HLEM, VLF-EM AND MAGNETOMETER

TEST

SURVEY

ON THE

ARC PROPERTY

FOR

KOKANEE EXPLORATIONS LTD.

SURVEY BY

SJ GEOPHYSICS LTD.

SLOCAN M.D., B.C.

N.T.S. 82 F/10

December 1991

Report By
Syd Visser
SJ Geophysics Ltd.

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INTRODUCTION

A horizontal loop electromagnetic (HLEM, Max-Min 1), very low frequency electromagnetic (VLF-EM) and a magnetometer test surveys were completed by SJ Geophysics Ltd. for Kokanee Explorations Ltd on the Arc property. The Arc property is located on the peninsula between Crawford Bay and Kootenay Lake north of Creston, B.C. in the Slocan M.D., (N.T.S. 85 F/10).

The purpose of the survey was determine if the source of the boulders which contained magnetic pyrrhotite, galena and spalerite or related structures could be located with geophysical methods.

INSTRUMENTATION AND FIELD WORK

The field work was performed by Syd Visser (Geophysicist) and Eric Ewen (technologist) both of SJ Geophysics LTD. during the period of December 6, 1991 to December 14, 1991 which included 7 production days and 2 mobilization days.

A Apex Parametrics Max-Min 1-9 HLEM system with a 100M coil separation, to get the desired depth penetration of approximately 50M, was used for the HLEM survey. The in-phase and quadrature (out-of-phase) component at up to 7 frequencies (110, 220, 880, 1760, 3520, 7040 and 14080Hz) were measured and recorded at 25M intervals along the grid lines. The line marked as 2600E was surveyed along a road close to line 2600E. The amplitude of the HLEM data on line 2400E is not correct due to wet equipment but the shape of the anomaly especially on the lower frequencies is correct.

The slopes, of the topography along the lines, were recorded, in the MMC data logger, at each station and used to calculate average slope and the chainage correction between the transmitter and the receiver. The chainage correction is only as accurate as the original chainage.

After careful examination of the in-phase component at 110Hz or 220Hz, which revealed no significant response in the majority of the survey area, was subtracted from the in-phase component of the remaining frequencies to eliminate the response due to chainage errors.

Two EDA Omni Plus combined proton precession magnetometer and VLF-EM units were used for a field instrument along with a EDA Omni-4 proton precession magnetometer as a base station for the VLF-EM and magnetometer survey.

The two VLF lines were surveyed using the signal from two separate VLF stations (Annapolis 21.4 KHz, Hawaii 23.4 KHz), Both station were used because of the direction of the incoming electromagnetic field to the direction of the grid and possible structures. The signal from Annapolis is located at an azimuth of approximately 280 degrees therefore making it ideal for NW and W trending structures and the signal from Hawaii is located at an azimuth of approximately 240 degrees which is ideal for NE trending structures. The direction of the VLF-EM survey is positive to the north.

A large amount of time was wasted during the initial part of the survey trying to locate lines from flags placed at 50m intervals. Kokanee Explorations Ltd. Geologists Dave Meeks and Peter Klewchuk sped up the survey considerably by flagging the lines ahead of the survey. Considerable time was allocated in the evenings, during the survey period, discussing the geology and the survey parameters with the geologists.

All the data was entered into a field computer in the evening and field plots generated on a dot matrix printer. The data was later plotted on velebond, using a 36 inch pen plotter.

DATA PRESENTATION

The in phase and quadrature components of the electromagnetic field, relative topography and compilation are presented on the following plates:

Plate G1	HLEM Max-Min Profiles In Phase & Quadrature
Plate G2	HLEM Max-Min Profiles In Phase & Quadrature
Plate G2A	HLEM Max-Min Profiles Quadrature
Plate G3	VLF-EM Survey - Profiles Dip Angle, Quadrature & Slope
Plate G4	Magnetometer Survey Profiles
Plate G5	Magnetometer Survey Profiles
Plate G6	VLF & Max-Min Survey COMPILATION MAP
Plate G7	HLEM Max-Min Survey COMPILATION MAP

DISCUSSION

HLEM

The HLEM data indicates a large number of very weak anomalies and a few localized strong anomalies as indicated on the compilation maps G6 and G7.

The weak anomalies whose response is limited to the higher frequency quadrature (out-of-phase) component of the HLEM data appear to strike to the NW. This NW strike is at approximately 90 degrees to the strike of the main conductive zone noted in the Cominco data. These weak responses would have been difficult to locate by the

previous Cominco Ltd. survey because equipment with a highest frequency of 2640Hz was used by them.

The weak anomaly on line 1400E at 4200N and line 1200E at 4400N which are both in swamps, may be due to conductive overburden. On the southern end of the grid, south of 1200N, some of the anomalies appear to be near ridge tops. Because of the large number of anomalies in this area with respect to the line spacing it is difficult to determine the strike of the weak conductors although they tend to favour a NW strike.

A number of strong HLEM anomalies (strong in phase response) are located north of 1300N on lines 2000E and 2200E and the tie line 1400E. Since these anomalies are mainly recorded on one line it is impossible to determine a strike. The Cominco data indicates that the strike of these good conductors or generally NE but that locally they may strike N to NW (The Cominco data should be repotted on profiles to reinterpreted properly). A large number of the conductors on the Cominco data certainly appear to be strike limited and therefore either suggest cross structures (faulting) or that not all of the anomalies are formational.

VLF-EM

The VLF-EM survey which was only used on parts of lines 2200E and 2400E while Dave Meeks was the Max-Min transmitter operator therefore freeing Eric Ewen to operate the Magnetometer and VLF-EM. The VLF-EM anomalies located on these lines closely correlate with the HLEM anomalies especially on the stronger anomalies north of 1200E. The weak VLF anomalies south of this area which correlate to the HLEM anomalies also correlate to change in topography. Without the aid of the HLEM data these weak anomalies would have been interpreted as due to topography.

The stronger response from Hawaii, which would couple better with NE striking conductor than the signal from Annapolis, would suggest that the conductors are striking to

the NE. Not sufficient data is available to confirm this.

Magnetics

In general the magnetic response is very uniform over the survey area especially on lines 1200E to 1600E. There are a number of weak 200-500 nT anomalies and some stronger spikes. There does not appear to be a direct correlation with magnetic anomalies and the EM anomalies with the exception of a few isolated cases which are described in the following text.

