COMINCO LTD.

EXPLORATION

CANADA

NTS 82M/10

1999 ASSESSMENT REPORT

KNEB PROPERTY

RECONNAISSANCE GROUND GEOPHYSICAL SURVEYS (UTEM/MAG)

REVELSTOKE M.D.,

REVELSTOKE, BRITISH COLUMBIA

WORK PERIOD

MAY 10-25, 1999

LATITUDE: 51°30′

LONGITUDE: 118°45′

JULY, 1999

ROBERT W. HOLROYD

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Exploration
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SUMMARY

A geophysical program was carried out on the Kneb property, north of Revelstoke, BC. The property is situated on the northwestern flank of Frenchman Cap dome on the eastern margin of the Shushwap Complex. About 12 kms to the southwest are the Cottonbelt and Bass deposits which occur on the west limb of the Mount Grace syncline, and the Complex and McLeod on the east limb. Mineralization occurs within an unusual lead-zinc-iron formation, several metres thick and several kms in length and contains an average of 5-6 % Pb, 2% Zn and 50 g/t Ag. In 1998, Cominco Ltd. geologists found a gossanous stratabound sulphide showing, about 500 m long and up to 7 m thick, composed of limonitic and silicified marble containing significant pyrrhotite and chalcopyrite, and sampling produced 1-4% Cu and up to 500 ppm Pb and/or Zn. A nunatak a short distance along strike to the west contained sphalerite and galena in addition to chalcopyrite and pyrrhotite, and several high-grade massive sulphide boulders to the north of the showing, suggested a source under the glacier to the east.

In May 1999, a geophysical program, comprising UTEM and magnetics, attempted to locate the source of the high-grade Pb/Zn boulders under the glacier. The showing, and the projection of the showing stratigraphy under the ice, proved to be non-conductive, with minor flanking magnetic responses. However, further to the north, a significant conductor with high magnetic signature, was identified and traced for over 800 m, though the eastern limit was not defined due to excessively steep terrain. The conductor occurs at the same geologic contact as the Cottonbelt and other deposits/showings associated with the Mount Grace syncline. Since most of the 1998 field mapping/prospecting was directed to the west, in the showing area, little is known about the area of the conductor. A field visit is required to attempt to determine the source of the conductor.

INTRODUCTION

The Kneb property is located about 60 kms northwest of Revelstoke, and access to the property was provided by helicopter from Revelstoke. The property is situated in alpine terrain, at elevations ranging from 2000 to over 2300 m, in the Monashee Mountains, and a significant portion of the claim group is covered by a glacier. To minimize danger due to crevasses, the 1999 geophysical program was carried out in early May, during which time considerable snow cover was present.

REGIONAL GEOLOGY

The property is situated along the northwestern margin of Frenchman Cap dome, and the stratigraphic succession comprises a heterogeneous package of generally thin-bedded quartzite, marble, calcareous gneiss and pelitic schist. This section, referred to as the "autochthonous cover rocks" (Brown 1980), overlies "core gneiss" of the dome which consist dominantly of feldspar augen orthogneiss, pelitic gneiss, hornblende gneiss and amphibolite (Hoy, 1987). The autochthonous cover rocks are separated from an overlying package of metasedimentary rocks by the Monashee decollement, a west-dipping reverse fault (Read and Brown, 1981). The allochthonous cover rocks include quartz feldspar paragneiss, micaceous quartzite, amphibolite and calc-silicate gneiss that have been extensively invaded by granitic gneiss and pegmatite (Wheeler, 1965).

The property was initially staked in 1998 to cover a gossanous stratabound sulphide showing, about 500 metres long and up to 7 m thick, composed of limonitic and silicified marble containing significant pyrrhotite and chalcopyrite. Cominco originally discovered a small more weakly mineralized part of this showing, exposed below the glacier, in 1965. Samples of Cu mineralization in outcrop produced 1 to 4% Cu with up to 500 ppm Pb and/or Zn. The easternmost exposure of this showing is in a nunatak just upslope of the present toe of the glacier, contains significant amounts of sphalerite and galena in addition to chalcopyrite and pyrrhotite, suggesting a metal zonation to Pb/Zn to the east under the glacier. A train of high-grade massive sulphide boulders to the north of the showings were believed to be sourced under the glacier, to the east of the showing. High grade boulder samples were sent of to ECL for analysis and returned the encouraging values, the best of which were 12.4 %Zn, 9.3% Pb, and 139.3 g/t Ag, and 12.4% Zn, 7.2% Pb, and 108.6 g/t Ag.

The Kneb mineralization displays similar characteristics to both the Cottonbelt and Ruddock Creek deposits, which have recently been interpreted to be probable Broken Hill type deposits, suggesting potential for a large high grade Zn-Pb-Cu-Ag-Au deposit.

GEOPHYSICS

The 1999 geophysical program on the Kneb property, designed to trace the mineralization under the glacier, was undertaken from May 10th to 25th. The program involved 24.7 kms of UTEM and 19.2 kms of magnetic surveys, carried out by a Cominco crew, with the aid of two mountaineering experts for safety. A large in-loop (Loop 1) UTEM survey was carried out, focused on the showing and the eastern extension under the glacier. Surprisingly the showing was not conductive and only weakly magnetic. A narrow horizon is traceable to the east from the showing area, and along the projection of the mineralized horizon, but, like the showing area, there is no associated conductivity. Testing of samples from the showing with a multimeter show that the showing mineralization is conductive on a local scale, with magnetite in the hanging wall. Testing of the boulders shows that mineralization to be non-conductive and slightly magnetic. Due to the high-grade nature of the sulphide boulders, locating the source of these boulders under the ice is the primary goal of the program. The following are the lab results from seven samples.

Sample no.	Zn%	Pb%	Ag g/t	Au ppb
ABM98-46	12.4	9.3	139.3	42
ABM98-47	12.4	7.2	108.6	180
ABM98-48	6.7	5.4	98.8	134
ABM98-49	0.4	15.1	236.8	420
ABM98-50	6.0	0.2	3.6	<10
ABM98-51	1.1	4.5	70.8	540
ABM98-52	9.0	6.0	108.6	80

A magnetic high immediately to the east of the boulders, under the ice, possibly outlines the source of the boulders. This magnetic feature is small, being only evident on one line, and has no associated UTEM response. However, there appears to be a northeast break immediately east of the magnetic feature, suggesting a possible structural break. Strong magnetic responses are evident to the north of the boulders, and though down-ice and hence not the source of the boulders may be of interest for similar style of mineralization. Weak conductive responses are related to these northern magnetic features.

About one km to the ENE of the showing, a significant conductor was outlined. A second UTEM loop (Loop 2) was laid out to the south of the conductor to detail this feature. The conductor was traced over a strike length of about 800 m though the eastern limit was not defined due to excessively steep terrain. The magnetic responses over the conductor are very strong, typically greater than 1000 nT. This is a flat lying conductive feature, dipping approximately 15° to the north, and responding to UTEM channels as late as Channel 3. Conductivity*thickness products have been interpreted to be less than 10 S, which is low to moderate conductance. The northern limit of the conductor was not defined from the two loops involved in this survey. Some outcrop was visible in the area of the conductor, despite greater than 10 m of snow throughout the area. The outcrop was very rusty, comprising kyanite-sillimanite schist, with little sulphide, within which a marble unit occurs. The geological setting is identical to the Cottonbelt deposit, 12 km to the southeast, and several showings to the north of Cottonbelt. Though the conductor has a near-surface component, the best conductivity appears to be at depths in the order of 100m. It is possible that the conductor is the down-dip continuation of the showing horizon, with glacial gouge removing the intervening trace of the mineralized horizon.

CONCLUSIONS AND RECOMENDATIONS

The UTEM conductor identified in the 1999 geophysical program is worthy of additional follow up. The conductor occurs near the favourable Unit 6A/6B contact, the same as Cottonbelt and other prospects within the Monashee syncline. It is recommended that further investigation of the area of the conductor take place after the snow cover has disappeared. Some exposure may be available to the east along the steep slope, possibly allowing mapping and sampling.

Report by:

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Cominco Ltd.

Distribution: Mining Recorder - 2
Exploration – 1
Admin. – 1 (excluding maps)

REFERENCES

Hoy, Trygve 1987 — **Geology of the Cottonbelt Lead-Zinc-Magnetite Layer, Carbonatites and Alkalic Rocks in the Mount Grace Area, Frenchman Cap Dome, Southeastern British Columbia**, Bulletin ISSN 0226-7497.

Read, P.B. and Brown, R.L. 1981 — **Columbia River Fault Zone: Southeastern Margin of the Shuswap and Monashee Complexes, Southeastern British Columbia**, Canadian Journal of Earth Sciences, Volume 18, No. 7, pages 1127-1145.

Wheeler, J.O. 1965 — **Big Bend Map Area, British Columbia**, Geological Survey of Canada, Paper 64-32, 37.

APPENDIX 1

EQUIPMENT AND PROCEDURES

MAGNETICS

The magnetics survey was carried out with the EDA OMNI PLUS system. Total field measurements were recorded, utilizing the same grid lines as the UTEM survey, though a denser station spacing of 25 m was used. Data is recorded and stored within the magnetometer's internal memory, and dumped to a computer in the evenings. A base station magnetometer was set up at the helicopter base outside Revelstoke and set to record at 15 second intervals throughout the day.

The base station and field units were linked and dumped to the computer simultaneously at the end of the day. Computer processing of the data allows diurnal magnetic variations to be removed from the field data. Reading accuracies of ±5 nT were attained for the magnetics survey.

UTEM

A description of the equipment used in the program, field surveying and data processing procedures are given below.

"UTEM" is an acronym for "University of Toronto Electromagnetometer". The system was developed by Dr. Y. Lamontagne while he was a graduate student at the University of Toronto.

The field procedure consists of first laying out a large loop of single strand insulated wire and energizing it with current from a transmitter loop which is powered by a 2 kW motor generator. Survey lines were generally oriented perpendicular to one side of the loop and surveying performed outside the loop, though for one loop, Loop #3, the surveying was carried out inside the loop.

The transmitter loop is energized with a precise triangular waveform at a carefully controlled frequency (30.974 Hz for this survey). The receiver system includes a sensor coil and backpack portable receiver which has an internal recording facility. The time synchronization between transmitter and receiver is achieved through quartz crystal clocks in both units, which must be accurate to within about one second in fifty years.

The receiver sensor typically measures the vertical 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 geological conductors. Deviations from the 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 receivers were configured to gather and record 10 channels of information 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 10,9,8,7, and 6, while better conductors will produce anomalous responses on progressively lower number channels. For example, massive, highly conducting sulphides or graphite will produce a response on all channels.

The digitally recorded data from the receiver's memory is dumped to a computer at the base camp, processed, and, after initial screen previewing, hard copy plots are produced. Data are presented on data sections as profiles of each of the nine channels, one section for each survey line, though in some cases several normalizing schemes may be utilized to further analyse the data, resulting in two or more profile plots per line.

