84-#902 - 12931

COMINCO LTD.

EXPLORATION WESTERN DISTRICT

NTS: 82F/16W

GEOPHYSICAL REPORT

ON

UTEM SURVEY ON THE

VULCAN 1 TO 3 CLAIMS

FORT STEELE MINING DIVISION, B.C.

Latitude : 49°47'N

Longitude : 116°20'W

Work Performed by : Syd J. Visser and Jovan Silic
between August 14th and 25th, 1984

Claim Owner & Operator : COMINCO LTD.

OCTOBER 1984 S. J. VISSER

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GEOPHYSICAL REPORT ON UTEM SURVEY ON THE VULCAN 1 TO 3 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.

Name	# of Units	Record #	Assessment Work Due
Vulcan 1	15	69	September 27, 1986
2	10	70	September 27, 1986
3	15	71	September 27, 1986

INTRODUCTION

The Vulcan 1 to 3 claims are located approx. 8 km northeast of the junction of Dewar and White Creeks (see Plate 269-84-1). Access is approx. 50 km west, by logging road, from Kimberley along the St. Mary's River, then 8 km along the east side of Dewar Creek and 2.5 km east along a cat road.

Over the past 25 years a variety of geological, geochemical, geophysical and diamond drilling has been done in the general area with no significant discoveries. The purpose of the UTEM survey was to try and locate conductors at greater depth than obtainable by previously used geophysical methods.

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 in this report covers an area of approx. 3 km by 2.5 km. The 8 lines surveyed vary in length from 1.2 to 1.8 km with regular station spacing of 50 m. The loop and lines were placed where the rough topography would permit (Plate 269-84-2).

A total of 12 km of lines were surveyed in the period from August 19th to 25th, 1984, for a total of 240 stations. The vertical component (Hz) was measured at every station. Nine channels of information were acquired and plotted at each station (D.S. 1 to 8).

DATA PRESENTATION

The results of the survey are presented on one location map, one compilation map and 8 data sections.

The maps are listed as follows:-

Plate 269-84-1 (in envelope)	Location Map Scale 1:50,000
Plate 269-84-2 (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:

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

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 8 diagrams (D.S. 1 to 8) with a computation of all relative points on Plate 269-84-2.

A number of crossover type anomalies were seen in the data. The low channel (Channel 2) crossover type anomalies as seen on Lines 5N to 8N (D.S. 1 to 4) indicates a weak extensive (larger than the loop dimensions) conductor. The depth to the top of the conductor varies from approx. 100 m on Lines 5N to 7N and approx. 200 m on Line 8N.

A number of high channel (Channels 6-7) crossover type anomalies are seen on the grid and are probably due to change in the conductivity structure of the local geology.

CONCLUSIONS

A weak extensive conductor is seen to extend from Lines 5N to 8N. The remainder of the grid shows some very weak anomalies indicating a change of geology.

Report by:

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

Endorsed by:

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

Approved for
Release:

G. Harden
Manager, Exploration
Western District
Cominco Ltd.

Distribution:

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

REFERENCES

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

APPENDIX I

LEGEND

UTEM DATA SECTIONS

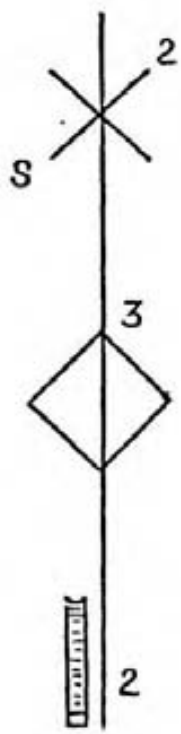
ORDINATE: Amplitude scale is given in %

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

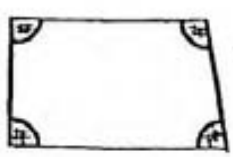


Axis of a crossover anomaly. The number indicates the latest anomalous channel.

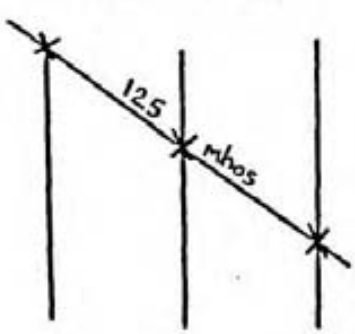
Depth indicated by: S - Shallow (< 50m)
M - Moderate (50-100m)
D - Deep (> 100m)

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.