The magnetic anomaly on line 1200E at 2600N may correlate with the HLEM anomaly at 2700N on the same line because of chainage errors. The magnetic survey was performed on a grid estimated from the geochem grid before the grid was flagged in for the HLEM survey and there are some apparent discrepancies in chaining between these grids. Time constrains did not allow us to repeat the survey. This area should be investigated for possible magnetic mineralization. There is a very good correlation between the magnetic, HLEM and VLF-EM anomalies at approximately 1125N on line 2400E and 850E on line 2200E. These are likely the most interesting anomalies on the survey. The other weaker correlations which also should be investigated are the anomalies at 1400N on line 2200E, 1425N on line 2400E and at the north end of line 2200E. The strongest magnetic anomalies between 950N and 1100N on line 2200E and between 1250N and 1300N on line 2400E do not appear to correlate to any EM anomalies and are therefore likely due to increase magnetite content of the rocks. It does appear that looking at this data and the data from the previous Cominco survey that the magnetics can play a significant role in mapping especially in the southern part of the grid if sufficient high quality data is collected and properly plotted.

RECOMMENDATIONS

The Geophysical work done to date does not give any clear indication that there is any correlation of the geophysics with sulphide mineralization. The Geophysics can certainly be used as a tool to aid the geological mapping.

Because of the above conclusion it is recommended to first perform a detailed prospecting (mapping the mineralized boulders) and geological survey along a well established grid especially in the areas with correlation HLEM and magnetic anomalies. The results of this survey should be closely correlated with the geophysics to date to determine the significance of any of the anomalies. The order of priority with the limited information available would be as follows:

1) 1125N on line 2400E
2) 2600N to 2700N on line 1200E
3) 850N and 900N on line 2200E
4) 1475N and possibly 1425N on line 2200E
5) 2200N to 2300N on line 2200E

Geological and geochemical information could easily influence the priority of theses anomalies and the remaining anomalies should not be ignored.

Since the terrain is not steep or the bush not thick it is not necessary to establish cut lines for any future geophysics survey but the lines should be well flagged and closely tied in with numerous tie lines. Because of the numerous weak and strong anomalies line control is very important to determine continuity and strike of these anomalies.

It is recommended to survey the complete area with an magnetometer and VLF-EM and then detail any area of interest with the multi frequency capability of the Max-Min. It should be kept in mind that the background conductivity in

the survey area is fairly high therefore the VLF-EM response tends to follow topography and depth penetration is very limited. The Magnetometer survey should include a base station magnetometer since subtle changes are likely to be of geological interest. The Station spacing of the survey should not exceed 12.5M or 10M and the line spacing should be 100M or less. With well flagged lines production of 5Km per day per Mag\VLF field unit should be easily obtainable.

CONCLUSION

The HLEM data and the VLF-EM data both located a large number of weak and localized good anomalies in the survey area. The weak VLF-EM anomalies would be impossible to separate from topography effect without the HLEM data. The magnetic data is generally very uniform in the survey area with the exception of some localized anomalies.

There are a number of EM anomalies that correlate with the local magnetic anomalies and should be investigated further. It is recommended to perform a detailed geological and prospecting program and establish a good grid over property before commencing any further geophysics. The geophysics will definitely help in mapping the local geology but not enough information is available at this time to determine if it aided in location sulphide mineralization although the test survey did prove to be encouraging.

Syd Visser F.G.A.C.
Geophysicist

SJ Geophysics Ltd.

EXHIBIT "A"

STATEMENT OF EXPENDITURES

GEOPHYSICS PROGRAM

ON ARC 13-25,28-30; NOAH 18-20;
AND SURE BET 1,3,5,6 CLAIMS

SLOCAN M.D.

Covering the period from Nov. 1, 1991 to Dec. 15, 1991

SALARIES:		
D. Meeks - P.Eng. - Map Preparation - 1 day @ $400/day		$ 400.00
GEOPHYSICS CONTRACTOR:		
S.J.V. Geophysics Ltd., Delta, B.C.		
Mag, VLF & Max Min surveys		
10 days - production, mob/demob, truck rental, expenses, interpretation		9,559.97
LINECUTTING:		
Daryl Calder, Cranbrook, B.C.		
12.785 km @ $392.50/km		5,018.11
Accommodation re Calder		497.10
	Geophysics Total =	$15,475.18

David P. Meeks

DAVID P. MEEKS
B.A.Sc.,P.Eng.

IN THE MATTER OF THE

B.C. MINERAL ACT

AND

IN THE MATTER OF A GEOPHYSICS PROGRAM

CARRIED OUT ON THE ARC 13-25,28-30 & 35 CLAIMS,
NOAH 8-10 CLAIMS, SURE BET 1,3,5 & 6 CLAIMS

CRAWFORD BAY AREA

in the Slocan Mining Division of
the Province of British Columbia

More Particularily N.T.S. 82F/10E

A F F I D A V I T

I, David P. Meeks, of the City of Cranbrook, in the Province of British Columbia, make Oath and say:

1. That I am employed as a Geologist by Kokanee Explorations 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 my Affidavit is a true copy of expenditures incurred on a geophysics program, on the Arc 13-25,28-30; Noah 8-10 and Sure Bet 1,3,5 and 6 Mineral Claims.

3. That the said expenditures were incurred between the 1st day of November, 1991 and the 15th day of December, 1991 for the purpose of mineral exploration.

David P. Meeks

DAVID P. MEEKS
B.A.Sc.,P.Eng.

APPENDIX I

STATEMENT OF QUALIFICATIONS

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

1) I am a graduate from the University of British Columbia, 1981, where I obtained a B.Sc. (Hon.) Degree in Geology and Geophysics.

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

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

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

Syd J. Visser, B.Sc., F.G.A.C.
Geophysicist

Statement of Qualification

I, David P. Meeks of 303 - 16th Avenue South, Cranbrook, British Columbia, hereby certify that:

1. I am a graduate from the University of British Columbia, 1979, where I obtained a B.A.Sc. degree in Geological Engineering in the hard rock mining exploration option of the program.