APPENDIX 2

DATA PRESENTATION

MAGNETICS

The total field magnetic data for KNEB grid are presented as colour contours on the 1:5,000 compilation map. Colour contours are plotted on a logarithmic scale as shown in the colour bar.

UTEM

The results of the 1995 UTEM surveys are presented on a compilation map (Figure 3) at a scale of 1:5,000. The symbols utilized to describe the UTEM responses are listed in Table 1. Data sections of the Hz component are plotted for each line surveyed, at 1:5,000. A legend is provided to explain the symbols used on the compilation maps and data sections.

The magnetic field amplitudes from both the transmitter loop (primary field) and from those induced in the ground (secondary field) vary considerably with distance from the loop. To present such data, a normalizing scheme must be used. In this survey, the calculated primary field from the transmitter loop is used to normalize the data according to the following schemes:

1. Continuously normalized plots-

   The standard normalization scheme is:

   a) For channel 1:

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

   where P is the primary field from the loop at the station and Ch.1 is the observed amplitude for channel 1.

   b) The remaining channels (n = 2 to 9) are channel 1 reduced and channel 1 normalized:

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

   where Ch.n is the observed amplitude of channel n (n = 2 to 9).

2. Point normalized plots-

   These plots display an arrow at the top of the section indicating the station to which all data on the line is normalized.

   a) For channel 1:

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

   where P_{pn} is the primary field from the loop at the station of normalization, i.e., point normalized station, and Ch.1 is the observed amplitude for Channel 1.

b) The remaining channels ($n = 2$ to 9) are channel 1 reduced and channel 1 normalized:

$$\%Ch.n\ anomaly = \frac{Ch.1 - Ch.1_{pn}}{Ch.1_{pn}} \times 100\%$$

where Ch.n is the observed amplitude of Channel n and $Ch.1_{pn}$ is the observed channel 1 amplitude at the point normalized station.

APPENDIX 3

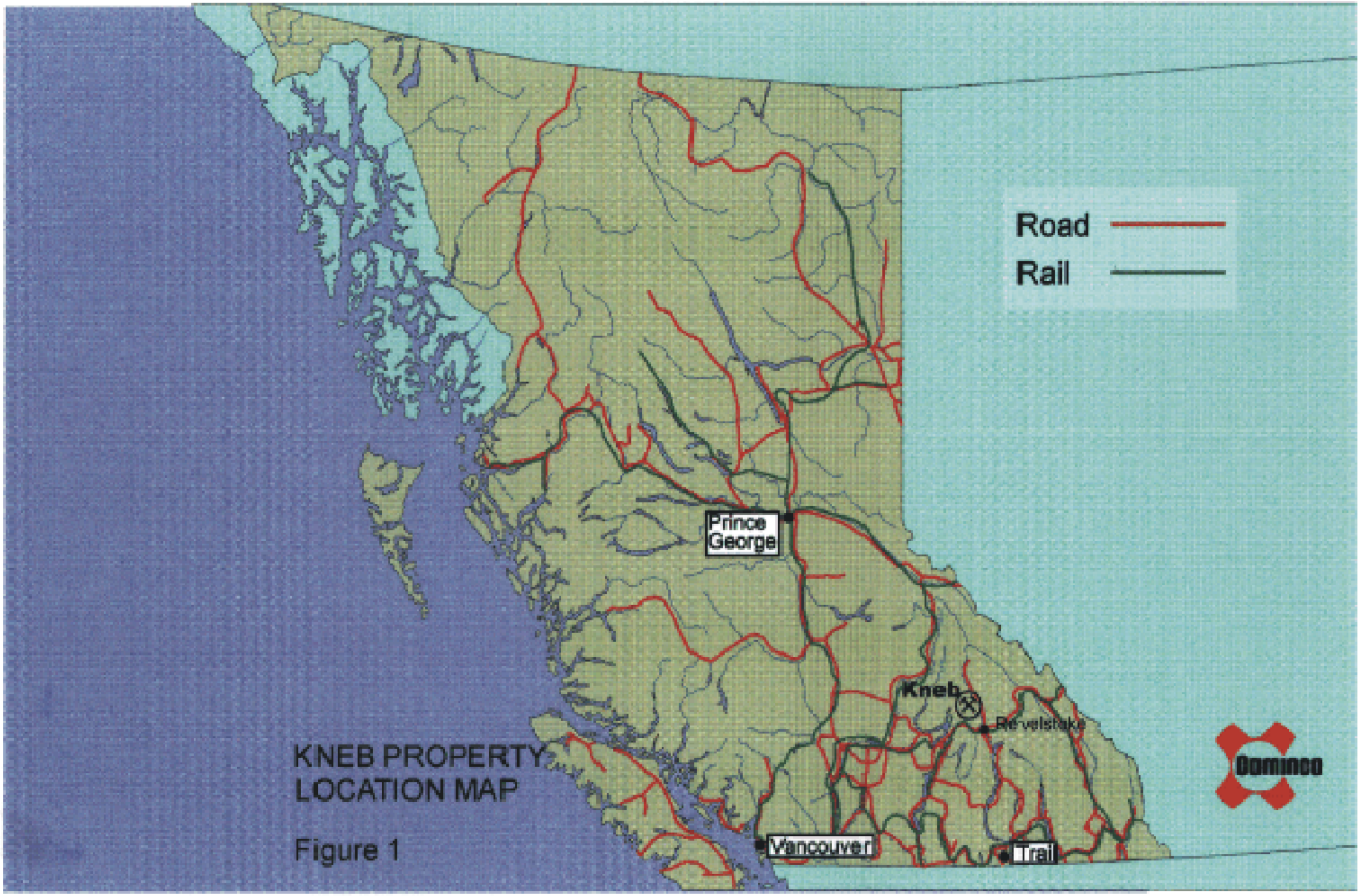
UTEM PROFILE PLOTS

APPENDIX 4

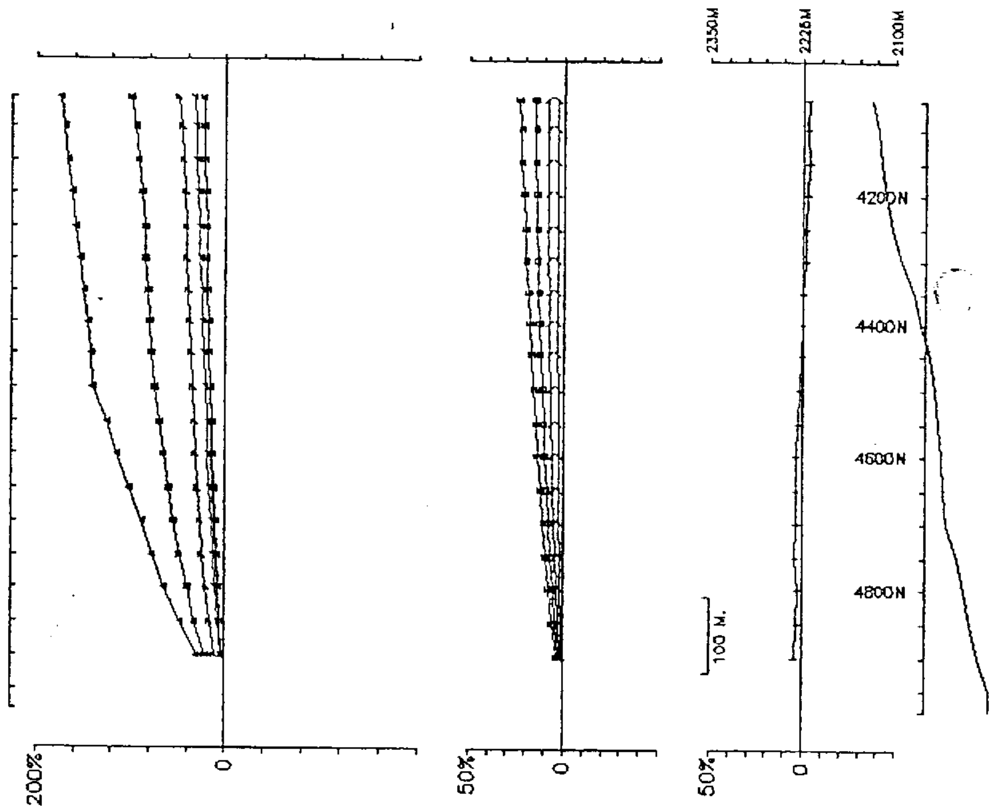
STATEMENT OF EXPENDITURES

Salaries:

Field -	Permanent (R.W. Holroyd, Scott Billows, Gill Graham, Kim Bilquist)	**$14,400**
	Temporary (R. Laver, G. Cox, J. Allardyce)	**$ 9,600**
Reporting – R.W. Holroyd (5 days)		**$ 1,750**
Accomodations/Food		**$ 6,200**
Truck Rental /Gas:		**$ 2,300**
Shipping/Supplies:		**$ 2,850**
Geophysical Equipment Rental:		**$ 6,400**
Helicopter		**$24,400**
TOTAL COST		**$67,900**

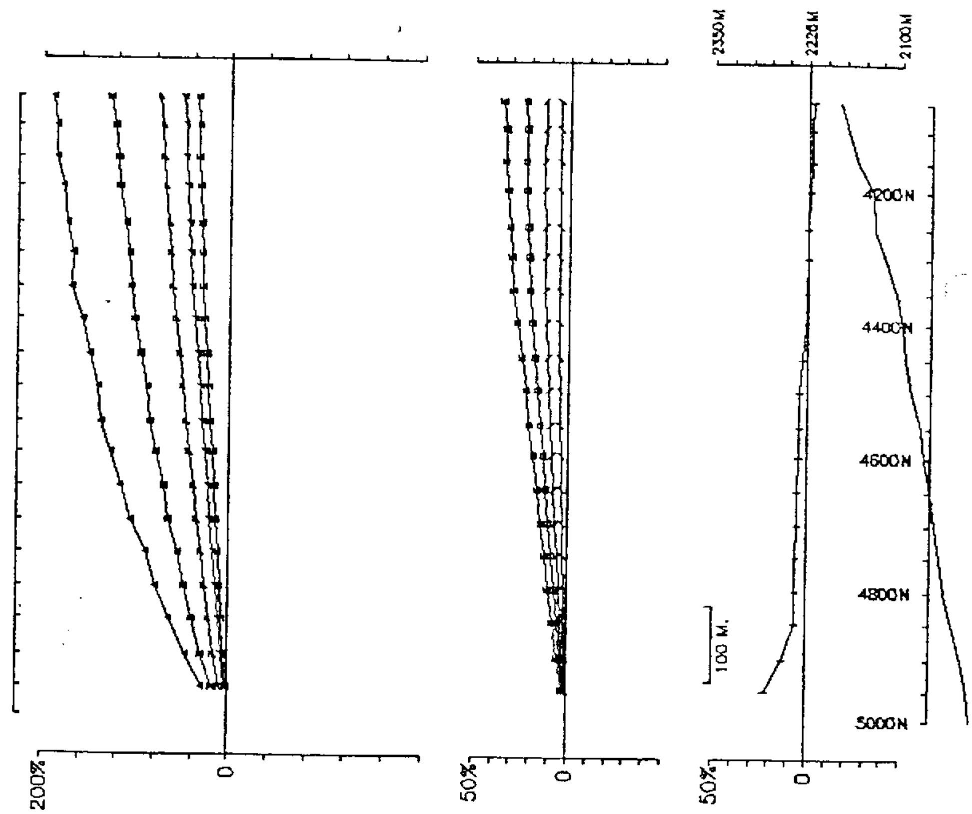

Road
Rail
Prince George
Kneb
Revelstoke
Vancouver
Trail
KNEB PROPERTY LOCATION MAP
Figure 1
Dominco

