GEOLOGICAL, GEOCHEMICAL, GEOPHYSICAL, & PHYSICAL
ASSESSMENT REPORT
ON THE

# MISTY-NIE-SAM PROPERTY

Claims:

**MISTY 1** (201883)
**MISTY 2** (201884)
**NIE 1** (201903)
**NIE 2** (201904)
**POLE** (201885)
**SAM 1** (201844)
**SAM 2** (201845)



ATLIN MINING DIVISION
N.T.S.: 104 K/1 & K/8

LATITUDE: 58° 17′ , LONGITUDE: 132° 18′ E

Owned & Operated By:

**North American Metals Corp.**
1500-700 West Pender Street,
Vancouver, British Columbia
V6C 1G8



Rick J. Zuran, B.Sc.
November, 1994

Field Work Completed June 28th to August 21st, 1994
REPORT No.: 94-MNS-1

**APPENDIX H**

Shoulder Grid Geophysical Report and Plates
(SJ Geophysics)

# GEOPHYSICAL REPORT

# MAGNETOMETER AND VLF-EM SURVEY

on the

# SHOULDER GRID

Atlin, Mining Division N.T.S. 104K 8

Prepared for:

NORTH AMERICAN METALS CORP.

#1500 - 700 West Pender Street,
Vancouver, B.C.
V6C 1G8

Prepared by:

Todd A. Ballantyne, P. Geo.

**SJ GEOPHYSICS LTD.**

11762 - 94th Avenue
Delta, British Columbia
Canada V4C 3R7

July 1994

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## INTRODUCTION

A magnetometer and VLF-EM survey was completed by SJ Geophysics Ltd. for North American Metals Corp. on the Shoulder Grid. The Shoulder Grid is located approximately 6 kilometres North of the Golden Bear Mine at Bearskin Lake in the Atlin mining division, B.C. (N.T.S. 104K 1).

The purpose of the survey was to aid in the mapping of local geology and to follow up on previous geophysical surveys conducted in this area.

## FIELD WORK AND INSTRUMENTATION

The Magnetometer and VLF-EM Survey was completed during the period July 6, 7 and 11, 1994. Data acquisition, processing and field presentation was performed by Todd A. Ballantyne (Geophysicist). Surveying was performed at 12.5 metre intervals along 50 metre picketed lines using a hip-chain to infill measurement locations, for a total of 8.25 kilometres. Grid line spacing was 100 metres. The 50 metre picket grid was surveyed in with a transit, except for lines 32300N and 32400N which were established and surveyed using a hip-chain and compass.

An EDA OMNI PLUS combined proton precession magnetometer and VLF-EM system was used for data acquisition and an EDA OMNI IV proton precession magnetometer was used as a base station. The VLF-EM survey used signals from Cutler (24.0 kHz, NAA), Hawaii (23.4 kHz, NPM) and Jim Creek (Seattle 24.8 kHz, NLK). The Cutler transmitter is poorly orientated for east/west lines and was used primarily for conformation of anomalies detected with the two other transmitters. The direction of VLF-EM surveying is positive to the east.

The data was processed as time permitted by a geophysicist. Data was plotted on an Ink Jet printer and also given to the client as AutoCad files. Final data plotting was performed on a 36 inch Ink Jet Colour Plotter.



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## DATA PRESENTATION

The magnetic data, VLF-EM data, filtered VLF-EM data (using a standard four point Fraser filter) and compilation of the magnetic and VLF-EM data are presented on the following plates:

| | | |
|---|---|---|
| Plate G1A | Magnetometer Survey<br>Total Field Profiles | In Pocket |
| Plate G1B | Magnetometer Survey<br>Total Field Contours | In Pocket |
| Plate G1C | Magnetometer Survey<br>Colour Contour Map | In Pocket |
| Plate G2A | VLF-EM Survey - Seattle, NLK 24.8 kHz<br>Dip Angle & Quadrature Profiles | In Pocket |
| Plate G2B | VLF-EM Survey - Seattle, NLK 24.8 kHz<br>Fraser Filtered Dip Angle, Total Field Profiles and Topography | In Pocket |
| Plate G2C | VLF-EM Survey - Seattle, NLK 24.8 kHz<br>Fraser Filtered Dip Angle Contours | In Pocket |
| Plate G3A | VLF-EM Survey - Cutler, NAA 24.0 kHz<br>Dip Angle & Quadrature Profiles | In Pocket |
| Plate G3B | VLF-EM Survey - Cutler, NAA 24.0 kHz<br>Fraser Filtered Dip Angle, Total Field Profiles and Topography | In Pocket |
| Plate G3C | VLF-EM Survey - Cutler, NAA 24.0 kHz<br>Fraser Filtered Dip Angle Contours | In Pocket |
| Plate G4A | VLF-EM Survey - Hawaii, NPM 23.4 kHz<br>Dip Angle & Quadrature Profiles | In Pocket |
| Plate G4B | VLF-EM Survey - Hawaii, NPM 23.4 kHz<br>Fraser Filtered Dip Angle, Total Field Profiles and Topography | In Pocket |
| Plate G4C | VLF-EM Survey - Hawaii, NPM 23.4 kHz<br>Fraser Filtered Dip Angle Contours | In Pocket |
| Plate G5A | Magnetometer and VLF-EM Survey<br>Compilation Map | In Pocket |

## INTERPRETATION

The interpretation is primarily presented on the compilation map plate G5A, but the most prominent anomalies will be discussed below. The magnetic relief over the surveyed area is approximately 6,900 nT. Highly magnetic dykes are responsible for the majority of large magnetic relief in the surveyed area. Magnetic linear anomalies



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predominantly trend NNW to NNE, while the majority of the VLF anomalies trend NNE. The magnetic data suggests a lithological contact in the northeast quadrant of the grid. In the southern area of the grid is sharp change in the magnetic response, which would suggest a change in lithology. There is not enough survey information to define the extent of the southern anomaly.

Area A is defined by a low magnitude magnetic response bound to the west by a strong, narrow magnetic high likely representing a dyke (anomaly M1). M1 is defined by two similar magnetic highs. The area between these highs is slightly different from the response of area A to the east. The southern extent of both arms of M1 appear to be truncated, hence the placement of anomaly M4 as a cross-structure. VLF is associated with anomaly M1.

Magnetic area B is a possible change in lithology between anomaly M3 and the weak magnetic linear immediately to the west. There is no VLF response associated with area B. To the west of area B is a hatched area represented by a magnetic low that appears to be distinct from B. This area continues south on the grid.

Anomaly M2 is an extremely high magnetic feature, very likely a dyke with high magnetic mineral content. There is a VLF anomaly associated with it, but because there are only two lines of VLF data it is difficult to determine whether the anomaly crosses the magnetic feature as shown or whether it is parallel to the high and situated just west. The VLF anomaly is picked from the Seattle data and neither of Hawaii or Cutler data clearly confirm this anomaly.