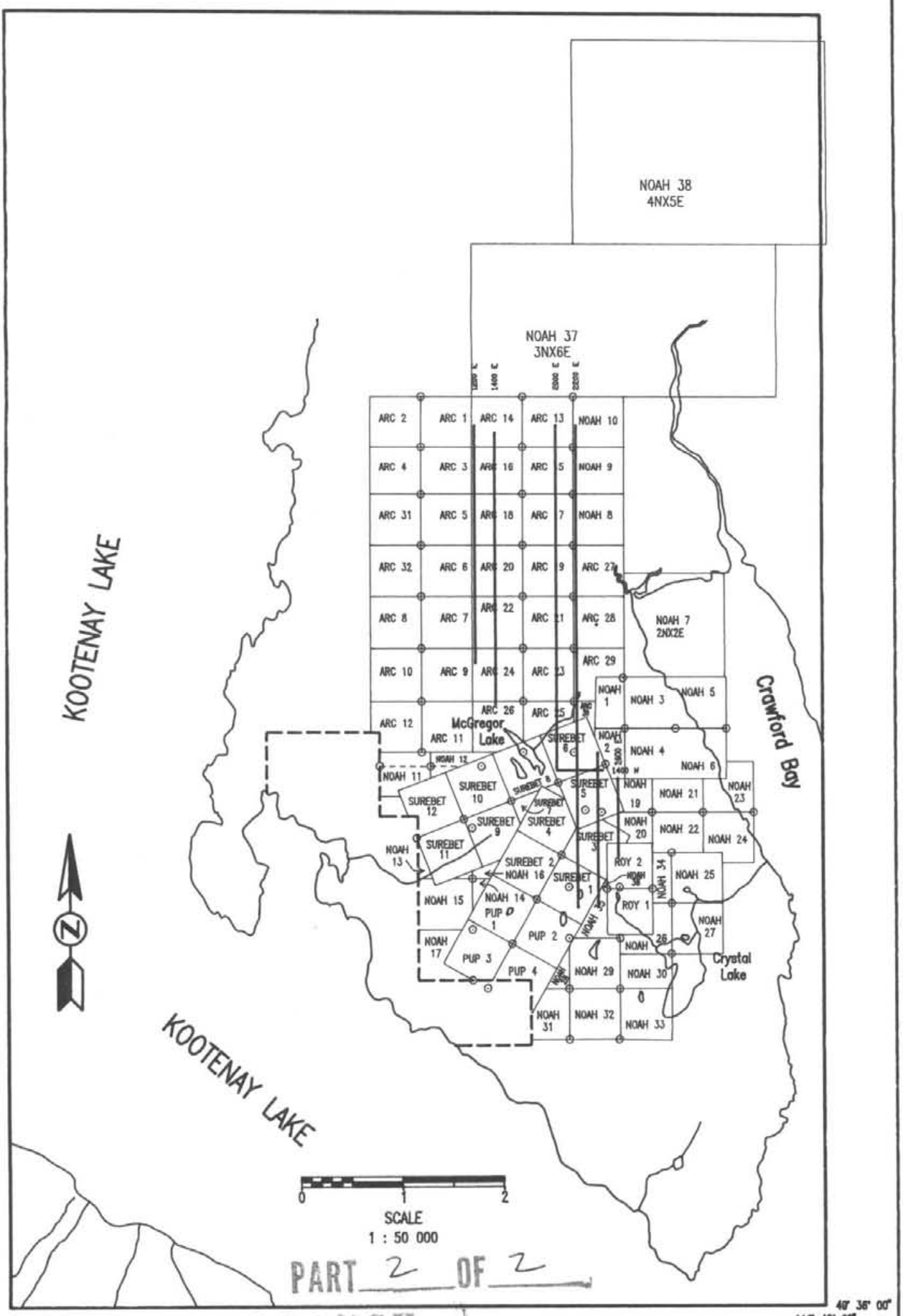
2. I have been engaged in mining exploration and petroleum exploitation and production since 1974.

3. I am a professional engineer in the Province of Alberta and am a member of the Association of Professional Engineers, Geologists and Geophysicists of Alberta.

David P. Meeks

David P. Meeks, B.A.Sc.,P.Eng.

Member # 37345



Kokanee Explorations Ltd.