APP 3-1



KNEB /Area na COMINCO /Wh Hz
Op: The boys Freq(Hz): 30.974 #Stns: 18 Loop: 1 Line: 200E DS:
Ch1 reduced. Ch1 normalized. Totals:P-738M. /L-811M. Line Azim.: 0 . Rx Label: 2

APP. 3-2



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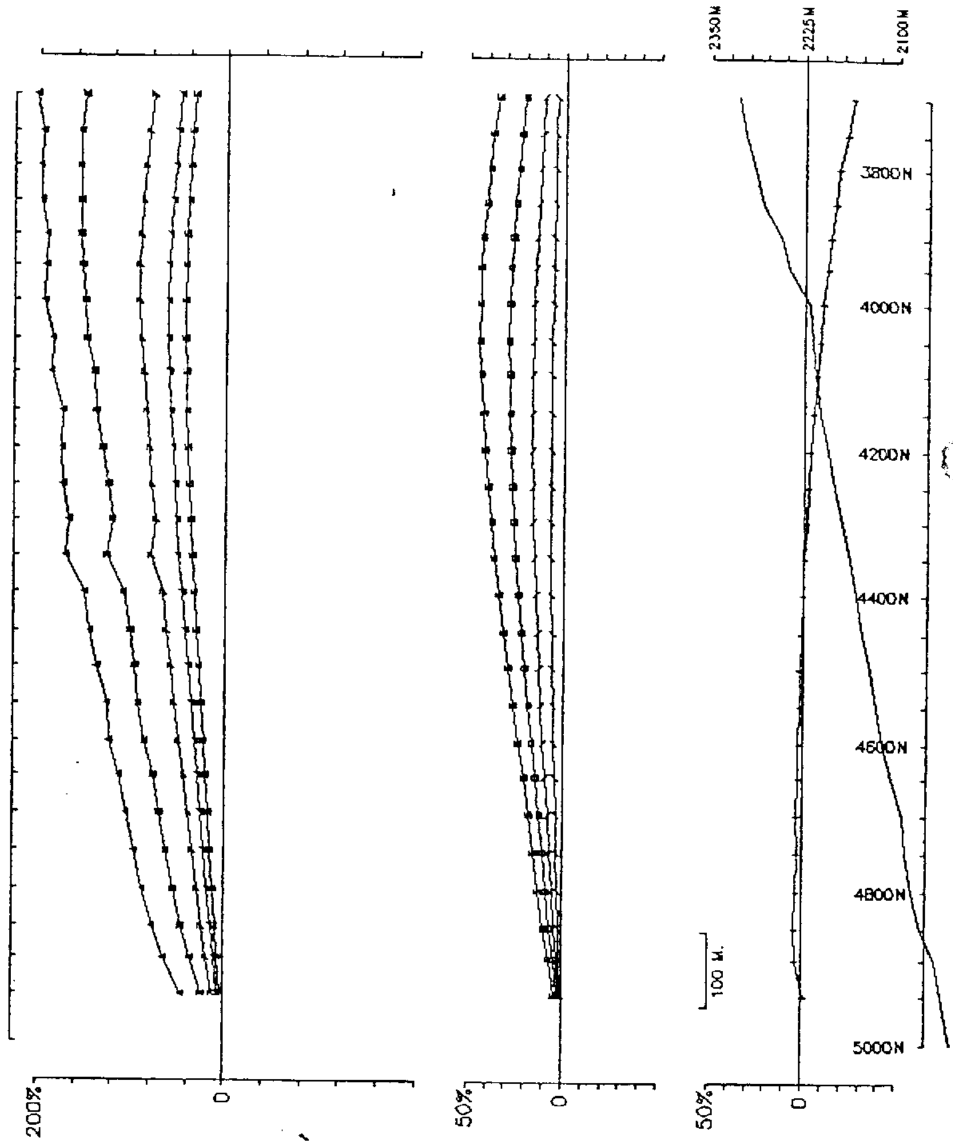
Chl reduced. Chl normalized. Totals:P-779M. /L-820M. Line Azim.: 0 . Rx Label: 4

APP. 3-3



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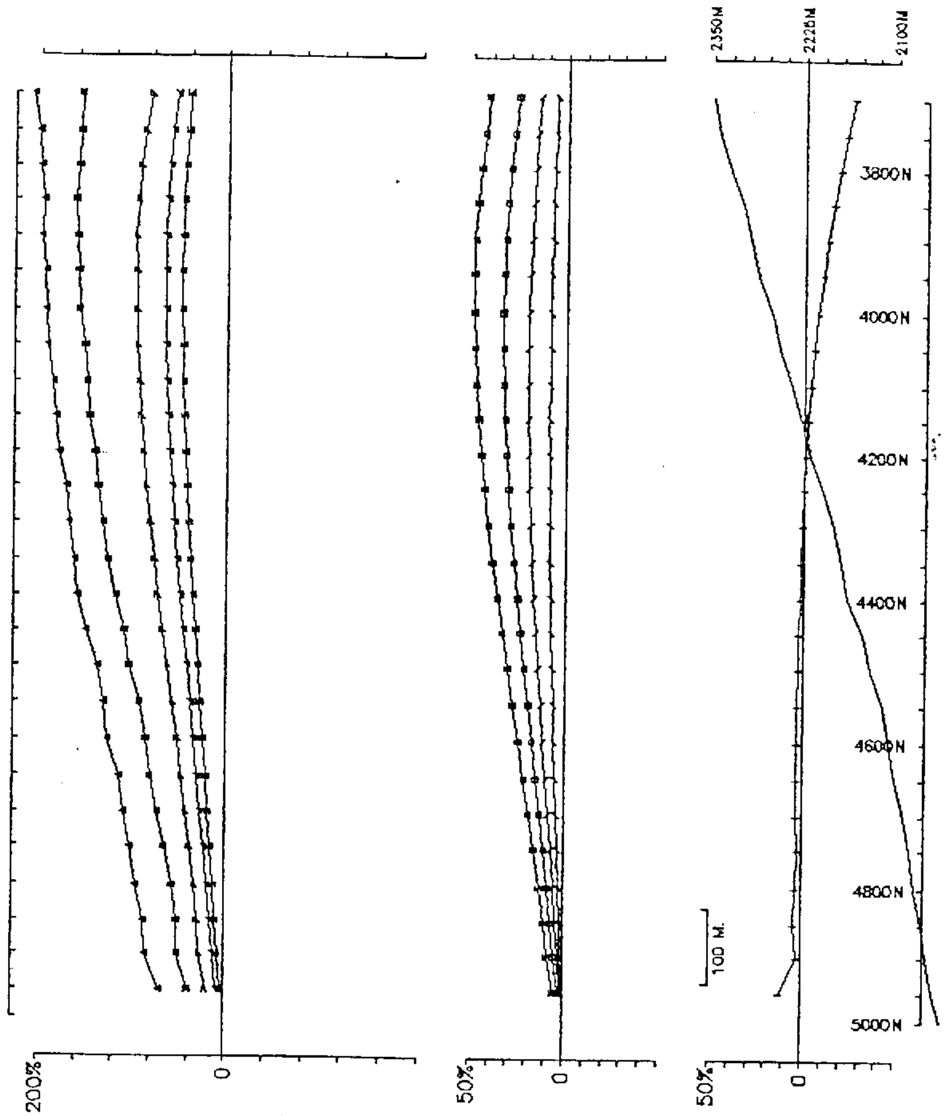
APP. 3-4



KNEB /Area na COMINCO /Wh Hz
Op: The boys Freq(Hz): 30.974 #Stns: 26 Loop: 1 Line: 800E DS:
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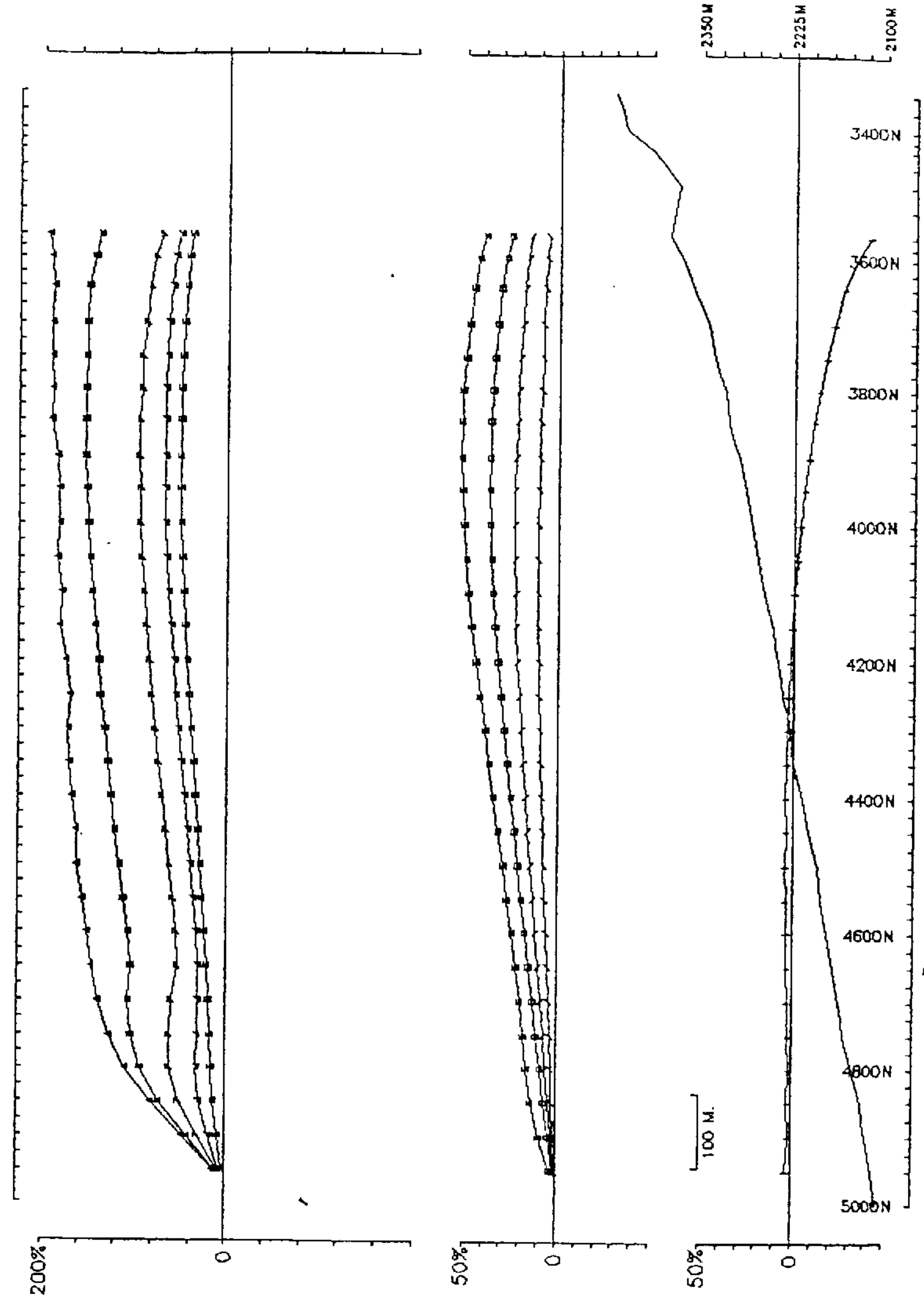
APP. 3-5



