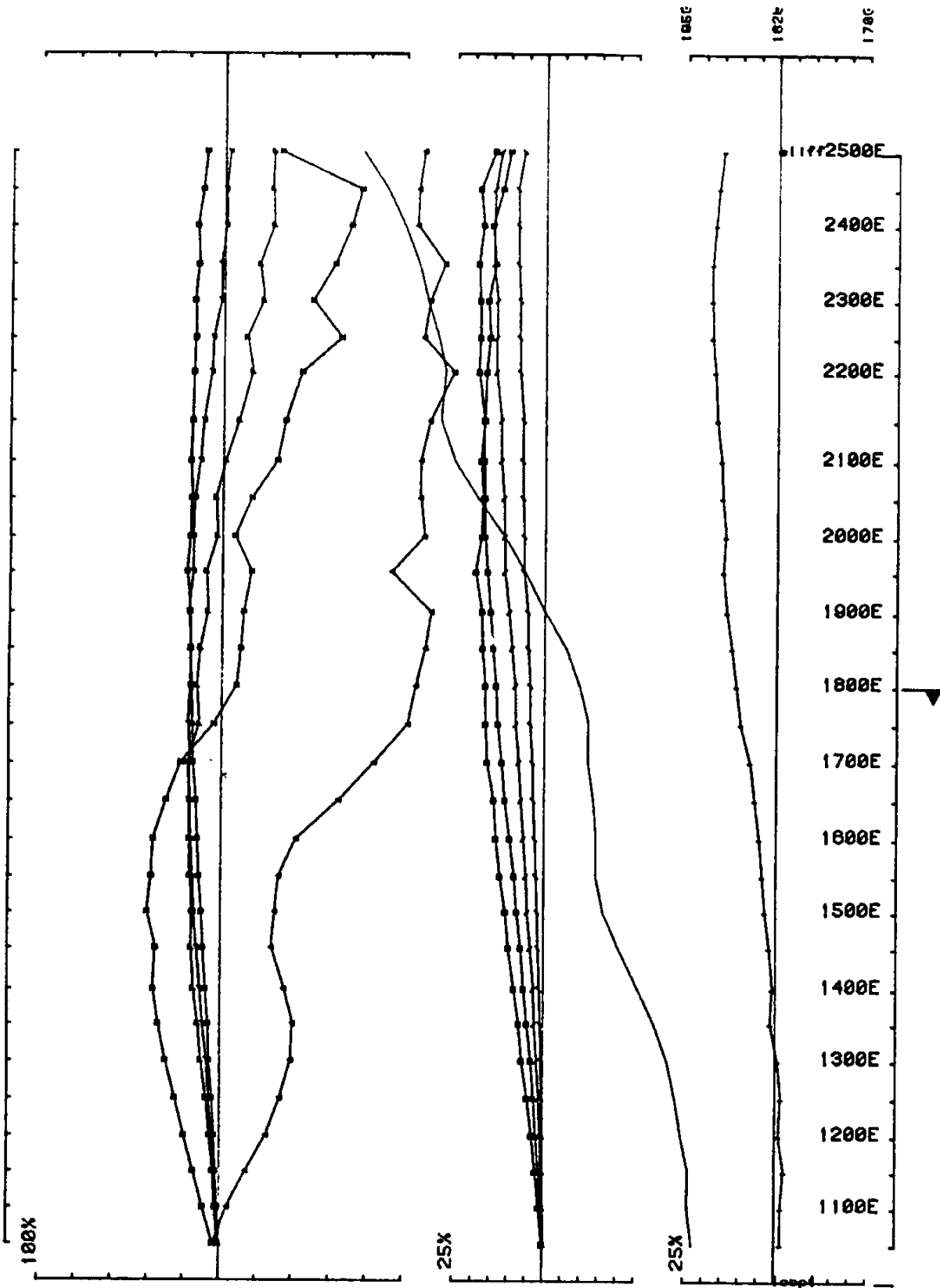
Area VULCAN Cominco operator SJV & JV freq(hz) 38.974  
 Loopno 1 Line 2000S component HZ secondary Ch 1 normalized Ch 1 reduced



