GEOPHYSICAL REPORT

UTEM SURVEY

ON THE

AFTON 9 CLAIM

AT

KETCHUM CREEK

FOR

CANAMERA EXPLORATION LTD.

BY

SJ GEOPHYSICS LTD. AND LAMONTAGNE GEOPHYSICS LTD.

SKEENA, M.D., B.C. N.T.S. 104 B/9

November 1990

Report by
Robert C. Brown
Syd J. Visser

PART 2 OF 2

(TO ACCOMPANY PART 1 OF 2: GEOLOGICAL REPORT)

TABLE OF CONTENTS

INTRODUCTION

A UTEM 3 survey was carried out by SJ Geophysics personnel on the Afton 9 claim on behalf of Canamera Exploration during November of 1990. The Afton 9 claim is located directly west of and adjoining the Eskay creek deposit and is bounded by Ketchum Creek to the west and the Unik River to the east which is approximately 20 kilometers west of the Bell II helicopter base on the Stewart-Cassier Highway.

The purpose of the survey was to search for massive sulphide deposits at depth.

FIELD WORK

The SJ Geophysics crew consisted of Robert Brown (Geophysicist). The crew mobilized from Vancouver to Smithers on the 6th of November, but were delayed in Smithers by the late arrival of equipment, due to Canadian Air, until the afternoon of the 7 th. The 8 th of November was spent in Bob Quin waiting for the weather to clear. The mob to camp took place on the morning of the 9 th.

The field work was considerably hampered by the quantity of snow present. The laying of the loop was particularly slow. This was due to the necessity of a two man team to lay wire. Loop one was intact, once completed , for only one night before repair was required, and subsequently only lasted another day. Consequently, it was decided to bisect the loop one and thus creating two smaller loops, which in terms of the survey parameters was a more desirable option. The north half of loop one was designated loop two, while the south half was named loop three. Loop two also suffered from the snow conditions and was broken twice by the weight of the continually falling snow. The south loop was finally completed on the 19 th of November after a new piece of wire was laid to replace the wire put out with the helicopter through Ketchum Creek, which was apparently broken.

Approximately 6.2Km were surveyed in the six production days. On the 20 th of November the decision to shut down the camp was made, by Canamera supervisor, due to weather and revaluation of the geology.

THE UTEM DESIGN PHILOSOPHY

UTEM uses a large, fixed, horizontal transmitter loop as its source. The loop may range in size from 300m x 300m up to as large as 4km x 4km. In general, smaller loops are used over conductive terrain whereas larger loops may only be used over resistive terrain. Depending on the noise levels, measurements may be made out to a distance of 1.5 to 2 times the loop dimensions. Lines may be surveyed out from the edge of the loop (used to detect dipping conductors) but may also be read across the loop wire through the centre of the loop (used to detect horizontal conductors).

The vertical component of the magnetic field (Hz) of the loop is always measured. However, horizontal in-line (Hx) and cross- line (Hy) components may also be measured if more detailed information is required. A receiver coil mounted on a portable tripod is used to measure the magnetic field. The UTEM system is also capable of measuring the two horizontal components of the electric field (Ex, and Ey), but this is used only for very specific geological problems. A dipole sensor comprised of two electrodes is used to measure the electric field components.

The UTEM transmitter passes a low-frequency (4 Hz to 90 Hz) current of precise triangular waveform through the transmitter loop. The frequency may be set to any value within the operating range of the transmitter, but is usually set at 31 Hz so as to minimize powerline effects (60 Hz noise). Since the receiver coil responds to the time derivative of the magnetic field, the system really "sees" the step response of the ground. UTEM is the only time domain system which measures the step response of the ground. All other systems to date transmit a modified step current so that they "see" the (im)pulse response of the ground at the receiver.

The transmitted ("primary") field induces current flow in the ground below and around the transmitter loop (i.e. in the "half-space") which itself produces a measurable EM field called the secondary field. This current flow has an inherent "momentum" which resists the change in primary field direction. It takes a certain amount of time for the current to be redirected by the new primary field direction; this time is called the time (decay) constant. The time constant of a good conductor is greater than that of a poor conductor.

The large scale current which is induced in the half-space by the primary field produces the half-space response as seen in typical UTEM profiles. Other currents may be induced in locally more conductive zones (conductors). In general, these have greater time constants than the half-space response. Such responses are superimposed upon (and distorted by) the half-space response. Using a scale modeling tank, the UTEM response of many different conductive bodies has been measured (in free space). These responses take the form of one or several crossovers with a variety of amplitudes and shapes. They have been assembled into type curve suites which are available from Lamontagne Geophysics.

SURVEY DESIGN

The survey was designed to look for deep seated shallow (less than 60 deg.) easterly dipping conductors.

Part of the grid was surveyed inside the loop mainly for logistical reasons since it would have been almost impossible to cross Ketchum Creek with the loop at this time of the year. The station spacing was retained at 25M internal to aid in reporting the short wavelength near surface anomalies form the deeper long wavelength anomalies,

DATA PRESENTATION

The data is presented on 11 sections in Appendix II. The compilation of the data along with the loop locations were plotted on Plate G1.

The data are plotted in "channel 1 normalized" form whereby a different reduction formula is used for channel 1 and the rest of the channels.

The channel 1 data are reduced before plotting according to the formula:

$$R1_c = (Ch1_c - H^P_c) / (H^P) \times 100\%$$

The other channels or reduced using a slightly different formula:

$$Hz: \quad Rn_c = (Chn_c - Ch1_c) / (Ch1_c) \times 100\%$$

$$Hx: \quad Rn_c = (Chn_c - Ch1_c) / (H^P) \times 100\%$$

The data may be plotted in either *point normalized* or *continuously normalized* form. In point normalized form the normalizing factor in the denominator of the above expressions (Hp for Hx and Ch1c for Hz) is the observed channel 1 amplitude or computed primary field at a single chosen station on the survey line. Thus at every station the field is expressed as a percentage of the normalizing field at the point of normalization. This point is denoted by "***>" on the plot. In continuously normalized form the normalizing factor in the denominator is the local ch1 value or computed primary field. In this form the response is thus continuously amplified as a function of offset from the loop as the primary exciting field diminishes. Although this type of normalization considerably distorts the response shape, it permits anomalies to be easily identified at a wide range of distances from the loop. Interpretation of the shape of the anomaly is usually done on the point normalized profiles.

The data are plotted on three axes. On the bottom axis channel 1 (latest time) is plotted alone, normalized to the calculated primary field. The intermediate to late time channels (ch5 - ch2) are plotted on the center axis. The early time channels (Ch10 - ch6) along with a repeat of channel 5 for comparison are plotted at the top on a reduced scale. The symbols used to identify the channels on the plots as well as the mean delay time for each channel is shown in the table below. The Y axis on each plot represents the difference from 100% of channel 1 (or calculated primary field in the case of channel 1).

