## 672846

### MAGNETOMETER AND VLF-EM

### SURVEY

### ON THE

### COOMBS COPPER PROPERTY

### FOR

### PROMIN EXPLORATIONS LIMITED

### AND

### SHOREHAM RESOURCES LTD.

### SURVEY BY

### SJ GEOPHYSICS LTD.

NANAIMO, M.D., B.C.

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N.T.S. 92F/7,8

DECEMBER 1990

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Report By Todd Ballantyne Syd Visser SJ GEOPHYSICS Ltd.

### INTRODUCTION

A magnetometer and VLF-EM survey was completed by SJ Geophysics Ltd., at the request of Promin Explorations Limited, on the Coombs Copper Property. The Coombs Copper Property is located near Coombs, B.C., in the Nanaimo, M.D. (N.T.S. 92F/7,8).

The purpose of the survey was to search for massive sulphides, to aid in the location of shear zones which may have associated mineralization, and to aid in the mapping of local geology.

### INSTRUMENTATION AND FIELD WORK

field work was performed by Todd Ballantyne The and (Geophysicist) David Wilde (SJ Geophysics Ltd. Personnel) during the period of October 8 to 17, 1990 which includes 1 standby day due to VLF station shutdown, 8 production days and 1 mobilization day. A total of approximately 21 Km, with stations every 12.5m along mainly flagged lines, were surveyed by magnetometer and VLF-EM. The thick bush and uncut lines slowed the survey considerably.

Two EDA OMNI PLUS combined proton precession magnetometers and VLF-EM systems were used for data acquisition and an EDA OMNI IV proton precession magnetometer was used as a base station. The VLF-EM survey signals from Jim Creek (Seattle, 24.8 KHz, NLK) and used Annapolis (21.4 KHz, NSS). The direction of the VLF-EM survey is positive north and positive east.

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 mylar, using a 36 inch pen plotter.

### 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:

- G1A Magnetics Profiles Total Field
- G1B Magnetics Contours Total Field
- G2A VLF-EM Profiles NLK Dip Angle and Quadrature
- G2B VLF-EM Profiles NLK Fraser Filtered Dip Angle and Slope
- G2C VLF-EM Contours NLK Fraser Filter Dip Angle
- G3A VLF-EM Profiles NSS Dip Angle and Quadrature
- G3B VLF-EM Profiles NSS Fraser Filtered Dip Angle
- G3C VLF-EM Contours NSS Fraser Filtered Dip Angle
- G4 Magnetic and 2 VLF-EM Surveys Compilation Map
- G5A Magnetics Profiles trench survey Total Field
- G5B VLF-EM Profiles NSS trench survey Dip Angle and Quadrature

### INTERPRETATION

The overall magnetic relief on the grid is approximately 5,600 nT. The high magnetic response, labelled M1 on Plate G4, is limited to the central region of the grid, between lines 10100N and 10600N, and is likely due to a shallow intrusive unit overlain by volcanics and possible skarn containing high amounts of magnetic minerals, namely magnetite. The western contact is sharp and marked by a possible cross-structure labelled A. The eastern contact is a more gradational feature which is due to a deepening of the more magnetic rocks or due to a gradation in the magnetic mineral content of the rocks.

The southern extent of M1 is a magnetically complex area containing a number of possible faults and or shear zones. The most prominent of these which appear as magnetic lows are labelled M2 and M4 on Plate G4.

Magnetic anomaly M3 is large magnetic low feature located in the eastern area of the grid and runs the length of the grid between lines 10800E and 11200E. While the magnetic relief in this area appears low in comparison to M1 it is actually quite active. The magnetic profiles have been plotted at 700 nT/cm in order to present the data in the center of the grid. Data in the area of M3 when plotted at 400 nT/cm exhibits a noisy response typical of volcanic units or plutonic units with highly variable magnetite content.

The magnetic response west of the central high M1 exhibits low relief even when plotted at 400 nT and represents a rock unit with lower magnetic mineral content.

The VLF-EM survey delineated two strong anomalies, V1 and V2, and several weak anomalies as presented on Plate G4.

VLF-EM anomaly V2, which trends approximately map eastwest and has a total strike length of 900 metres, correlates

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very well with magnetic low feature M4 which may represent a structure such as mineralized shear zone or water filled fault. The anomaly is bisected by a possible cross-structure B between lines 10700E and 10600E. The eastern segment, of anomaly V2, is a weak conductor with no obvious magnetic correlation, except that it is located within a rock unit of moderate magnetic relief.