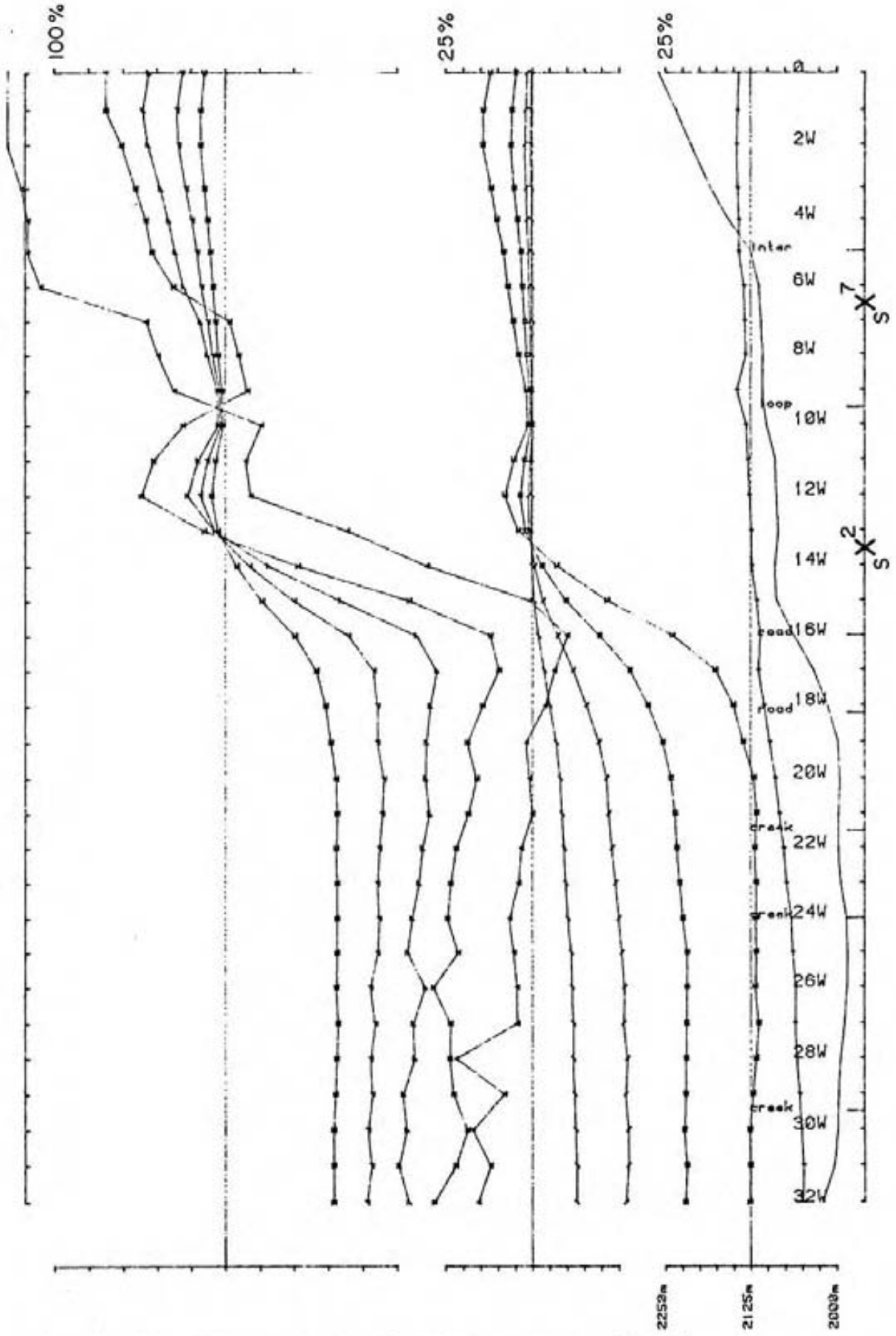
Conductor axis located by crossover anomalies with a conductance determination. The conductance is the interpreted conductivity x thickness of the conductor in mhos (same as Siemens).

Only the principal crossovers are indicated.