UTEM SYSTEM MEAN DELAY TIME

Channel Number	Delay Time (msec)	Symbol
1	12.8	|
2	6.4	〉
3	3.2	□
4	1.6	⋝
5	0.8	⊴
6	0.4	7
7	0.2	×
8	0.1	△
9	0.05	◇
10	0.025	

Base Frequency = 31 Hz

DISCUSSION

No well defined UTEM anomalies were located in the survey area. A number of very weak conductors, likely shear or fault zones and a number of contact zones due to changes in conductivity were noted in the survey area as shown on Plate G1. Although the background conductivity is high (low resistivity) there in no indication of highly conductive graphite units in the survey area.

Syd J. Visser B.Sc., FGAC
Geophysicist

SJ Geophysics Ltd.

APPENDIX I

STATEMENT OF QUALIFICATIONS

I Syd J. Visser, of 11762 94th Avenue, Delta, British Columbia, hereby certify that,

1) I an a graduate from the University of British Columbia, 1981, where I obtained a B.Sc. (Hon.).

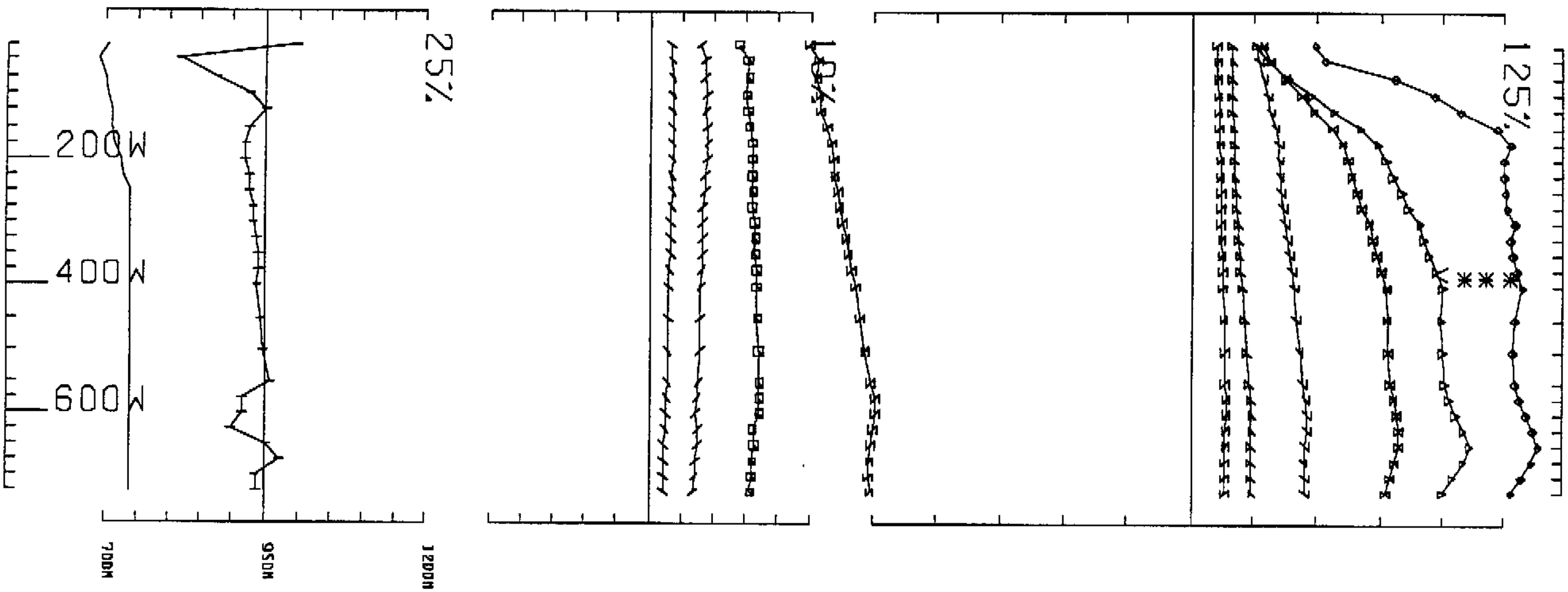
2) I am a graduate from Haileybury School of Mines, 1971.

3) I have been engaged in mining exploration since 1968.

4) I an a Fellow of the Geological Association of Canada.