KNEB /Area na COMINCO /Wh Hz
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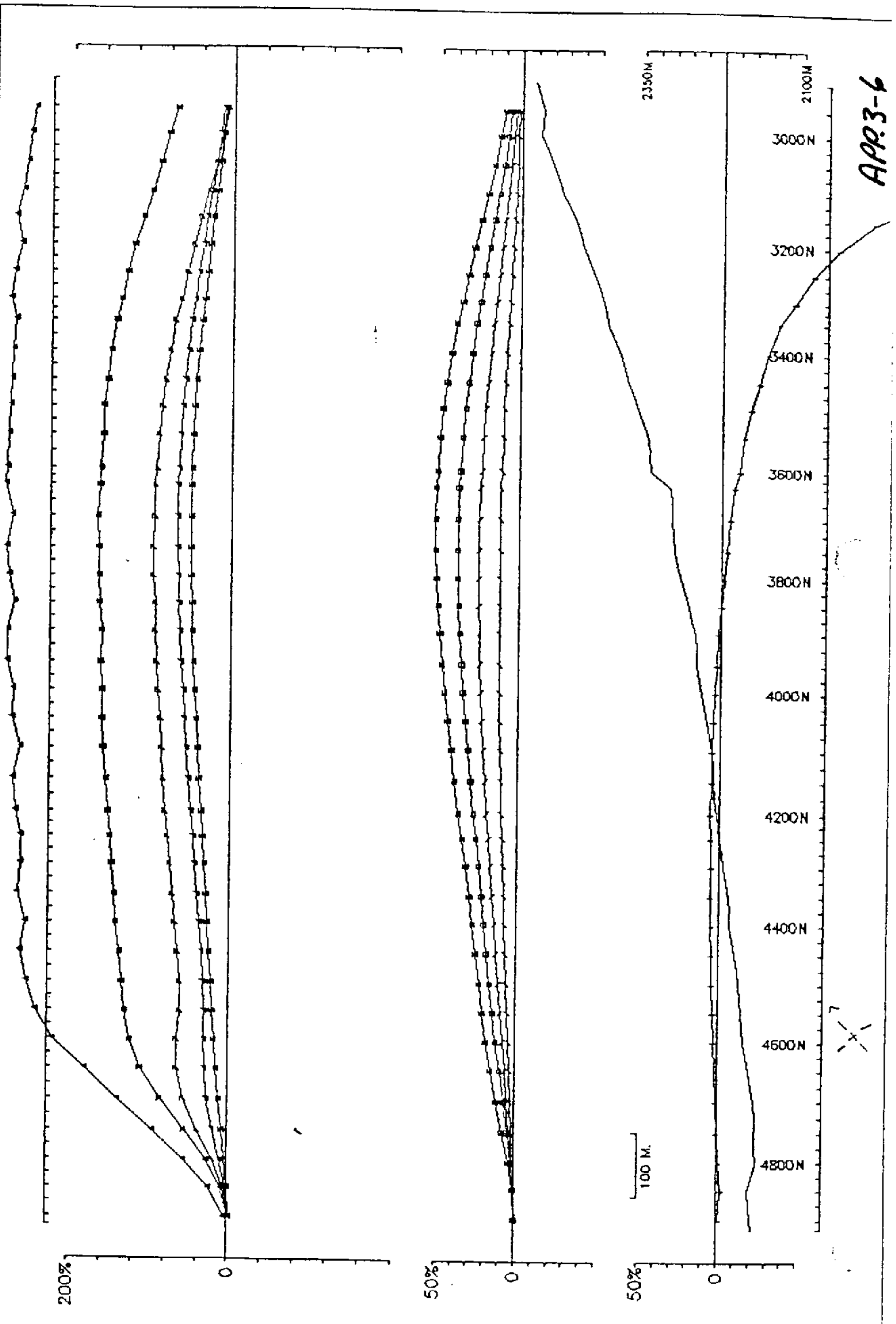

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Op: The boys Freq(Hz): 30.974 #Stns: 40 Loop: 1 Line: 1200E DS:
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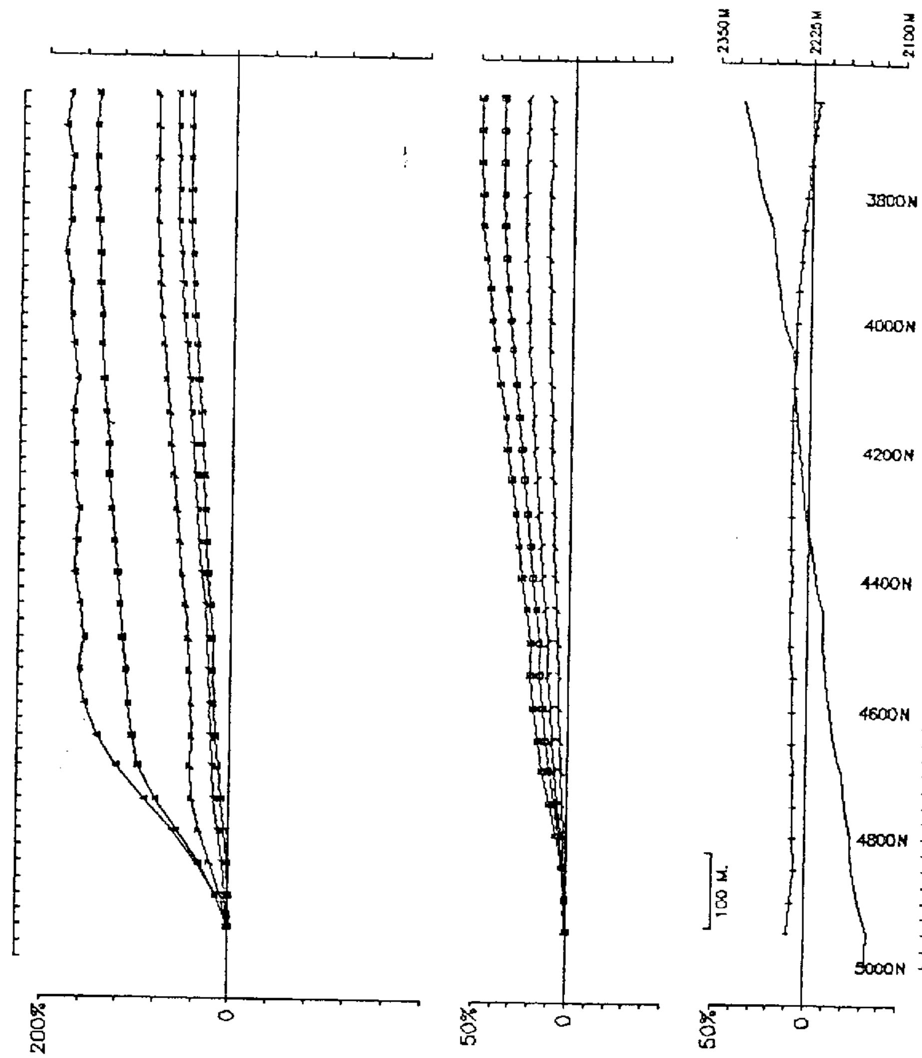
APP. 3-7



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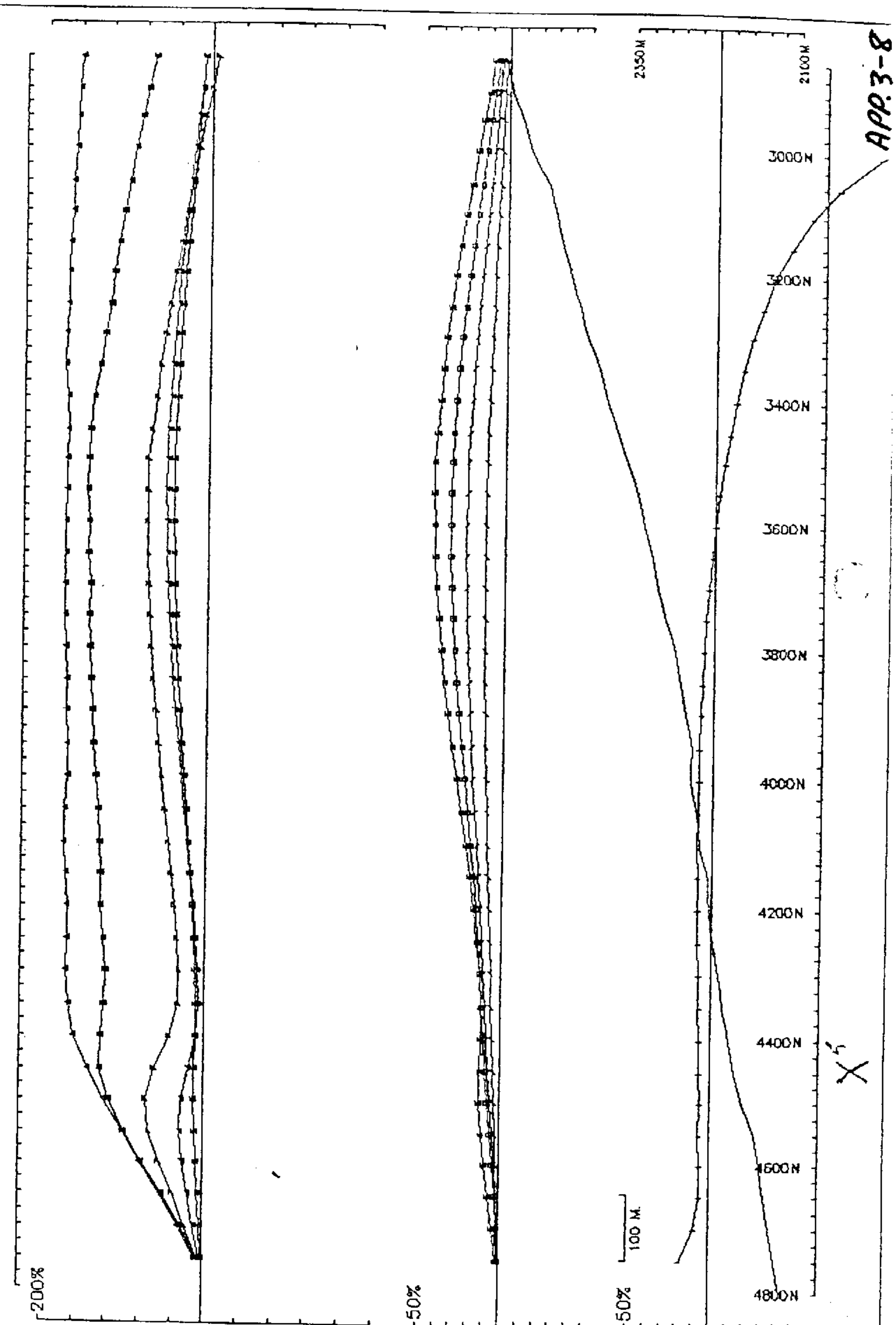

