86-858-15428

COMINCO LTD.

EXPLORATION

WESTERN DISTRICT

NTS: 82F/1W

GEOPHYSICAL REPORT

ON A

UTEM SURVEY ON THE

SHA 19 to 23 CLAIMS

FORT STEELE MINING DIVISION, B.C.

- ASSESSMENT REPORT -

Latitude : 49°01'N

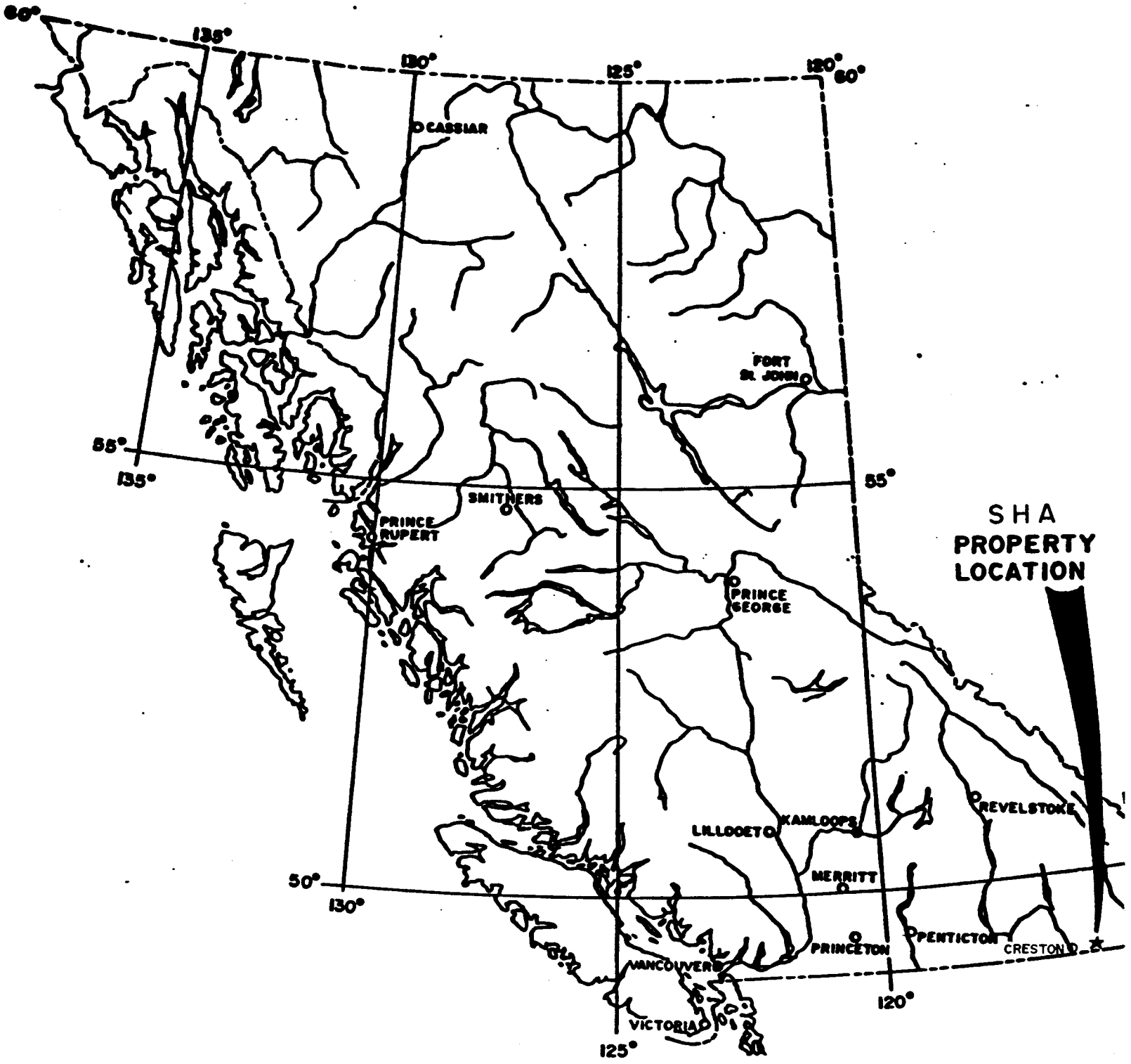
Longitude : 116°~~20'W~~ 17'

Work Performed by : S.J. Visser & J. Vyselaar
between September 4 and 22, 1986

Claim Owner & Operator : COMINCO LTD.

DECEMBER 1986

S. J. Visser



S H A PROPERTY
GENERAL LOCATION MAP

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COMINCO LTD.

EXPLORATION WESTERN DISTRICT

NTS: 82F/1

GEOPHYSICAL REPORT ON UTEM SURVEY ON THE SHA 19 to 23 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.

GRID NAME	# OF UNITS	RECORD #	ASSESSMENT WORK DUE
Sha 19	20	2434	July 2, 1988
20	20	2435	July 2, 1988
21	20	2436	July 2, 1988
22	10	2437	July 2, 1988
23	10	2438	July 2, 1987

INTRODUCTION

The Sha 19 to 23 claims are located approx 17 km southwest of Yahk and approx. 15 km southeast of Creston, adjoining the U.S.A.-Canada border. Access is from Yahk or Creston along Highway 3 to Goatfell, then approx. 15 km south via logging road, near Carroll Creek and Little Moyie River, and power line access road to East Mission Creek. A four-wheel drive vehicle is required for the last few kilometres.

The Sha 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.

The purpose of the UTEM survey described in this report is to explore for massive sulphide deposits.

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 September 4th and 22nd, 1986, covers an area of approx. 4.5 km x 1.5 km. Thirteen lines varying in length from 1.2 km to 1.9 km, for a total of 18.8 km, were surveyed from four loops. With the exception of Line 1000N, Loop 4, which was surveyed inside the loop at station spacings of 25 and 50 m; all the lines were surveyed outside the loop with a station spacing of 50 m.

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

The power line on the northwest end of the grid slowed down surveying considerably and was the reason for some of the noisy data, especially from Loop 3.

DATA PRESENTATION

The results of the survey are presented on one claim & grid location map, one compilation map and 26 data sections.

The maps are listed as follows:-

Plate 311-86-1 (in text)	Location Map Scale 1:250,000
Plate 311-86-2 (in envelope)	UTEM Grid and Compilation Map Scale 1:20,000

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:

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

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)

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

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

N_i = Ch.1 for Ch1 normalized

N_i = 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

Two features are seen in the data. The first, striking across the east end of the grid (Plate 311-86-2), from Loop 1 data (D.S. 1-4, 1a-4a), outlines a zone where the conductivity is slightly higher than the surrounding rock. The data from Loop 3 indicate the second feature, a crossover anomaly striking across the grid at about 1000E (Plate 311-86-2). An extra crossover anomaly was noticed on Line 1000N at 1100E (D.S. 11 & 11a). The latter was detailed with Loop 4 (D.S. 13 & 13a) taking measurements inside the loop. It is probably due to a small (< 400 m square) weak conductor (< 20 mhos) dipping shallowly to the east.

CONCLUSION

The data indicate a weakly conducting zone striking across the east end of the grid and another striking across the west end of the grid. A small, weak conductor was noticed on Line 1000N between 1150E and 1400E.

No large, strong conductors were found in the survey area.

Report by :

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

Approved for Release :

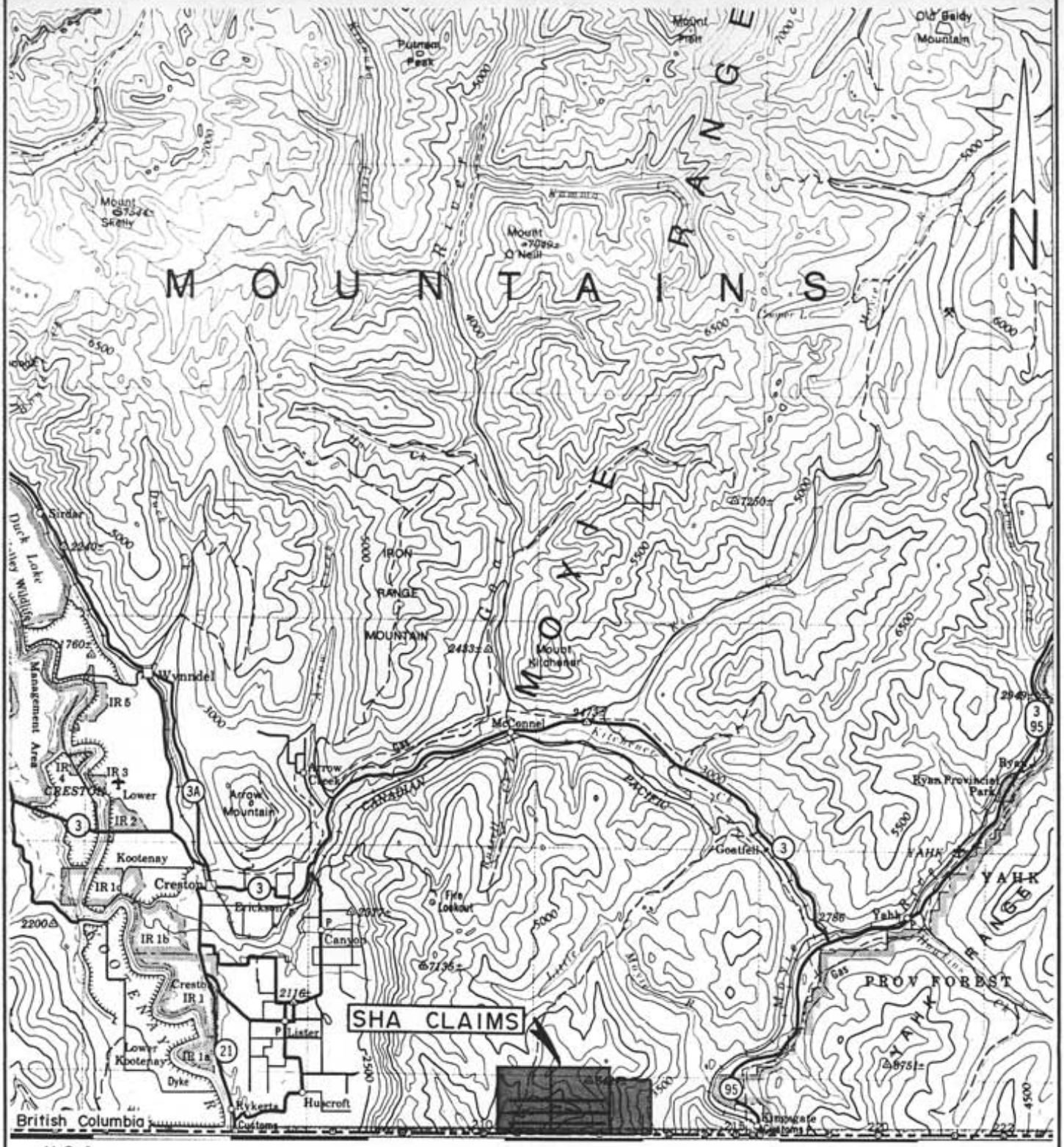
J. M. Hamilton, P.Eng.
Manager, Exploration
Western Canada
Cominco Ltd.

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



SHA PROPERTY

FORT STEELE M.D.; B.C.

Commonwealth

N.T.S. 82-F/1

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

CLAIM and GRID LOCATION MAP

Scale: 1 : 250,000

Date: DECEMBER 1986

Plate: 311 - 86 - 1

APPENDIX I

LEGEND

UTEM DATA SECTIONS

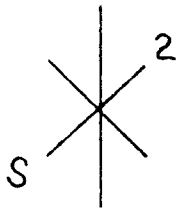
ORDINATE: Amplitude scale is given in %

ABSCISSA: Station or Picket Numbers in Hundreds of Meters

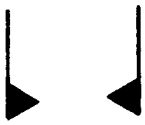
SYMBOL	CHANNEL	MEAN DELAY TIME	
		15 Hz	30 Hz
	1	25.6 ms	12.8 ms
	2	12.8	6.4
	3	6.4	3.2
	4	3.2	1.6
	5	1.6	0.8
	6	0.8	0.4
	7	0.4	0.2
	8	0.2	0.1
	9	0.1	0.05
	10	0.05	0.025

LEGEND

UTEM COMPILATION MAPS



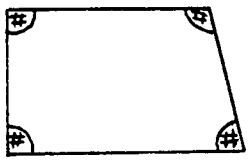
Axis of a crossover anomaly. The number indicates the latest anomalous channel.



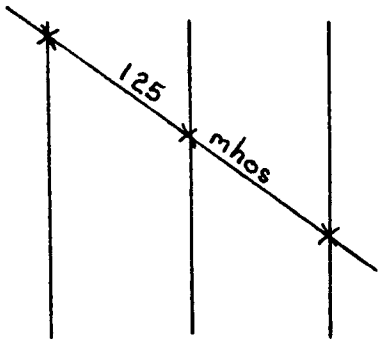
Area where conductivity is higher than average background.

Depth indicated by:

S - Shallow	(< 50 m)
M - Moderate	(50-100 m)
D - Deep	(> 100 m)



Outline of a transmitter loop.