Syd J. Visser, B.Sc., FGAC
Geophysicist

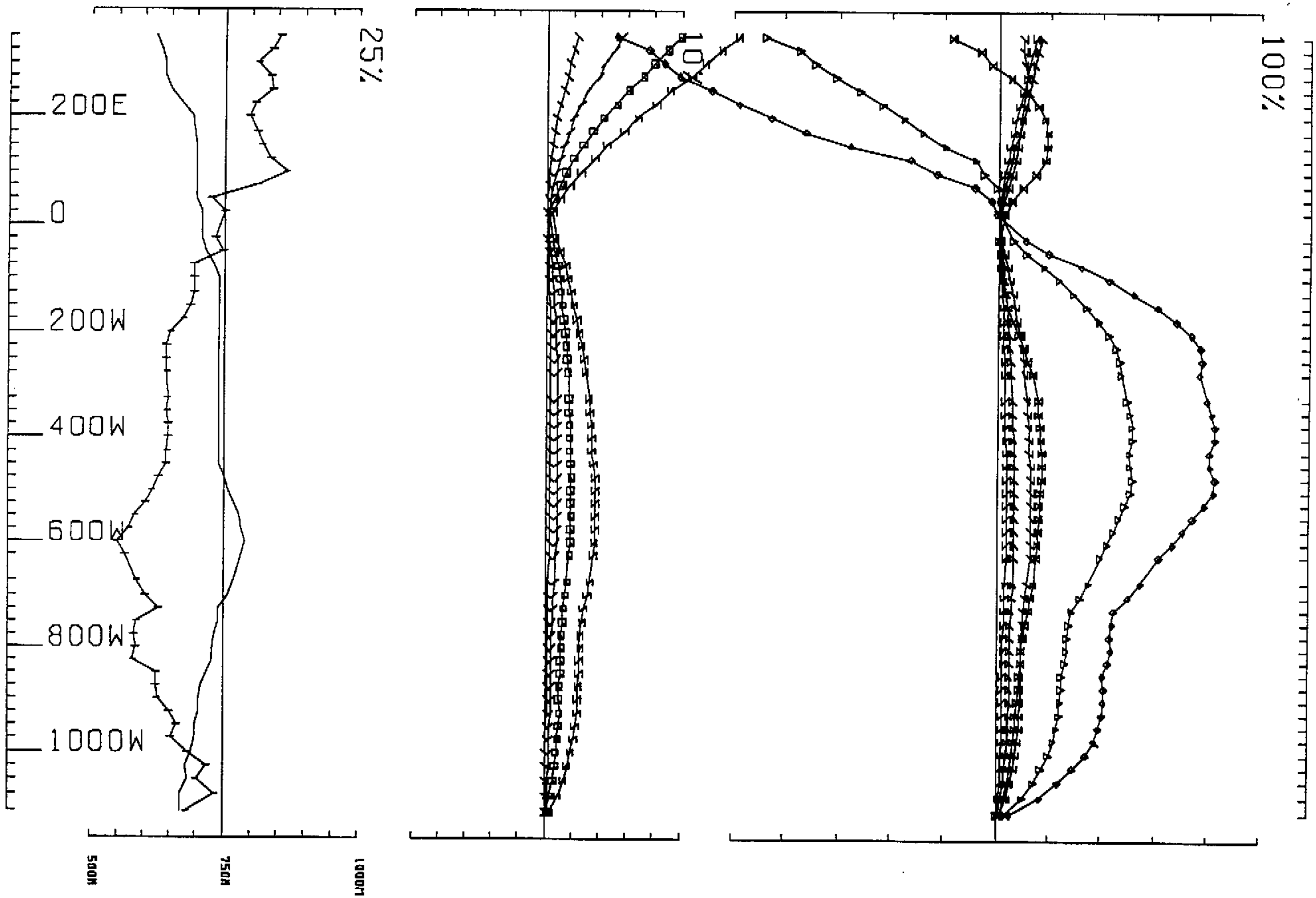
APPENDIX II



UTEM SURVEY AT KETCHUM CREEK FOR CANAMERA EXPLORATION LTD.

CONDUCTED BY SJ GEOPHYSICS LTD JOB 9010 BASE FREQ (HZ) 30.97

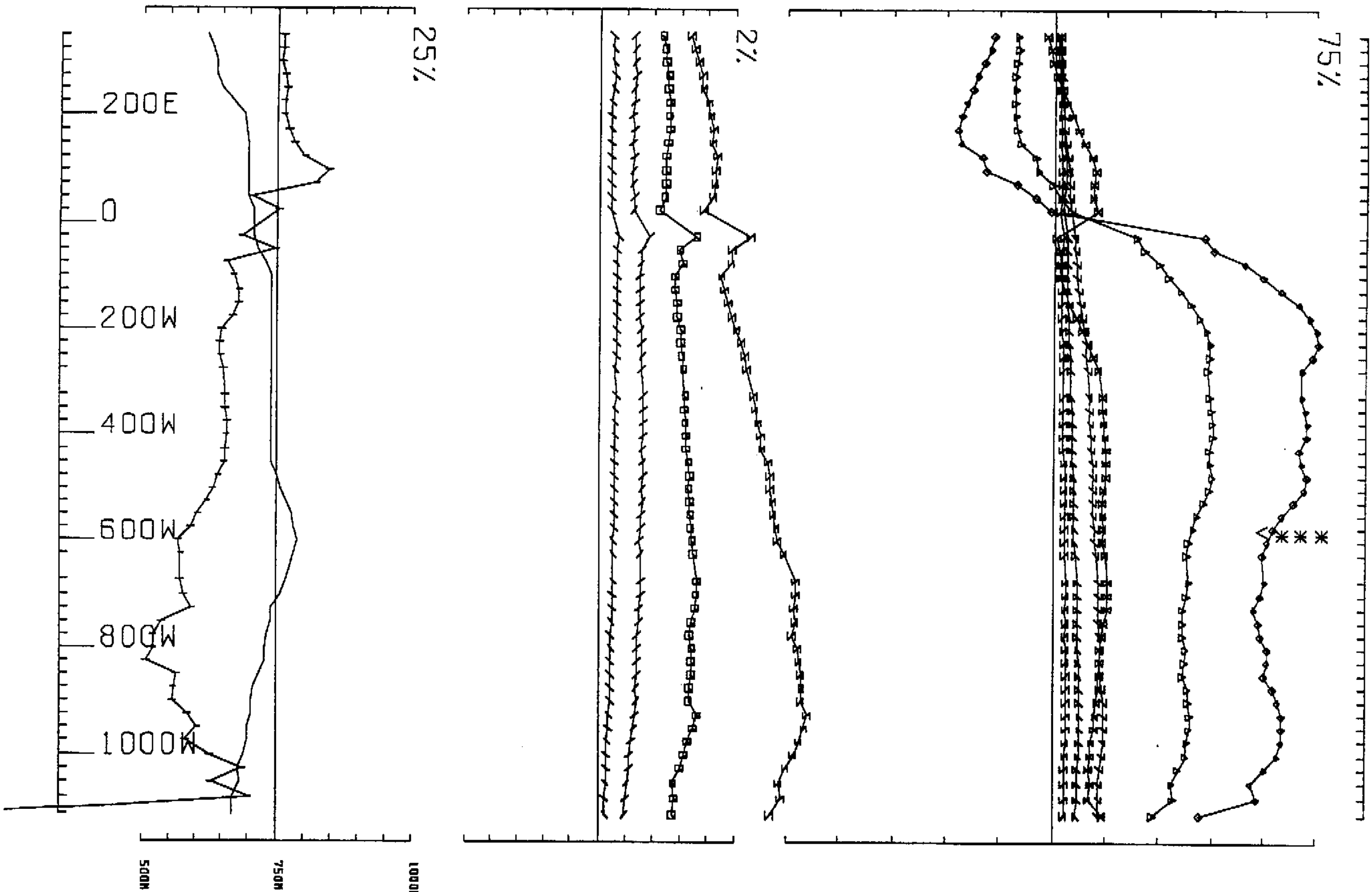
LOOP NO 1 LINE 200 S COMPONENT HZ SECONDARY FIELD CH1 POINT NORM.