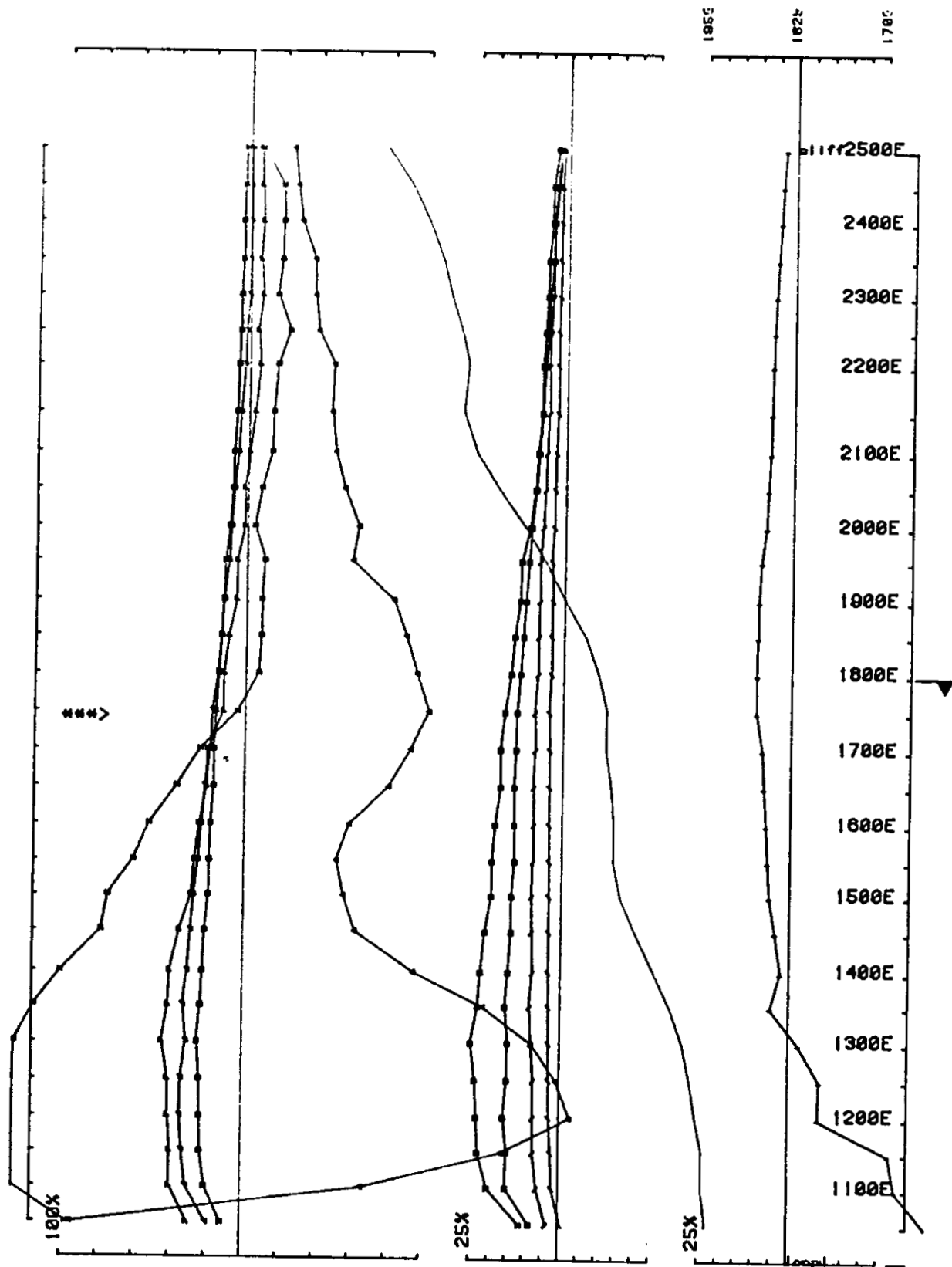
Area VULCAN ComInco operator SJV & JV freq(hz) 30.974  
 Loopno 1 Line 1500S component Hz secondary Ch 1 normalized Ch 1 reduced