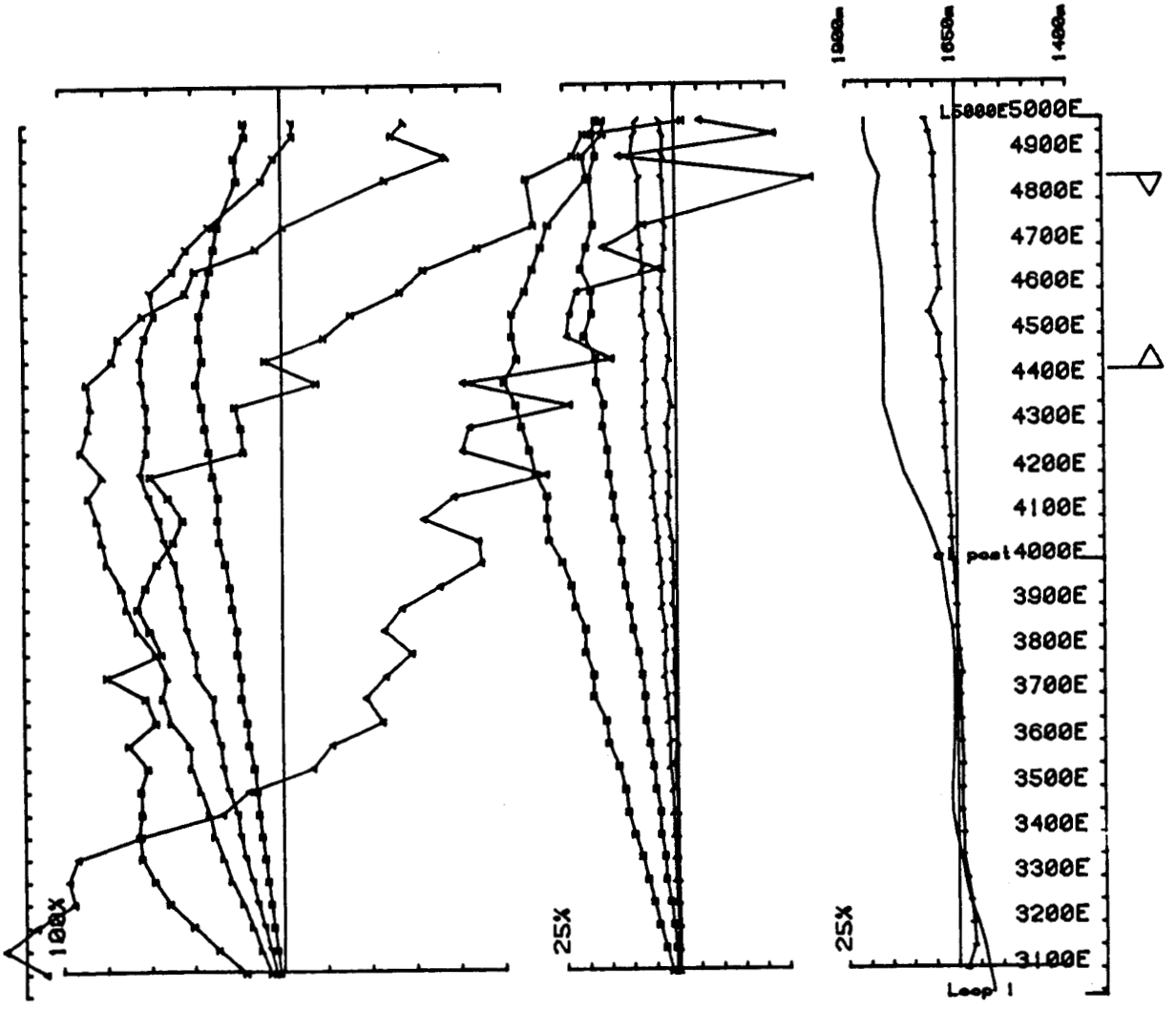


Conductor axis located by crossover anomalies with a conductance determination. The conductance is the interpreted conductivity x thickness of the conductor in mhos (same as Siemens).

Only the principal crossovers are indicated.

A P P E N D I X II

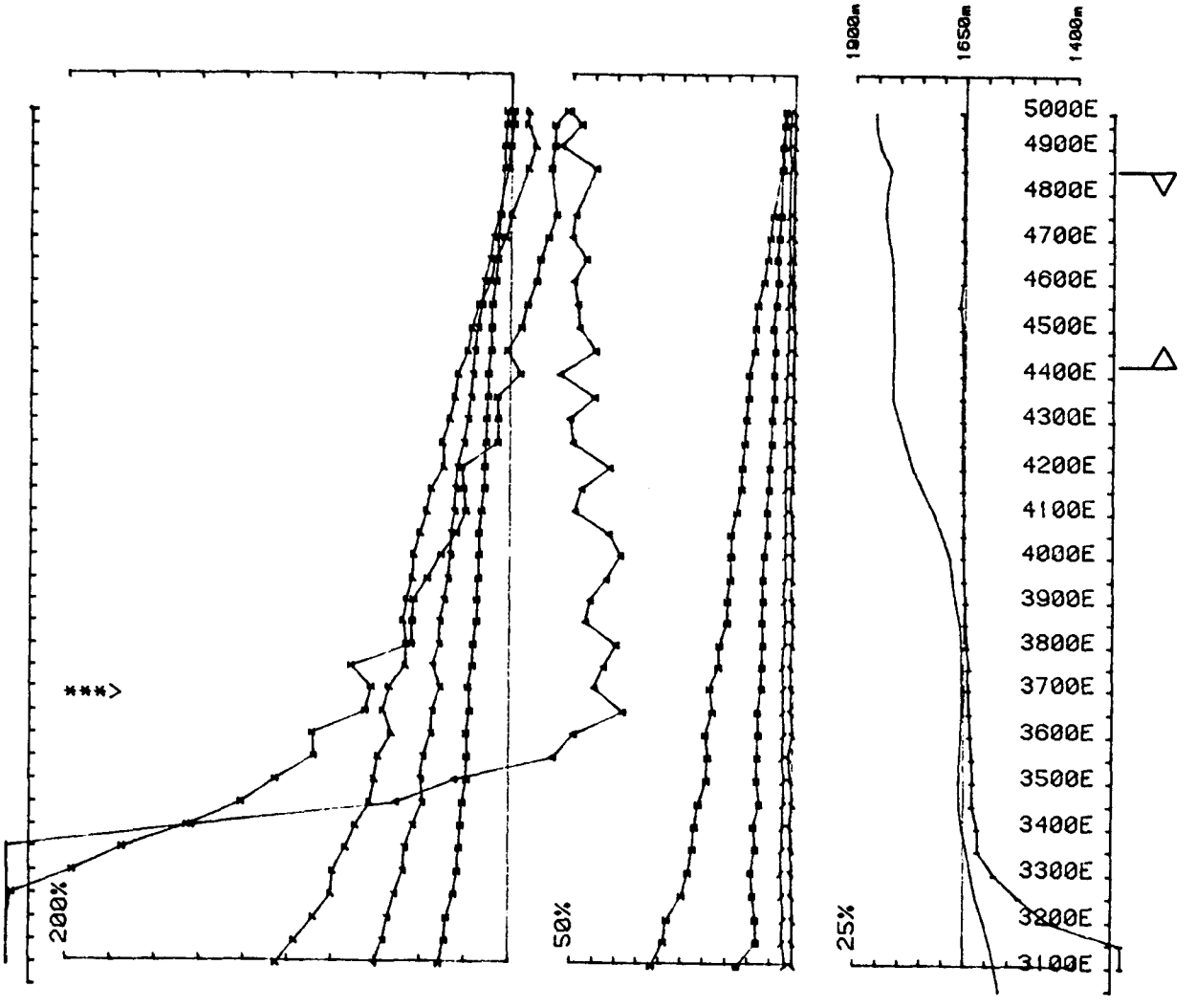
DATA SECTIONS



Area SHA 1986 Cominco operator SJV & JV freq(hz) 30.974

Loopno 1 Line 0N component Hz secondary Ch 1 normalized Ch 1 reduced

DS 1



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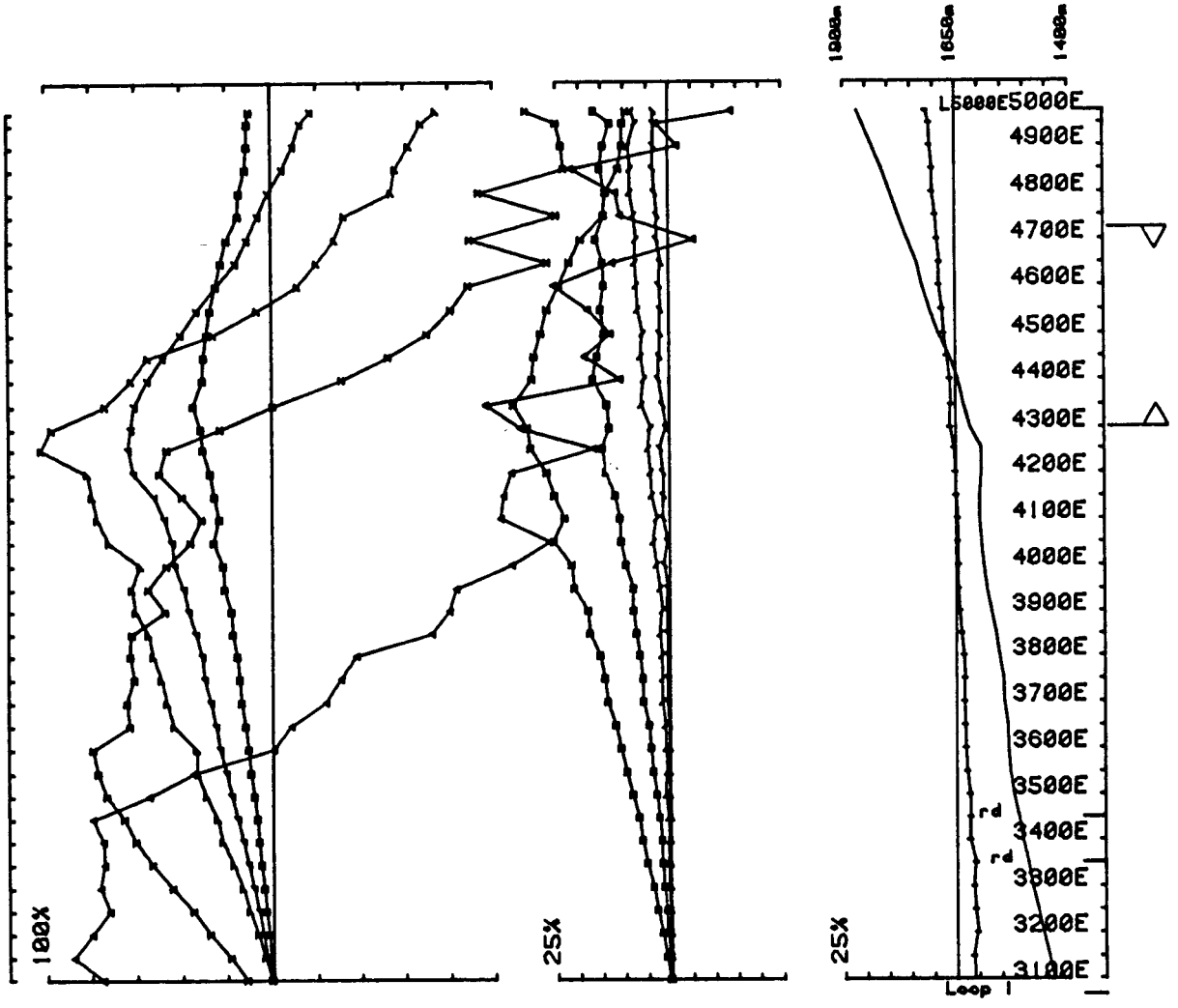
Loopno 1 Line 0N component Hz secondary Ch 1 normalized Ch 1 reduced

DS 1a



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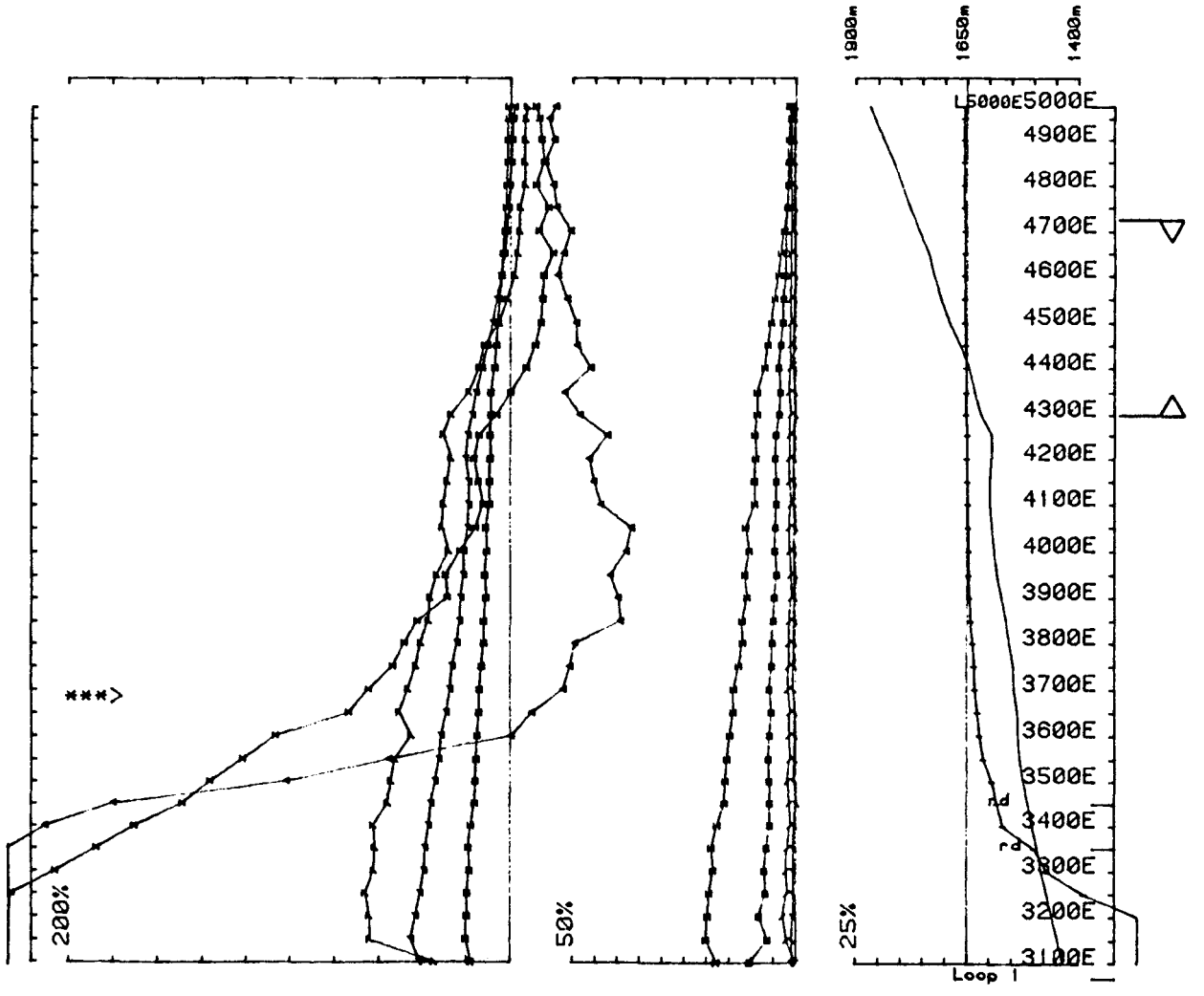
Loopne 1 Line 500N component Hz secondary Ch 1 normalized Ch 1 reduced

