87 214

REPORT ON AN AIRBORNE MAGNETIC AND VLF-EM SURVEY WINE HABOUR GOLD PROPERTY GUYSBOROUGH COUNTY, NOVA SCOTIA

TERRAQUEST LTD.

87 214

A-707

REPORT ON AN

AIRBORNE MAGNETIC AND VLF-EM SURVEY

WINE HABOUR GOLD PROPERTY

GUYSBOROUGH COUNTY, NOVA SCOTIA

for

WILCO MINING COMPANY LIMITED

E.L. 1303
J.H. MacMillan
11F4B

by

TERRAQUEST LTD.
Toronto, Canada

August 18, 1987

Suite 905, 121 Richmond Street West, Toronto, Canada, M5H 2K1, Telephone (416) 869-0010

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1. INTRODUCTION

This report describes the specifications and results of a geophysical survey carried out for Wilco Mining Company Limited of 306-4198 Dundas Street West, Toronot, Ontario, M8X 1Y6 by Terraquest Ltd., 905 - 121 Richmond Street West, Toronto, Canada. The field work was performed on July 11, 1987 and the data processing, interpretation and reporting from July 12 to August 18, 1987.

The purpose of a survey of this type is two-fold. One is to prospect directly for anomalously conductive and magnetic areas in the earth's crust which may be caused by, or at least related to, mineral deposits. A second is to use the magnetic and conductivity patterns derived from the survey results to assist in mapping geology, and to indicate the presence of faults, shear zones, folding, alteration zones and other structures potentially favourable to the presence of gold and base-metal concentration. To achieve this purpose the survey area was systematically traversed by an aircraft carrying geophysical instruments along parallel flight lines spaced at even intervals, 100 metres above the terrain surface, and aligned so as to intersect the regional geology in a way to provide the optimum contour patterns of geophysical data.

2. THE PROPERTY

The property is located in Guysborough County, Nova Scotia, approximately 13 kilometres southeast of the town of Sherbrooke and 150 kilometres northeast of the town of Halifax. The property lies along the north shore of Wine Habour Bay and is directly accessible by roads.

The latitude and longitude are 45 degrees 04 minutes, and 61 degrees 50 minutes respectively, and the N.T.S. reference is 11F/4.

The exploration licences are shown in figure 2 and listed below:

11022, 8631 ..... 2 Exploration Licences

3. GEOLOGY

Map References

1. Geological Map of the Province of Nova Scotia. scale 1:500,000. Department of Mines and Energy, Nova Scotia 1979.
2. Wine Habour Property, Guysborough County, Nova Scotia. scale 1:10,000. Wilco Mining Company Limited 1987.

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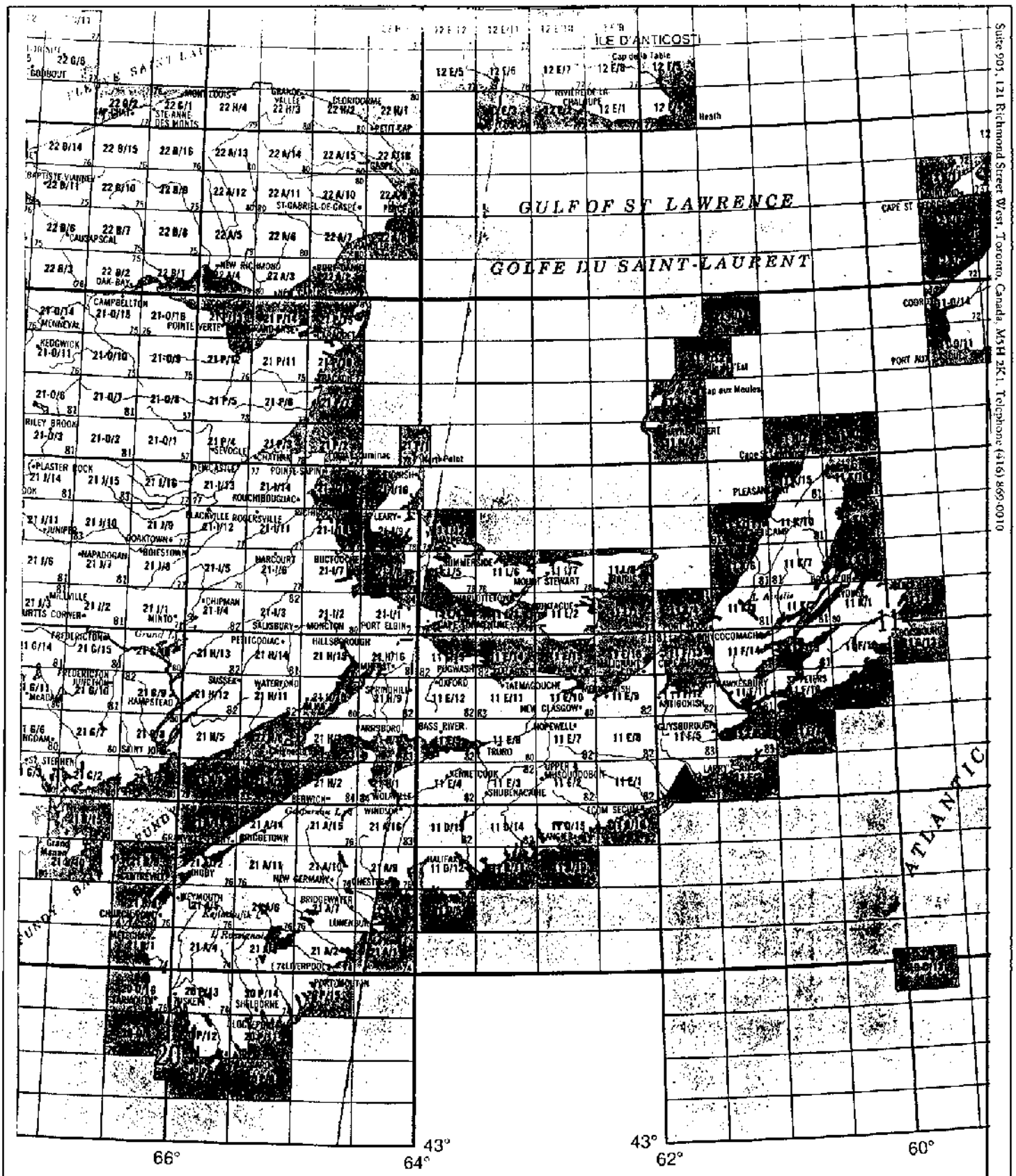