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Dp: The boys Freq(Hz): 30.974 #Stns: 39 Loop: 1 Line: 1550E DS:
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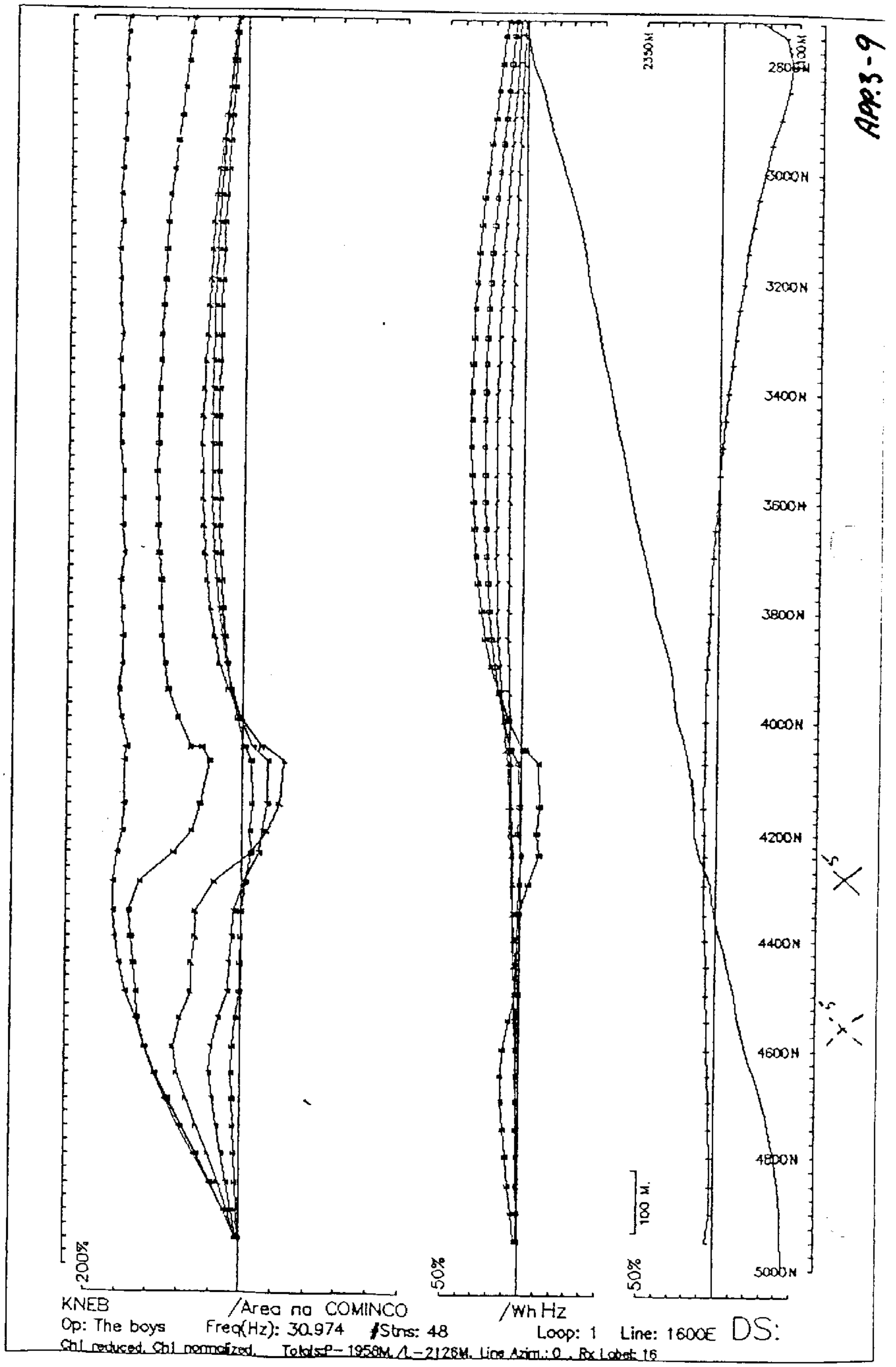
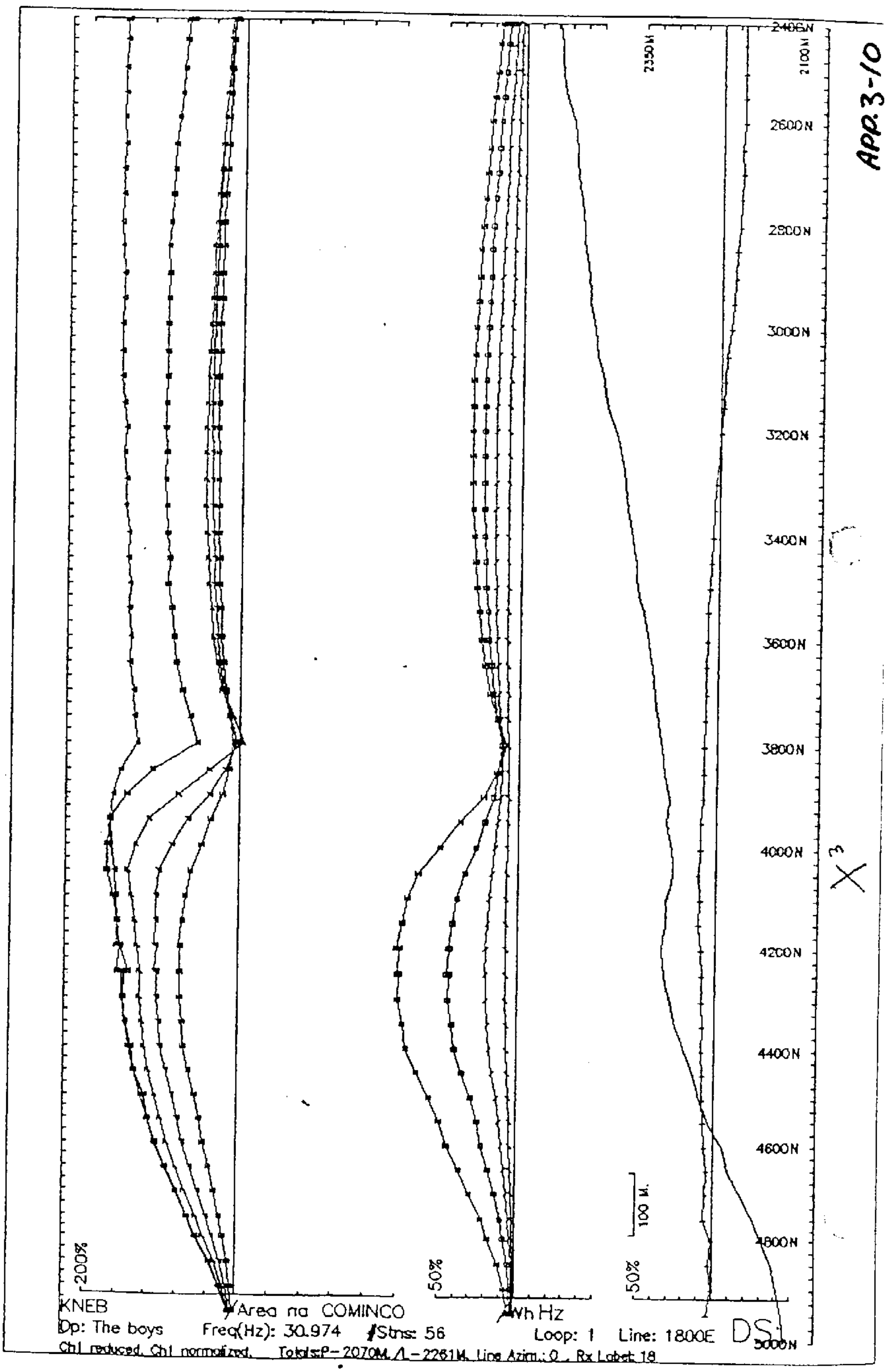

APP.3-9
2350 N
100 N
2800 N
3000 N
3200 N
3400 N
3600 N
3800 N
4000 N
4200 N
4400 N
4600 N
4800 N
5000 N
100 M.
200%
50%
50%
KNEB
/Area no COMINCO
/Wh Hz
Op: The boys
Freq(Hz): 30.974
#Stns: 48
Loop: 1
Line: 1600E
DS:
Ch1 reduced, Ch1 normalized.
Totals:P– 1958M, /L–2126M, Line Azim.: 0 , Rx Label: 16