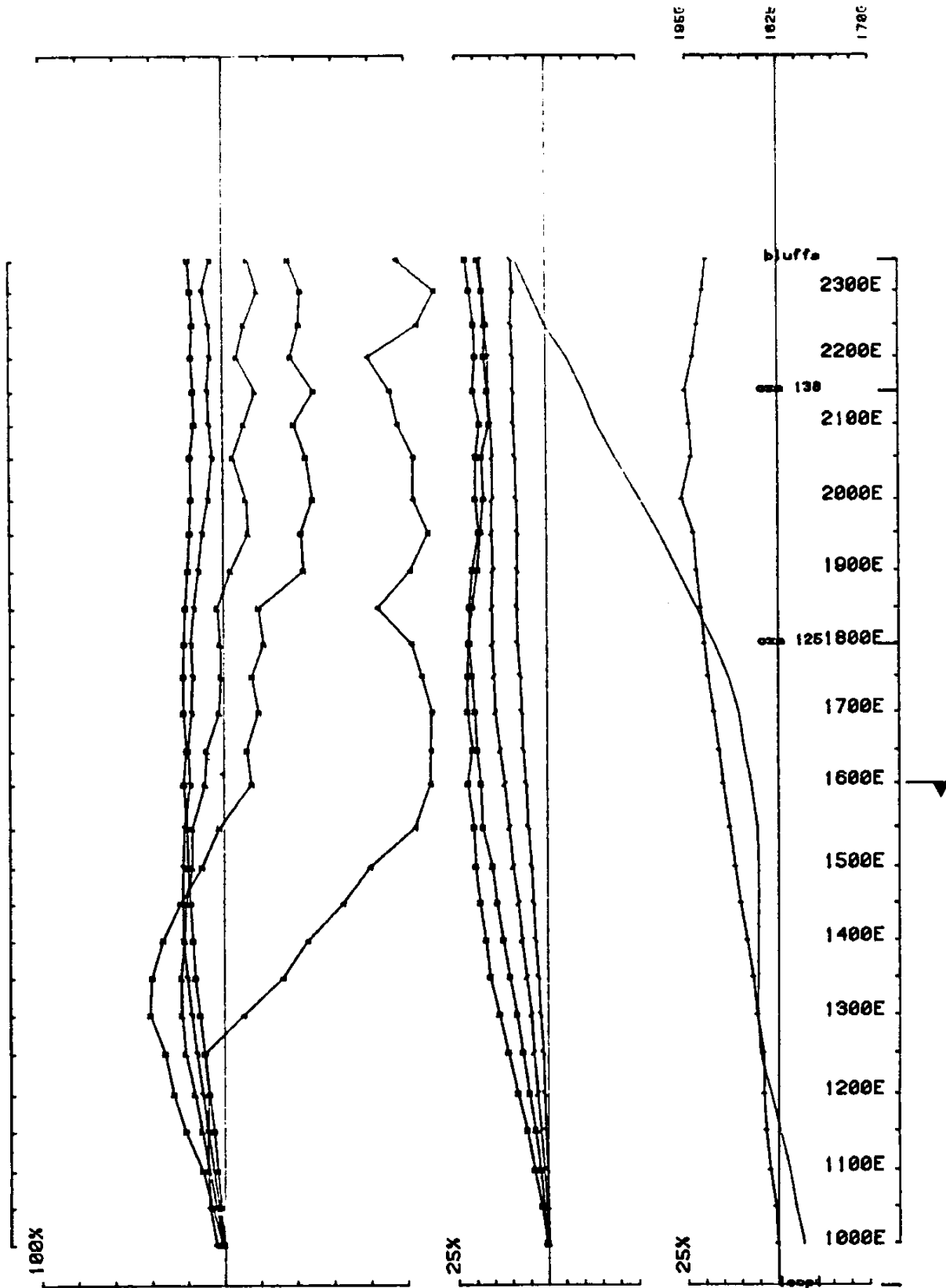
Area VULCAN Cominco operator SJV & JV freq(hz) 30.974  
 Loopno 1 Line 1500S component Hz secondary Ch 1 realized Ch 1 reduced