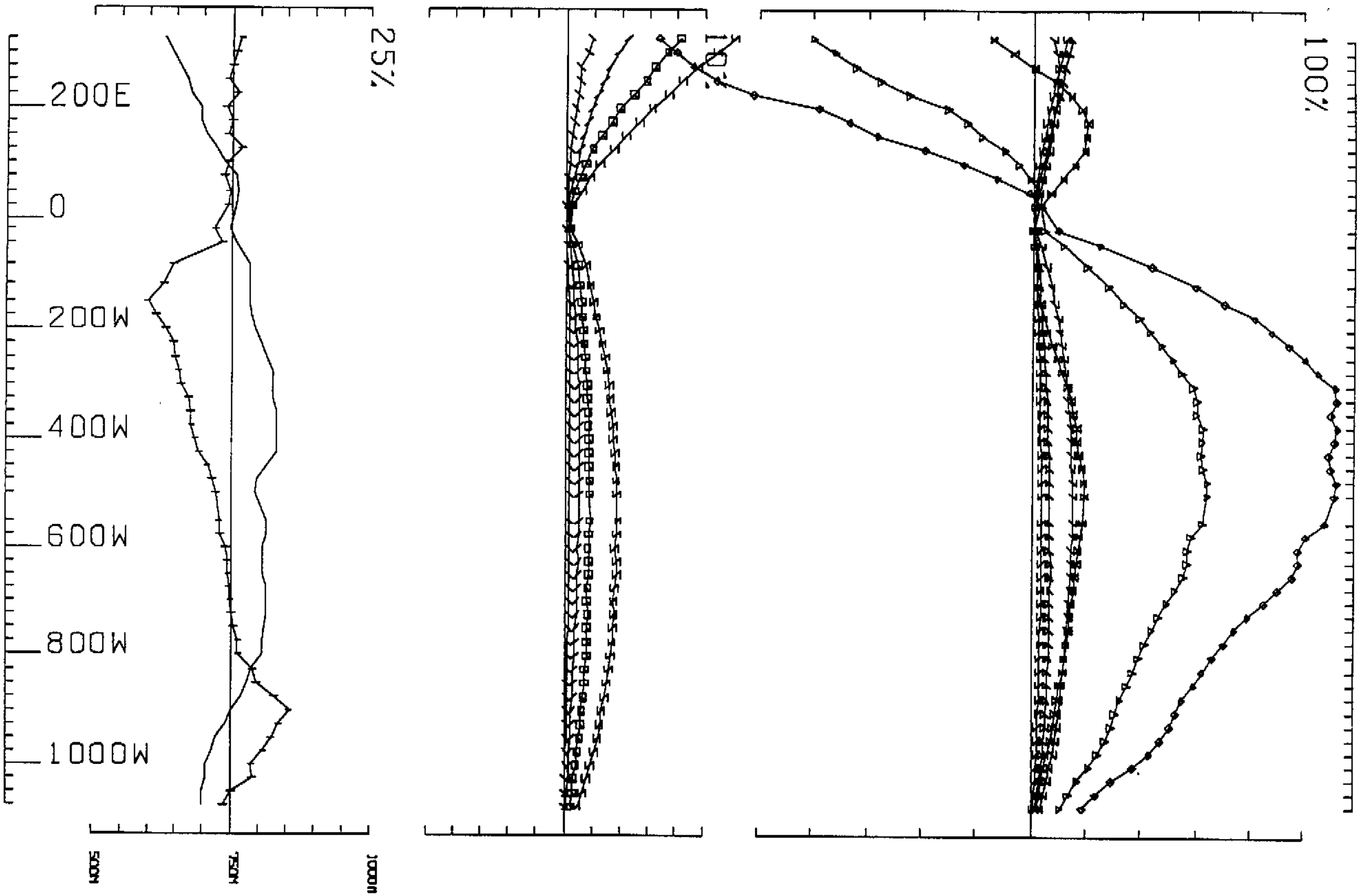
UTEM SURVEY AT KETCHUM CREEK FOR CANAMERA EXPLORATION LTD.

CONDUCTED BY SJ GEOPHYSICS LTD JOB 9010 BASE FREQ (HZ) 30.97

LOOP NO 2 LINE 0 N COMPONENT HZ SECONDARY FIELD CH1 CONTIN. NORM.



UTEM SURVEY AT KETCHUM CREEK FOR CANAMERA EXPLORATION LTD.
CONDUCTED BY SJ GEOPHYSICS LTD JOB 9010 BASE FREQ (HZ) 30.97
LOOP NO 2 LINE 0 N COMPONENT HZ SECONDARY FIELD CH1 POINT NORM.



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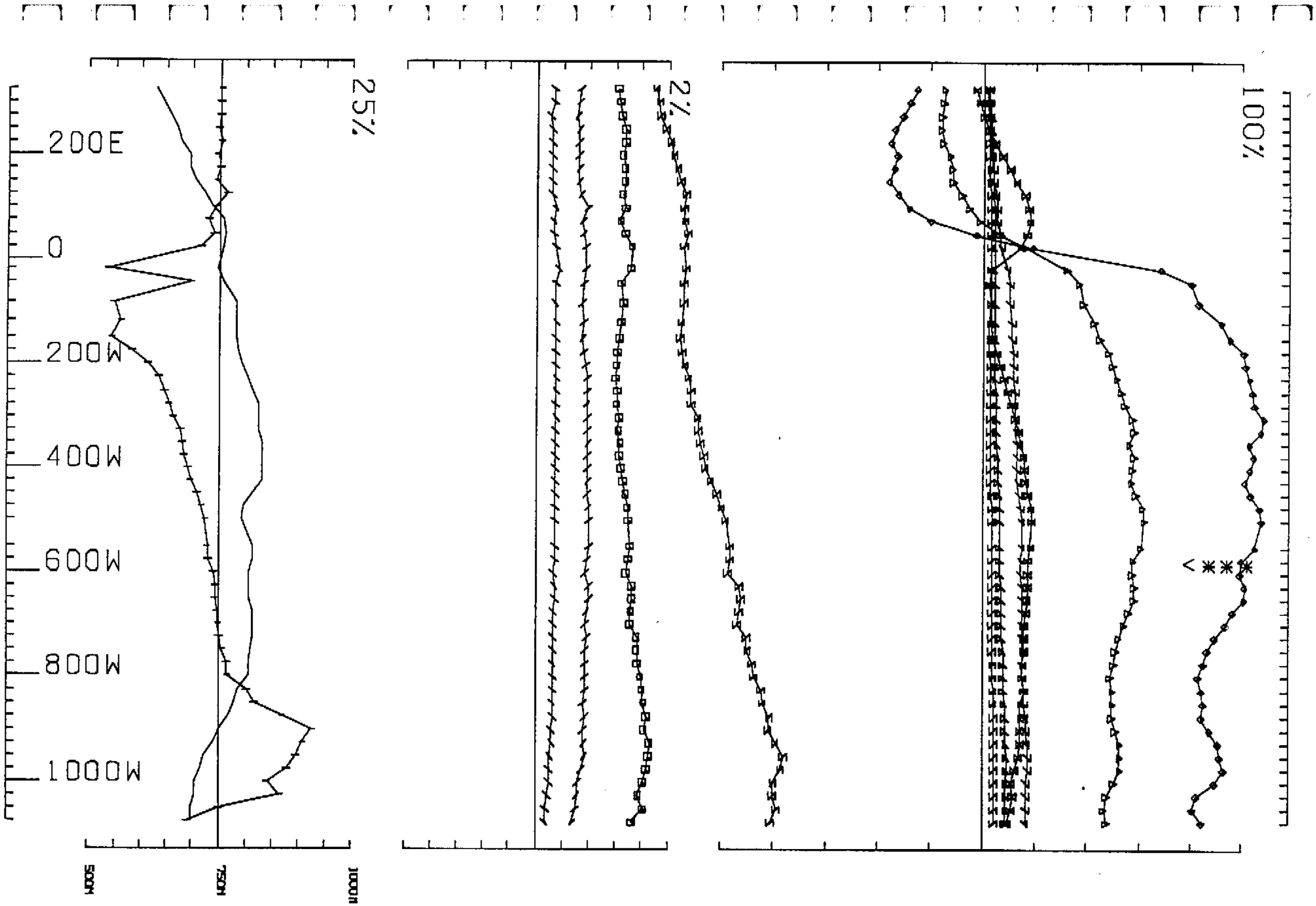
CONDUCTED BY SJ GEOPHYSICS LTD JOB 9010 BASE FREQ (HZ) 30.97
LOOP NO 2 LINE 200 N COMPONENT HZ SECONDARY FIELD CH1 CONTIN. NORM.