200%
50%
50%
100 M.
2400N
2350 N
2100 N
2600N
2800N
3000N
3200N
3400N
3600N
3800N
4000N
4200N
4400N
4600N
4800N
5000N
KNEB
Area na COMINCO
Hz
Dp: The boys
Freq(Hz): 30.974
#Stns: 56
Loop: 1
Line: 1800E
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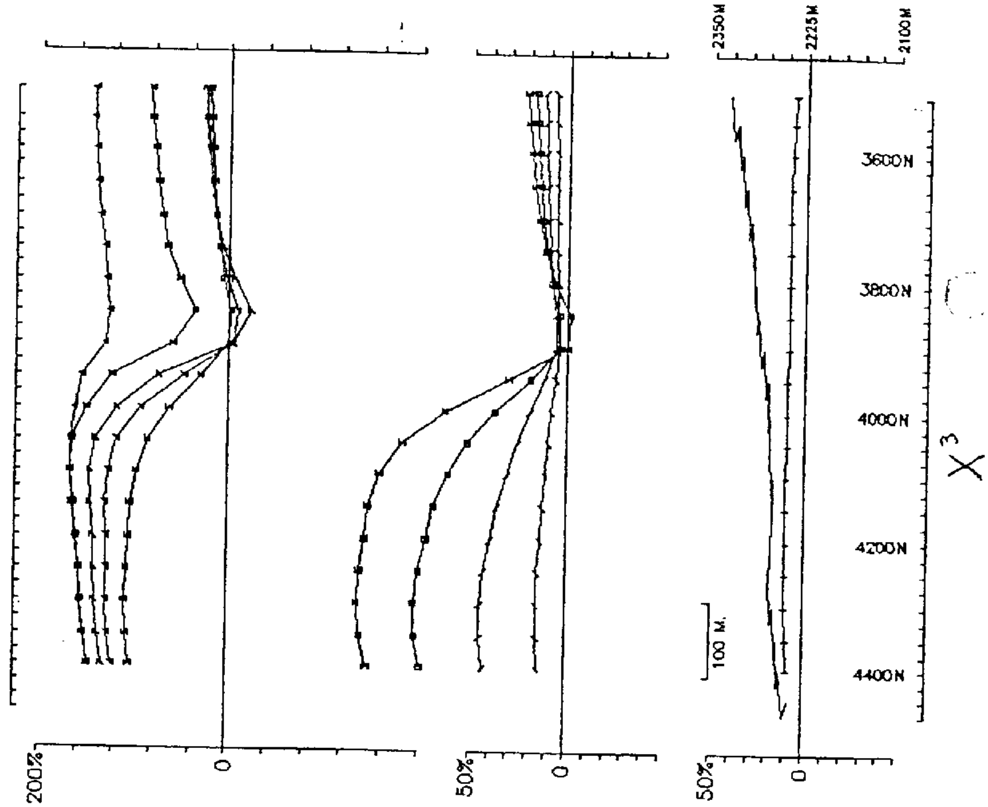
APP. 3-10

APP.3-11



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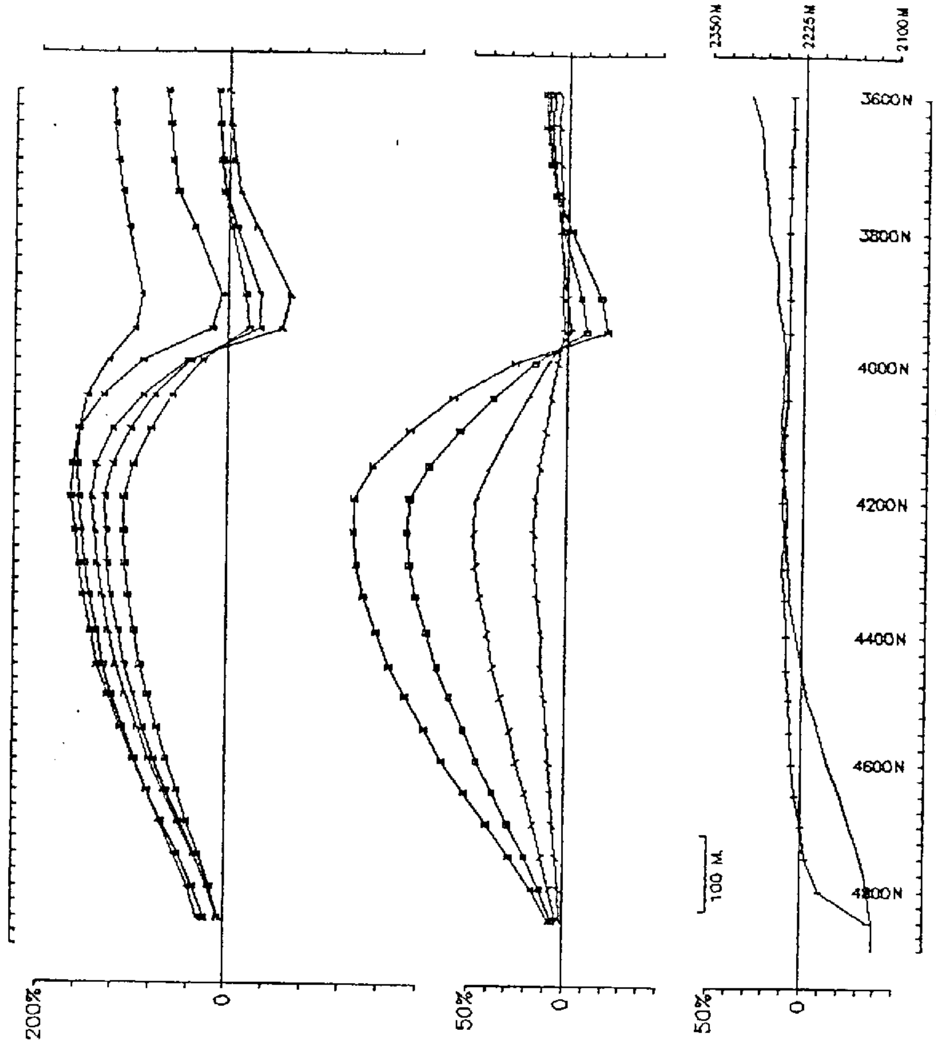
APP. 3-12



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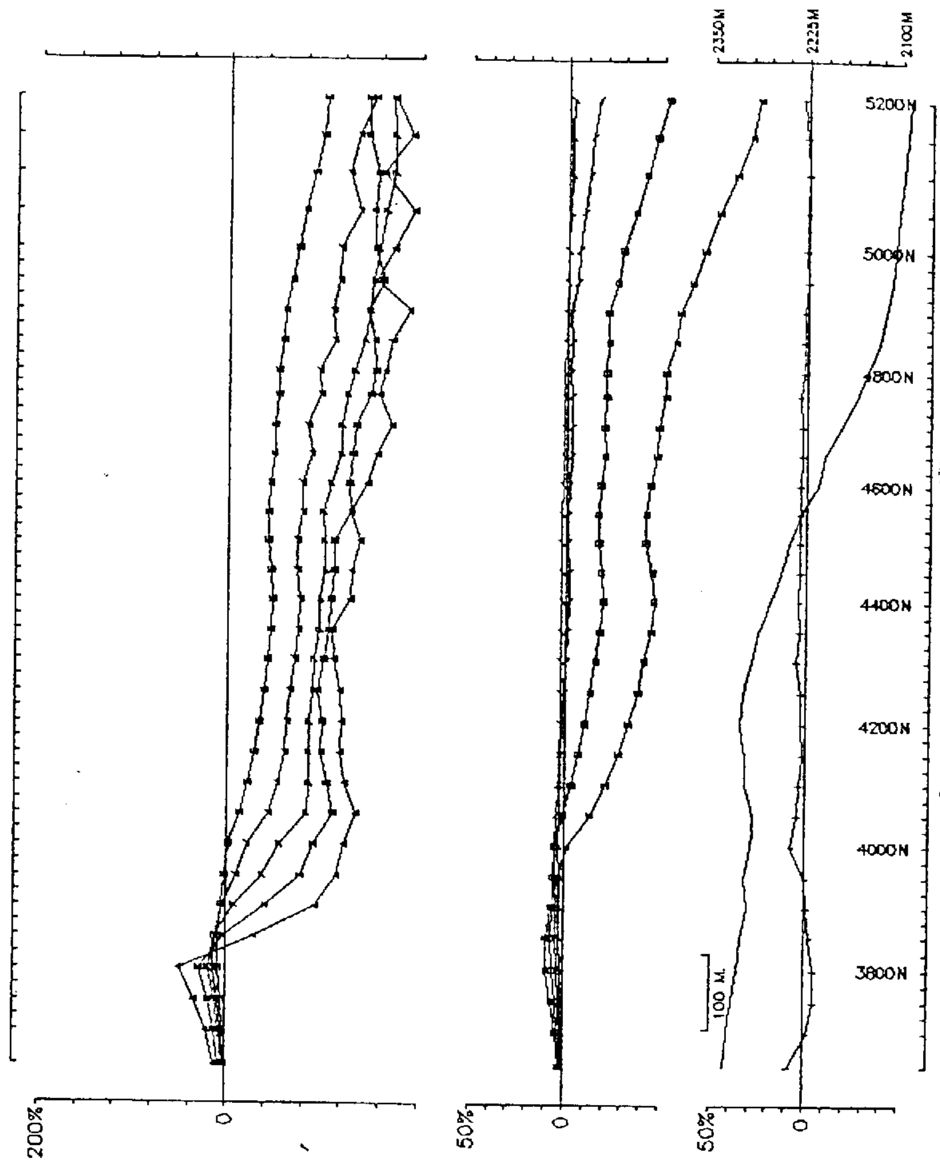
APP.3-13