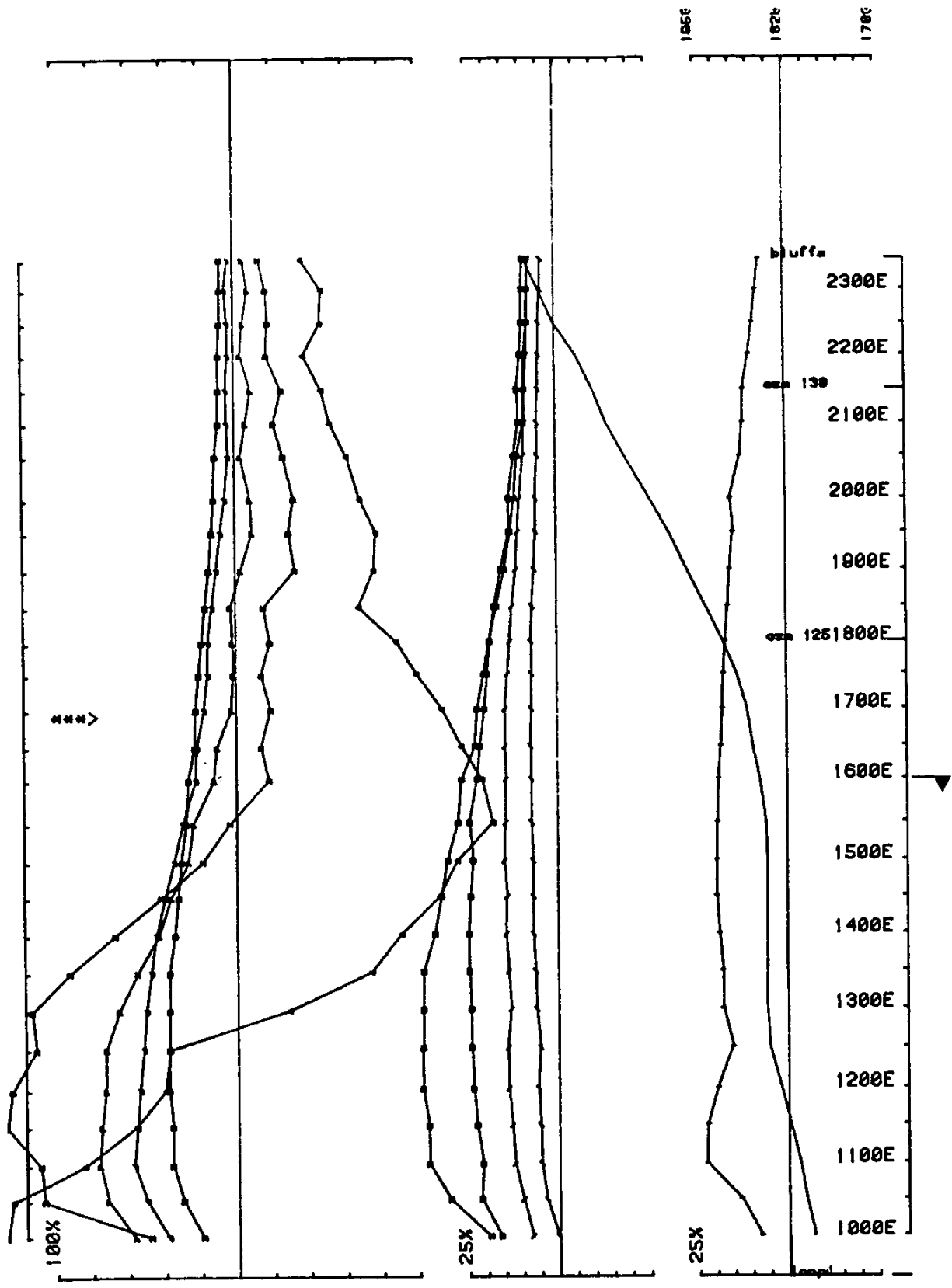
Area VULCAN Cominco operator JUL & JV & SJV freq(hz) 30.974  
 Loopne 1 Line 800S component HZ secondary Ch 1 normalized Ch 1 reduced



Area VULCAN Cominco operator JUL & JV & SJV freq(hz) 30.974  
 Loopno 1 Line 800S component HZ secondary Ch 1 normalized Ch 1 reduced



Area VULCAN Cominco operator JUL & JV & SJV freq(hz) 30.974  
 Loopno 1 Line 100S component HZ secondary Ch 1 normalized Ch 1 reduced