A P P E N D I X II

DATA SECTIONS

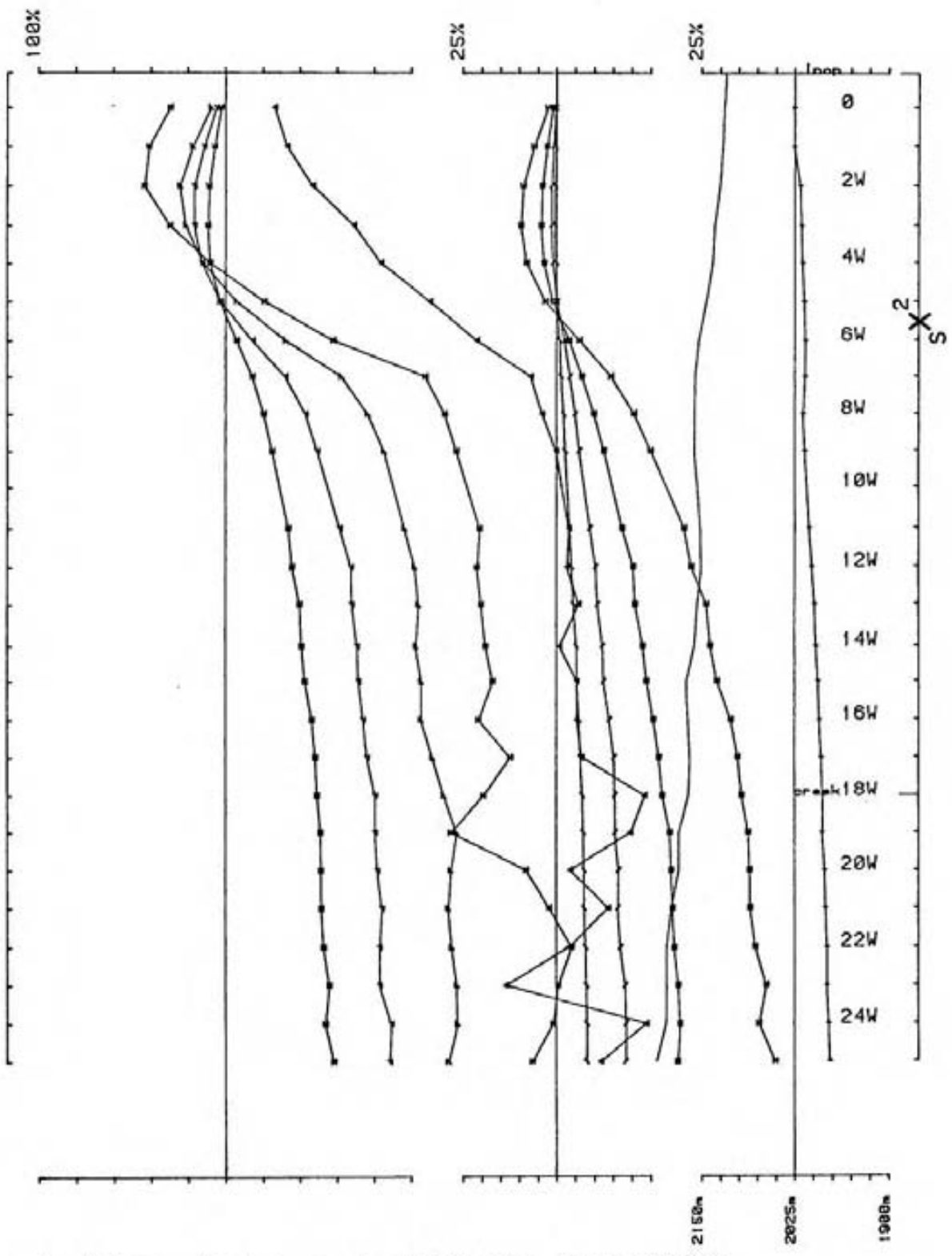
D.S. 1 - 8



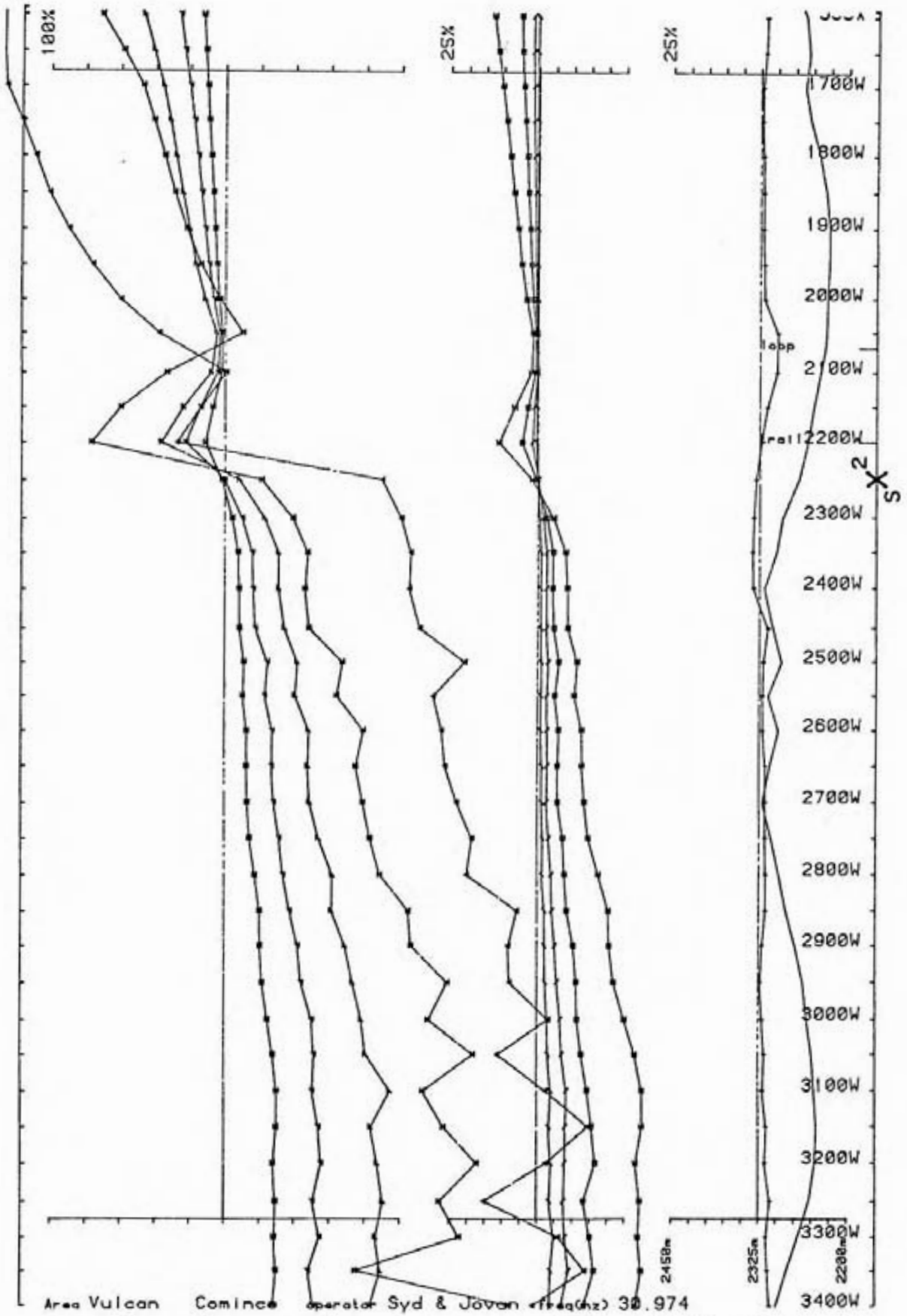
Area Vulcan Cominco operator Syd & Jovan freq(hz) 30.974