VLF-EM anomaly V1 appears to be a wide conductive feature or two parallel conductors which correlate with a weak magnetic low. This map north trending anomaly is terminated to the west by cross-structure D and remains open to the east.

VLF-EM anomaly V3 exhibits a strong response over lines 9700E and 9800E and a weak response across lines 9900E to 10300E. The anomaly follows a weak magnetic low trend and appears to cross the magnetic contact at cross-structure A and diminish within M1.

Anomaly V4 is a weak conductor that correlates very well with the western extent of magnetic anomaly M2 and terminates before cross-structure A. Anomaly V5 is weak, but prominent and appears to be a wide conductive feature or two parallel conductors. The dip angle data appears to be strongly affected by topography, but this cannot be isolated as the anomaly source. Anomaly V6 is similar to V5 with the exception of the locally strong conductors on line 10700E.

The remainder of the weak VLF-EM anomalies are likely due to contacts, changes in overburden, or topography.

Using a compass and hip chain, four lines were surveyed, on unflagged lines, approximately perpendicular to the expected strike a structure that has been trenched in the area of 10450E and 10450N. The data is presented with interpretation on Plates G5A and G5B. The tie-in points of these lines are listed in appendix II. The VLF-EM has delineated a strong conductor which correlates with a magnetic contact. The results of the test lines are positive

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and should be followed up with a picketed grid if further interest is warranted. The data has been plotted on an idealized grid and does not represent the exact locations of anomalies.

### RECOMMENDATIONS

It is recommended to closely correlate the magnetic and VLF-EM data, especially VLF-EM anomalies V1, V2, V3, V4 which correlate with magnetic lows and anomaly V6 on line 10700E, to the known geology and geochemical data to best determine which of the anomalies are of the most interest and should be followed up with more detail work. There are numerous local magnetic highs and lows, too many to be investigate presently without detailed comparison with geological and geochemical information, to determine which are worthy of further investigation.

The areas of interest should be followed up with more sophisticated geophysical techniques, before drilling the anomalies, to better determine the physical qualities such as dip, conductivity, depth to top and strike, of these anomalies. As a follow up technique, Max-Min would be well suited for surveying test lines, which could be surveyed at any orientation, to detail the mapping of lithology whose strike was null or poorly coupled with the available VLF-EM signals of the present survey. Line cutting would be necessary in areas of dense bush and previously tree thinned areas.

### CONCLUSION

The magnetometer survey has outlined a highly magnetic rock unit in the central grid area which likely represents a shallow intrusive unit overlain by volcanics. This anomalous area is structurally complex. Located in its southern half are numerous probable fault and possible mineralized shear zones. East of the high magnetic unit is a rock unit with less magnetite content, but still with a relatively high magnetic relief. West of the central magnetic high is a lithological contact with a rock type of low magnetic mineral content.

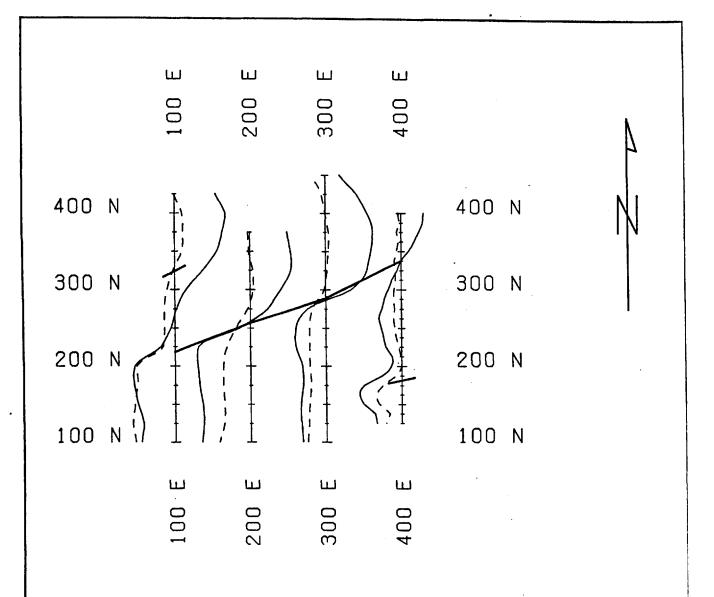
The VLF-EM survey delineated two strong anomalies and several weak anomalies. There is a strong association between VLF-EM anomalies and magnetic lows in the southern areas of the grid. These anomalies should be closely correlated to the known geology and geochemistry to best determine which will warrant further investigation.