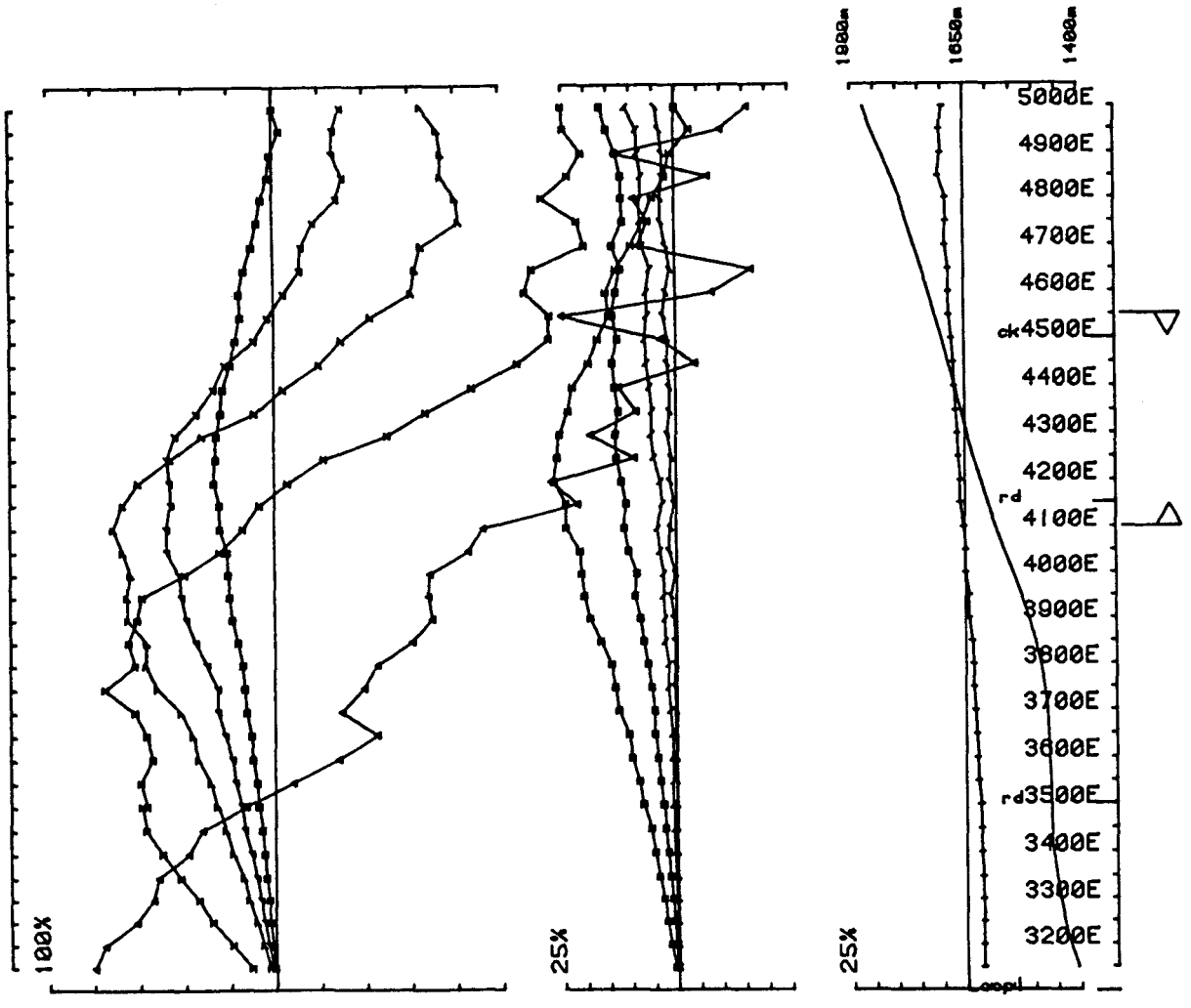
DS 2



Area SHA 1986 Cominco operator SJV & JV freq(hz) 30.974

Loopno 1 Line 500N component Hz secondary Ch 1 normalized Ch 1 reduced

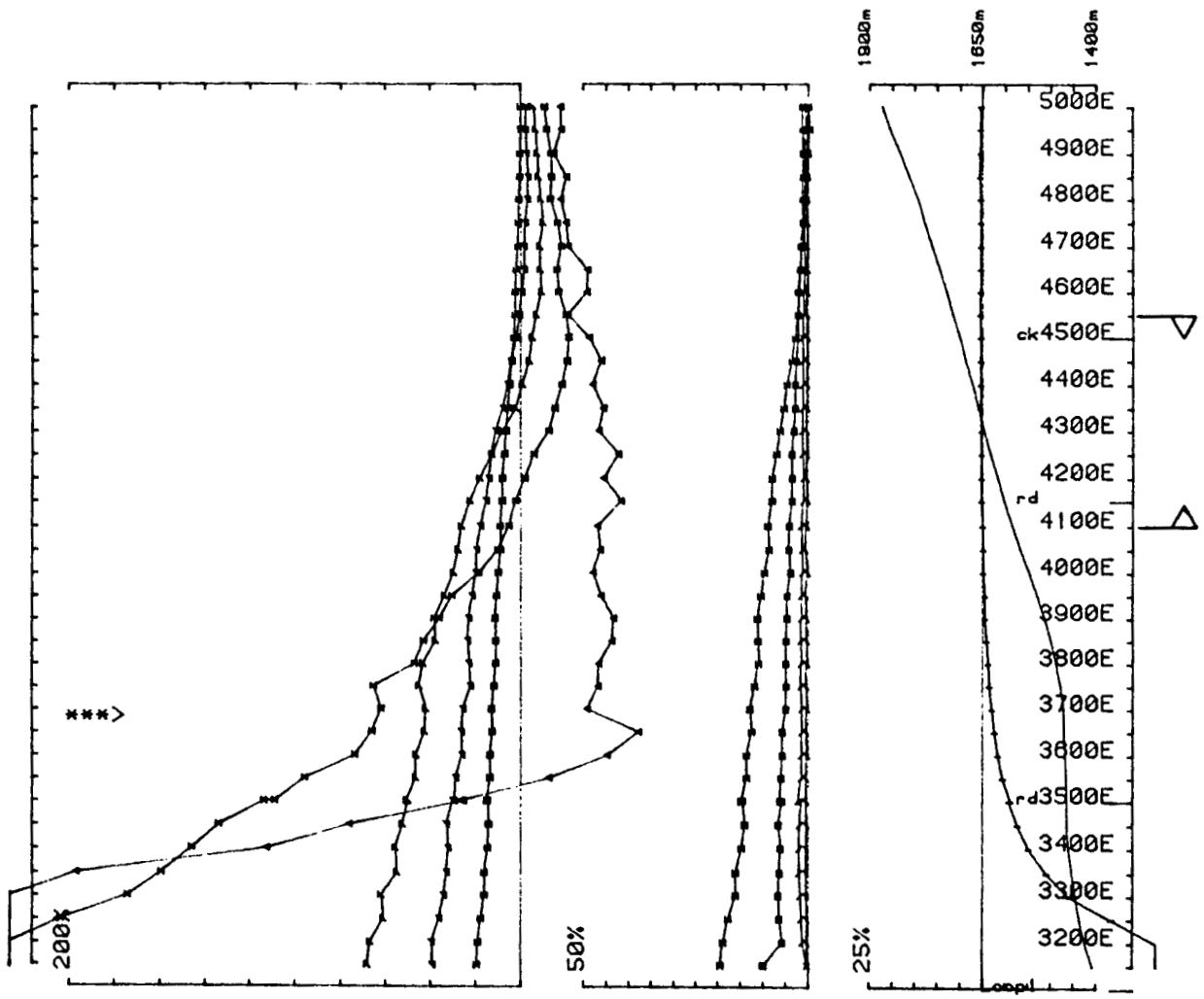
DS 2a



Area SHA 1986 Cominco operator SJV & JV freq(hz) 30.974

Loopno 1 Line 1000N component Hz secondary Ch 1 normalized Ch 1 reduced

DS 3



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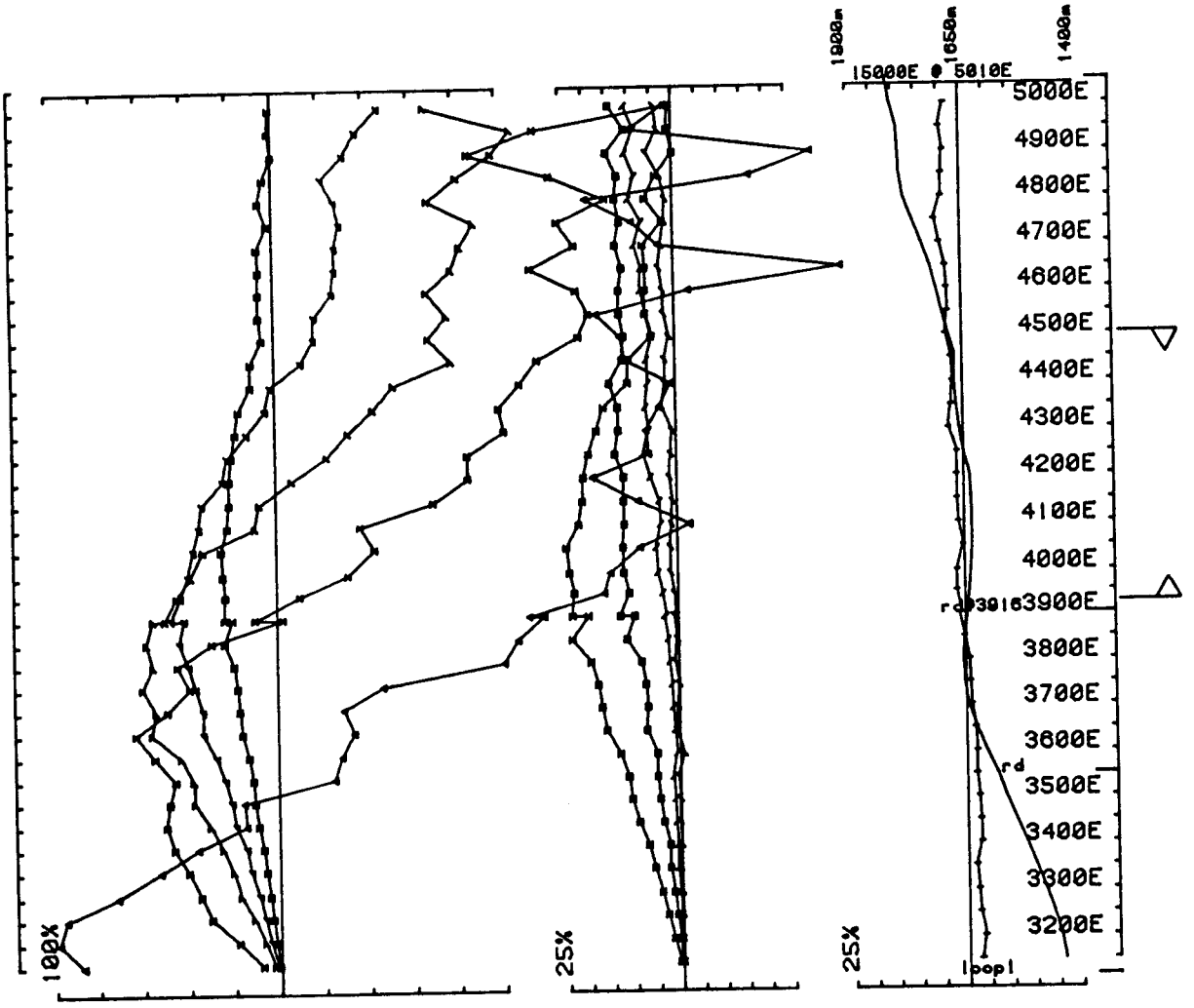
Loopno 1 Line 1000N component Hz secondary Ch 1 normalized Ch 1 reduced