Area VULCAN ComInco operator JUL & JV & SJV freq(hz) 30.974  
 Loopne 1 Line 100S component Hz secondary Ch 1 normalized Ch 1 reduced



APPENDIX III

IN THE MATTER OF THE B.C. MINERAL ACT  
AND IN THE MATTER OF A GEOPHYSICAL PROGRAMME  
CARRIED OUT ON VULCAN 3, 12 & 13 CLAIMS  
LOCATED 45 KM WEST OF KIMBERLEY, B.C.  
IN THE FORT STEELE MINING DIVISION OF THE  
PROVINCE OF BRITISH COLUMBIA, MORE PARTICULARLY


N.T.S.: 82F/16

S T A T E M E N T

I, SYD J. VISSER, OF THE MUNICIPALITY OF DELTA, IN THE PROVINCE OF BRITISH COLUMBIA, MAKE OATH AND SAY:-

- 1) THAT I am employed as a geophysicist by S.J.V. Consultants Ltd., on contract with 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 a geophysical survey on the VULCAN mineral claims;
- 3) THAT the said expenditures were incurred for the purpose of mineral exploration of the above-noted claims between the 15th day of August and the 20th day of August, 1986.

Signed:

  
\_\_\_\_\_  
S. J. Visser, B.Sc.  
Geophysicist  
S.J.V. Consultants Ltd.

NOVEMBER 1986

EXHIBIT "A"

STATEMENT OF GEOPHYSICAL EXPENDITURES - 1986

ON THE VULCAN 3, 12, & 13 CLAIMS

(1) SALARIES

a)	J.J. Lajoie, geophysicist 2 days @ \$280/day	\$ 560.00	
b)	S.J. Visser, geophysicist 2 days @ \$240/day	480.00	
c)	J. Vyselaar, geophysicist 4 days @ \$240/day	960.00	
d)	M.J. Davies, technician 6 days @ \$115/day	690.00	
e)	S. Kemp, assistant 6 days @ \$ 80/day	480.00	
f)	N. Murphy, assistant 6 days @ \$70/day	<u>420.00</u>	\$ 3,590.00

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

4 days @ \$250/day 1,000.00

(3) EQUIPMENT RENTAL

4 operating days @ \$150/day 600.00

(4) EXPENSE ACCOUNTS

J.J. Lajoie	\$ 328.00	
S.J. Visser (est.)	150.00	
J. Vyselaar (est.)	150.00	
M.J. Davies (est.)	<u>150.00</u>	778.00

(5) HELICOPTER (BIGHORN)

1,284.00

Carried Forward 7,252.00

Carried Forward \$ 7,252.00

(6) MISCELLANEOUS

Accommodation - 6 days @ \$40/day	240.00	
Truck Rental - 2 trucks x 5 days x \$40/day	400.00	
Wire Usage	<u>100.00</u>	740.00

T O T A L \$ 7,992.00

*Linecutting*

\$ 4136.75

*Grand Total \$ 12,128.75*

I certify this to be a true Statement of Expenditures for the geophysical survey on the Vulcan 3, 12 and 13 claims in 1986.




S.J. Visser, B.Sc.  
Geophysicist  
S.J.V. Consultants Ltd.

APPENDIX IV

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

I, SYD J. VISSER, of 8081 - 112th Street, in the Municipality of Delta, in the Province of British Columbia, do hereby certify:-

- 1) THAT 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) THAT I have worked in mineral exploration since 1968.



S.J. Visser, B.Sc.  
Geophysicist  
S.J.V. Consultants Ltd.

November 1986



ROAD  
(approximate)

Claim Boundary

Claim Boundary



GEOLOGICAL BRANCH  
ASSESSMENT REPORT

15,239



M X 2  
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)

OUTLINE OF UTEM LOOP  
AND LOOP NUMBER

← AREA WHERE CONDUCTIVITY IS  
HIGHER THAN AVERAGE BACKGROUND

**VULCAN PROPERTY (South Grid)**

Drawn by:	Traced by:
Checked by:	Reviewed by:

UTEM GRID and  
COMPILATION MAP  
FORT STEELE M.D., B.C.

Scale: 1:10,000 Date: NOVEMBER 1986 Plate: 309-86-2