> Todd A. Ballantyne, B.Sc., Geophysicist

SJ Geophysigs Ltd.

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

SJ Geophysics Ltd.



## LEGEND

DIP ANGLE - SOLID LINES PROFILE SCALE: 15% / CM BASE VALUE: 0% QUADRATURE - DASHED LINES PROFILE SCALE: 15% / CM BASE VALUE: 0% INSTRUMENTATION: EDA OMNI PLUS VLF-EM SYSTEM STATION: NSS, 21.4 KHZ (ANNAPOLIS) SURVEY DIRECTION FACING EAST

VLF-EM CONDUCTOR AXIS

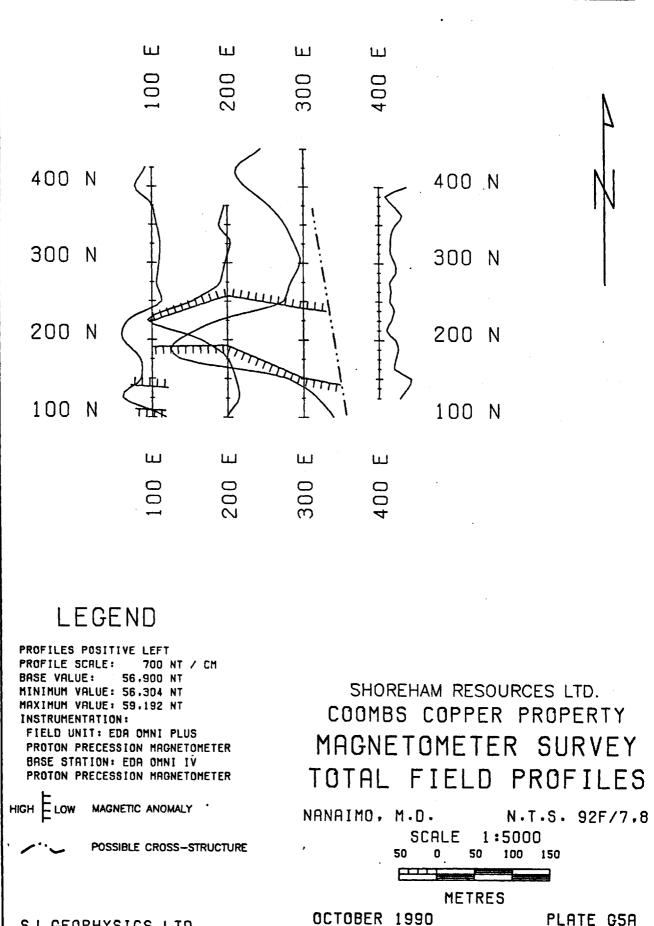
SJ GEOPHYSICS LTD.