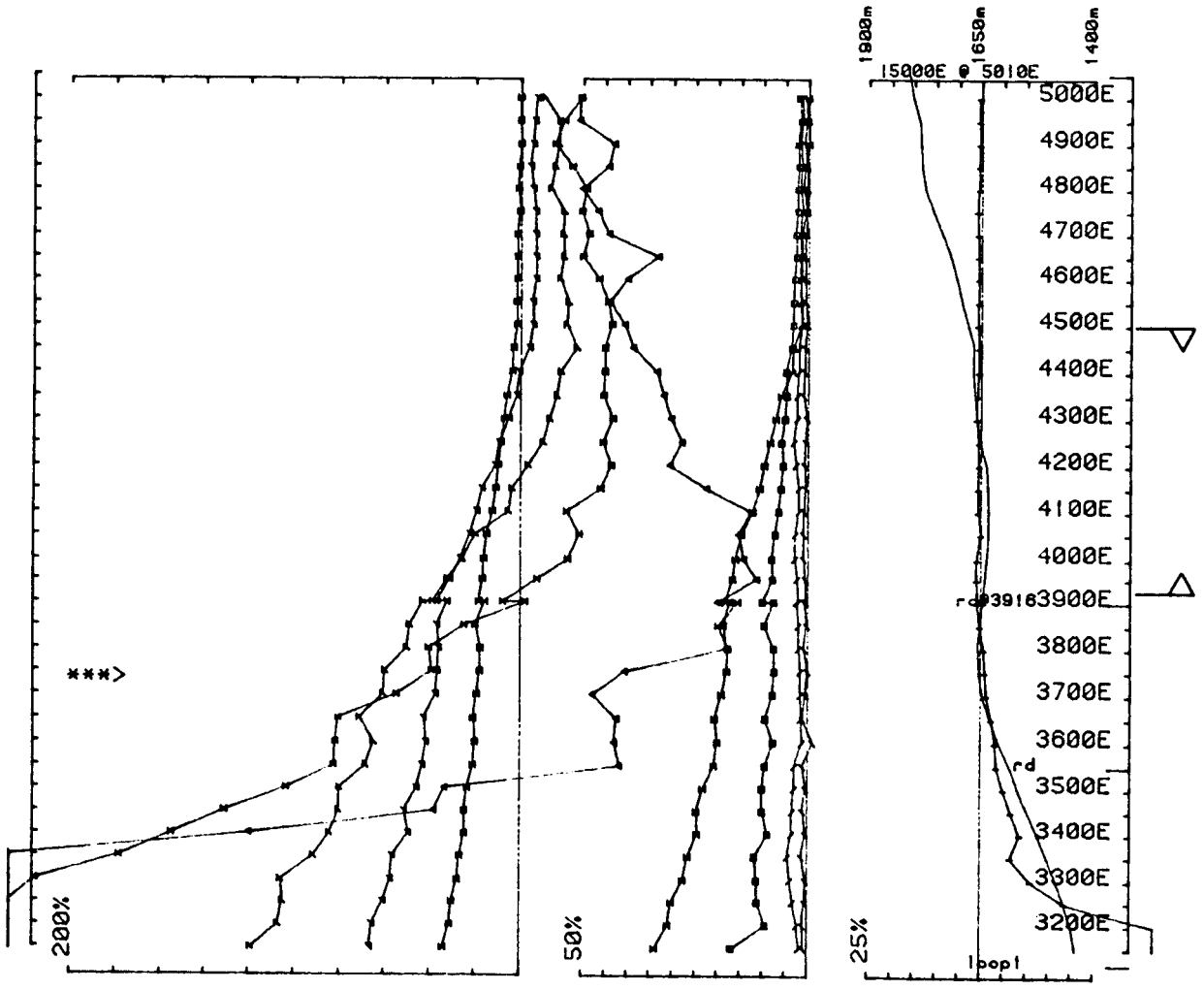
DS 3a



Area SHA 1986 Cominco operator SJV & JV freq(hz) 30.974

Loopno 1 Line 1500N component Hz secondary Ch 1 normalized Ch 1 reduced

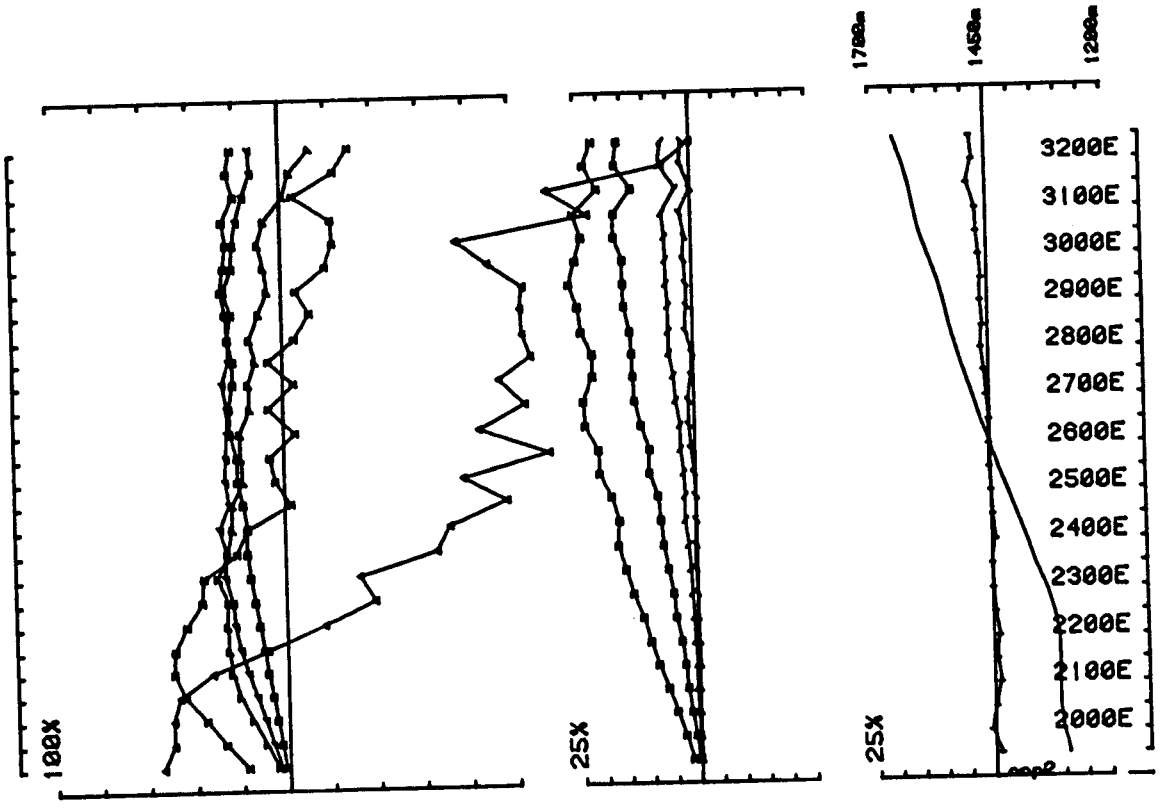
DS 4



Area SHA 1986 Cominco operator SJV & JV freq(hz) 30.974

Loopno 1 Line 1500N component Hz secondary Ch 1 normalized Ch 1 reduced

DS 4a



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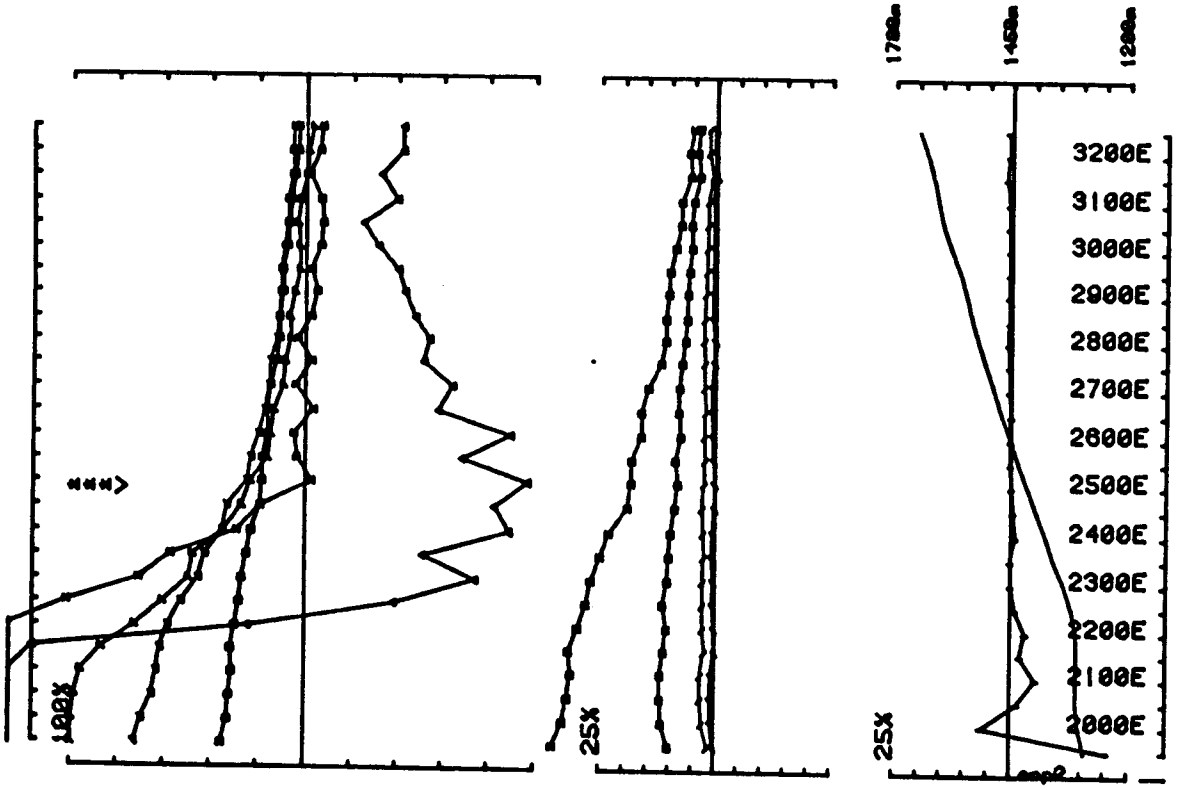

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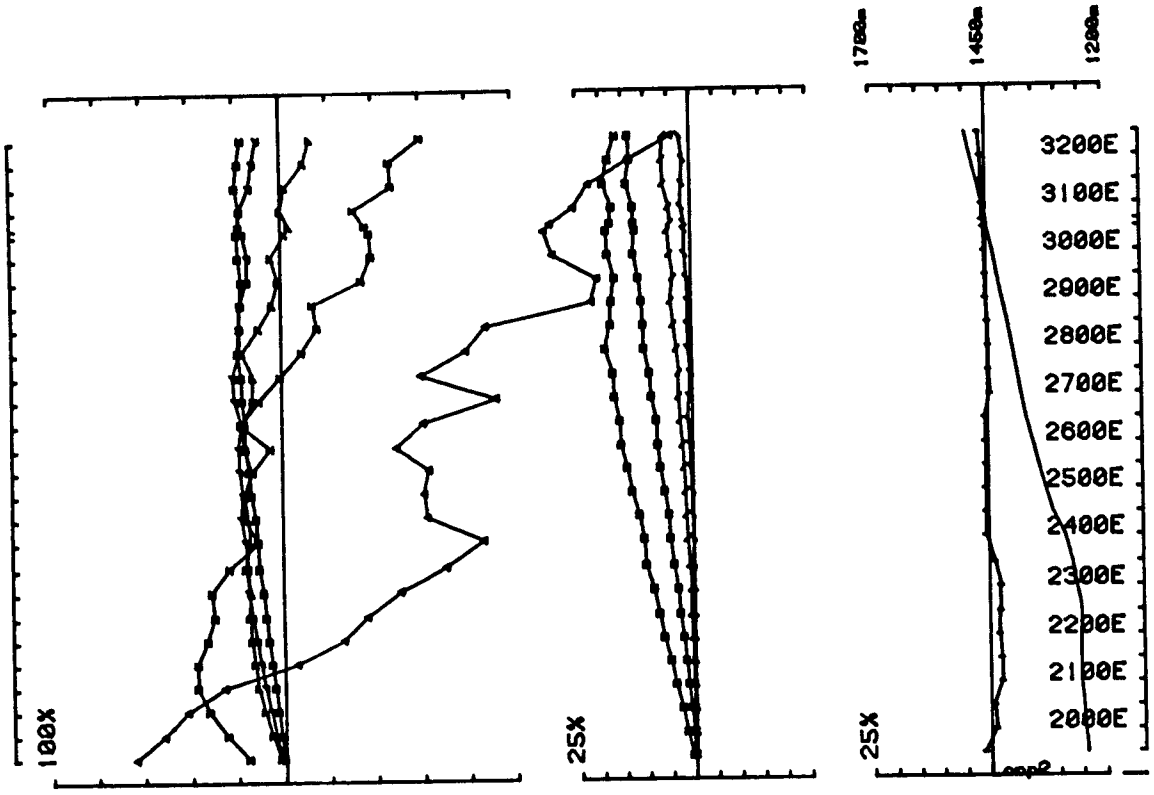