Loopno 10 Line 5N component Hz secondary primary field normalized Ch Interduced

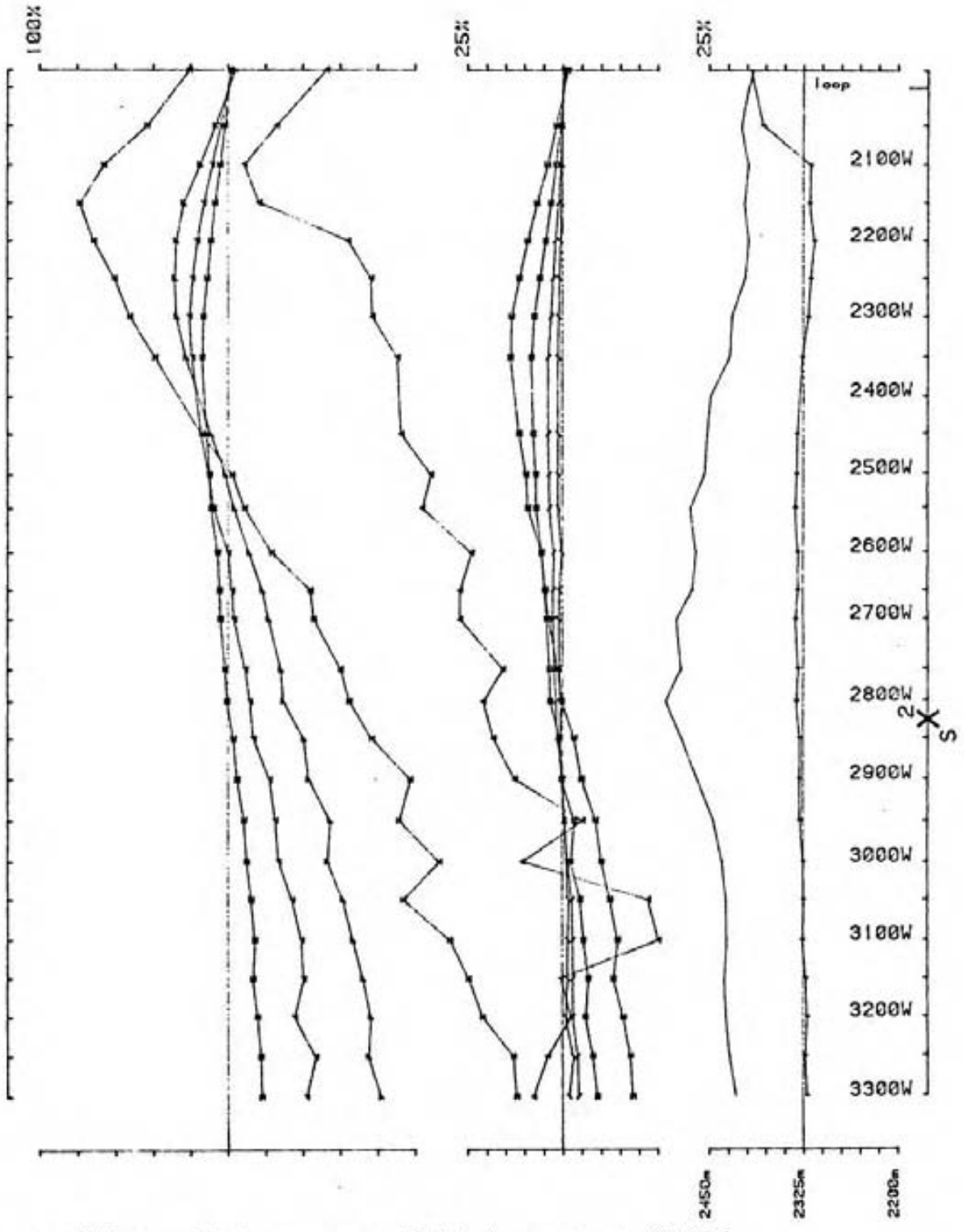
DS 1


100%
25%
25%
0
2W
4W
6W
8W
10W
12W
14W
16W
18W
20W
22W
24W
2158m
2025m
1988m
Area Vulcan Cominco operator Syd & Jovan freq(hz) 30.974
Loopno 10 Line 6N component Hz secondary Ch I normalized Ch I reduced