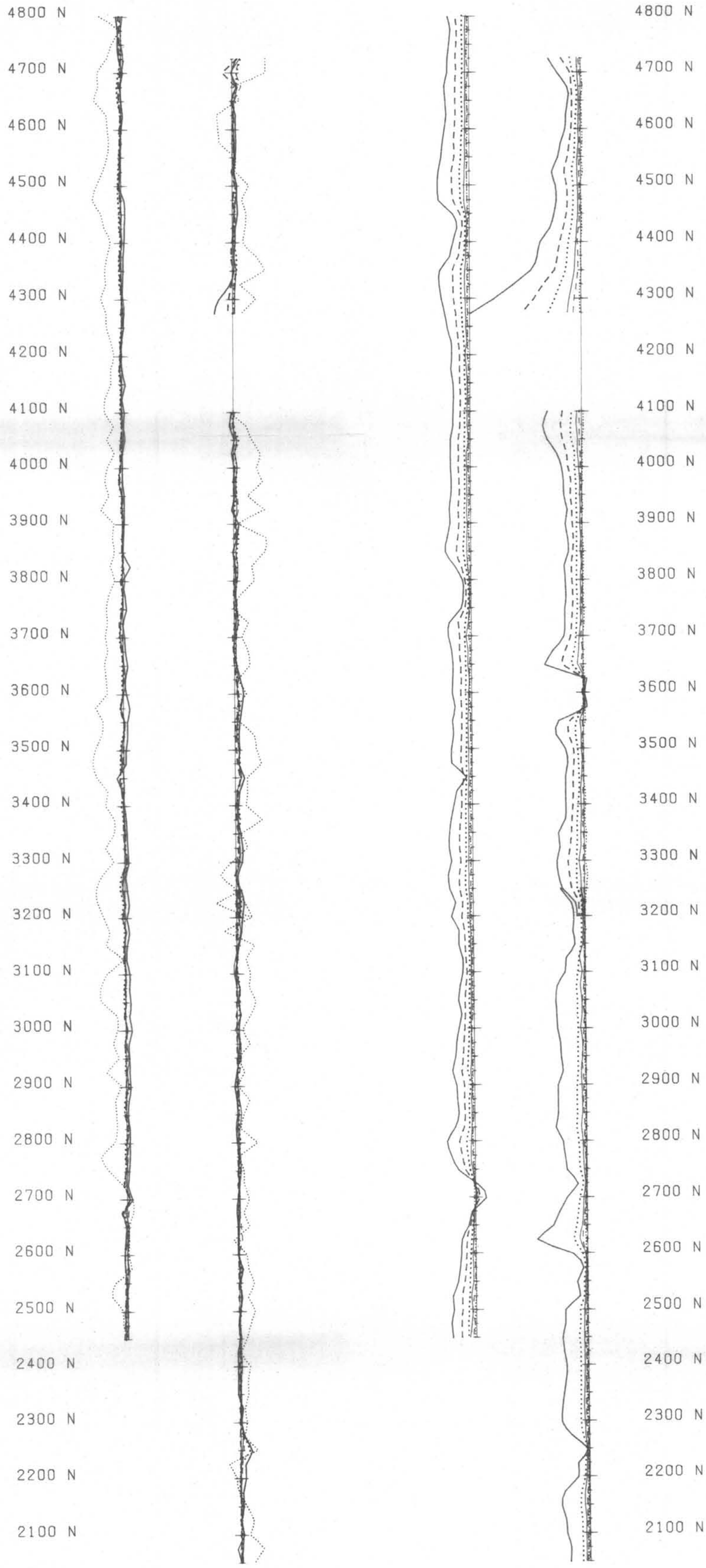
Noah/Arc/Surebet/Pup Claims

NTS: 82F/10W	Geophysics Line Locations
Date: 92/03/03	

IN PHASE PROFILES

(220 hZ IS SUBTRACTED FROM PROFILES >220 hZ)

QUADRATURE PROFILES



N

LEGEND

PROFILES POSITIVE TO LEFT
PROFILE SCALE: 10% / CM
BASE VALUE: 0

220 HZ
880 HZ
1760 HZ
3520 HZ
7060 HZ
14020 HZ

INSTRUMENTATION: APEX MAXMIN 1-9

ARC PROPERTY
KOKANEE EXPLORATIONS LTD.
HLEM MAX-MIN PROFILES
IN PHASE & QUADRATURE
SLOCAN MINING DIVISION, B.C. NTS 82 F/10

SCALE 1:5000

100 0 100 200 300
METRES

DECEMBER 1991

PART 2 OF 2 PLATE G1

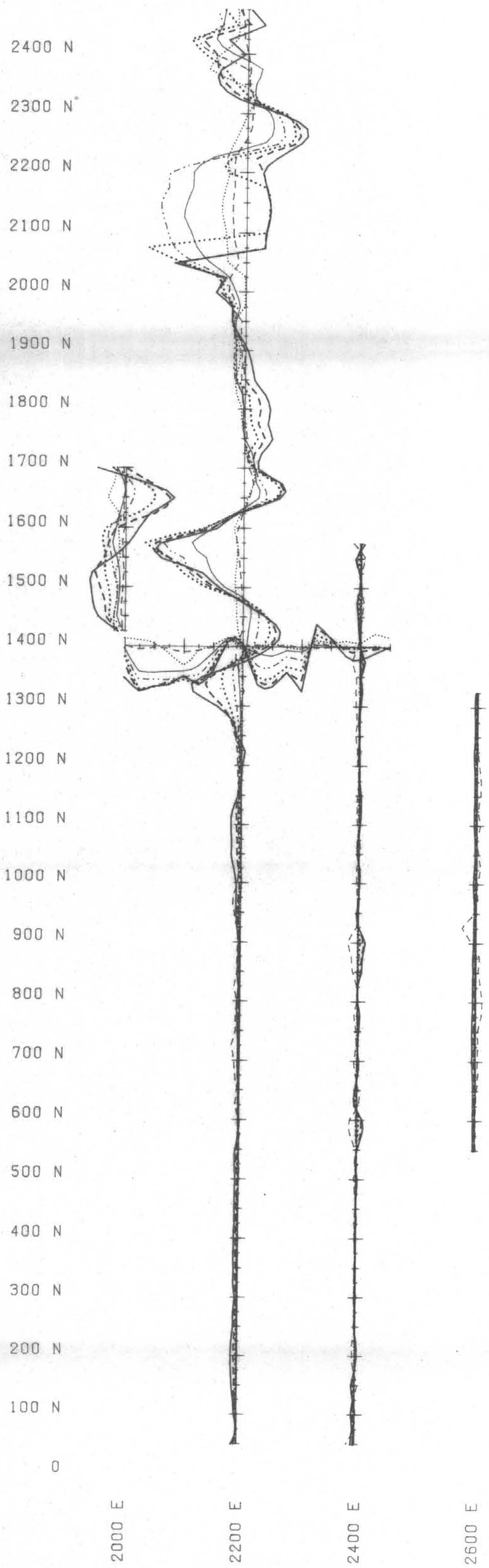
SJ GEOPHYSICS LTD.