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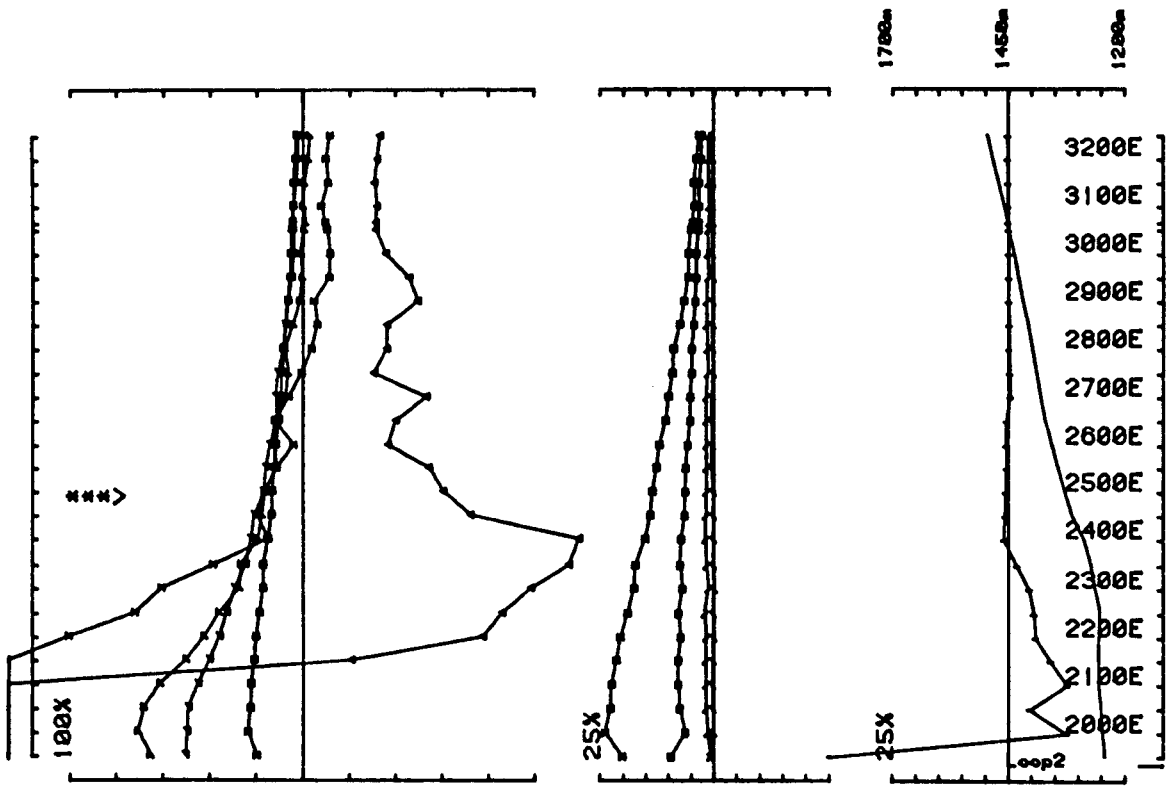

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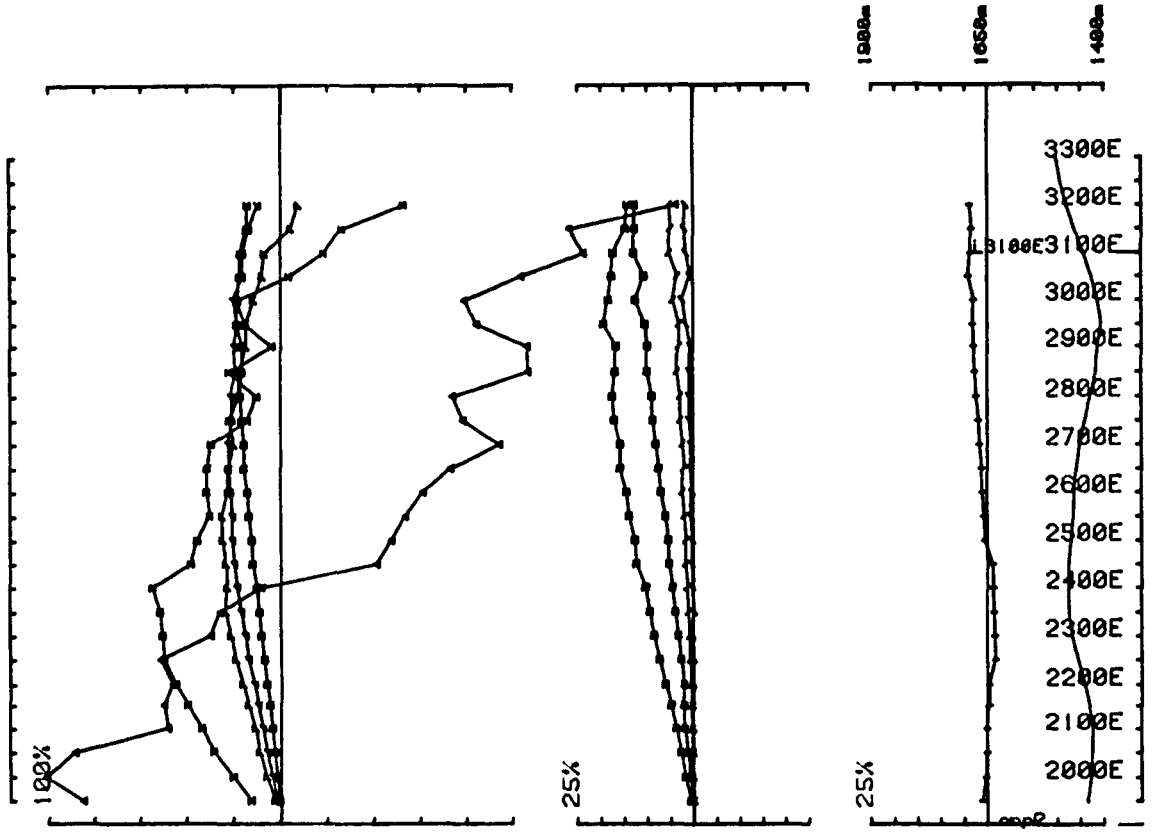
DS 6a



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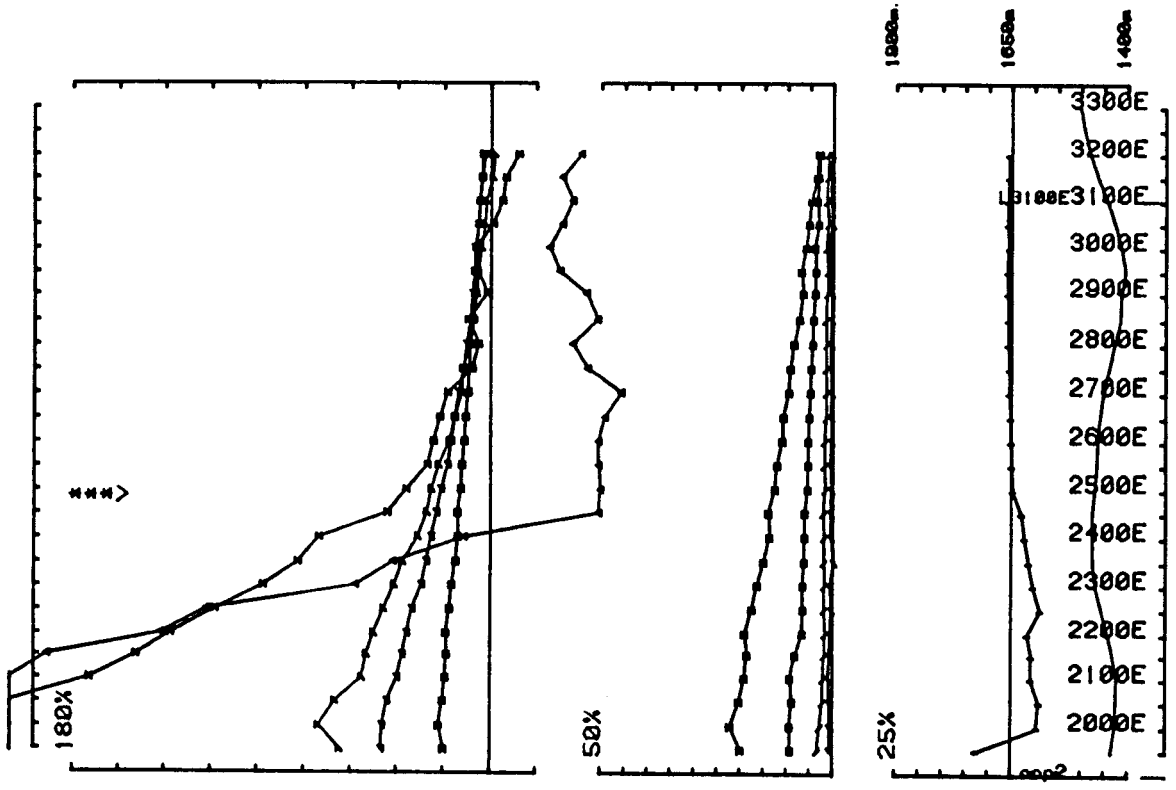

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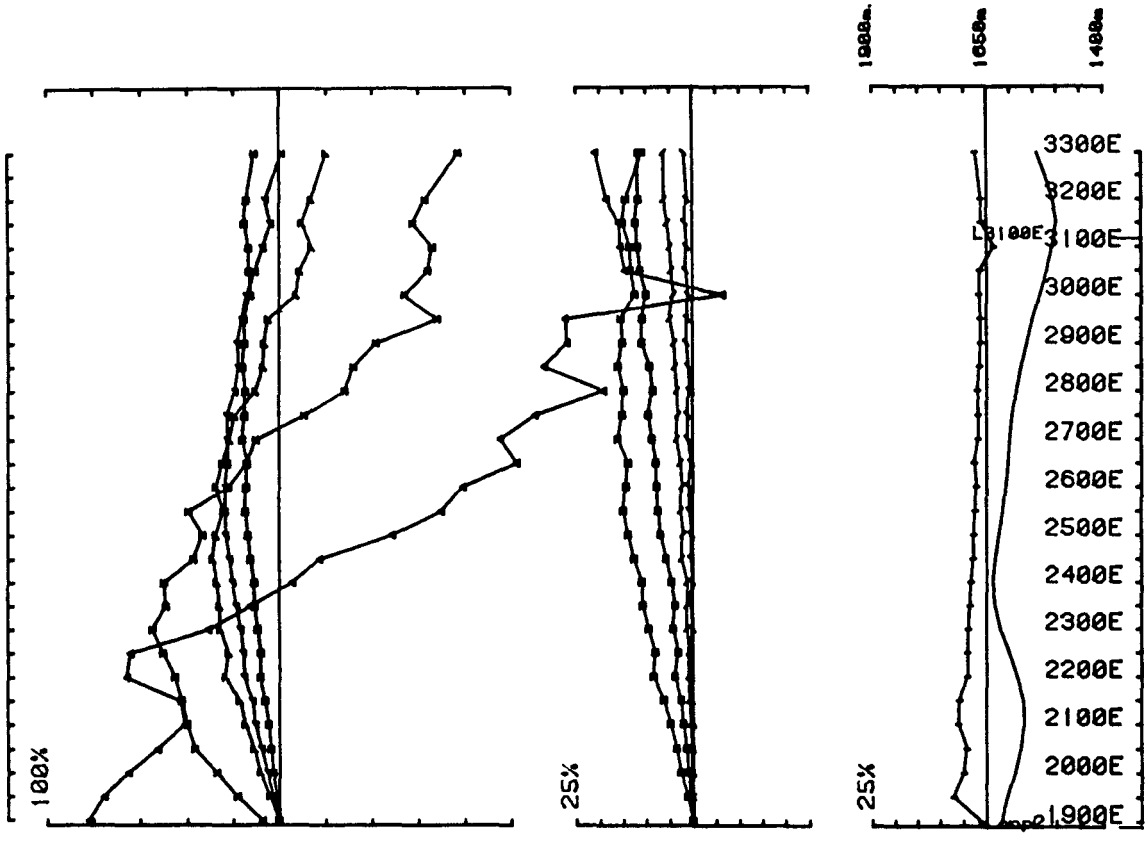
Loopno 2 Line 1000N component Hz secondary Ch I normalized Ch I reduced

DS 7a



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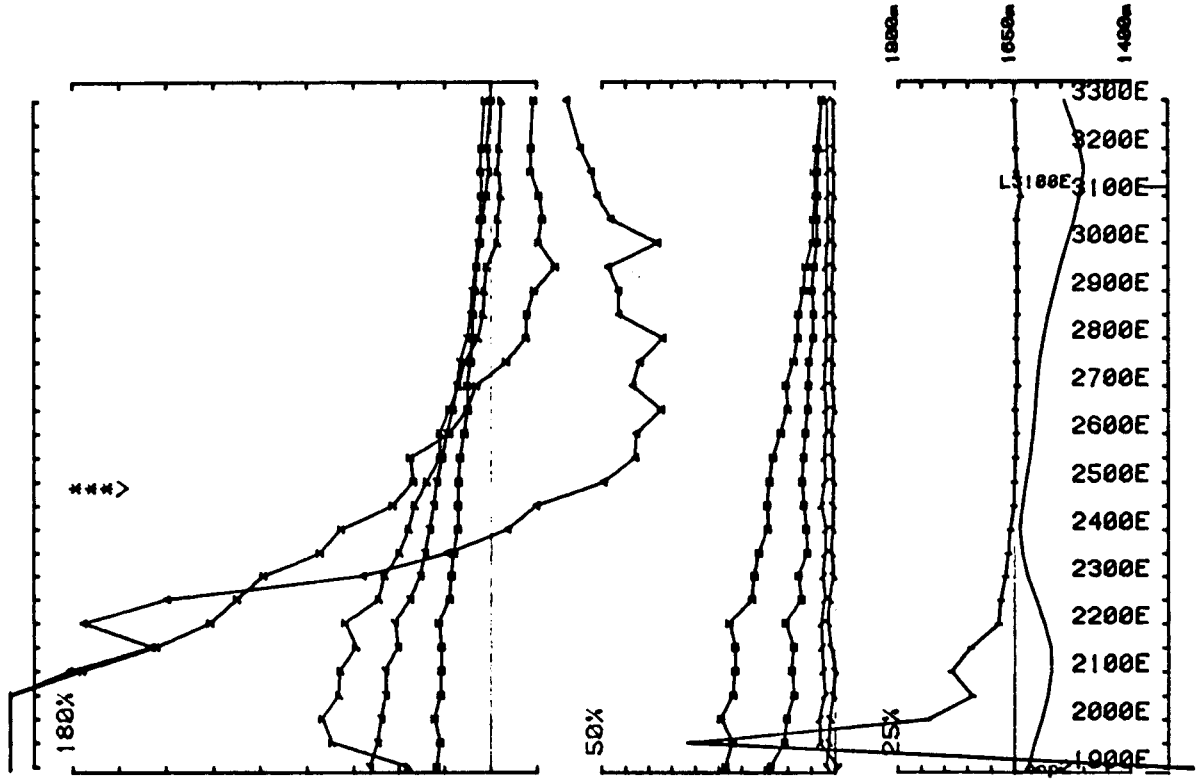