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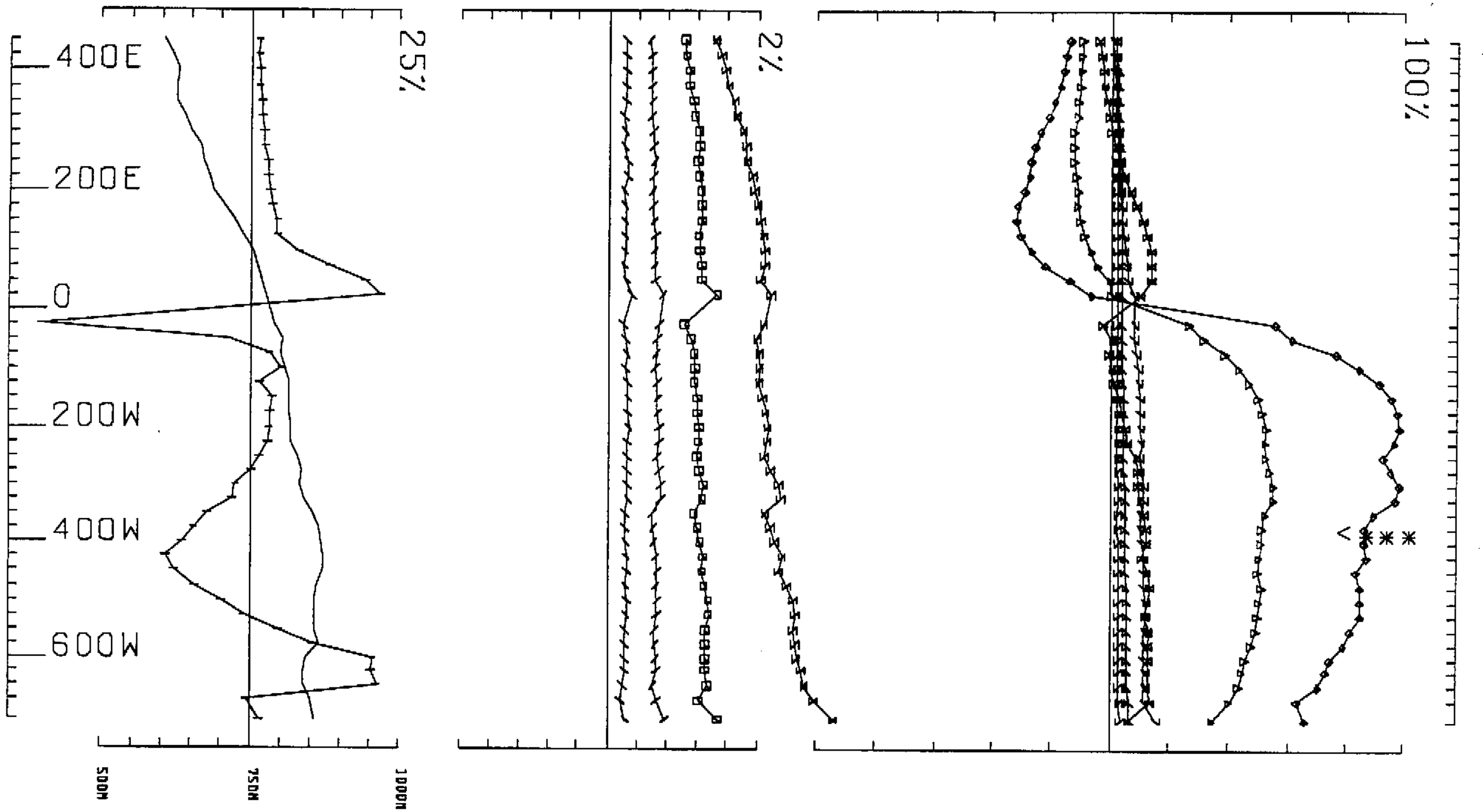
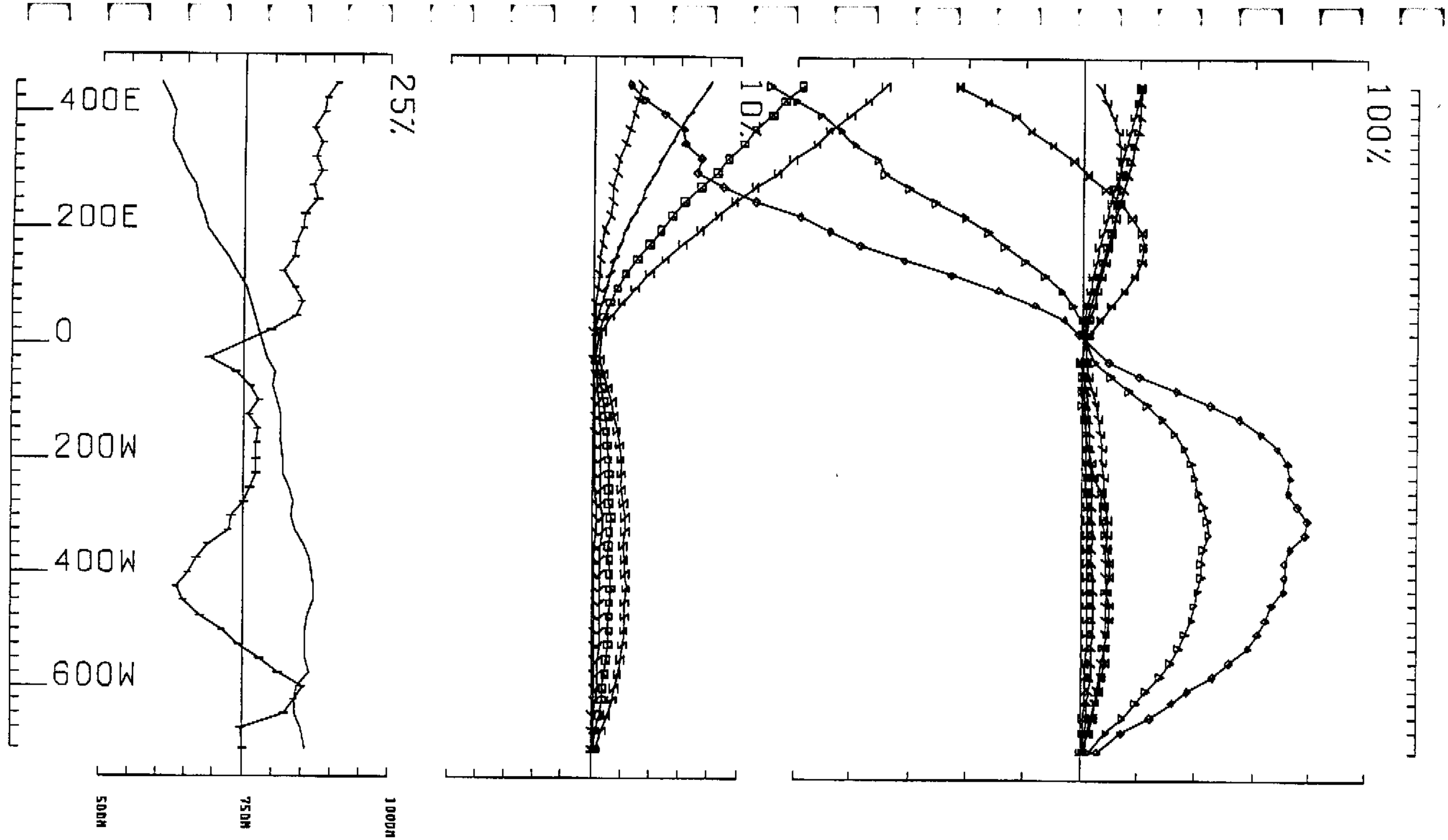
CONDUCTED BY SJ GEOPHYSICS LTD JOB 9010 BASE FREQ (HZ) 30.97