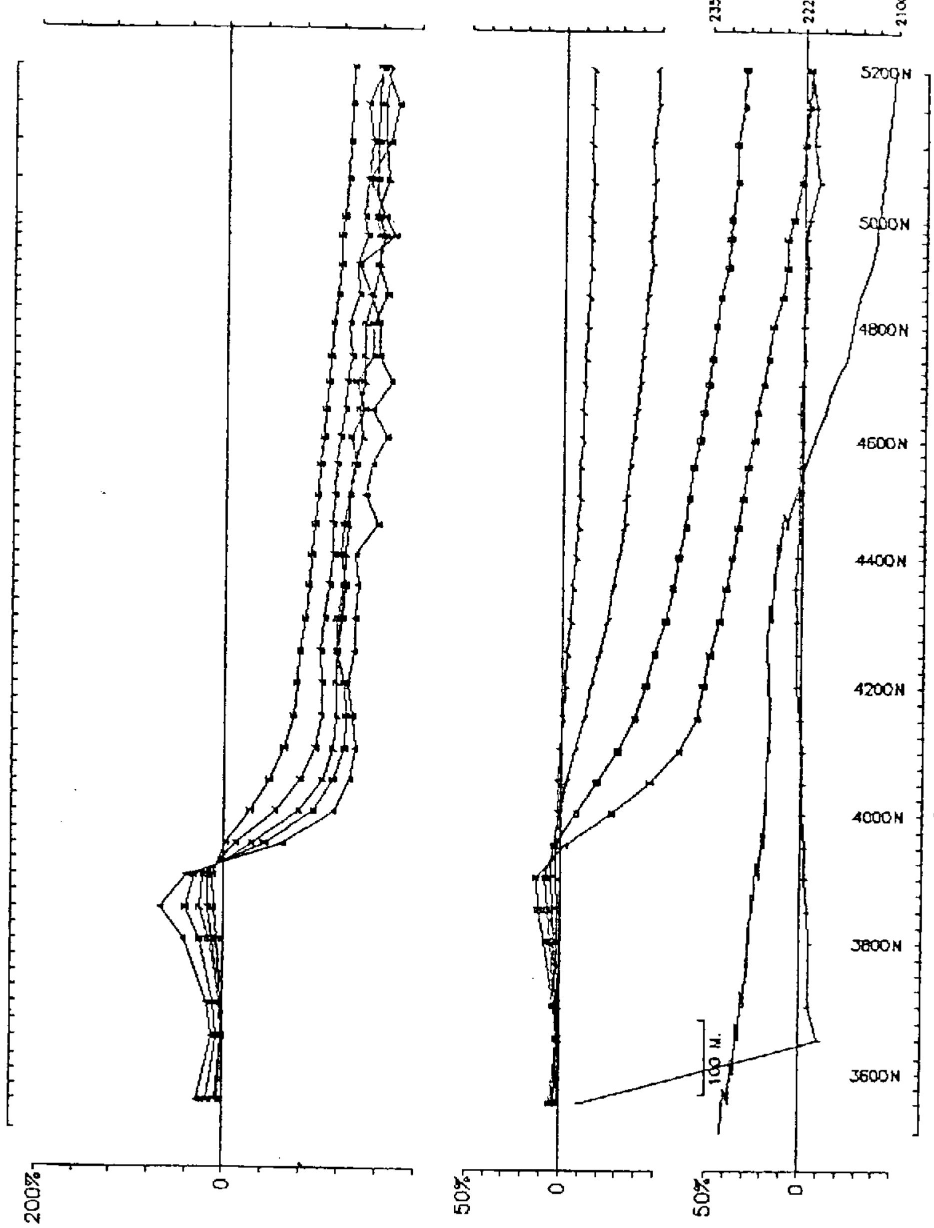


KNEB /Area na COMINCO /Wh Hz

Op: The boys Freq(Hz): 30.974 #Stns: 32 Loop: 2 Line: 1800E DS:

Chl reduced. Chl normalized. Totals:P– 1281M./L–1290M. Line Azim.: 0 . Rx Label: 18

APP. 3-14



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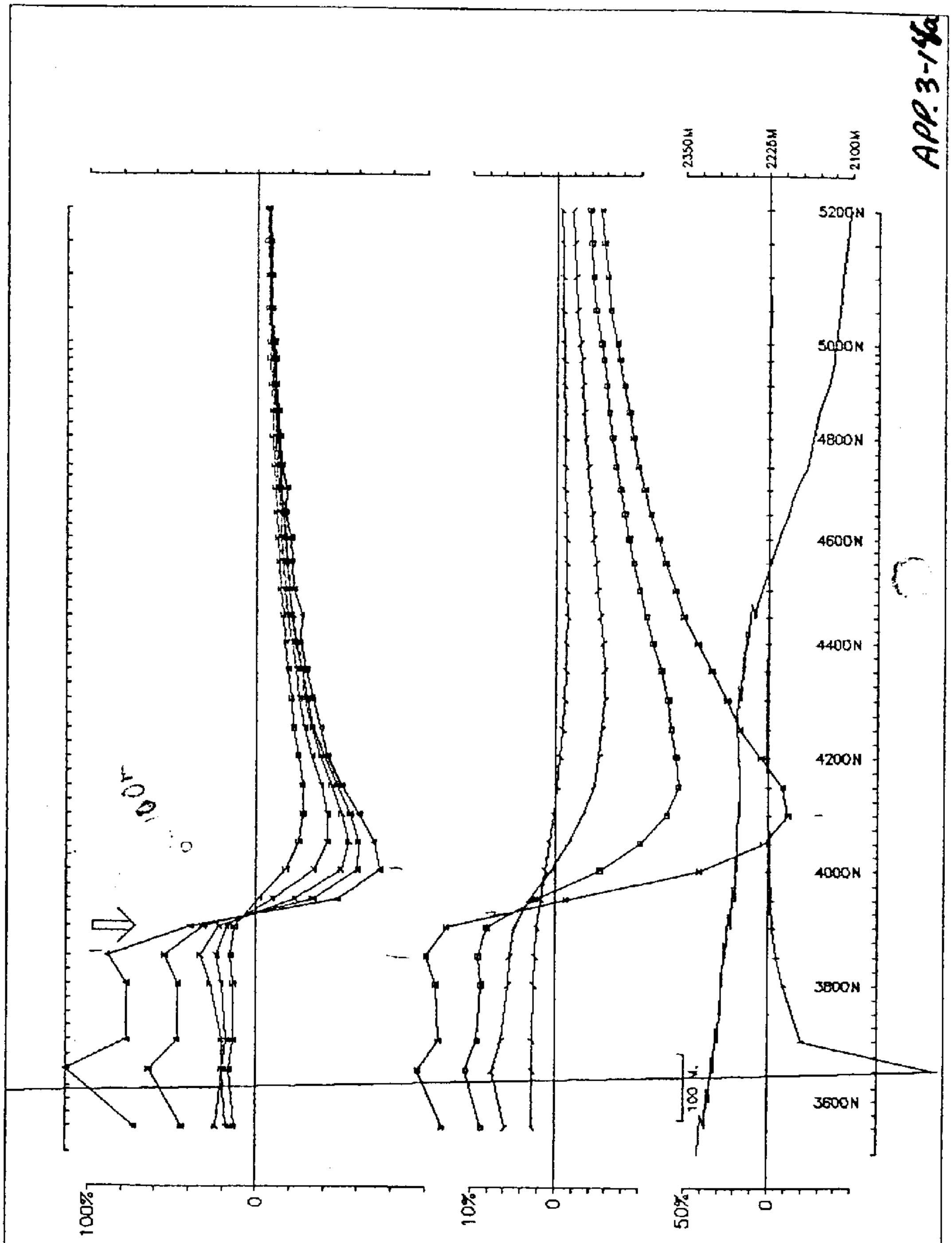

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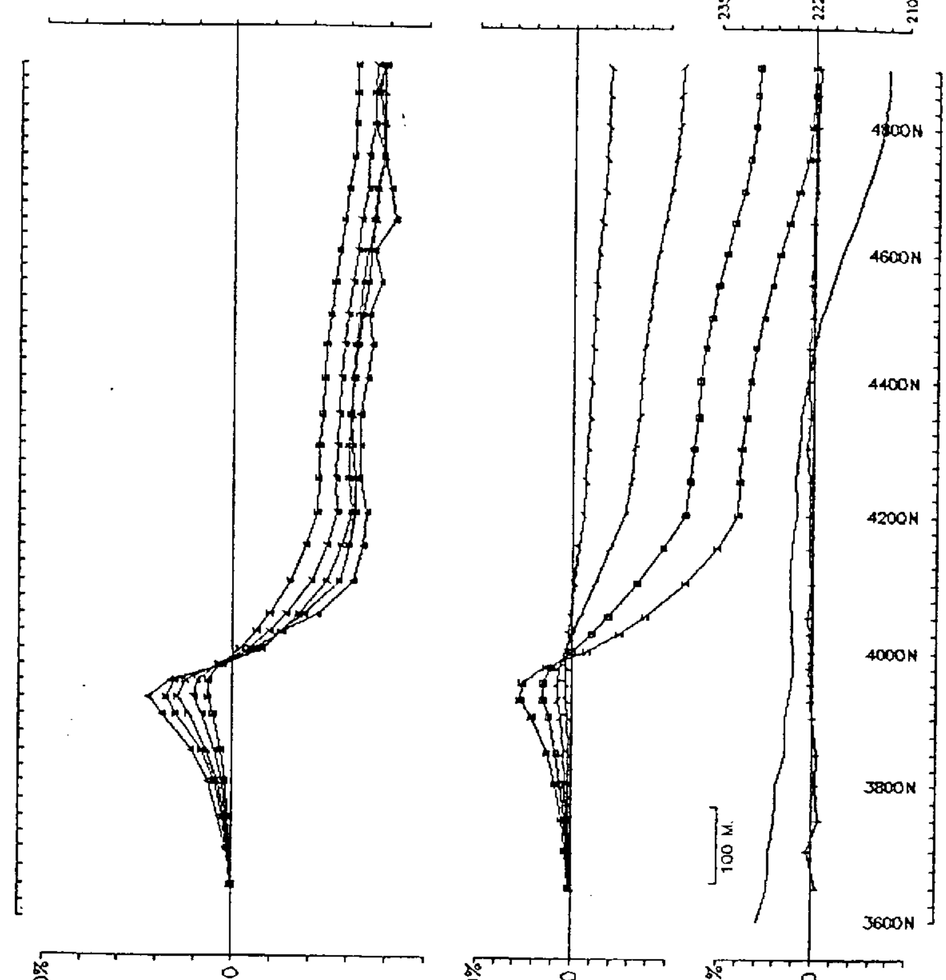

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Op: The boys Freq(Hz): 30.974 #Stns: 29 Loop: 2 Line: 2100E DS:
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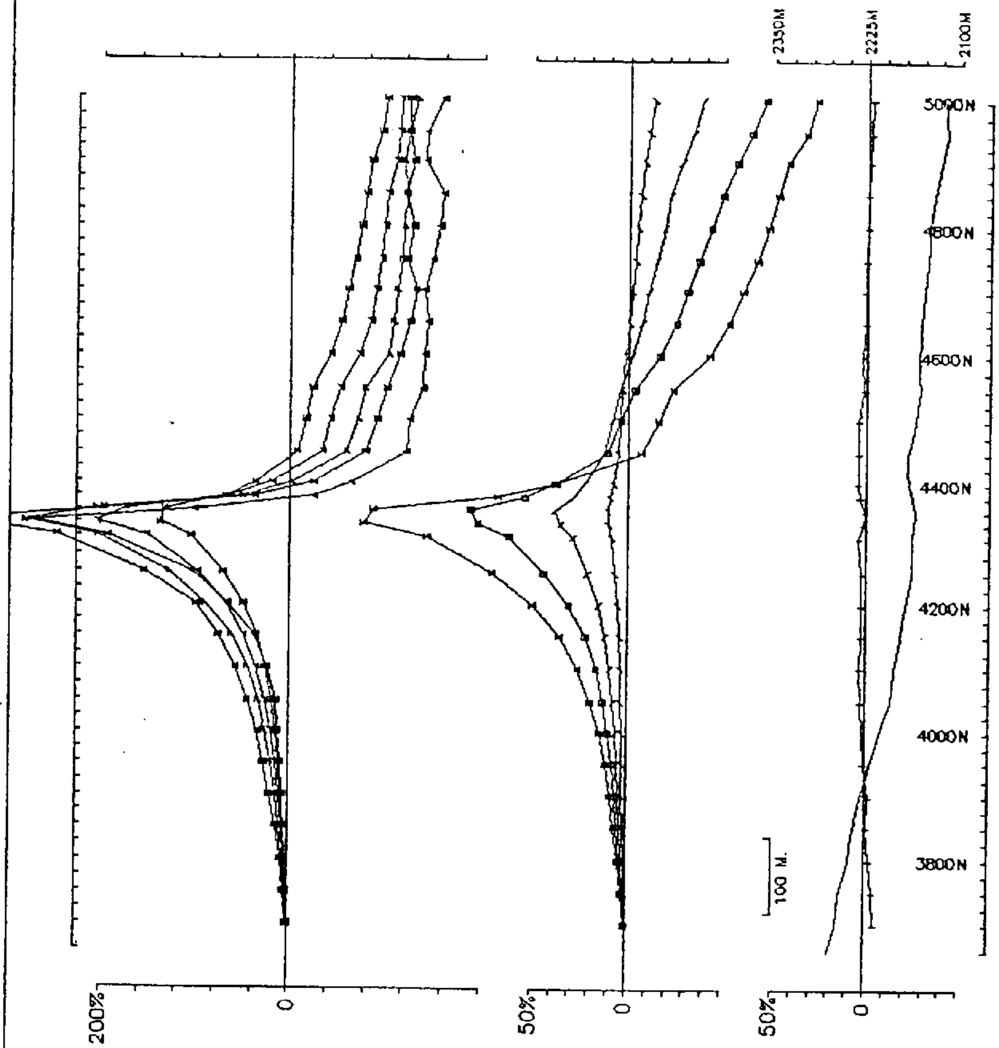
APP. 3-15