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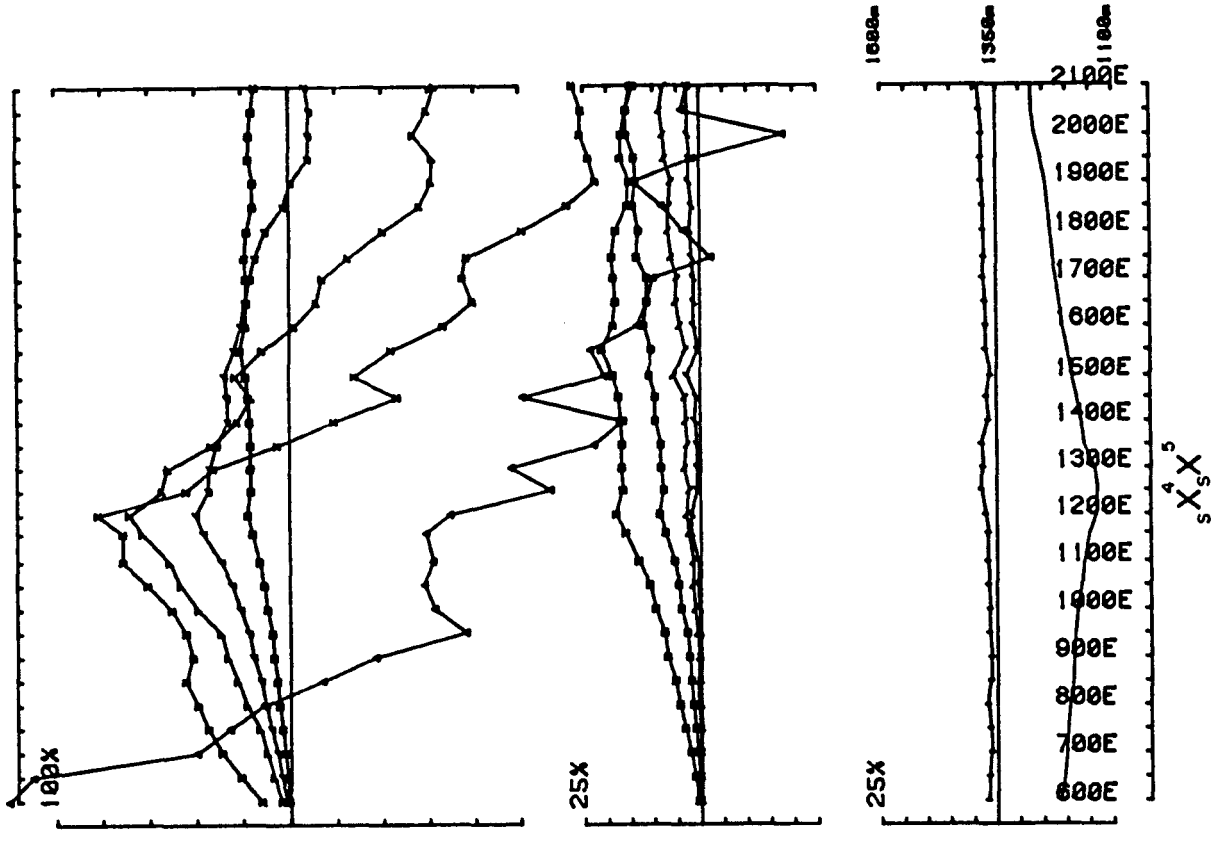
DS 8a



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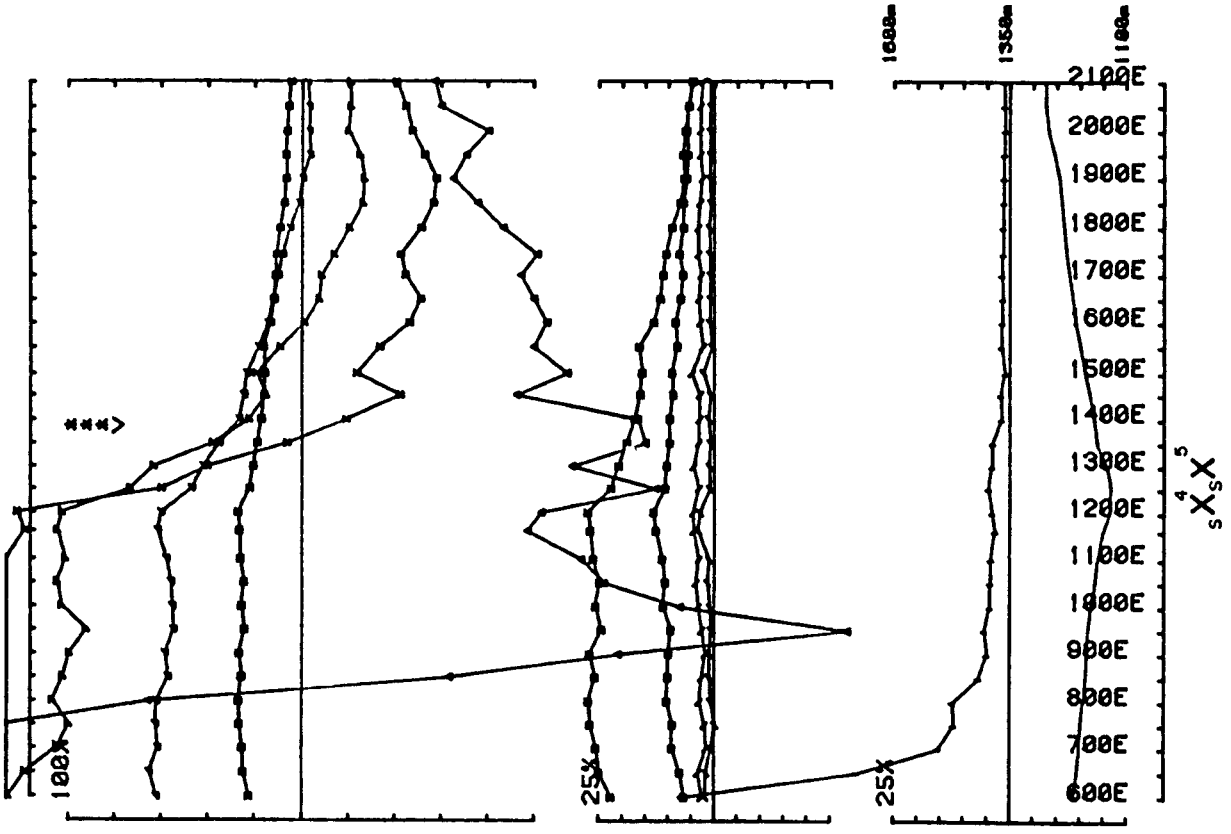

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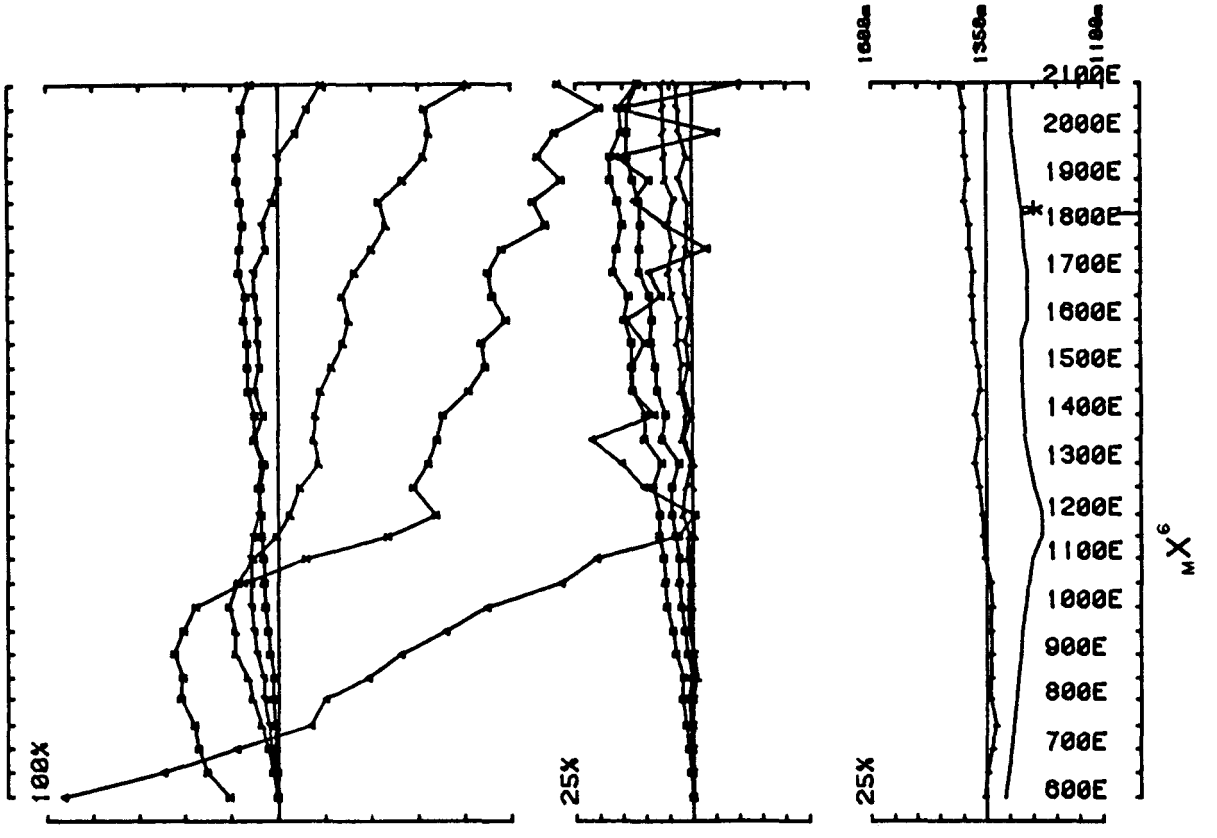
DS 9a



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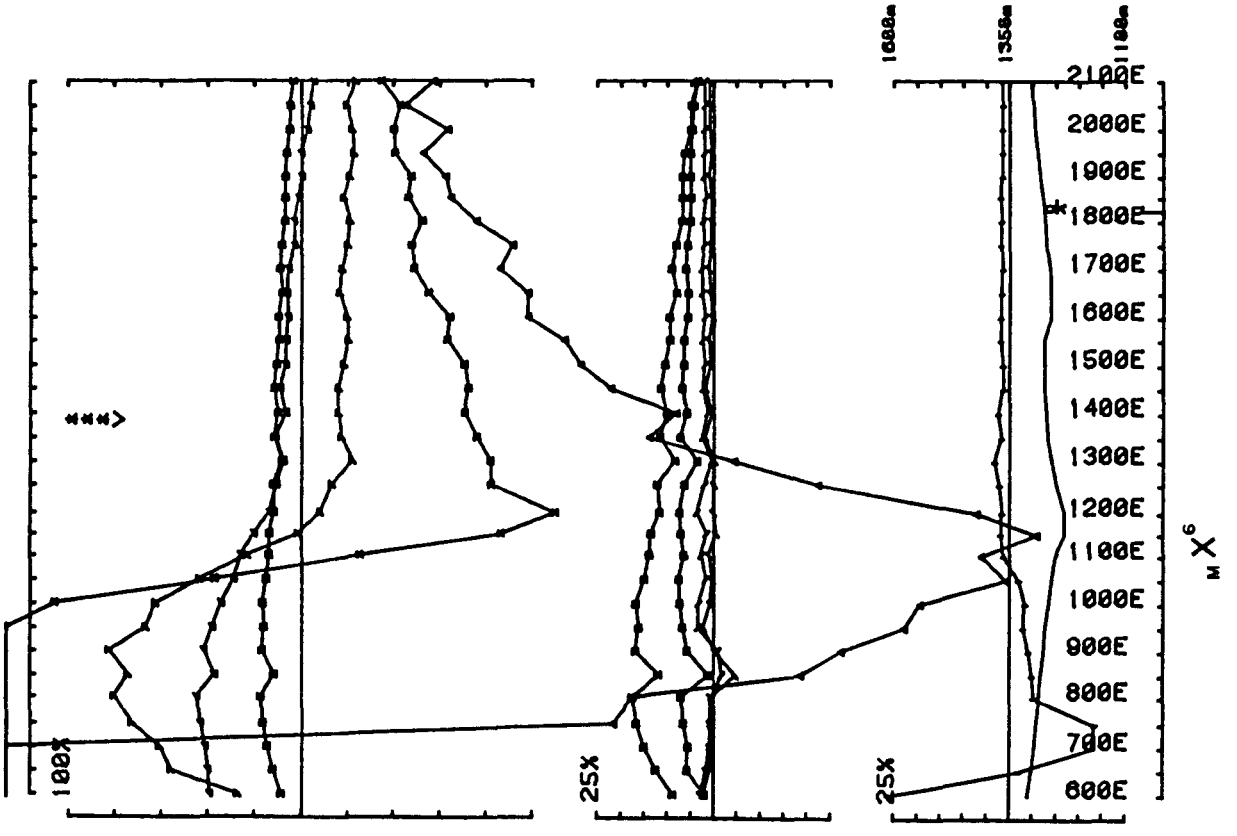