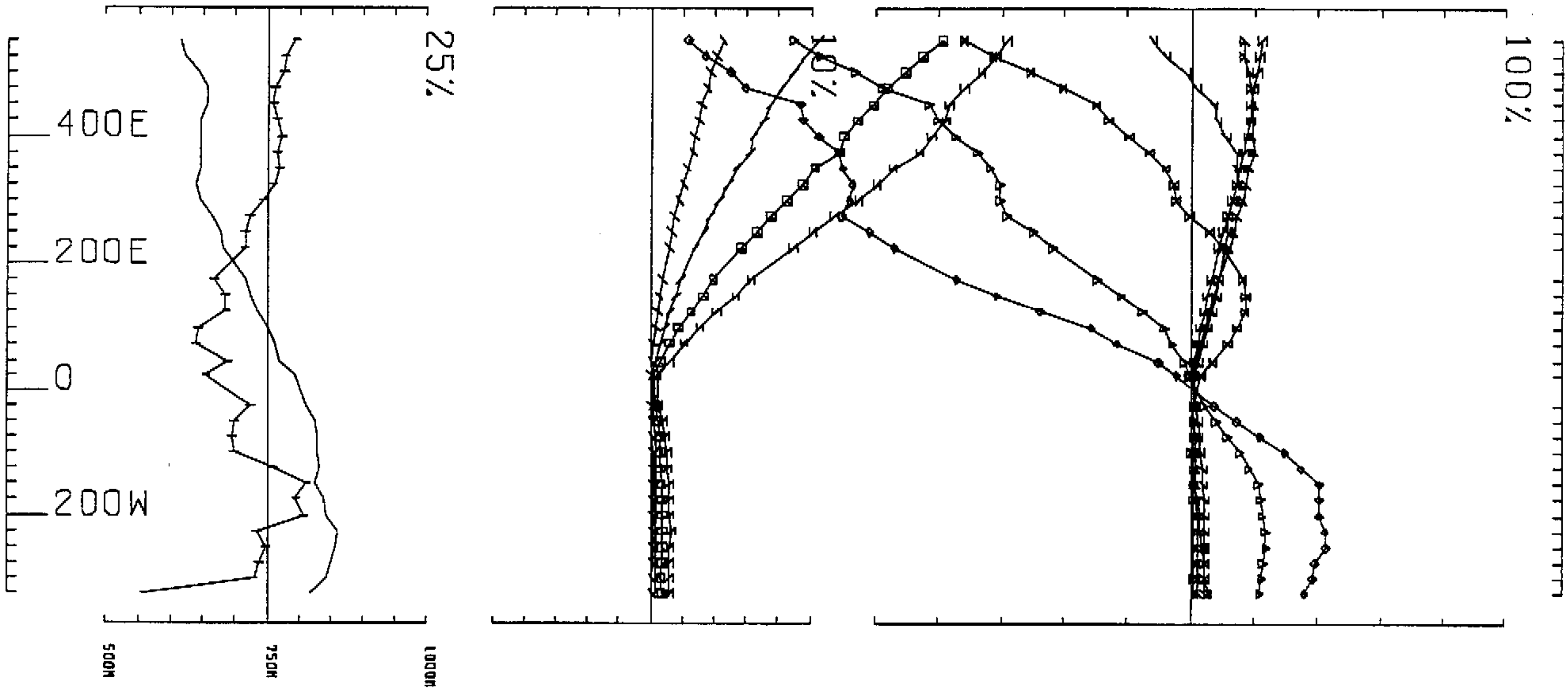
LOOP NO 2 LINE 200 N COMPONENT HZ SECONDARY FIELD CH1 POINT NORM.



UTEM SURVEY AT KETCHUM CREEK FOR CANAMERA EXPLORATION LTD.
CONDUCTED BY SJ GEOPHYSICS LTD JOB 9010 BASE FREQ (HZ) 30.97
LOOP NO 2 LINE 400 N COMPONENT HZ SECONDARY FIELD CH1 POINT NORM.



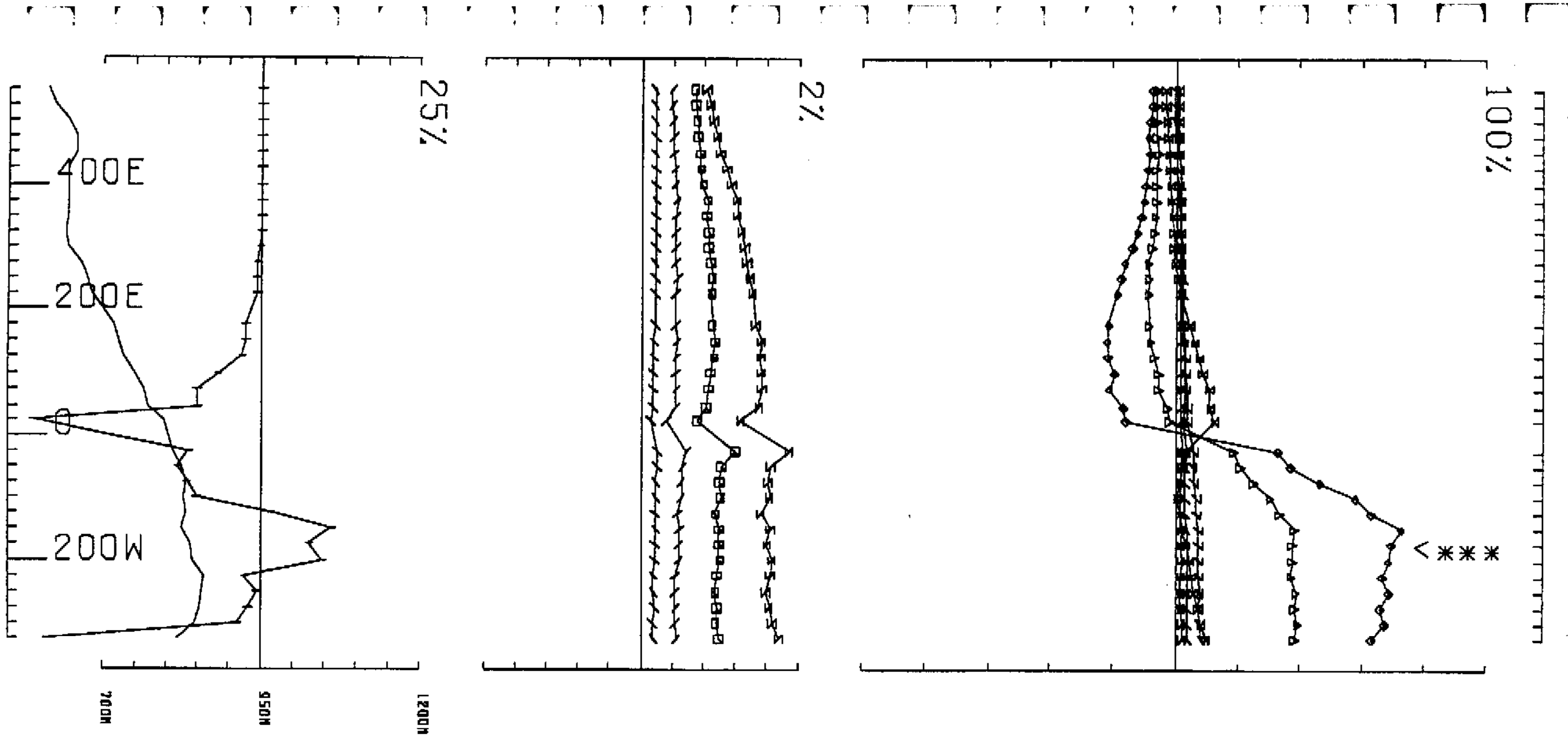
UTEM SURVEY AT KETCHUM CREEK FOR CANAMERA EXPLORATION LTD.
CONDUCTED BY SJ GEOPHYSICS LTD JOB 9010 BASE FREQ (HZ) 30.97
LOOP NO 2 LINE 400 N COMPONENT HZ SECONDARY FIELD CH1 CONTIN. NORM.