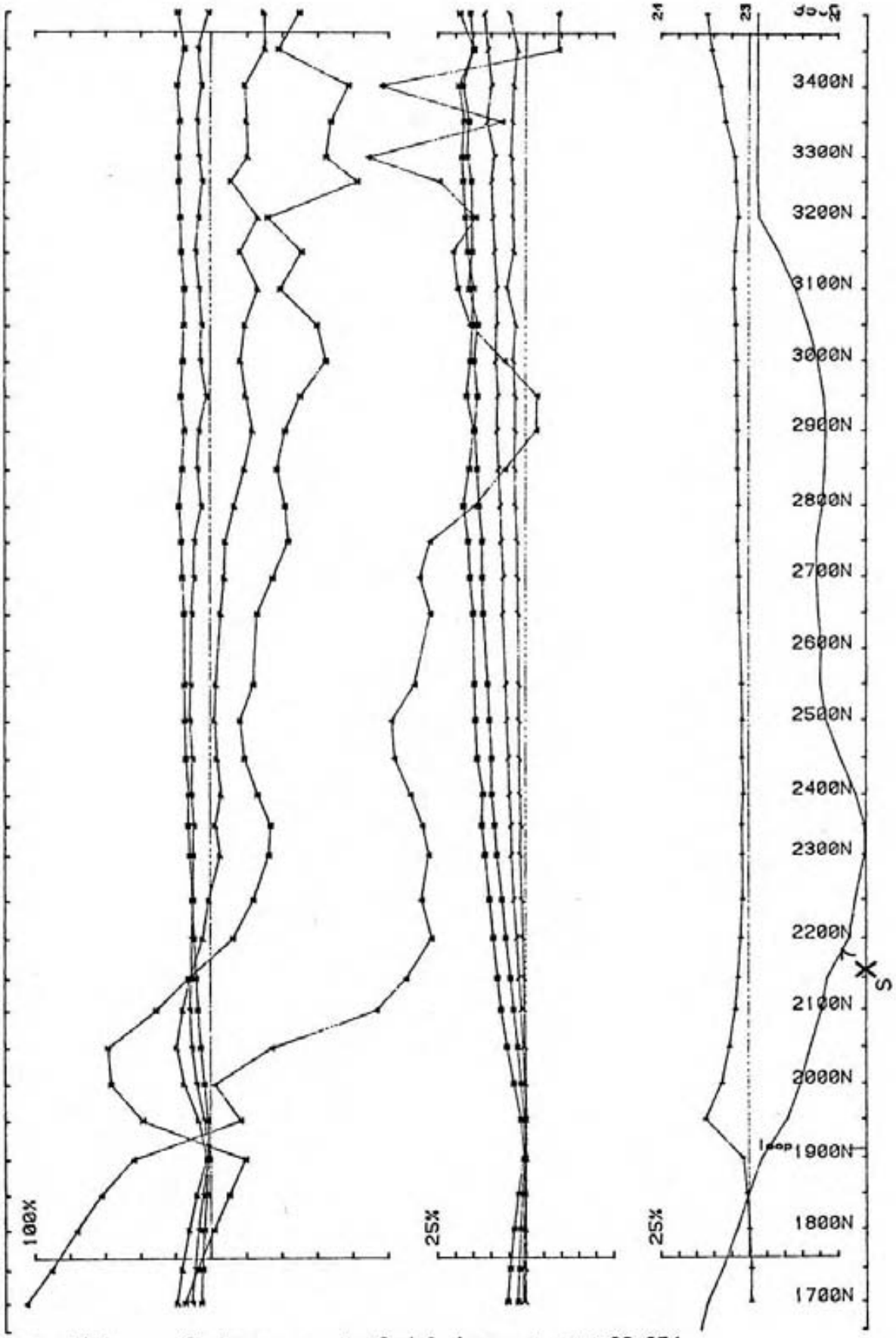
DS 2


100%
25%
25%
1700W
1800W
1900W
2000W
2100W
2200W
2300W
2400W
2500W
2600W
2700W
2800W
2900W
3000W
3100W
3200W
3300W
3400W
Loop
Rail
S
X
2
2458m
2325m
2208m
Area Vulcan Cominco operator Syd & Jovan Freq(Hz) 30.974
Loopno 10 Line 7N component Hz secondary primary field normalized Ch 1 reduced
Inter

DS 3


100%
25%
25%
loop
2100W
2200W
2300W
2400W
2500W
2600W
2700W
2800W
2900W
3000W
3100W
3200W
3300W
2450m
2325m
2200m
Area Vulcan Cominco operator Syd & Jovan freq(hz) 30.974
Loopno 10 Line 8N component Hz secondary Ch 1 normalized Ch 1 reduced