Anomaly M4 was picked primarily on it's coincidence with the termination anomaly M1, but also because it explains the truncation of VLF anomaly V3 and an unlabelled VLF anomaly to the south.

Magnetic anomaly M5 is an active area with an overall high background, within the high the response is noisy, representative of volcanic/igneous rocks with varied magnetic phases or intrusions. There is not enough survey data to determine the extent of this anomaly.

The VLF-EM transmitter in Jim Creek, Washington (widely referred to as Seattle) was chosen as the primary transmitter for surveying. Transmitters Hawaii and Cutler were

used to gain complimentary information and also definition of structures that would be poorly orientated, i.e., NE trends for Hawaii, for use of Seattle. The signal strength of Cutler is weak and it is poorly positioned for use with east/west survey lines; because of this it's data can easily be misinterpreted, see figure 1. Though normally reverse cross-overs are not of interest, in this case the reverse anomaly is also correct.

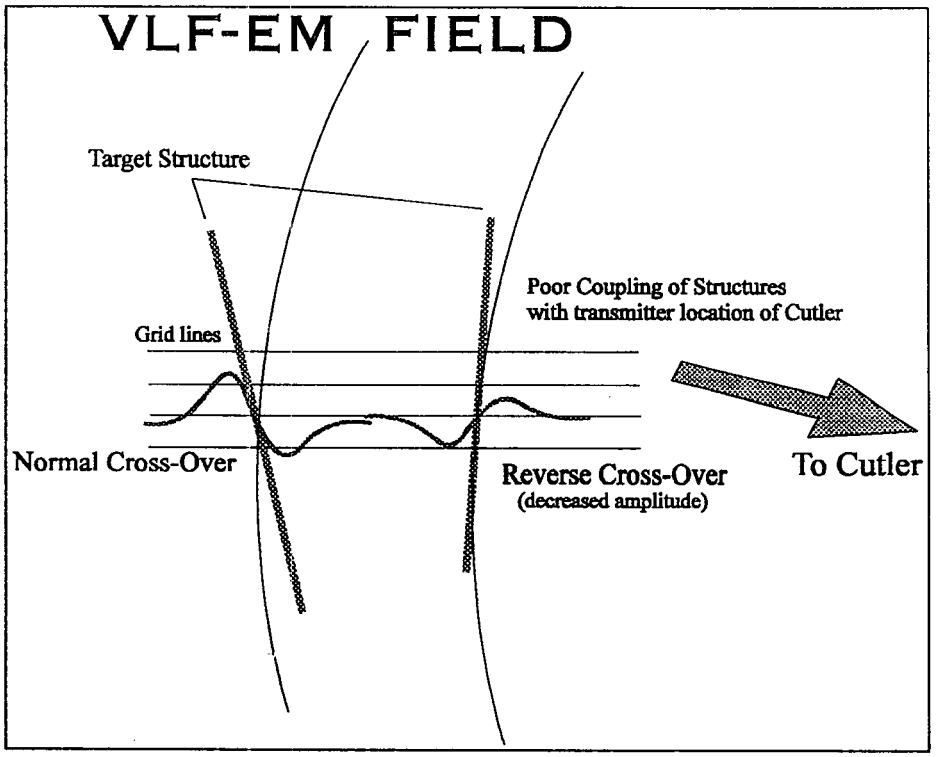


*Figure 1. VLF-EM Field of Cutler as it couples with Structures of varying strike - Illustrating it's poor coupling angle.*

VLF anomaly V1 appears to be a conductor running parallel to and between lines 33200N and 33300N. It is noted because of a change in the VLF signature between these lines. If the VLF data were looked at as though the data was collected in a north/south direction, then there are obvious high-low transition between these two lines which imply a conductive source somewhere in between. V1 is interrupted by magnetic anomaly M4 and there is an absence of VLF response where M4 crosses V1.

Anomaly V2 is defined from Cutler data. It is a strong anomaly that may be affected by the edge of the plateau, but is well defined on lines 32300N and 32400 which

should have little topographic influence. These lines were added to the grid using a hip-chain and compass.

Anomaly V3 is defined from Cutler data. It is a strong, broad anomaly coincident with the magnetic high M1. The broadness of the anomaly suggests that the source is wide, at depth or a combination of both. This conductor is poorly represented in the Seattle data, which is expected from it's orientation to Seattle's VLF signal.

Other VLF anomalies are shown on the compilation map and these should also be compared with the known geology.

## RECOMMENDATIONS

The geophysical data should be compiled with geological mapping and sampling to determine if infill mag/vlf is required or other geophysical techniques are required. If the results of the mag/vlf survey prove useful for mapping the geology, it is recommended to further interpret the geophysics with the geology. The VLF quadrature data should be compared with the geology to determine if any very weak VLF anomalies (those anomalies which display more quadrature response than in-phase) are attributable to structures of interest and if so infill surveying may be warranted.

North-south VLF surveying with Cutler and Hawaii is recommended to define structures that may be trending parallel to the existing grid.

## CONCLUSION

Highly magnetic dykes are responsible for an approximate 6,900 nT relief over the survey area. Magnetic linear anomalies predominantly trend NNW to NNE, most of which are located in the north half of the grid. The magnetic survey has outlined three distinct areas on the grid which have differing concentrations of magnetic minerals and are expected to be different rock types. But are not limited to different rock types as they may represent less magnetic phases of a volcanic/igneous package. A lithological contact is noted in the northeastern area of the grid.

The VLF survey has shown the dominant trend of VLF anomalies to be NNE. VLF anomalies are not generally coincident with magnetic anomalies. A conductive



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structure trending parallel to and between lines 33200N and 33300N is suggested in the Seattle data, which may be of interest for further geophysical mapping.

8 August 1994

Todd A. Ballantyne, B.Sc., P. Geo.
Geophysicist



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## APPENDIX I

# Statement of Qualifications



*SJ Geophysics Ltd. 11762 - 94th Ave., Delta, B.C. Canada tel (604) 582-1100 fax (604) 589-7466*

## Statement Of Qualifications

I, Todd A. Ballantyne, of 3538 West Sixteenth Avenue, Vancouver, in the Province of British Columbia, DO HEREBY CERTIFY:

1. THAT I am a graduate of the University of British Columbia with a Bachelor of Science degree in Geophysics.

2. THAT I have been engaged in mining and petroleum exploration since 1987.

3. THAT I am registered as a Professional Geoscientist with the Association of Professional Engineers and Geoscientists of the Province of British Columbia

3. THAT this report is based on fieldwork carried out by myself in July 1994.

4. THAT I own no shares, directly or indirectly in North American Metals Corp., nor do I expect to acquire any shares. I have no interest, directly or indirectly, in the Shoulder Prospect.

5. THAT I consent to the use by North American Metals Corp. of this report in a Statement of Material Facts or any such document as may be required by the Vancouver Stock Exchange or the Office of the Superintendent of Brokers.