UTEM SURVEY AT KETCHUM CREEK FOR CANAMERA EXPLORATION LTD.

CONDUCTED BY SJ GEOPHYSICS LTD JOB 9010 BASE FREQ (HZ) 30.97

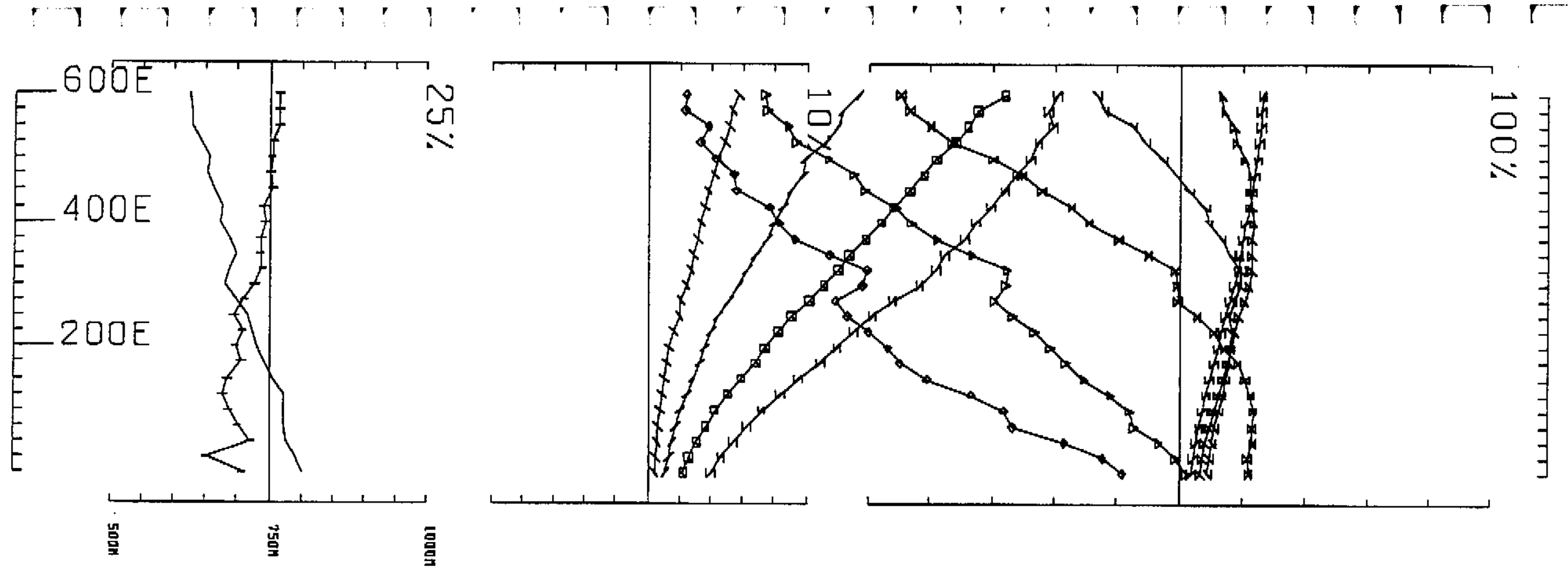
LOOP NO 2 LINE 500 N COMPONENT HZ SECONDARY FIELD CH1 CONTIN. NORM.



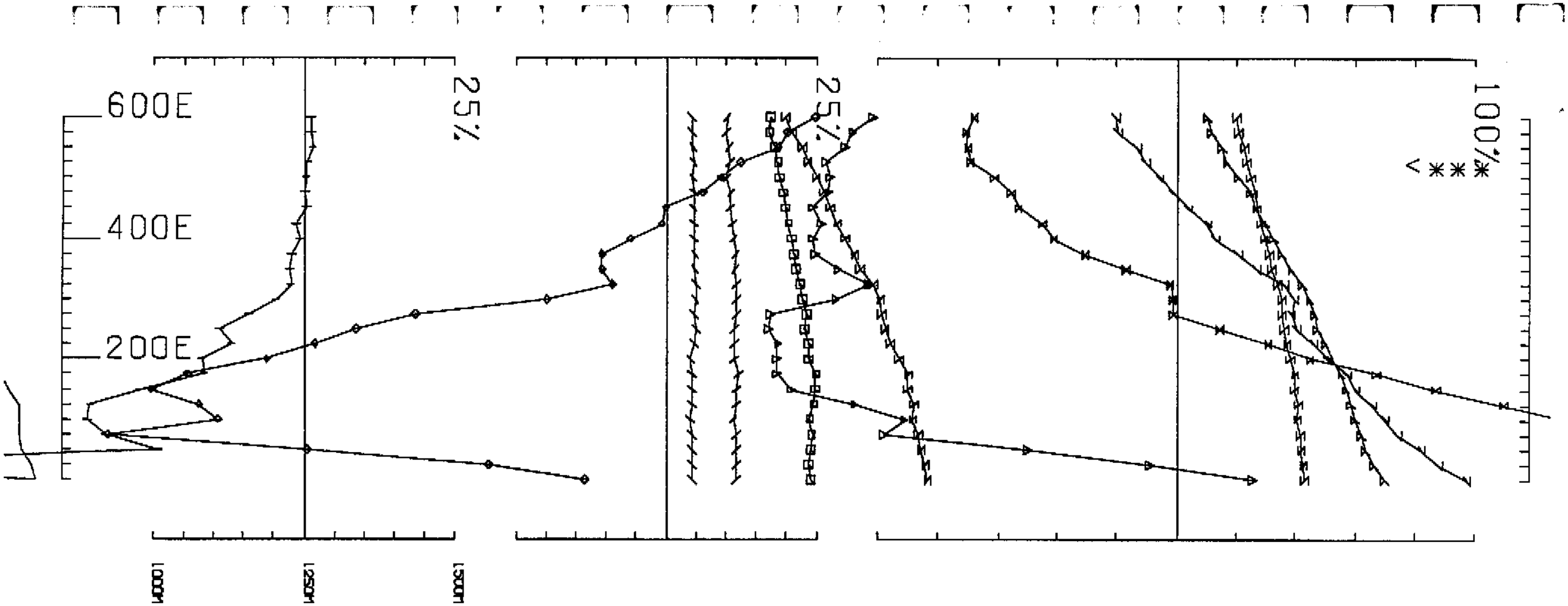
UTEM SURVEY AT KETCHUM CREEK FOR CANAMERA EXPLORATION LTD.