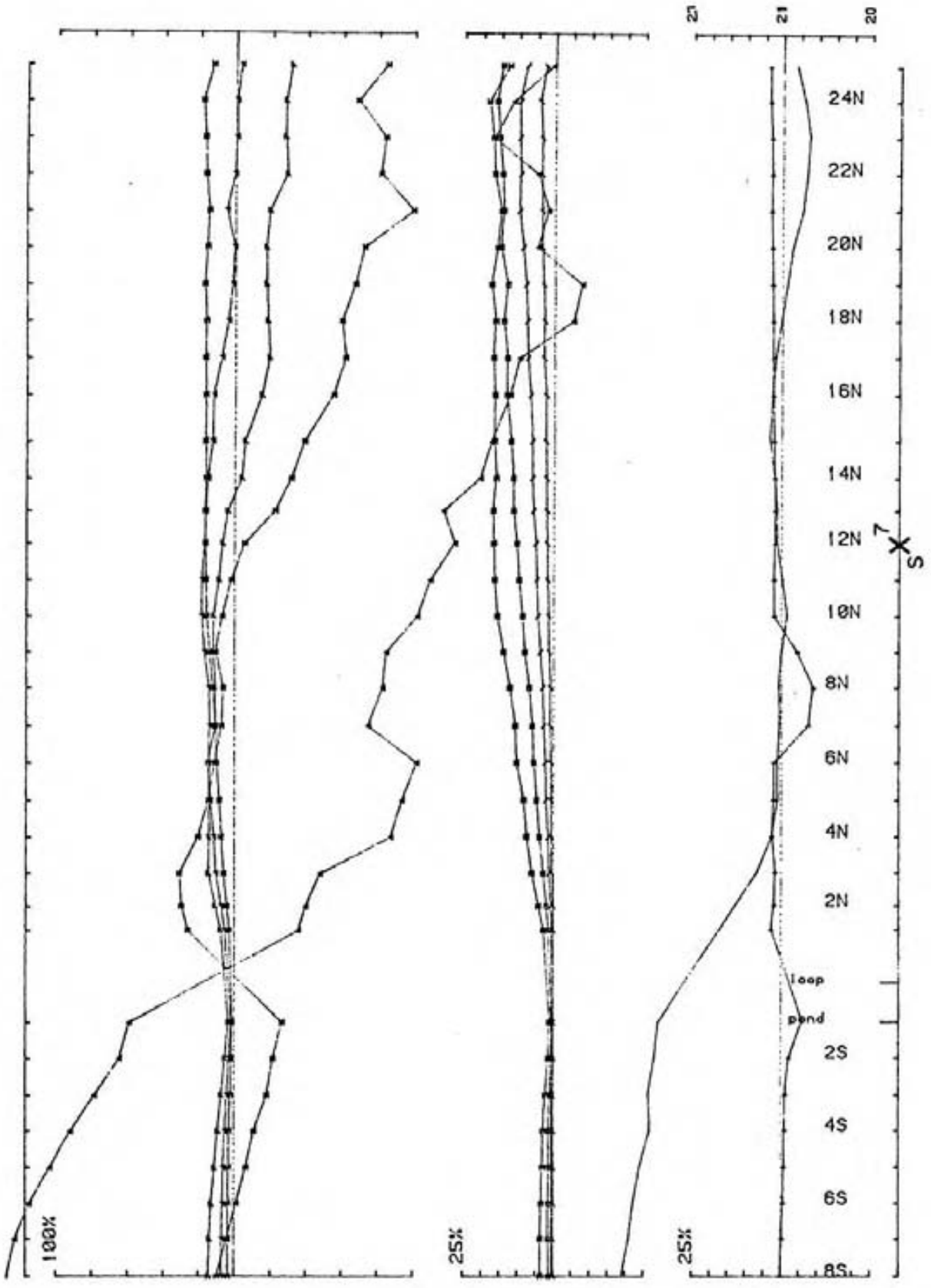
DS 4



Area Vulcan Cominco operator Syd & Jovan freq(hz) 30,974

Loops 11 Line 6E component Hz secondary primary field normalized Ch I reduced

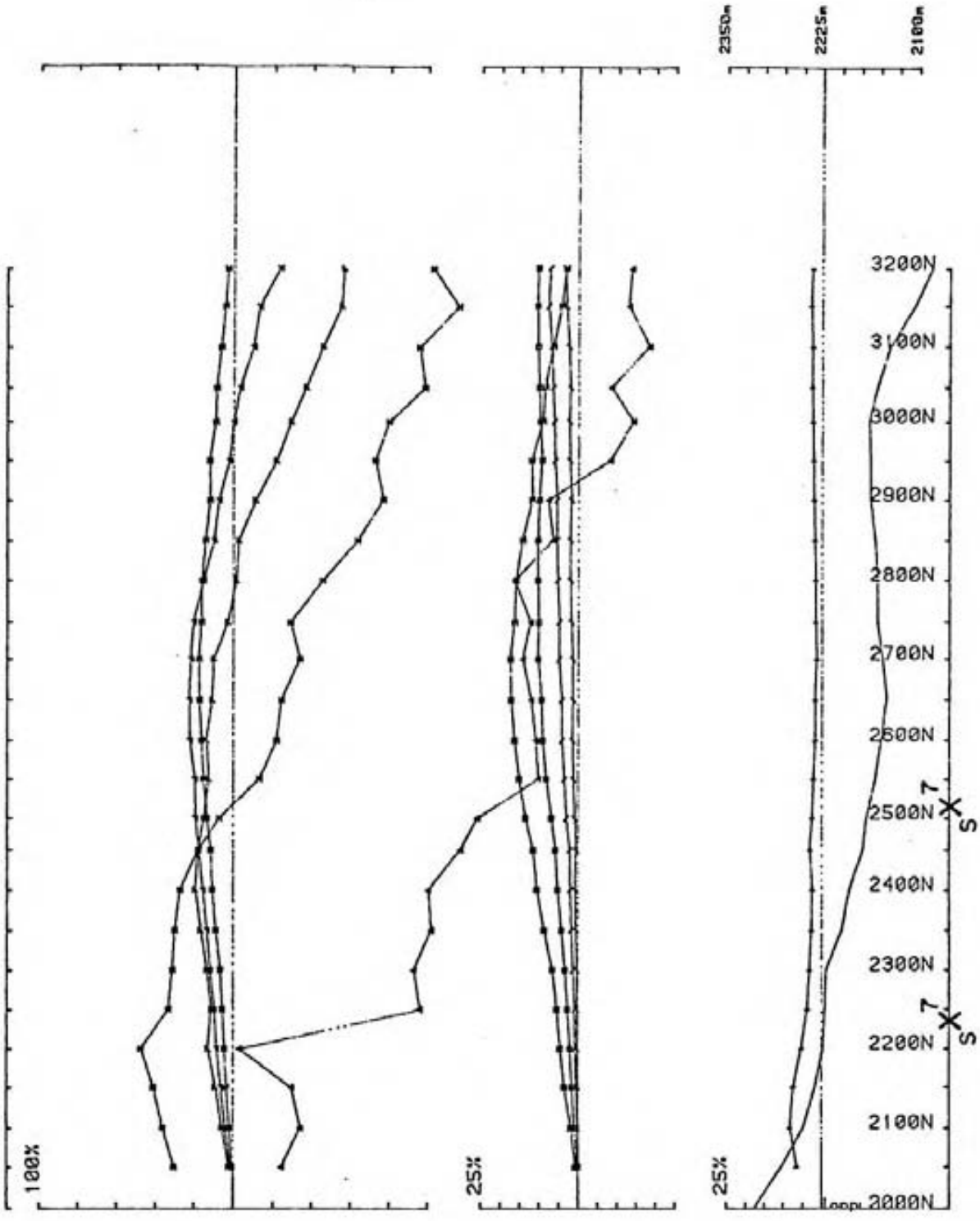
DS 5



Area Vulcan Cominco operator Syd & Jovan freq(hz) 30.974

Loopne 11 Line 7E component Hz secondary primary field normalized Ch 1 reduced

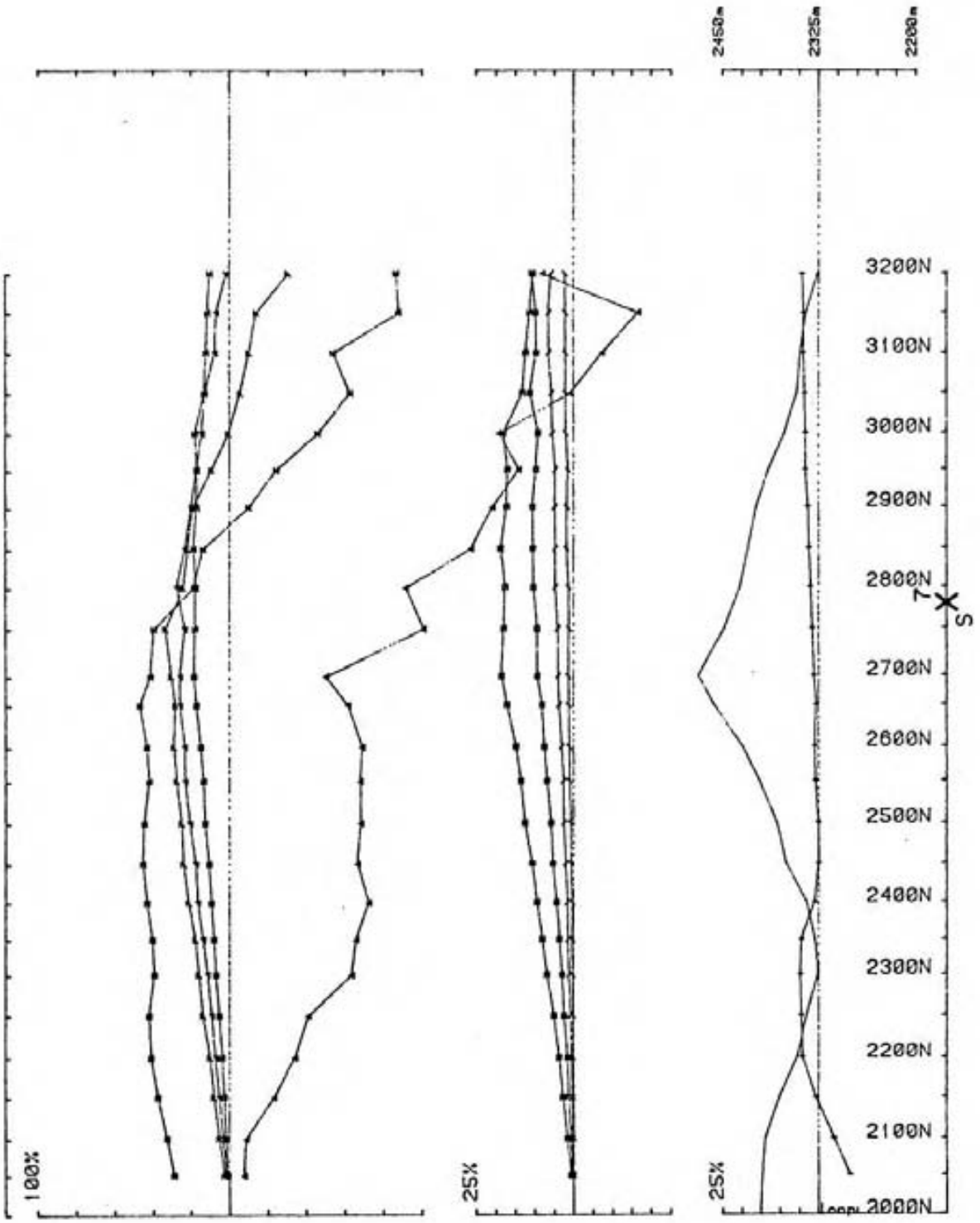
DS 6



Area Vulcan Cominco operator Syd & Jovan freq(hz) 30.974

Loopno 11 Line 8E component Hz secondary Ch 1 normalized Ch 1 reduced

DS 7



Area Vulcan Cominco operator Syd & Jovan freq(hz) 30.974
Loopno 11 Line 9E component Hz secondary Ch 1 normalized Ch 1 reduced

DS 8

APPENDIX III

APPENDIX III

IN THE MATTER OF THE B.C. MINERAL ACT

AND IN THE MATTER OF A GEOPHYSICAL PROGRAMME

CARRIED OUT ON THE VULCAN CLAIMS

LOCATED 58 KM WEST OF KIMBERLEY, B.C.

IN THE FORT STEELE MINING DIVISION OF THE

PROVINCE OF BRITISH COLUMBIA, MORE PARTICULARLY

N.T.S. 82F/16W

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 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 VULCAN mineral claims;

3. THAT the said expenditures were incurred between August 19th and August 25th, 1984, 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 - 1984

VULCAN CLAIMS

(1)	SALARIES	
	Preparation, Field Work, Mob/Demob, Interpretation, etc.	4,530.00
	Geophysicists - Syd J. Visser	
	J. Silic	
	Assistants - C. Pelto	
	M. Poole	
	B. Graham	
(2)	EQUIPMENT AND TRUCK RENTAL	1,130.00
(3)	EXPENSE ACCOUNTS (hotels, meals, etc)	1,070.00
	Total Cost	$ 6,730.00

I certify this to be a true statement of expenditures for the geophysical survey on the VULCAN 1, 2 and 3 claims in 1984.