8 August 1994

Todd A. Ballantyne, B.Sc., P. Geo.
Geophysicist



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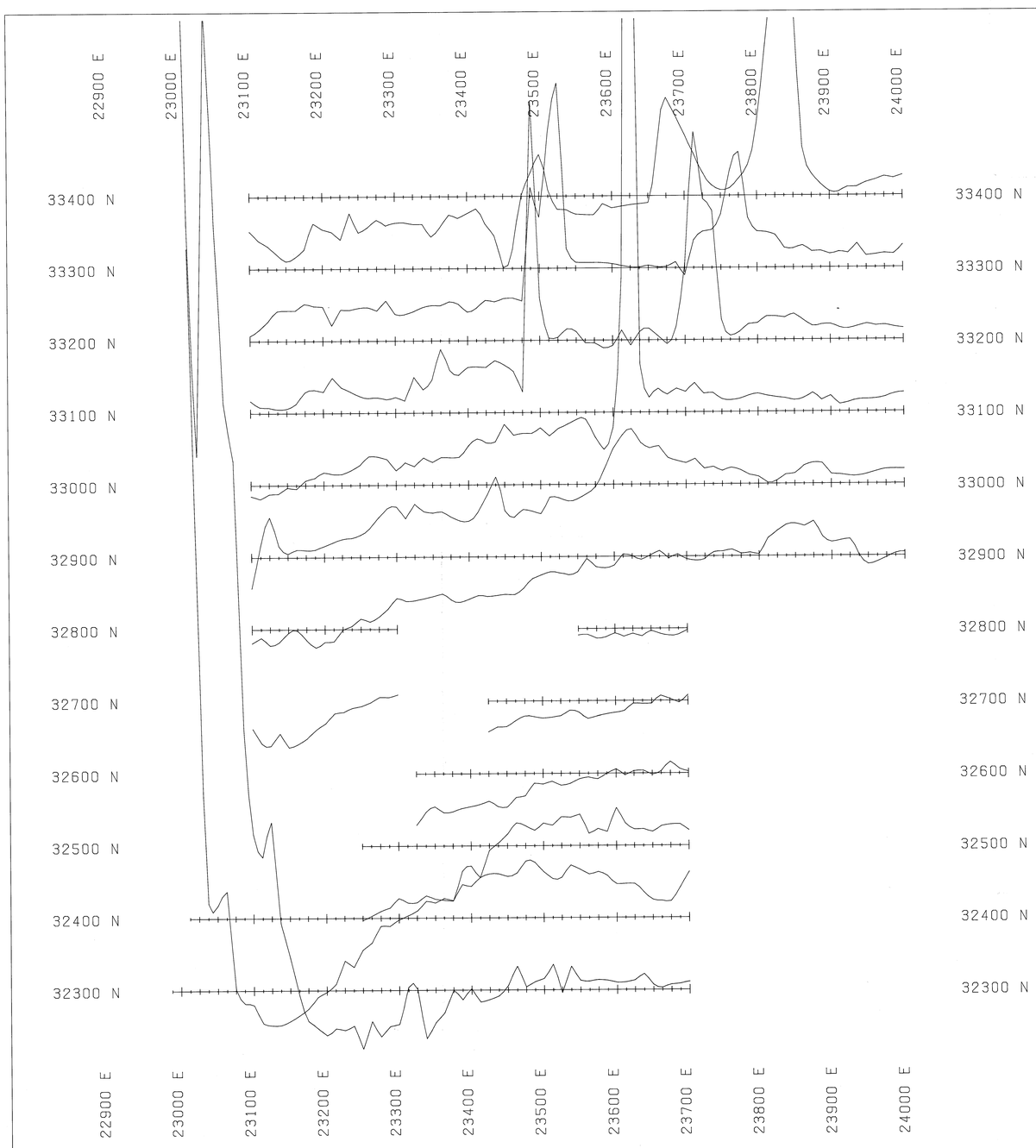


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GEOLOGICAL BRANCH
ASSESSMENT REPORT

23,621

PART 3 OF 3

LEGEND

PROFILES POSITIVE UP

MAGNETIC PROFILE SCALE:

BASE VALUE: 57,250 nT | 57,000 nT | 56,750 nT

MINIMUM VALUE: 56,349 nT

MAXIMUM VALUE: 63,275 nT

EQUIPMENT:

EDA OMNI PLUS COMBINED PROTON PRECESSION MAGNETOMETER AND VLF-EM SYSTEM - FIELD UNIT

EDA OMNI IV PROTON PRECESSION MAGNETOMETER AS A BASE STATION UNIT

N

NORTH AMERICAN METALS CORP.