22,216

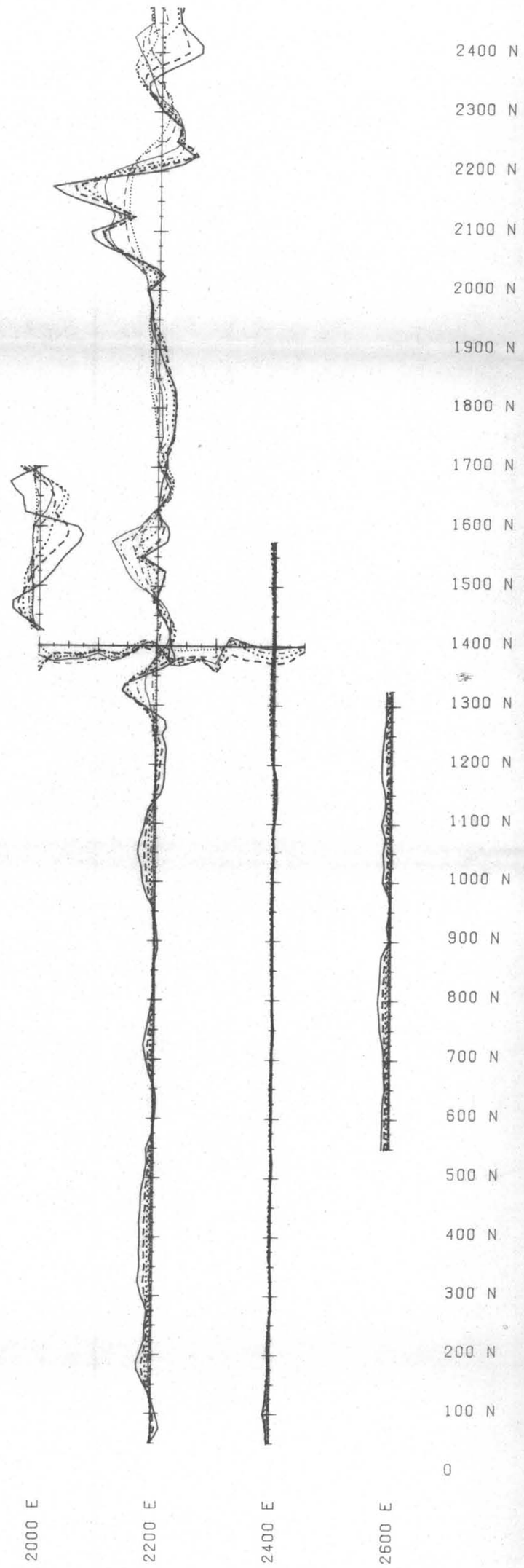
GEOLOGICAL BRANCH
ASSESSMENT REPORT

IN PHASE PROFILES

(220 hZ is subtracted from profiles >220 hZ)



QUADRATURE PROFILES



N

LEGEND

PROFILES POSITIVE TO LEFT
PROFILE SCALE: 50% / CM
BASE VALUE: 0

- 110 HZ
- 220 HZ
- 880 HZ
- 1760 HZ
- 3520 HZ
- 7060 HZ
- 14020 HZ

INSTRUMENTATION: APEX MAXMIN 1-9

ARC PROPERTY
KOKANEE EXPLORATIONS LTD.

HLEM MAX-MIN PROFILES IN PHASE & QUADRATURE

SLOCAN MINING DIVISION, B.C. NTS 82 F1E

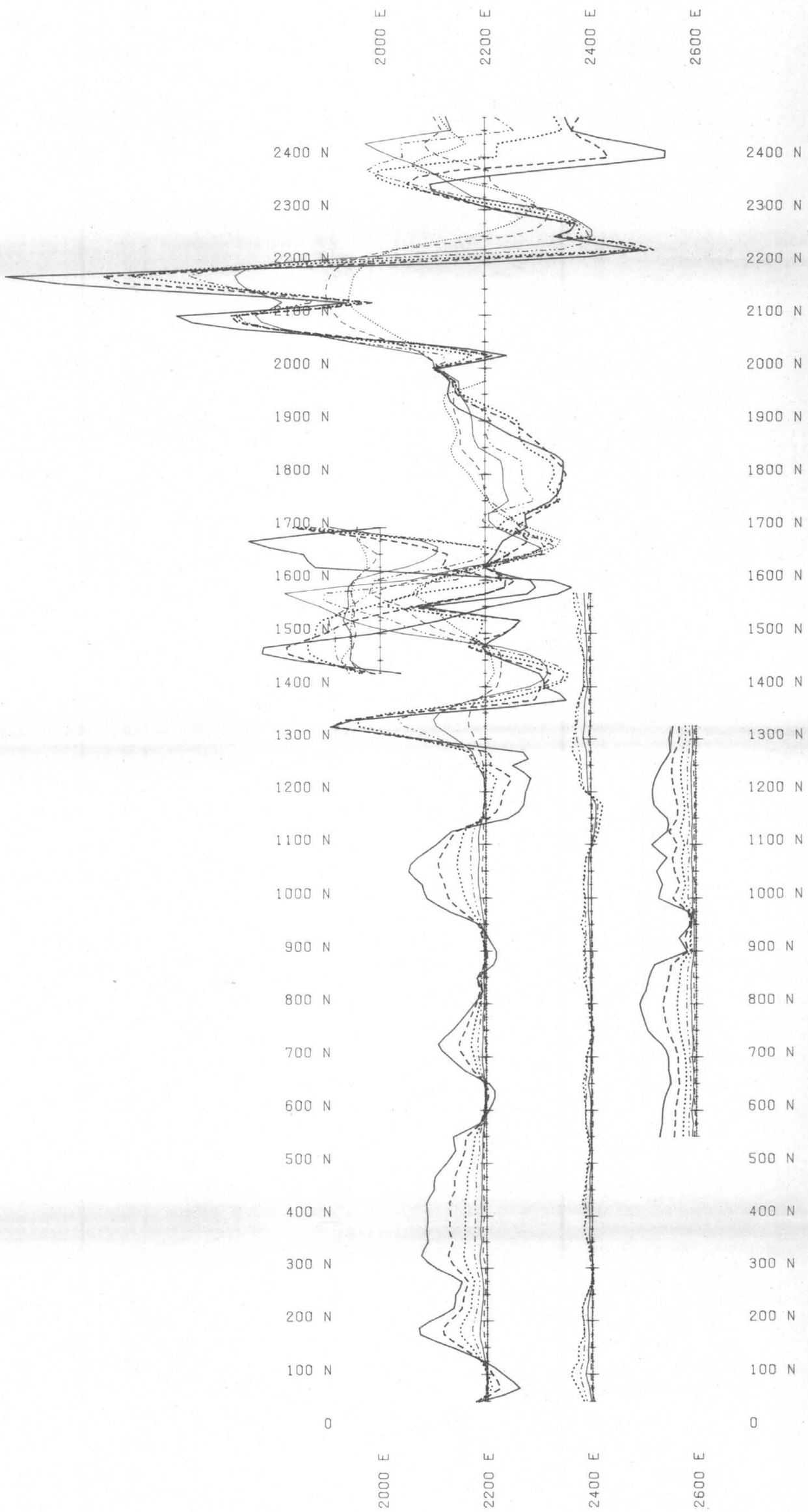
SCALE 1:5000

100 0 100 200 300
METRES

SJ GEOPHYSICS LTD.