SHOREHAM RESOURCES LTD. COOMBS COPPER PROPERTY VLF-EM SURVEY DIP ANGLE & QUADRATURE

NANAIMO, M.D. N.T.S. 92F/7,8 SCALE 1:5000 50 0 50 100 150 METRES


OCTOBER 1990

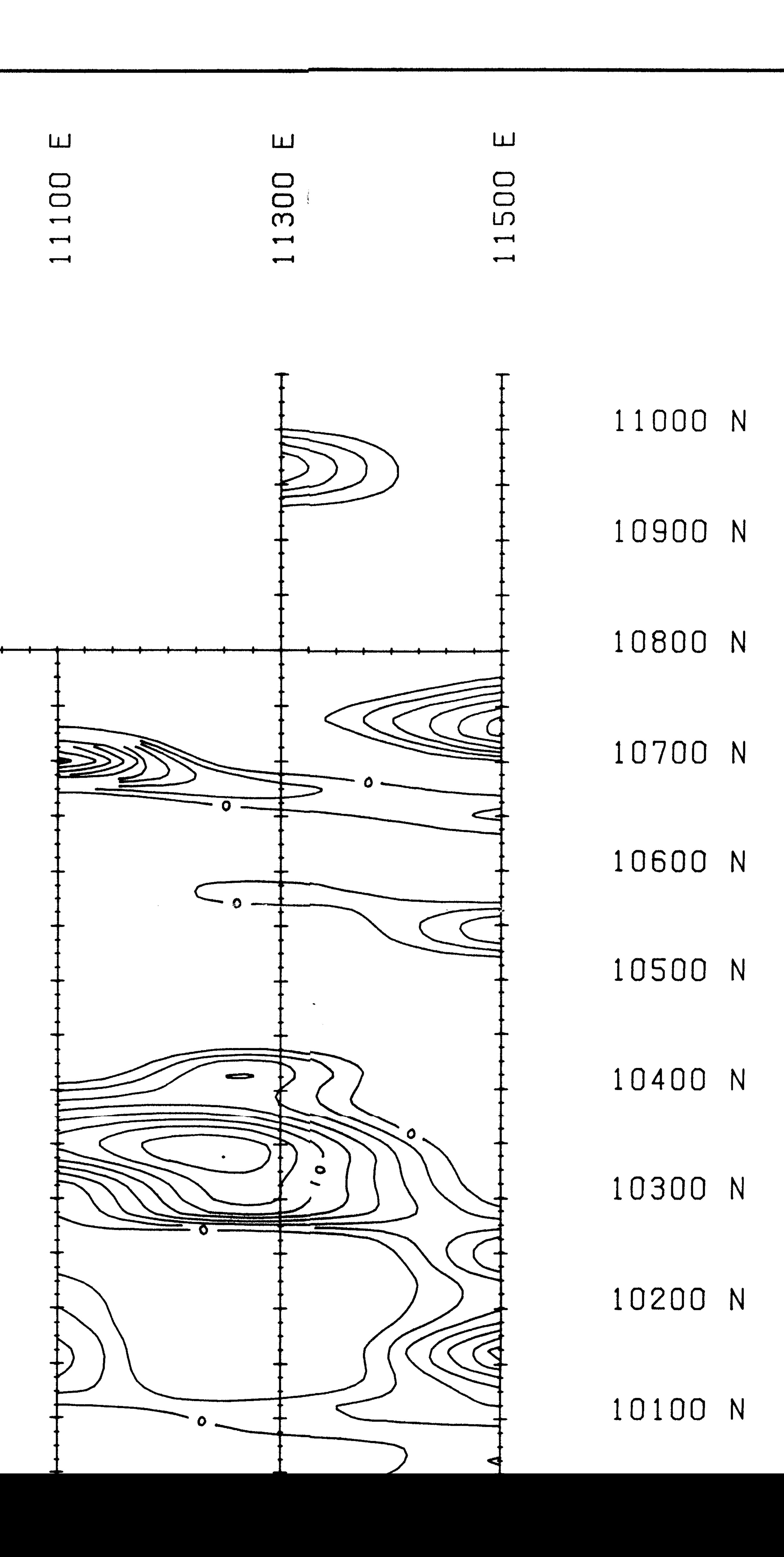
PLATE G5B

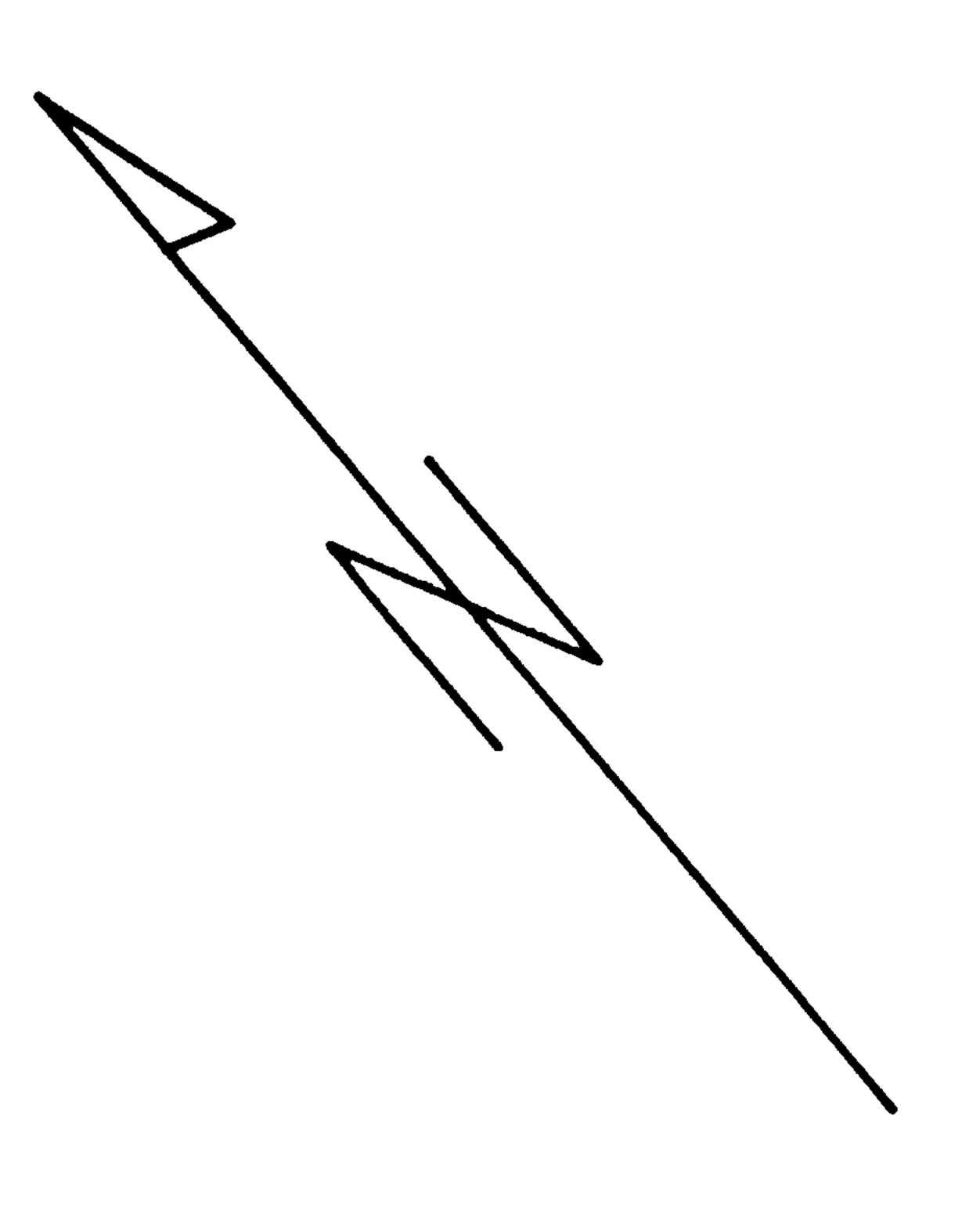


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LEGEND

NEGATIVE CONTOURS SUPPRESSED SURVEY DIRECTION FACING NORTH CONTOUR INTERVAL: 2% POSTED INTERVAL: 10% MAXIMUM VALUE: 50% MINUMUM VALUE:

INSTRUMENTATION: EDA OMNI PLUS VLF-EM SYSTEM STATION: NSS. 21.4 KHZ. (ANNAPOLIS)