GOLDEN BEAR MINE

SHOULDER GRID

# MAGNETOMETER SURVEY

# TOTAL FIELD PROFILES

ATLIN, MINING DIVISION

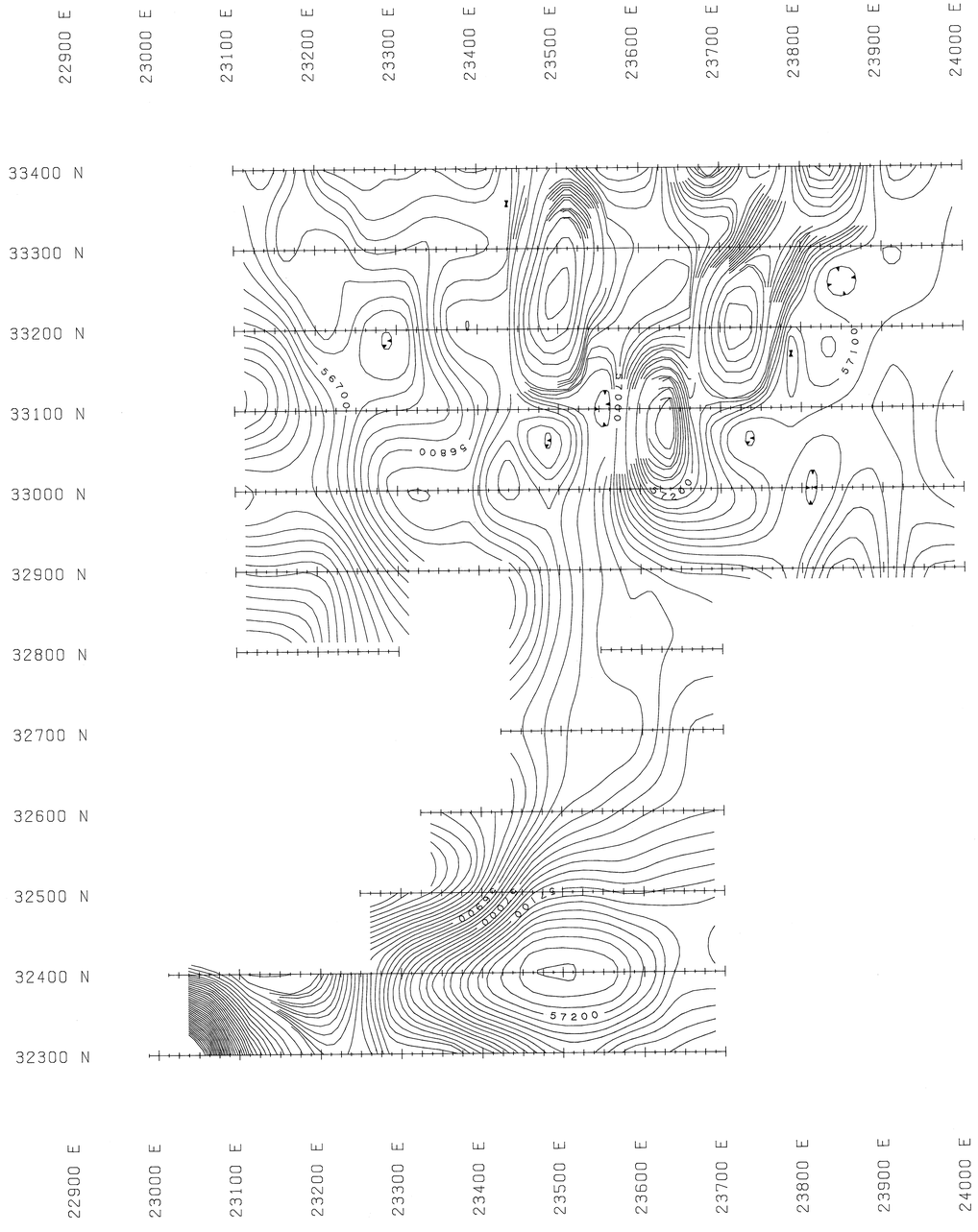
N.T.S. 104K 8

SCALE IN METRES

100 0 100 200 300

JULY 1994

PLATE G1A






N

LEGEND

CONTOUR INTERVAL: 20 nT
POSTED INTERVAL: 100 nT
MINIMUM VALUE: 56,349 nT
MAXIMUM VALUE: 63,275 nT

EQUIPMENT:
EDA OMNI PLUS COMBINED PROTON PRECESSION MAGNETOMETER AND VLF-EM SYSTEM - FIELD UNIT
EDA OMNI IV PROTON PRECESSION MAGNETOMETER AS A BASE STATION UNIT

NORTH AMERICAN METALS CORP.

GOLDEN BEAR MINE

SHOULDER GRID

# MAGNETOMETER SURVEY

# TOTAL FIELD CONTOURS

ATLIN, MINING DIVISION N.T.S. 104K 8

SCALE IN METRES

100 0 100 200 300

JULY 1994

PLATE G1B

SJ GEOPHYSICS LTD.




N

## LEGEND

PROFILES POSITIVE UP
SURVEYING PERFORMED FACING EAST
DIP ANGLE - SOLID LINE
QUADRATURE - DOTTED LINE
VERTICAL SCALE: 15%/CM
BASE VALUE: 0 %

EQUIPMENT:
EDA OMNI PLUS COMBINED PROTON PRECESSION MAGNETOMETER AND VLF-EM SYSTEM - FIELD UNIT
EDA OMNI IV PROTON PRECESSION MAGNETOMETER AS A BASE STATION UNIT
VLF-EM TRANSMITTER: 24.8 kHz, SEATTLE - NLK

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GOLDEN BEAR MINE

SHOULDER GRID

# VLF-EM SURVEY PROFILES
# DIP ANGLE & QUADRATURE

ATLIN, MINING DIVISION N.T.S. 104K 8

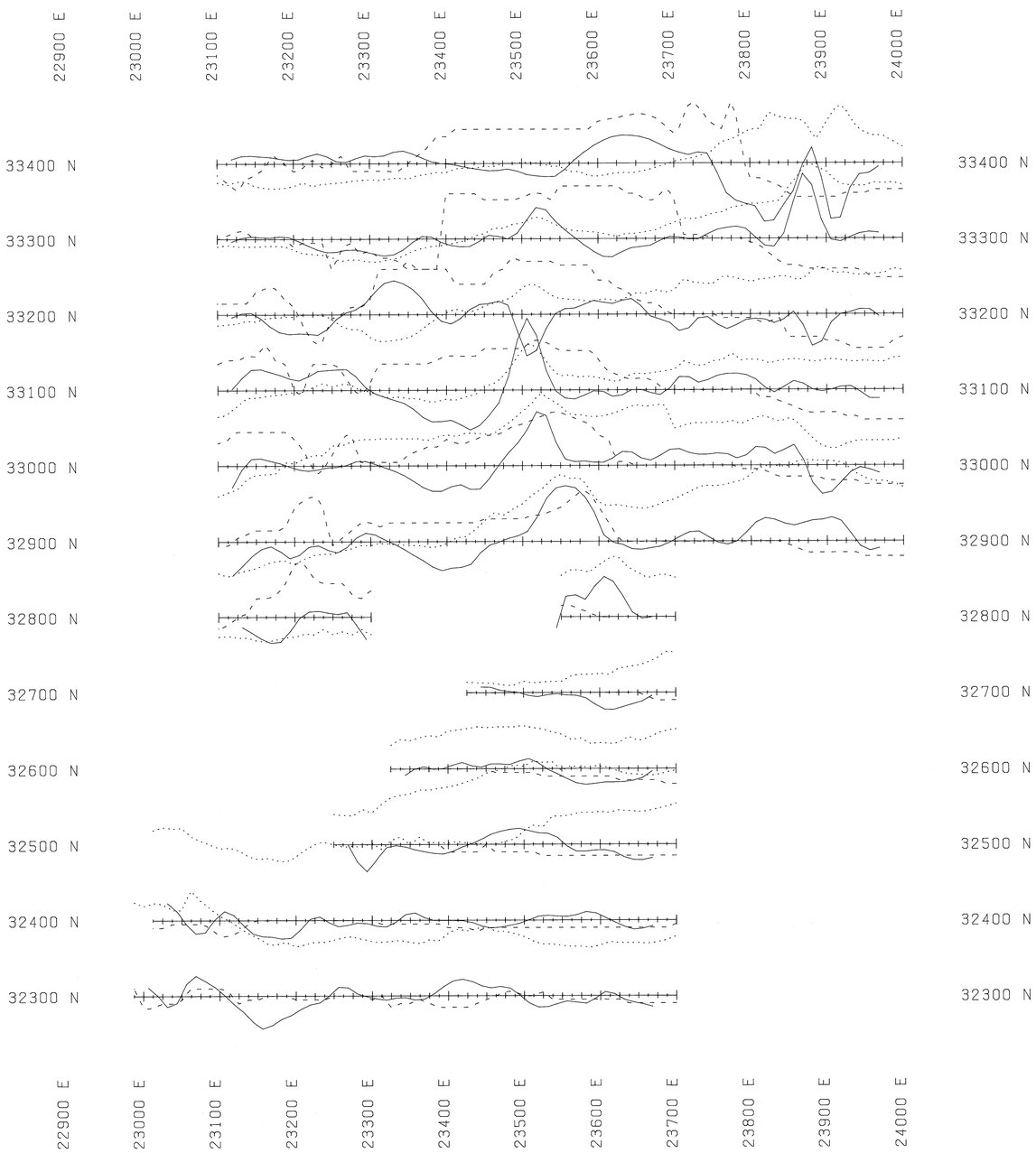
SCALE IN METRES

100 0 100 200 300

JULY 1994

PLATE G2A

SJ GEOPHYSICS LTD.