DECEMBER 1991

PART 2 OF 2 PLATE G2



N

LEGEND

PROFILES POSITIVE TO LEFT
PROFILE SCALE: 10% / CM
BASE VALUE: 0
110 HZ
220 HZ
880 HZ
1760 HZ
3520 HZ
7060 HZ
14020 HZ
INSTRUMENTATION: APEX MAXMIN 1-9

ARC PROPERTY
KOKANEE EXPLORATIONS LTD.
HLEM MAX-MIN PROFILES
QUADRATURE
SLOCAN MINING DIVISION, B.C. NTS 82 F/10

SCALE 1:5000

100 0 100 200 300
METRES

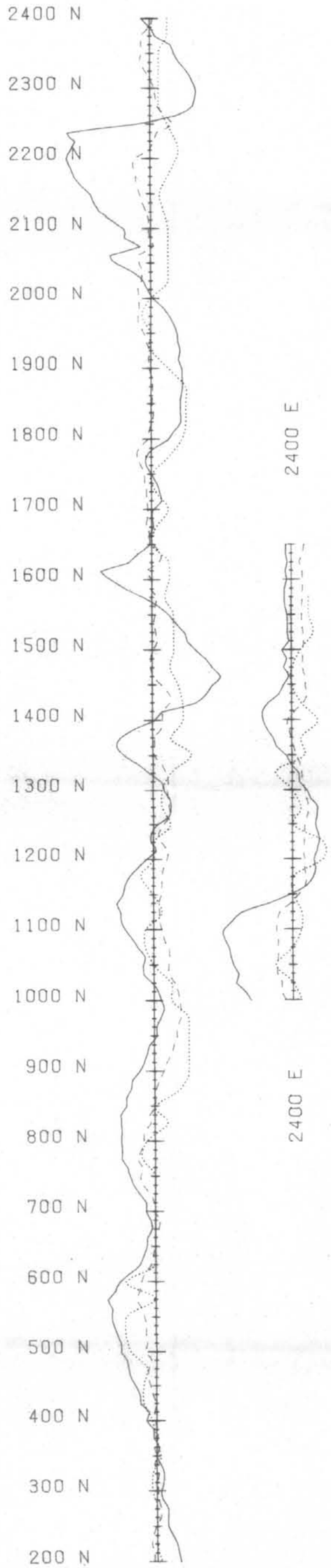
DECEMBER 1991

PART 2 OF 2

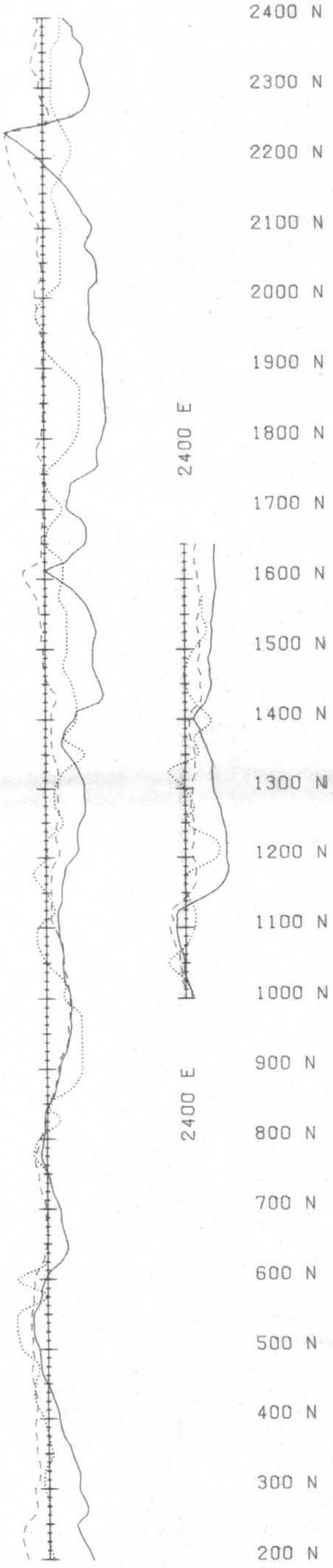
PLATE G2f

SJ GEOPHYSICS LTD.

HAWAII 23.4 kHz.



ANNAPOLIS 21.4 kHz.



LEGEND

DIP ANGLE - SOLID LINE
PROFILE SCALE: 20% / CM
BASE VALUE: 0
QUADRATURE - DASHED LINE
PROFILE SCALE: 20% / CM
BASE VALUE: 0
SLOPE - DOTTED LINE
PROFILE SCALE: 40% / CM
BASE VALUE: 0
SURVEY DIRECTION FACING NORTH
PROFILES POSITIVE TO LEFT

INSTRUMENTATION:
EDA OMNI-PLUS VLF-EM SYSTEM

ARC PROPERTY
KOKANEE EXPLORATIONS LTD.