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
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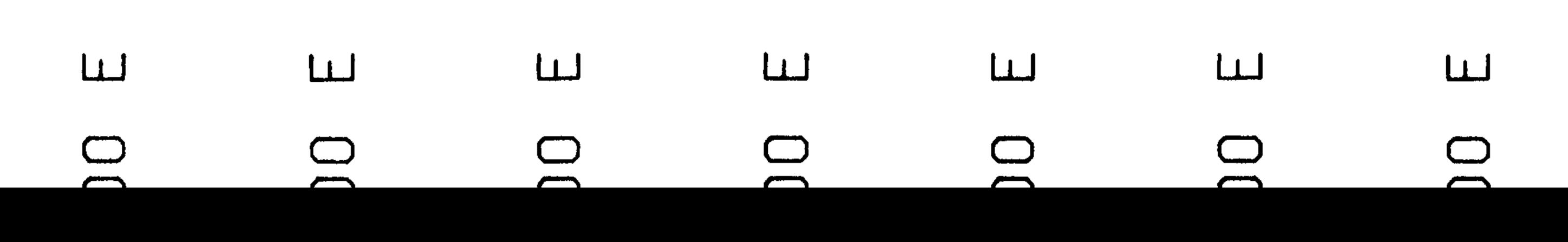
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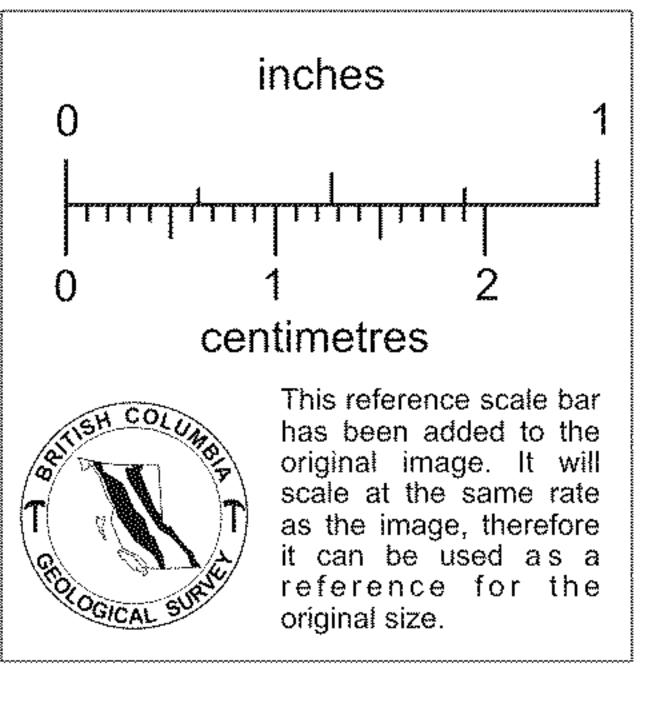


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
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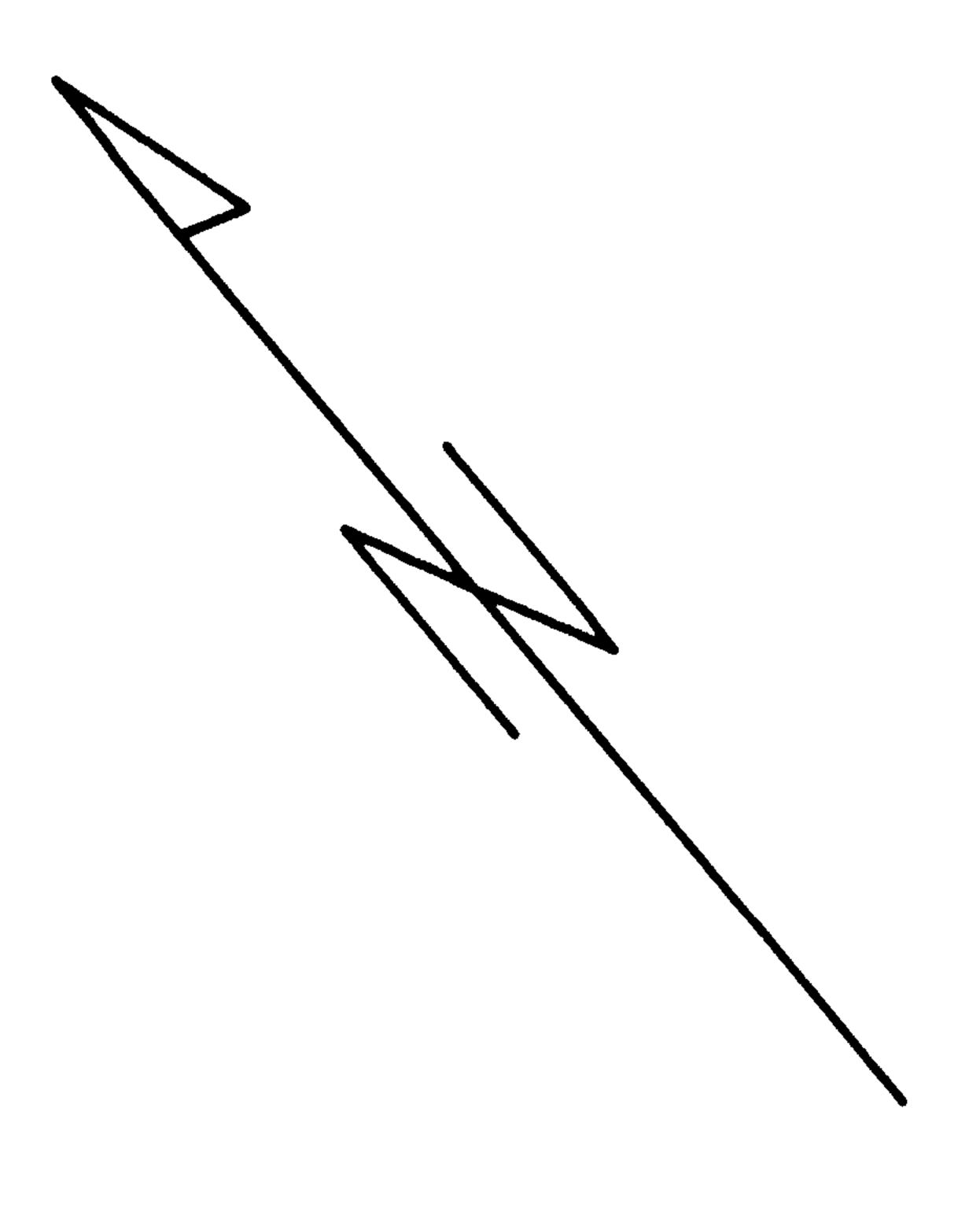
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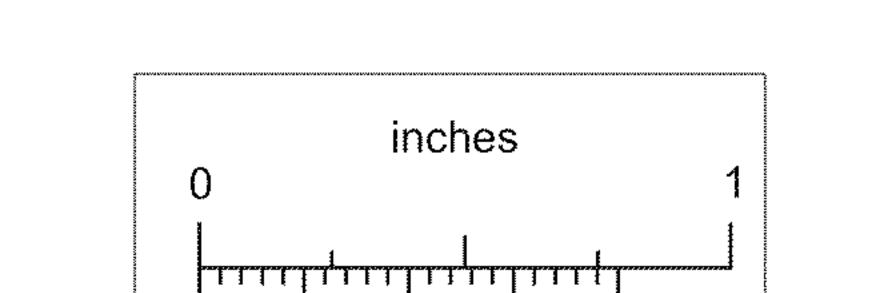
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