CONDUCTED BY SJ GEOPHYSICS LTD JOB 9010 BASE FREQ (HZ) 30.97

LOOP NO 2 LINE 500 N COMPONENT HZ SECONDARY FIELD CH1 POINT NORM.



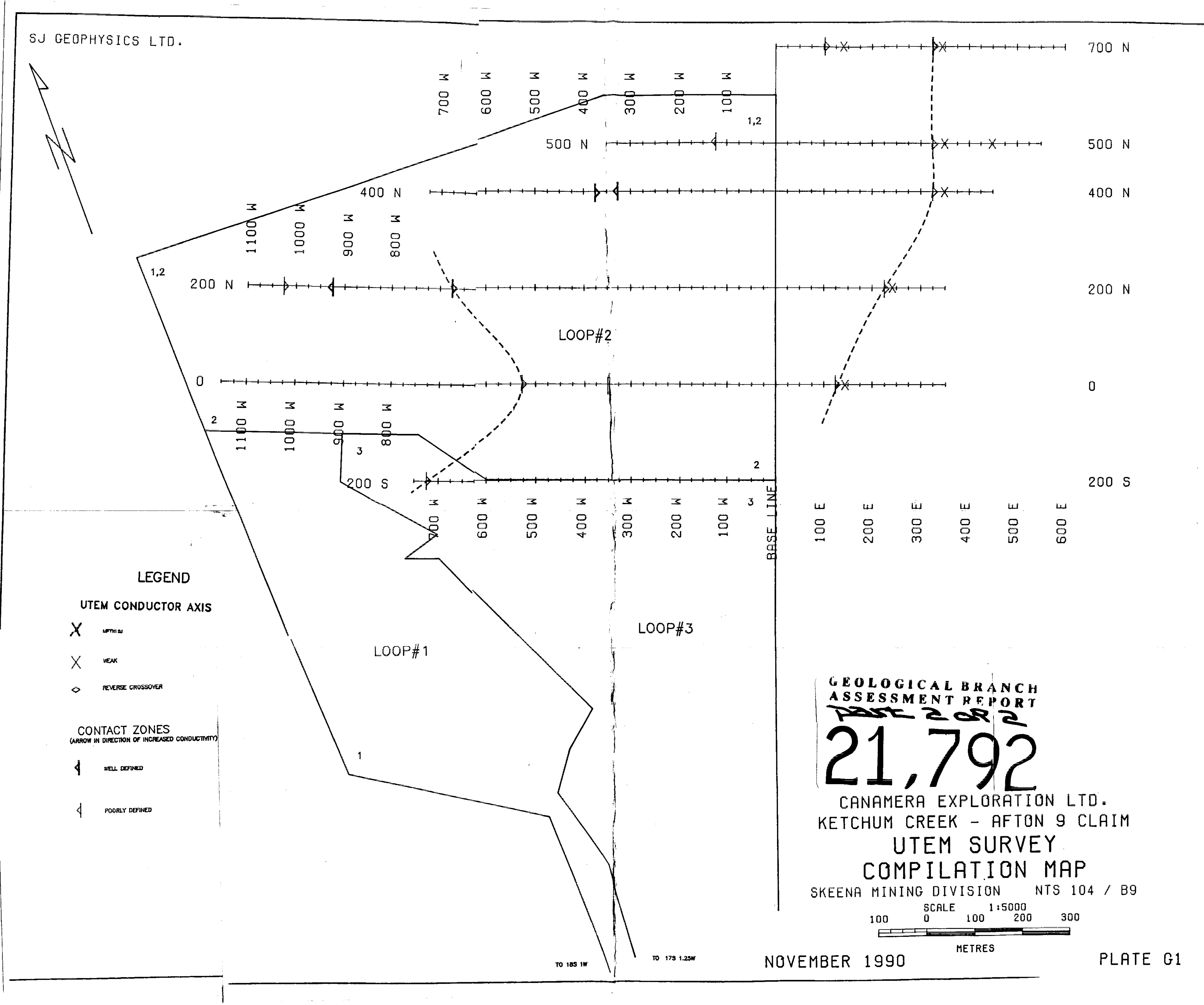
UTEM SURVEY AT KETCHUM CREEK FOR CANAMERA EXPLORATION LTD.
CONDUCTED BY SJ GEOPHYSICS LTD JOB 9010 BASE FREQ (HZ) 30.97
LOOP NO 2 LINE 700 N COMPONENT HZ SECONDARY FIELD CH1 CONTIN. NORM.



UTEM SURVEY AT KETCHUM CREEK FOR CANAMERA EXPLORATION LTD.

CONDUCTED BY SJ GEOPHYSICS LTD JOB 9010 BASE FREQ (HZ) 30.97

LOOP NO 2 LINE 700 N COMPONENT HZ SECONDARY FIELD CH1 POINT NORM.


SJ GEOPHYSICS LTD.
700 N
500 N
400 N
200 N
0
200 S
700 W
600 W
500 W
400 W
300 W
200 W
100 W
1100 W
1000 W
900 W
800 W
BASE LINE
100 E
200 E
300 E
400 E
500 E
600 E
LOOP#1
LOOP#2
LOOP#3
1,2
1,2
2
2
3
3
1
TO 18S 1W
TO 17S 1.25W
LEGEND
UTEM CONDUCTOR AXIS
WEAK
REVERSE CROSSOVER
CONTACT ZONES
(ARROW IN DIRECTION OF INCREASED CONDUCTIVITY)
WELL DEFINED
POORLY DEFINED
GEOLOGICAL BRANCH
ASSESSMENT REPORT
PART 2 OF 2
21,792
CANAMERA EXPLORATION LTD.
KETCHUM CREEK - AFTON 9 CLAIM
UTEM SURVEY
COMPILATION MAP
SKEENA MINING DIVISION
NTS 104 / B9
SCALE 1:5000
100 0 100 200 300
METRES
NOVEMBER 1990
PLATE G1