VLF EM SURVEY - PROFILES
DIP ANGLE, QUADRATURE & SLOPE

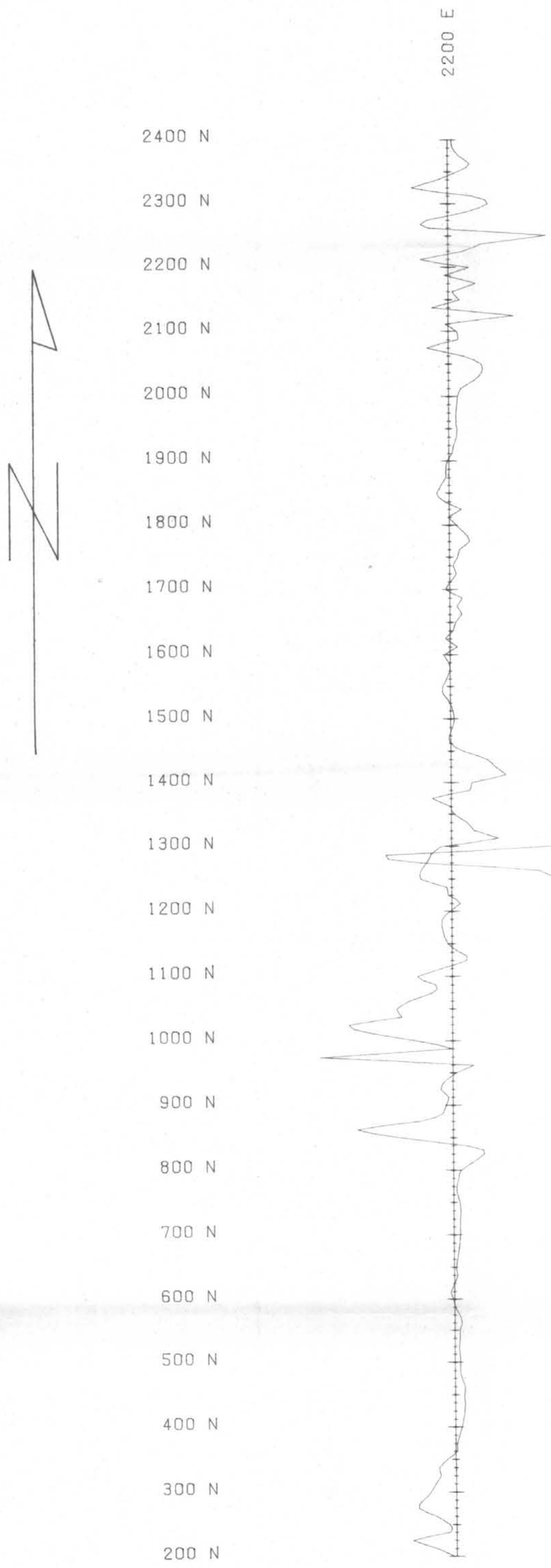
SLOCAN MINING DIVISION, B.C. NTS 82 F/5

SCALE 1:5000

100 0 100 200 300
METRES

DECEMBER 1991 PART 2 OF 2

SJ GEOPHYSICS LTD.



2400 N
2300 N
2200 N
2100 N
2000 N
1900 N
1800 N
1700 N
1600 N
1500 N
1400 N
1300 N
1200 N
1100 N
1000 N
900 N
800 N
700 N
600 N
500 N
400 N
300 N
200 N

LEGEND

PROFILE SCALE: 250 NT / CM
BASE VALUE: 57000 NT
MAXIMUM VALUE: 58518 NT
MINUMUM VALUE: 56232 NT
INSTRUMENTATION:
BASE: EDA OMNI MK IV MAGNETOMETER
FIELD: EDA OMNI PLUS MAGNETOMETER
PROFILES POSITIVE TO LEFT

ARC PROPERTY
KOKANEE EXPLORATIONS LTD.

MAGNETOMETER SURVEY
PROFILES

SLOCAN MINING DIVISION, B.C. NTS 82 F/3

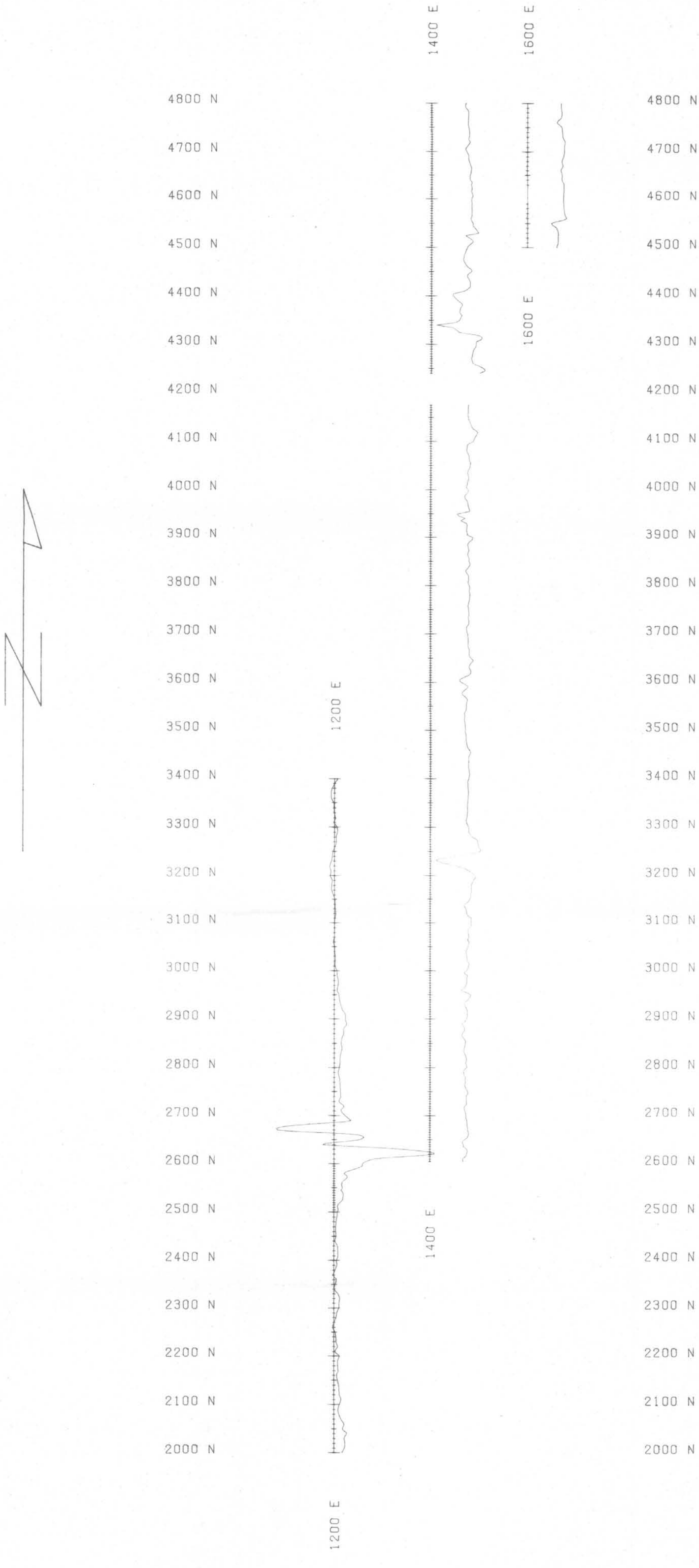
SCALE 1:5000

100 0 100 200 300
METRES

DECEMBER 1991

PART 2 OF 2

SJ GEOPHYSICS LTD.



LEGEND

PROFILE SCALE: 100 NT / CM
BASE VALUE: 57000 NT
MAXIMUM VALUE: 57235 NT
MINUMUM VALUE: 56581 NT
INSTRUMENTATION:
BASE: EDA OMNI MK IV MAGNETOMETER
FIELD: EDA OMNI PLUS MAGNETOMETER
PROFILES POSITIVE TO LEFT

ARC PROPERTY
KOKANEE EXPLORATIONS LTD.