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

APPENDIX IV

CERTIFICATION

I, SYD J. VISSER, of 8081 - 112th Street in the Municipality of Delta, 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, B.Sc.
Geophysicist
Cominco Ltd.

KOOTENAY

VULCAN 1

VULCAN 2

VULCAN 3

VULCAN 6

VULCAN 5

VULCAN 4

VULCAN 7

VULCAN 8

NTS 82 F/16 W

NTS 82 F/9

Copper

0 1 2 3 4
KILOMETRES

TO ACCOMPANY
A REPORT BY
S.J. VISSER

VULCAN PROPERTY

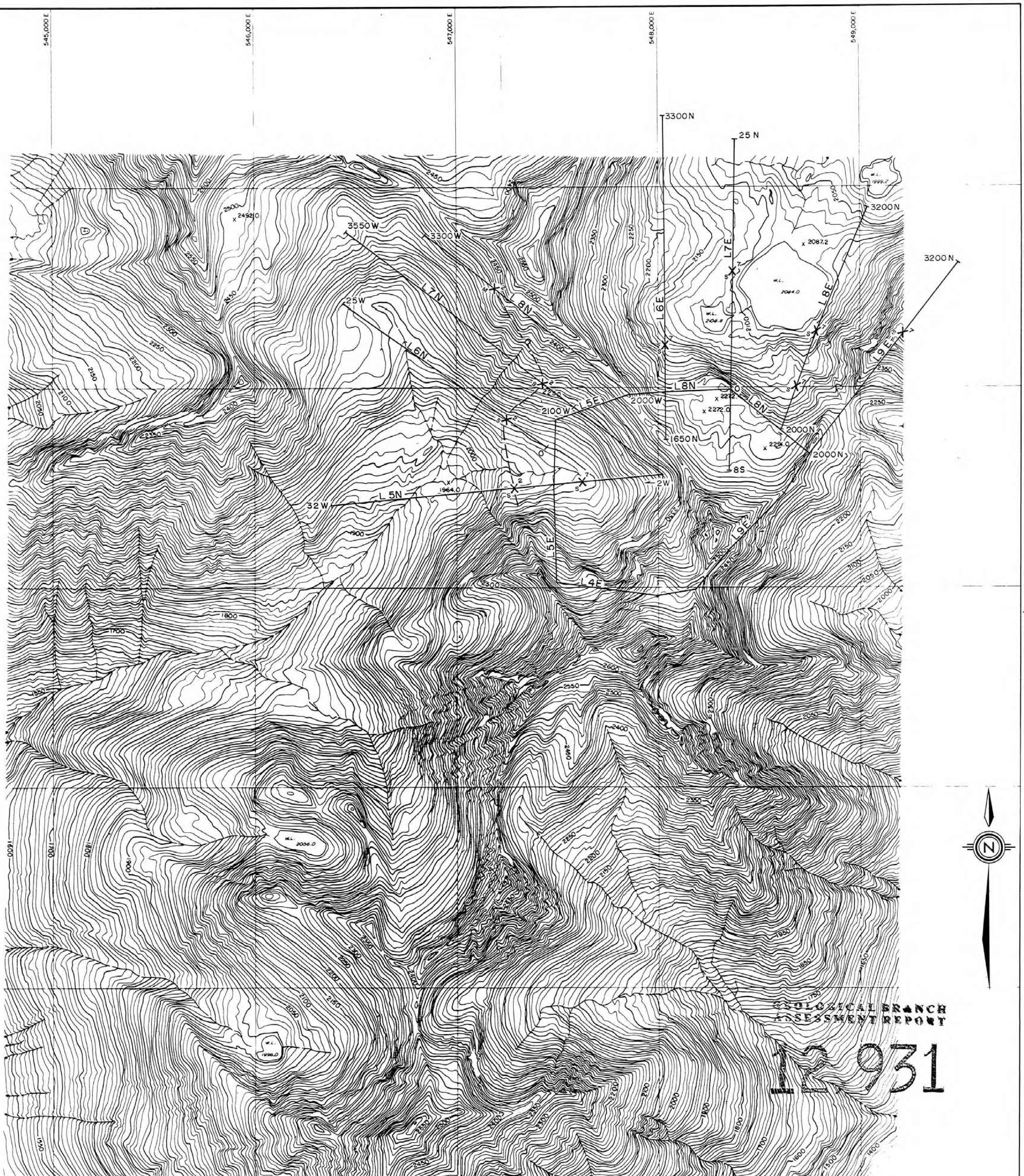
NTS
82F/16W

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

CLAIM and GRID
LOCATION MAP

FORT STEELE M.D.;B.C.

Scale 1 : 50,000 | Date OCTOBER 1984 | Plate 269-84-1



AXIS OF A CROSSOVER ANOMALY

LATEST ANOMALOUS CHANNEL

DEPTH OF ANOMALY INDICATED BY S(shallow), M(moderate), D(deep)

TO ACCOMPANY A REPORT BY S.J. VISSER

VULCAN PROPERTY

NTS 82F/16W

Drawn by:		Traced by:		UTEM GRID and COMPILATION MAP FORT STEELE M.D.; B.C.
Revised by	Date	Revised by	Date	

Scale: 1:10,000 | Date: OCTOBER 1984 | Plate: 269-84-2