LEGEND

PROFILES POSITIVE UP
SURVEYING PERFORMED FACING EAST
DIP ANGLE - SOLID LINE
  VERTICAL SCALE: 15%/CM  0% BASE VALUE
VLF FIELD STRENGTH - DOTTED LINE
  VERTICAL SCALE:5%/CM  25% BASE VALUE
TOPOGRAPHY SLOPE - DASHED LINE
  VERTICAL SCALE: 50%/CM  0% BASE VALUE

EQUIPMENT:
  EDA OMNI PLUS COMBINED PROTON PRECESSION
  MAGNETOMETER AND VLF-EM SYSTEM - FIELD UNIT
  EDA OMNI IV PROTON PRECESSION MAGNETOMETER
  AS A BASE STATION UNIT
VLF-EM TRANSMITTER: 24.8 kHz, SEATTLE - NLK

NORTH AMERICAN METALS CORP.

GOLDEN BEAR MINE

SHOULDER GRID

# VLF-EM SURVEY PROFILES

FRASER FILTERED DIP, TOTAL FIELD, TOPOGRAPHY

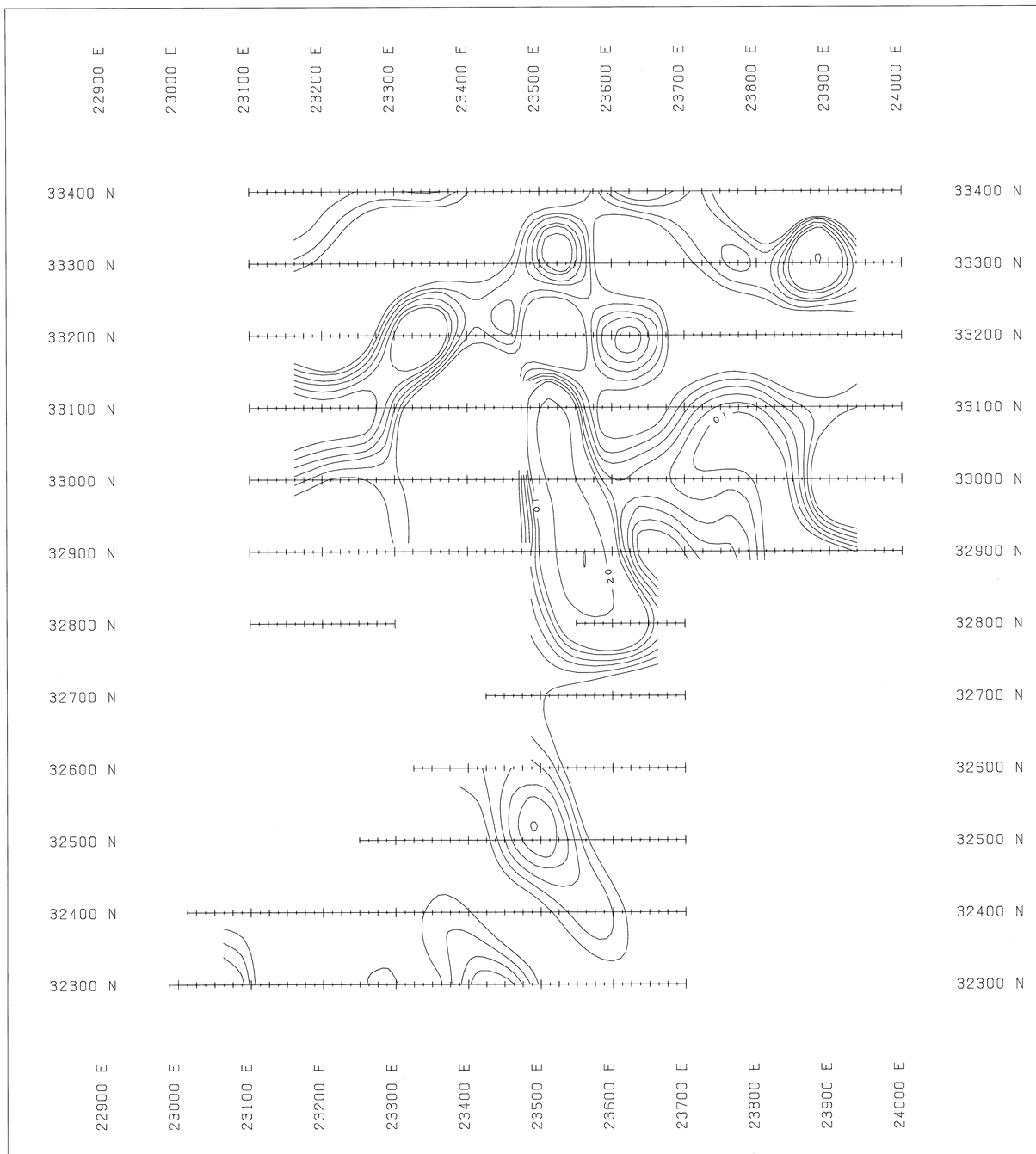
ATLIN, MINING DIVISION  N.T.S. 104K 8

SCALE IN METRES

100 0 100 200 300

JULY 1994  PLATE G2B

SJ GEOPHYSICS LTD.






N

LEGEND

NEGATIVE CONTOURS SUPPRESSED
CONTOUR INTERVAL: 2%
POSTED INTERVAL: 10%

EQUIPMENT:
EDA OMNI PLUS COMBINED PROTON PRECESSION MAGNETOMETER AND VLF-EM SYSTEM - FIELD UNIT
EDA OMNI IV PROTON PRECESSION MAGNETOMETER AS A BASE STATION UNIT
VLF-EM TRANSMITTER: 24.8 kHz, SEATTLE - NLK

NORTH AMERICAN METALS CORP.