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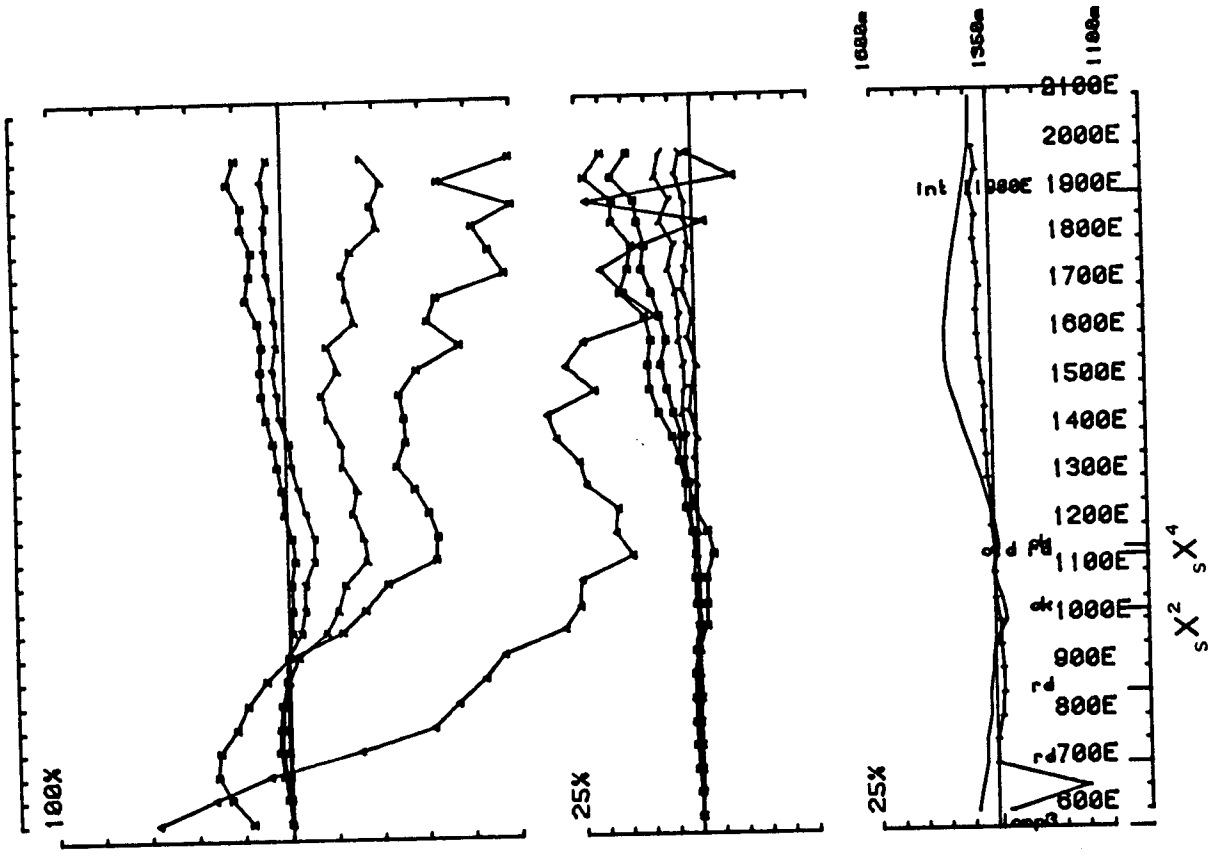

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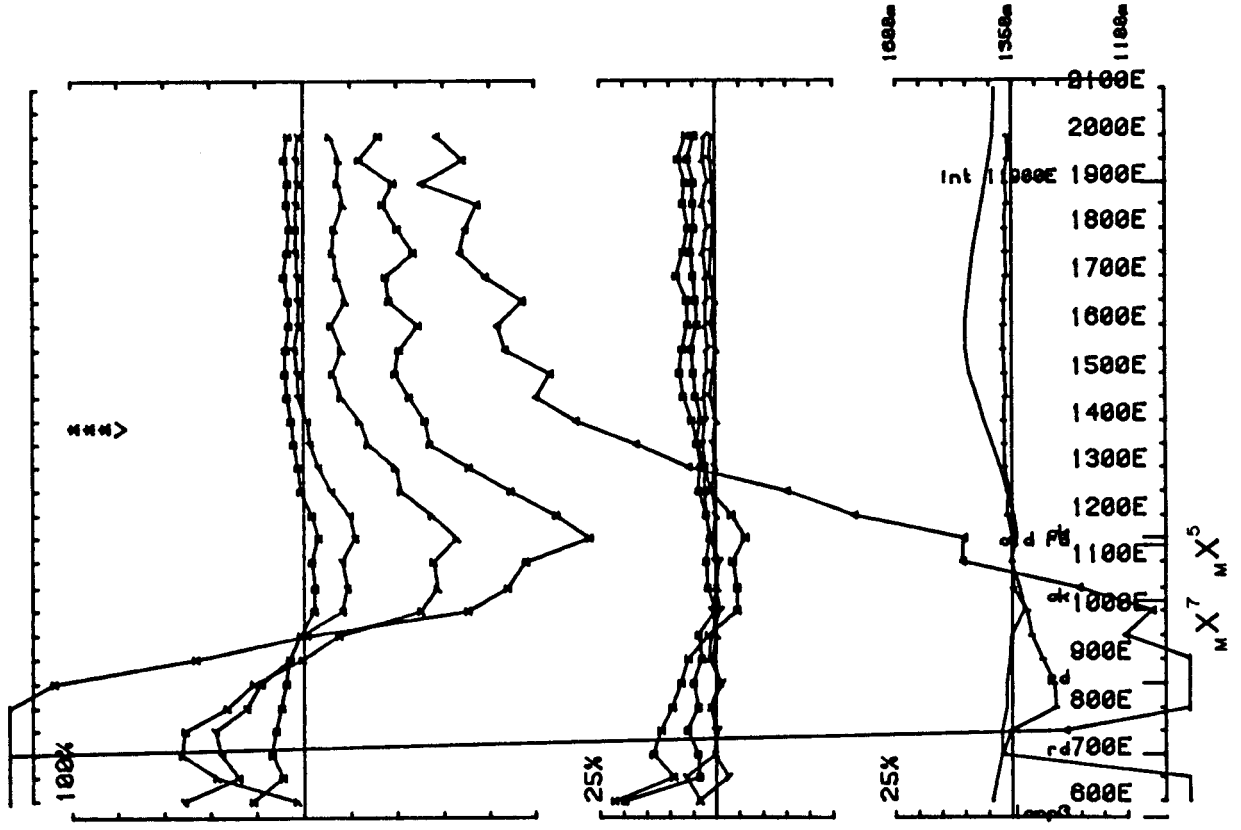

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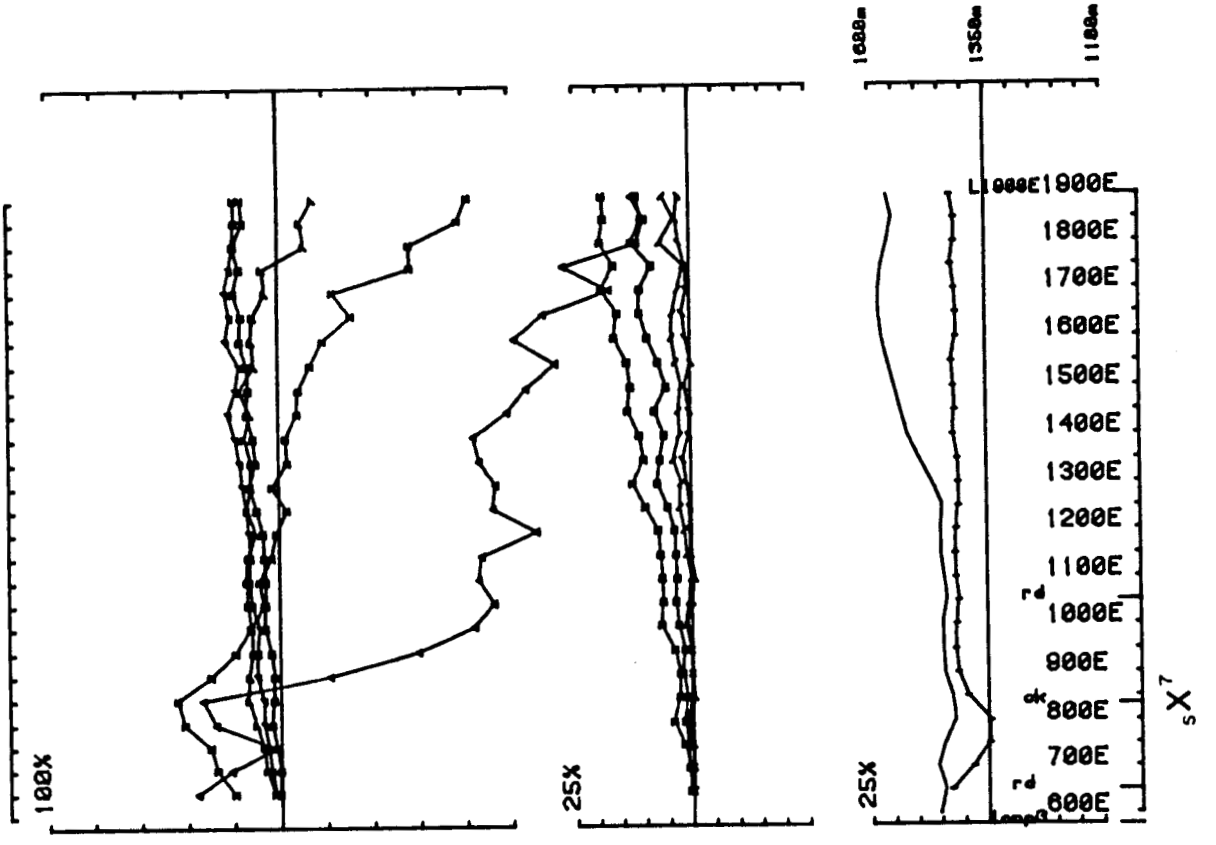
DS 11a



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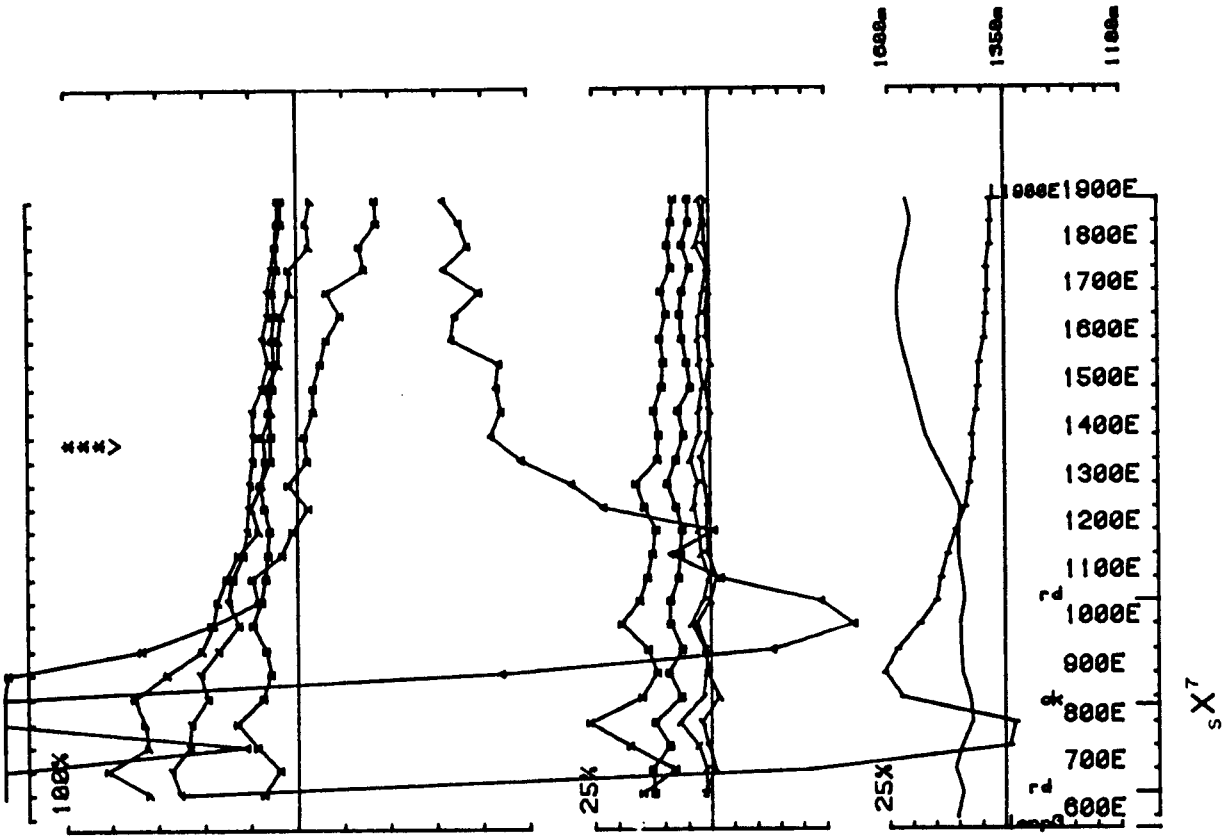