MAGNETOMETER SURVEY PROFILES

SLOCAN MINING DIVISION, B.C. NTS 82 F

SCALE 1:5000

100 0 100 200 300
METRES

SJ GEOPHYSICS LTD.

DECEMBER 1991

PLATE 5

PART 2 OF 2

GEOLOGICAL BRANCH
ASSESSMENT REPORT

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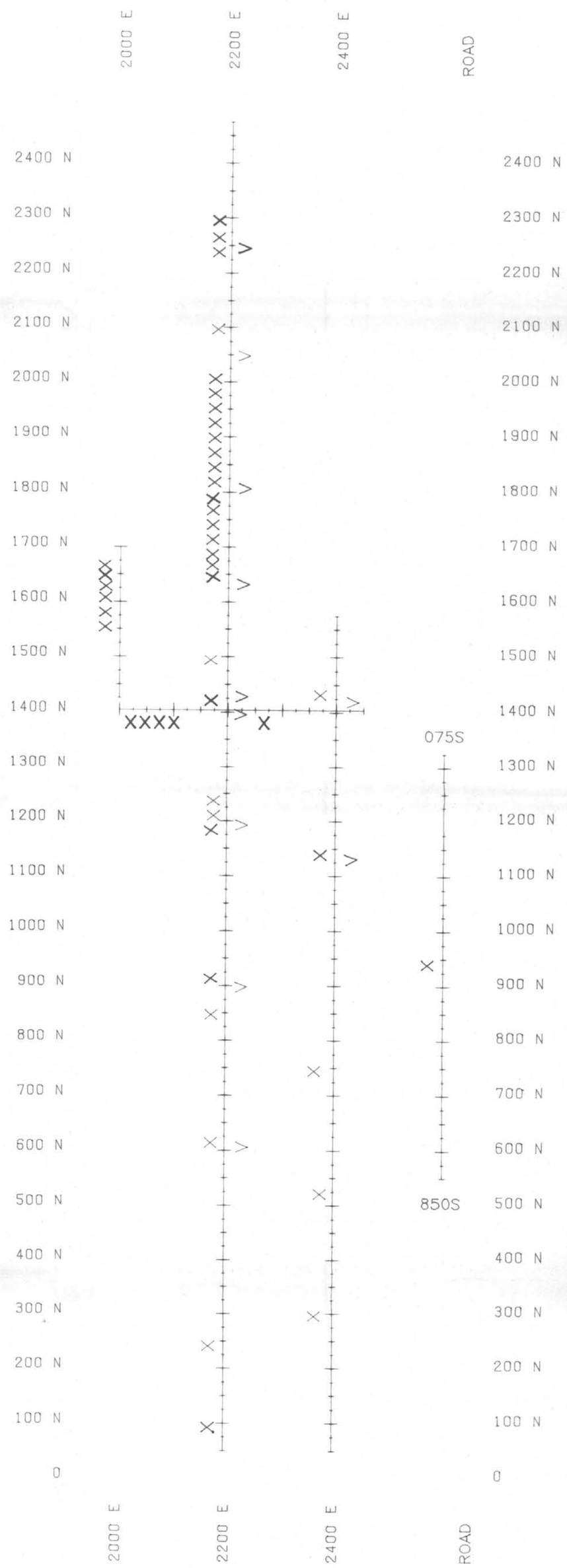

LEGEND

MAX–MIN CONDUCTOR AXIS

XXXX STRONG
XXXX MEDIUM
XXXX WEAK

VLF - EM CONDUCTOR AXIS

VVV STRONG
VVV MEDIUM
VVV WEAK

NOTE: VLF DONE ON SMALLER GRID

ARC PROPERTY

KOKANEE EXPLORATIONS LTD.

VLF & MAXMIN SURVEY COMPILATION MAP

SLOCAN MINING DIVISION, B.C. NTS 82 F/3

SCALE 1:5000

100 0 100 200 300

METRES

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DECEMBER 1991

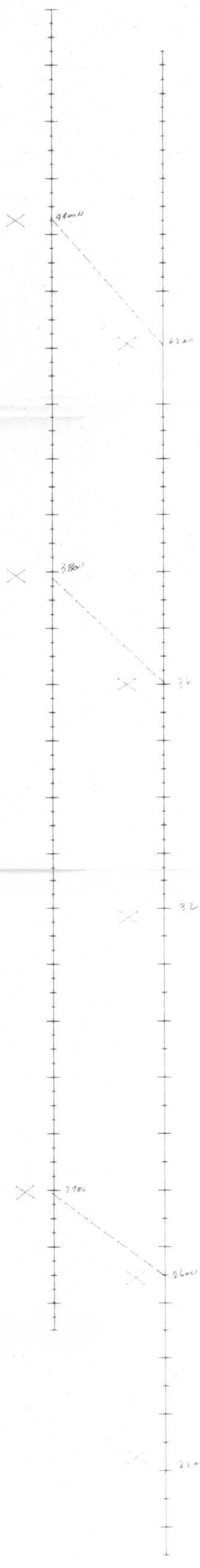
PART 2 OF 2

PLATE G6

4800 N
4700 N
4600 N
4500 N
4400 N
4300 N
4200 N
4100 N
4000 N
3900 N
3800 N
3700 N
3600 N
3500 N
3400 N
3300 N
3200 N
3100 N
3000 N
2900 N
2800 N
2700 N
2600 N
2500 N
2400 N
2300 N
2200 N
2100 N
2000 N

1200 E

1400 E



LEGEND

MAX–MIN CONDUCTOR AXIS

XXXX STRONG
XXXX MEDIUM
XXXX WEAK

ARC PROPERTY
KOKANEE EXPLORATIONS LTD.
HLEM MAXMIN SURVEY
COMPILATION MAP

SLOCAN MINING DIVISION, B.C. NTS 82F/10

SCALE 1:5000

100 0 100 200 300
METRES

DECEMBER 1991

PART 2 OF 2

PLATE G7

SJ GEOPHYSICS LTD.

GEOLOGICAL BRANCH
ASSESSMENT REPORT

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