GOLDEN BEAR MINE

SHOULDER GRID

# VLF-EM SURVEY CONTOURS
# FRASER FILTERED DIP ANGLE

ATLIN, MINING DIVISION N.T.S. 104K 8

SCALE IN METRES

100 0 100 200 300

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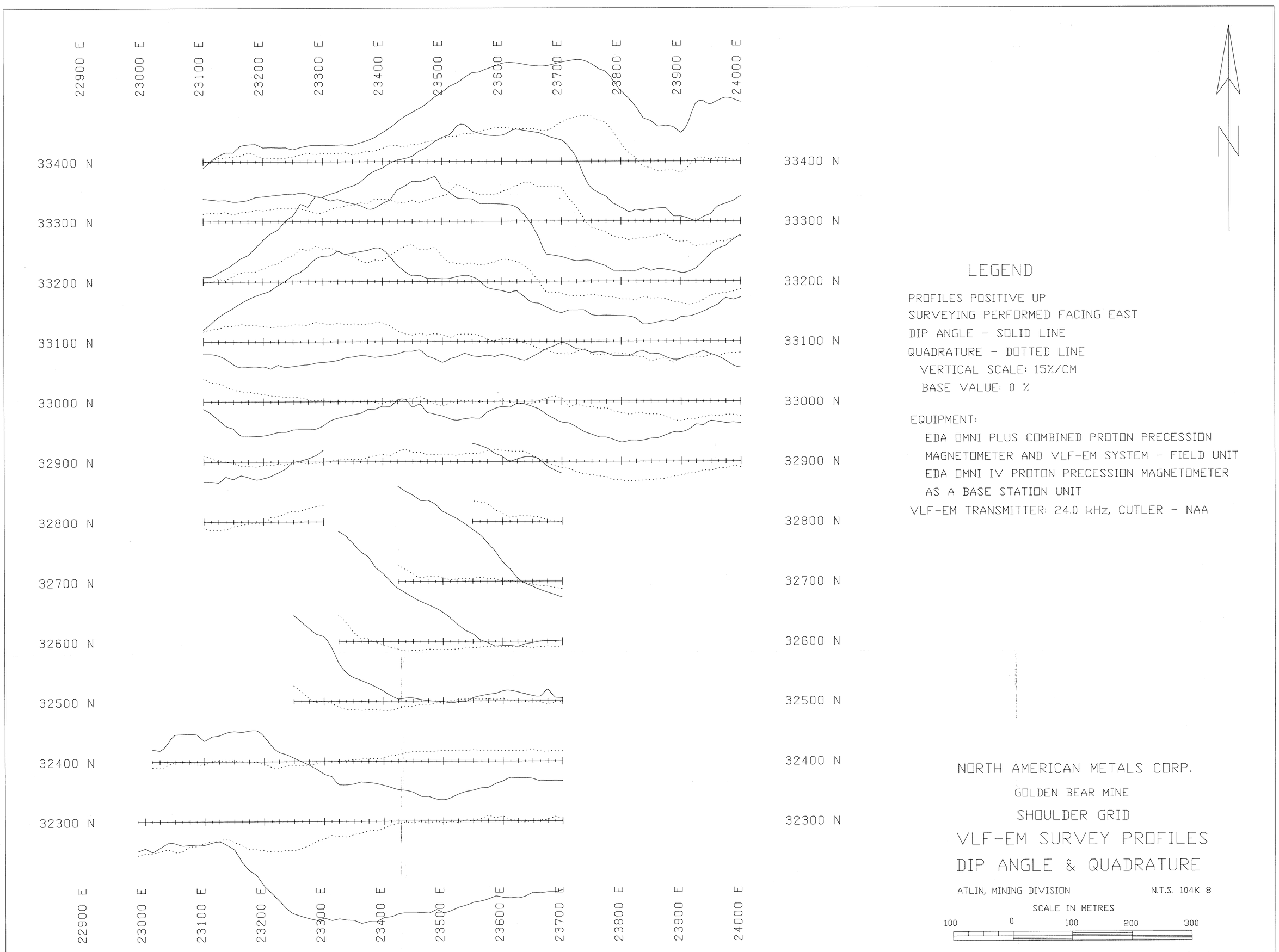
JULY 1994

PLATE G2C




## LEGEND

PROFILES POSITIVE UP
SURVEYING PERFORMED FACING EAST
DIP ANGLE - SOLID LINE
QUADRATURE - DOTTED LINE
VERTICAL SCALE: 15%/CM
BASE VALUE: 0 %

EQUIPMENT:
EDA OMNI PLUS COMBINED PROTON PRECESSION MAGNETOMETER AND VLF-EM SYSTEM - FIELD UNIT
EDA OMNI IV PROTON PRECESSION MAGNETOMETER AS A BASE STATION UNIT
VLF-EM TRANSMITTER: 24.0 kHz, CUTLER - NAA

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GOLDEN BEAR MINE

SHOULDER GRID

# VLF-EM SURVEY PROFILES
# DIP ANGLE & QUADRATURE

ATLIN, MINING DIVISION N.T.S. 104K 8

SCALE IN METRES

100 0 100 200 300

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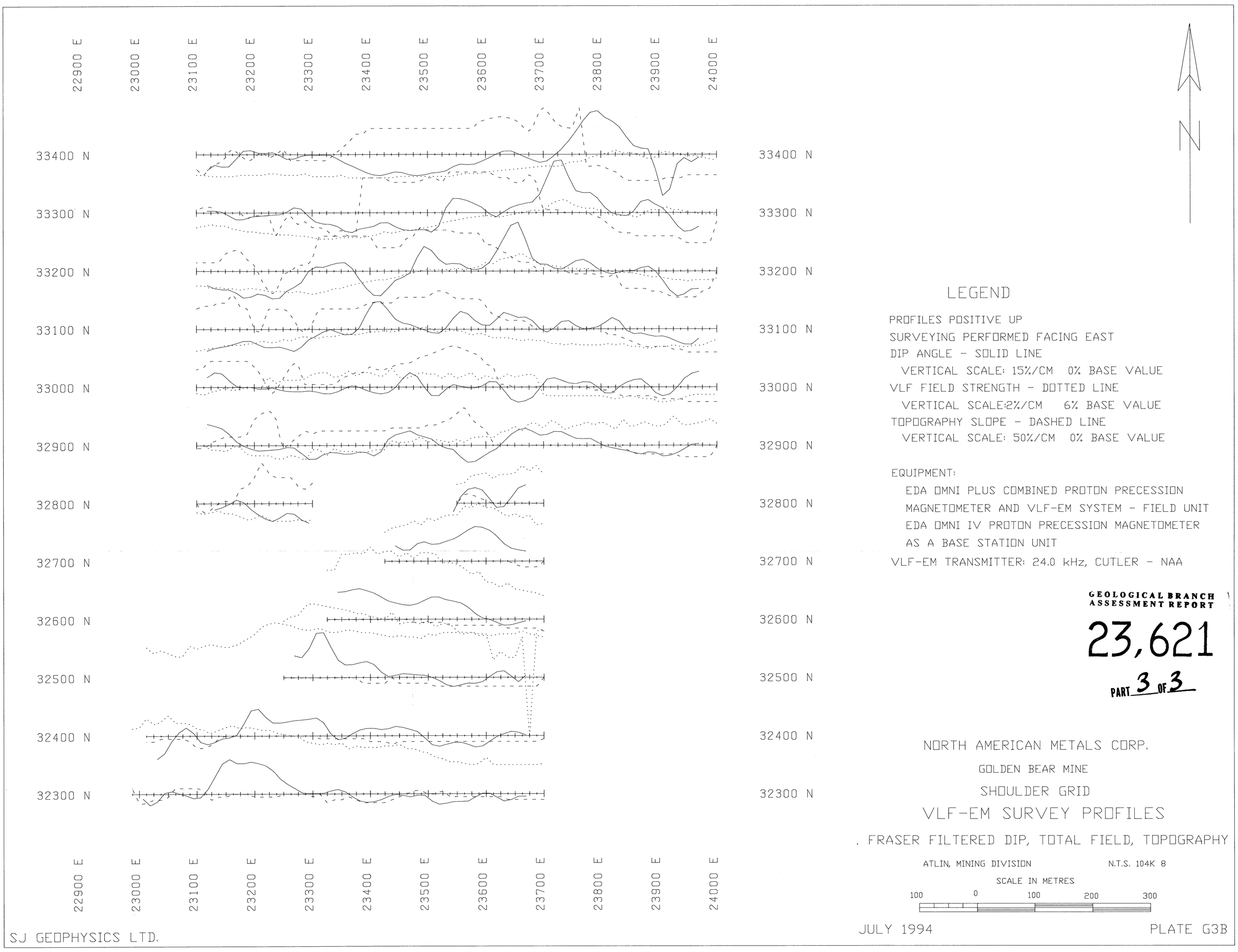
JULY 1994 PLATE G3A