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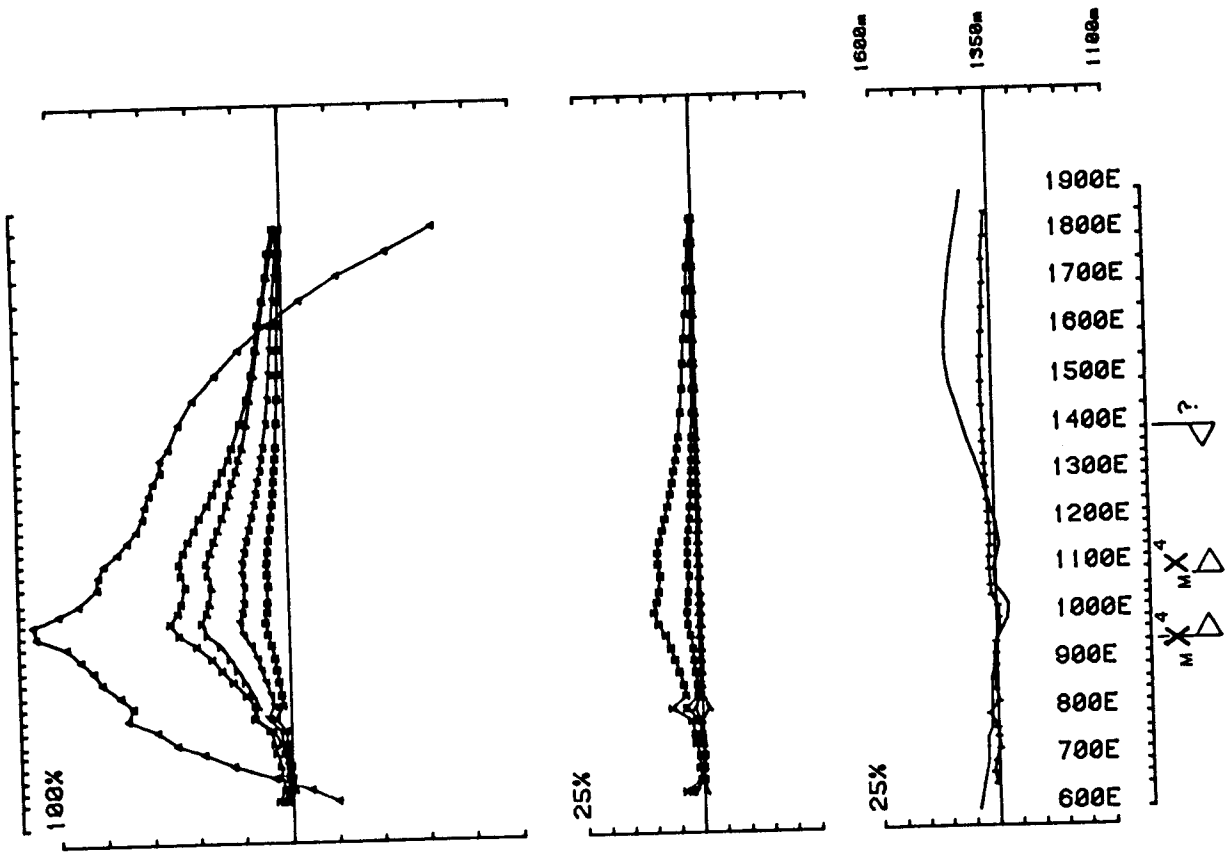
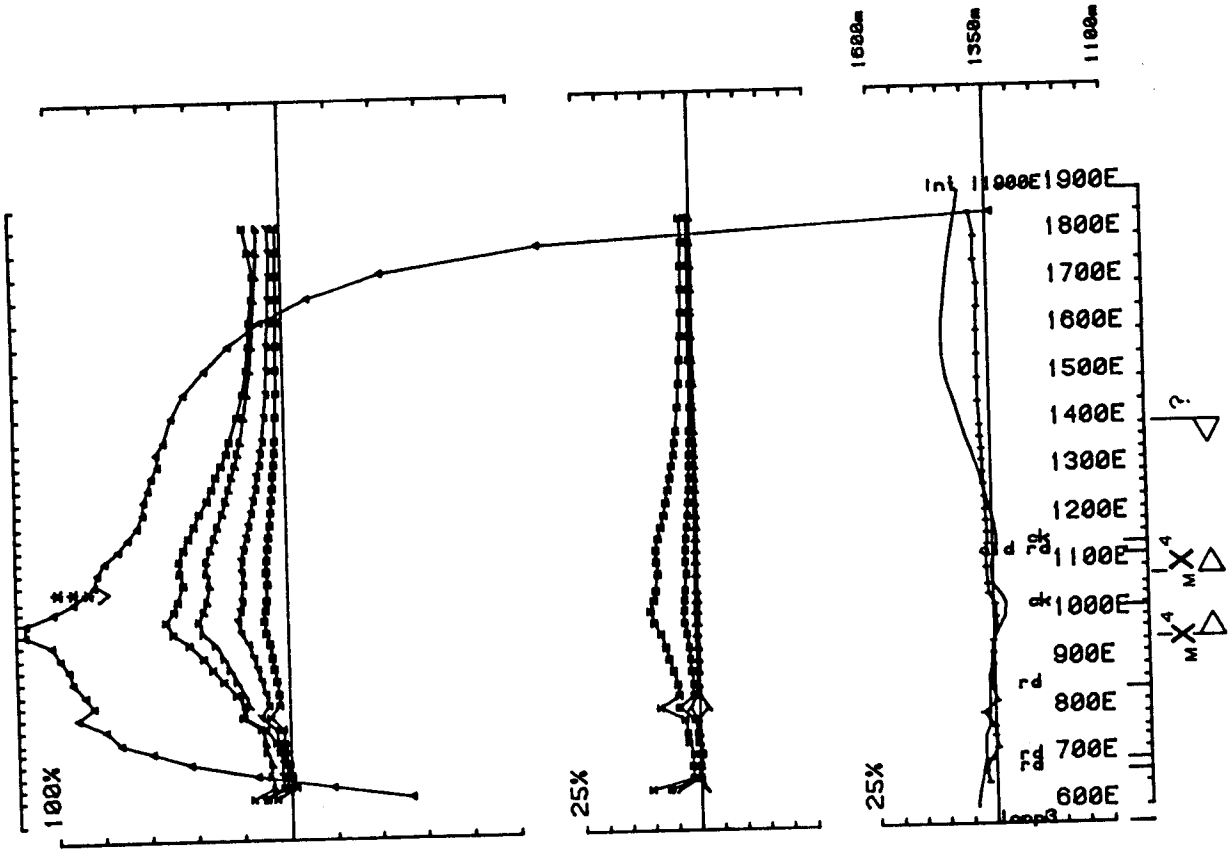


Area SHA 1986 Cominco operator SJV & JV freq(hz) 30.974
Loopne 4 Line 1000N component Hz secondary primary field normalized Ch 1 reduced

DS 13



Area SHA 1986 Cominco operator SJV & JV freq(hz) 30.974

Loopne 4 Line 1000N component Hz secondary primary field normalized Ch I reduced

DS 13a

APPENDIX III

APPENDIX III

IN THE MATTER OF THE B.C. MINERAL ACT

AND IN THE MATTER OF A GEOPHYSICAL PROGRAMME

CARRIED OUT ON SHA 19 to 23 CLAIMS

LOCATED 15 KM SOUTHEAST OF CRESTON, B.C.

IN THE FORT STEELE MINING DIVISION OF THE

PROVINCE OF BRITISH COLUMBIA, MORE PARTICULARLY

N.T.S.: 82F/1

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 SHA mineral claims;

3) THAT the said expenditures were incurred for the purpose of mineral exploration of the above-noted claims between the 4th day of September and the 22nd day of September, 1986.

Signed: 

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

DECEMBER 1986

EXHIBIT "A"

STATEMENT OF GEOPHYSICAL EXPENDITURES - 1986

ON THE SHA 19 to 23 CLAIMS

(1) SALARIES

a)	S.J. Visser, geophysicist 11 days @ $240/day	2,640.00	
b)	J. Vyselaar, geophysicist 13 days @ $240/day	3,120.00	
c)	M.J. Davies, technician 14 days @ $115/day	1,610.00	
d)	B. Murphy, assistant 13 days @ $70/day	910.00	$ 8,280.00

(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

	8 days @ $250/day	2,000.00

(3) EQUIPMENT RENTAL

UTEM	13 operating days @ $150/day	1,950.00

(4) EXPENSE ACCOUNTS

S.J. Visser (incl. B. Murphy)	805.29	
J. Vyselaar (est.)	368.00	
M.J. Davies (est.)	348.00	1,521.29

Carried Forward	13,751.29

Carried Forward	$ 13,751.29

(6) MISCELLANEOUS

Accommodation - 13 days @ $46.60/day	605.80	
Truck Rental - 13 days @ $89.88/day	1,168.44	
Wire Usage	100.00	
Prorated Demobilization 13 x $29.70	386.10	2,260.34
T O T A L		$ 16,011.63

Physical Work
Linecutting 16.18 km
@ 400/km 6472.00

@ 22483.63

I certify this to be a true Statement of Expenditures for the geophysical survey on the Sha 19 to 23 claims in 1986.

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

December 1986

APPENDIX IV

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.

December 1986

SCALE ÉCHELLE

LEGEND

LINE CUT - JULY 2 TO AUGUST 1/86

SHA 15
20 units

SHA 16
20 units

SHA 17
20 units

SHA 18
20 units

SHA 19
20 units

SHA 20
20 units

SHA 21
20 units

SHA 22
10 units

SHA 23
10 units

82F/8

82G/5

82F/1

82G/4

Cranbrook

Grassy Mtn

Mount Joseph

Mount Connel

McConnel

Ryan

Yahk Mountain

YAHK RANGE

Dickson Canyon

Upper

BRITISH COLUMBIA

IDAHO

INDEX MAP

0 10 20km

SCALE 1:500,000

Drawn by: D.L. Pighin		Traced by:	
Revised by	Date	Revised by	Date

SHA CLAIMS
1986 EXPLORATION

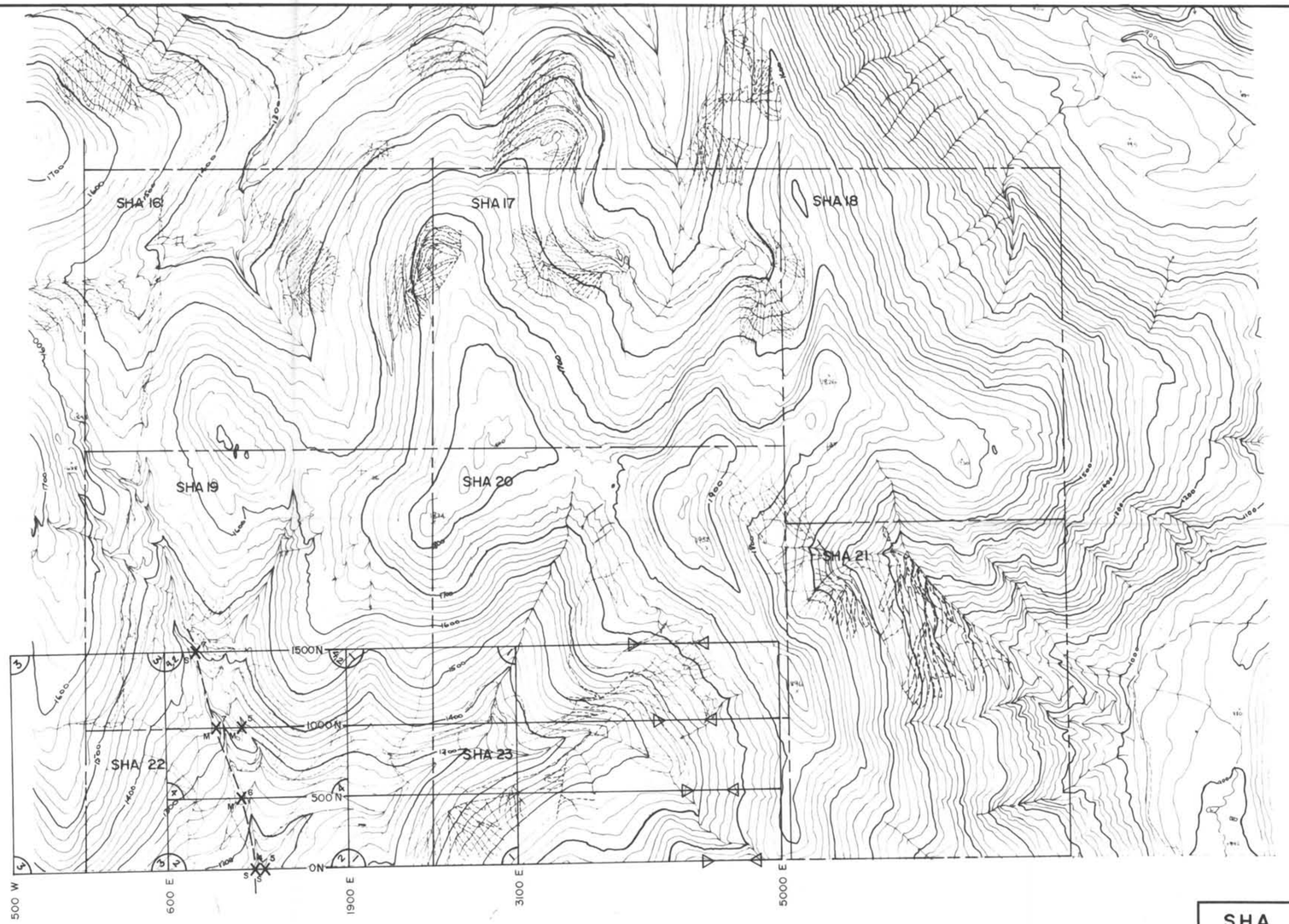
Scale: As shown

Date: August 1986

Plate:

2100

NCI - 112A - CL



OUTLINE OF A UTEM TRANSMITTER LOOP AND LOOP NUMBER.

$_{M}X^{6}$ AXIS OF A CROSSOVER ANOMALY.
THE NUMBER INDICATES THE LATEST ANOMALOUS CHANNEL.
DEPTH INDICATED BY: S - shallow (<100 m.)
M - moderate (100 - 200 m.)
D - deep (>200 m.)

AREA WHERE CONDUCTIVITY IS HIGHER THAN AVERAGE BACKGROUND.

GEOLOGICAL BRANCH
ASSESSMENT REPORT

15,428

0 500 1000 1500 2000 Metres

SHA PROPERTY

FORT STEELE M.D.; B.C.

N.T.S. 82-F/1

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

UTEM GRID and COMPILATION MAP

Scale: 1:20,000 | Date: DECEMBER 1986 | Plate: 311-86-2

Form 210 - 0680