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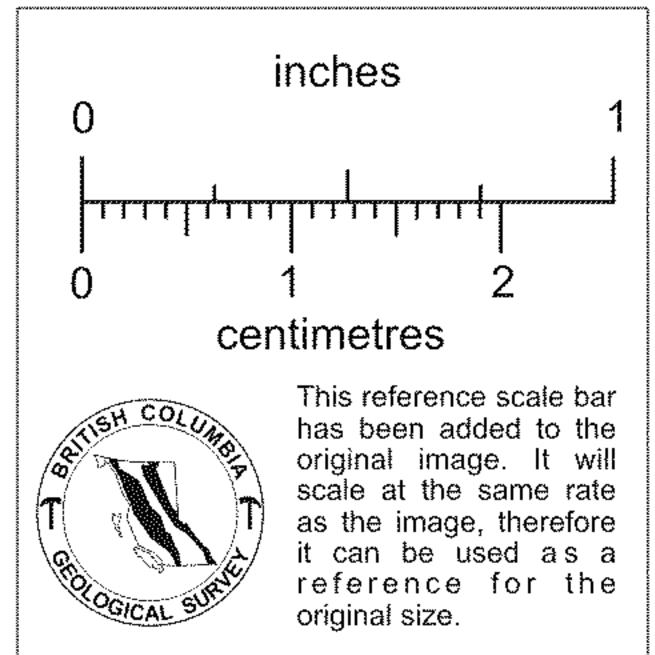
NEGATIVE CONTOURS SUPPRESSED SURVEY DIRECTION FACING NORTH CONTOUR INTERVAL: 2% POSTED INTERVAL: 10% MAXIMUM VALUE: 36% MINIMUM VALUE: 0

INSTRUMENTATION: EDA OMNI PLUS VLF-EM SYSTEM STATION: NLK. 24.8 KHZ (SEATTLE)





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PROFILE SCALE: 20%
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QUADRATURE - DASHED
PROFILE SCALE: 20%
BASE VALUE: 0%

LEGEND

10700 N

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10400 N

10300 N

10200 N

10100 N

10000 N

- 10800 N
- 10900 N

- 11000 N