## LEGEND

PROFILES POSITIVE UP
SURVEYING PERFORMED FACING EAST
DIP ANGLE - SOLID LINE
VERTICAL SCALE: 15%/CM 0% BASE VALUE
VLF FIELD STRENGTH - DOTTED LINE
VERTICAL SCALE:2%/CM 6% BASE VALUE
TOPOGRAPHY SLOPE - DASHED LINE
VERTICAL SCALE: 50%/CM 0% BASE VALUE

EQUIPMENT:
EDA OMNI PLUS COMBINED PROTON PRECESSION MAGNETOMETER AND VLF-EM SYSTEM - FIELD UNIT
EDA OMNI IV PROTON PRECESSION MAGNETOMETER AS A BASE STATION UNIT
VLF-EM TRANSMITTER: 24.0 kHz, CUTLER - NAA



NORTH AMERICAN METALS CORP.

GOLDEN BEAR MINE

SHOULDER GRID

# VLF-EM SURVEY PROFILES

. FRASER FILTERED DIP, TOTAL FIELD, TOPOGRAPHY

ATLIN, MINING DIVISION N.T.S. 104K 8

SCALE IN METRES

100 0 100 200 300

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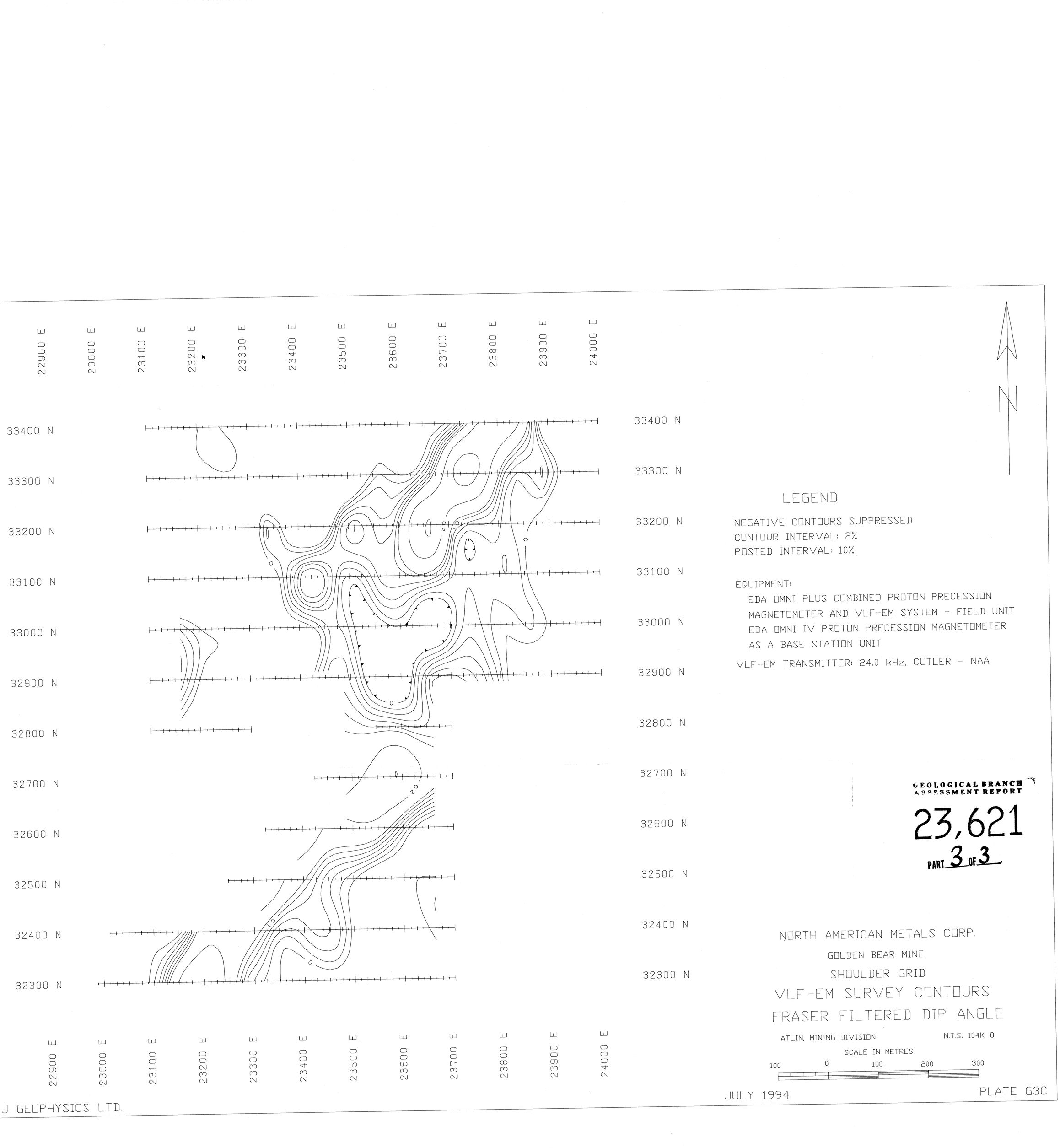
JULY 1994 PLATE G3B




## LEGEND

NEGATIVE CONTOURS SUPPRESSED
CONTOUR INTERVAL: 2%
POSTED INTERVAL: 10%

EQUIPMENT:
EDA OMNI PLUS COMBINED PROTON PRECESSION MAGNETOMETER AND VLF-EM SYSTEM - FIELD UNIT
EDA OMNI IV PROTON PRECESSION MAGNETOMETER AS A BASE STATION UNIT

VLF-EM TRANSMITTER: 24.0 kHz, CUTLER - NAA



NORTH AMERICAN METALS CORP.