APP. 3-16



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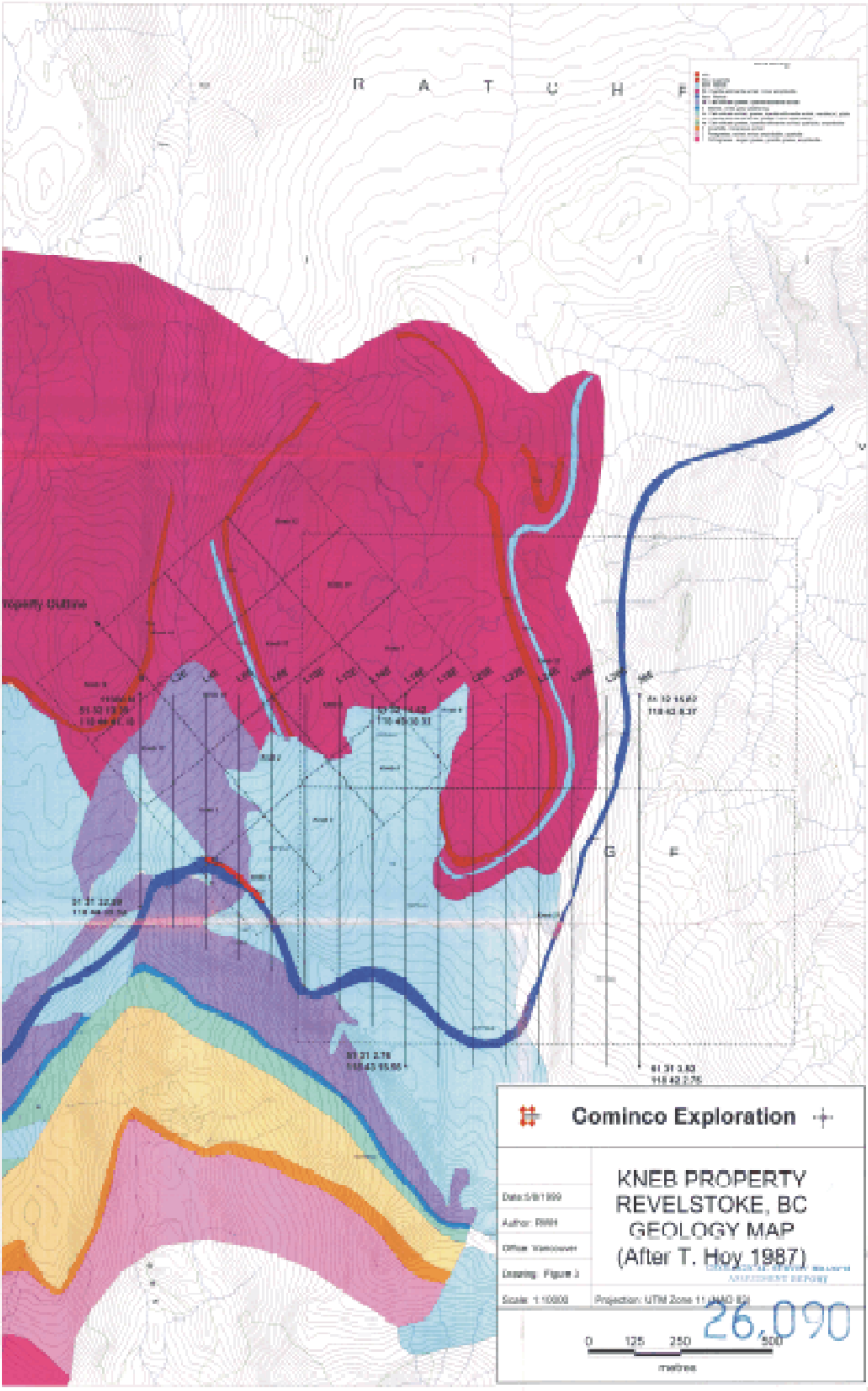
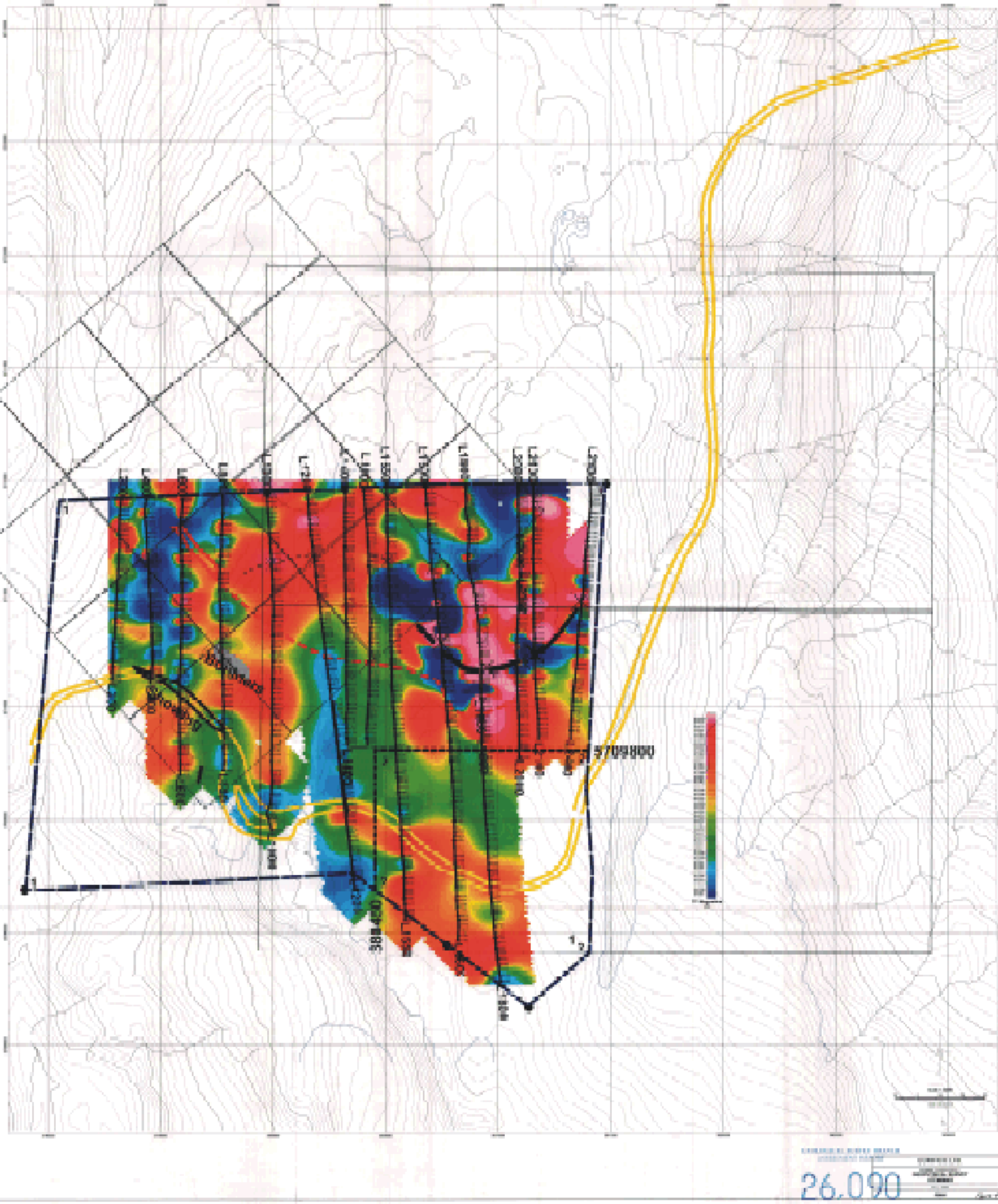
Op: The boys Freq(Hz): 30.974 #Stns: 29 Loop: 2 Line: 2400E DS:
Chl reduced, Chl normalized. Totals:P- 1092M./L-201091M. Line Azim.: 0 . Rx Label: 24

R A T C H F O R
R A N G E
Ratchford Creek
Kneb 1
Kneb 2
Kneb 3
Kneb 4
Kneb 5
Kneb 6
Kneb 7
Kneb 8
Kneb 11
Kneb 12
Kneb 13
Kneb 14
Kneb 15
Kneb 16
Kneb 17
Kneb 18
Kneb 21
Kneb 22
0
L2E
L4E
L6E
L8E
L10E
L12E
L14E
L16E
L18E
L20E
L22E
L24E
L26E
L28E
30E
11000 N
51 32 13.39
118 44 41.18
51 32 14.62
118 43 18.32
51 32 15.62
118 42 5.37
51 31 32.59
118 44 39.62
51 31 2.76
118 43 15.56
51 31 3.82
118 42 2.75
ICEFIELD
Rapids
5715000 mN
5714000 mN
5713000 mN
5712000 mN
5711000 mN
5710000 mN
5709000 mN
5708000 mN
5707000 mN
379000 mE
380000 mE
381000 mE
382000 mE
383000 mE
GEOLOGICAL SURVEY BRANCH
ASSESSMENT REPORT
Cominco Exploration
KNEB PROPERTY
REVELSTOKE, BC
CLAIM MAP
Date:30/7/1999
Author: R.W. Holroyd
Office: Vancouver
Drawing:
Scale: 1:10000
Projection: UTM Zone 11 (NAD 83)
Figure 2
0 125 250 500
metres


R A T U H F
Cominco Exploration
KNEB PROPERTY
REVELSTOKE, BC
GEOLOGY MAP
(After T. Hoy 1987)
Drawing: Figure 3
Scale: 1:10000
0 125 250 500
metres
26,090



26,090