GOLDEN BEAR MINE

SHOULDER GRID

# VLF-EM SURVEY CONTOURS
# FRASER FILTERED DIP ANGLE

ATLIN, MINING DIVISION N.T.S. 104K 8

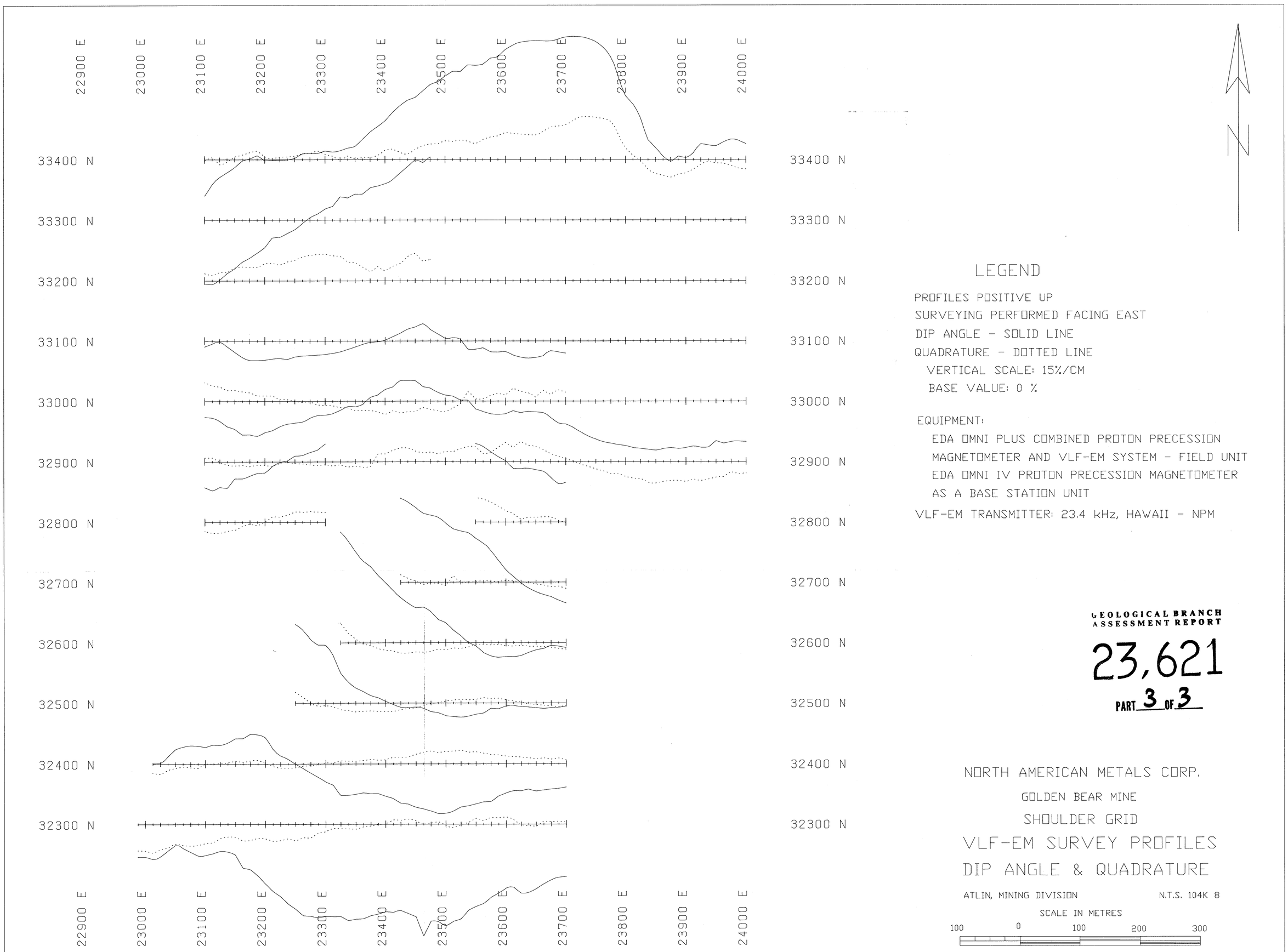
SCALE IN METRES

100 0 100 200 300

JULY 1994

PLATE G3C

SJ GEOPHYSICS LTD.




N

## LEGEND

PROFILES POSITIVE UP
SURVEYING PERFORMED FACING EAST
DIP ANGLE - SOLID LINE
QUADRATURE - DOTTED LINE
VERTICAL SCALE: 15%/CM
BASE VALUE: 0 %

EQUIPMENT:
EDA OMNI PLUS COMBINED PROTON PRECESSION MAGNETOMETER AND VLF-EM SYSTEM - FIELD UNIT
EDA OMNI IV PROTON PRECESSION MAGNETOMETER AS A BASE STATION UNIT
VLF-EM TRANSMITTER: 23.4 kHz, HAWAII - NPM



NORTH AMERICAN METALS CORP.

GOLDEN BEAR MINE

SHOULDER GRID

# VLF-EM SURVEY PROFILES
# DIP ANGLE & QUADRATURE

ATLIN, MINING DIVISION N.T.S. 104K 8

SCALE IN METRES

100 0 100 200 300

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JULY 1994

PLATE G4A


C=VLF CUTLER ANOMALY

OTHER VLF ANOMALIES FROM SEATTLE DATA

## LEGEND

MAGNETIC FEATURE
- STRONG ANOMALY
- WEAK ANOMALY

VLF-EM ANOMALY AXIS
- STRONG ANOMALY
- WEAK ANOMALY

POSSIBLE CROSS-STRUCTURE

EQUIPMENT:
EDA OMNI PLUS COMBINED PROTON PRECESSION MAGNETOMETER AND VLF-EM SYSTEM - FIELD UNIT
EDA OMNI IV PROTON PRECESSION MAGNETOMETER AS A BASE STATION UNIT

VLF-EM TRANSMITTER: 24.8 kHz, SEATTLE - NLK
23.4 kHz, HAWAII - NPM
24.0 kHz, CUTLER - NAA

SEATTLE IS PRIMARY VLF TRANSMITTER, OTHERS USED FOR SUPPORTIVE INFORMATION AND STRUCTURES POORLY ORIENTATED FOR EAST/WEST LINES



NORTH AMERICAN METALS CORP.

GOLDEN BEAR MINE

SHOULDER GRID

# MAGNETOMETER & VLF-EM SURVEY COMPILATION MAP

ATLIN, MINING DIVISION N.T.S. 104K 8

SCALE IN METRES

100 0 100 200 300

JULY 1994 PLATE G5A

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