FIGURE 1. General Location

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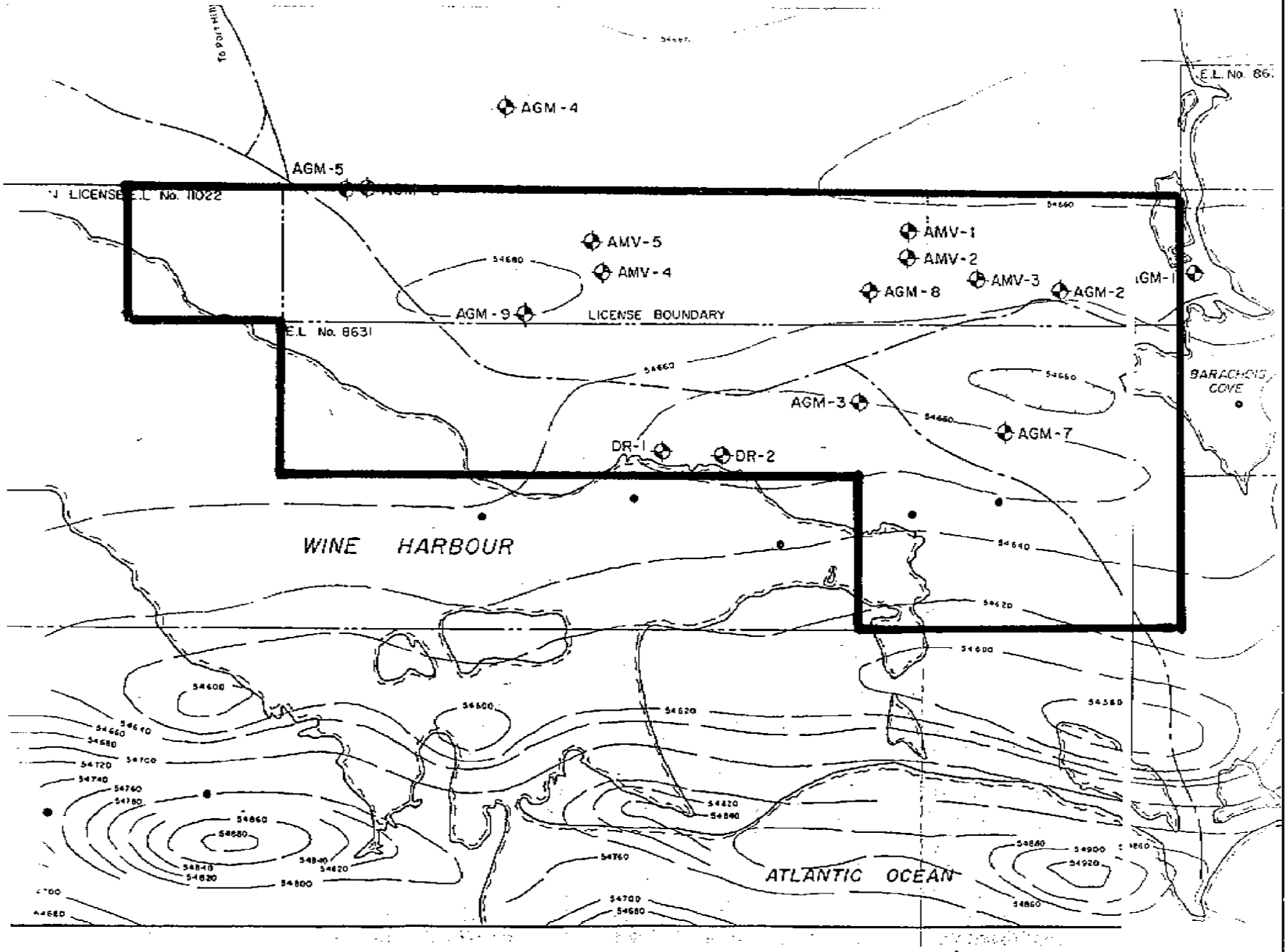

FIGURE 2. Claim Location Map
(exact locations not certified)

The survey area is underlain by greywackes and minor slates and argillite of the Cambro-Ordovician Goldenville Formation. Narrow bands of the Halifax Formation argillites occur to the north and west. A Devono-Carboniferous intrusive of monzogranite lies 60 kilometres along strike to the west, west of Sheet Harbour.

Locally the sediments are isoclinally folded about east-west trending axes. Major faults trend to the northwest.

This area has previously supported gold mining by the Plow Lead Mining Company and the Old Provincial Mining Company. More recently, exploration and diamond drilling have been carried out by Durham Resources, Acadia Minerals Ventures and Albatross Gold Mines. Gold occurrs in the quartz veins associated with the agrillitic to slaty horizons.

4. SURVEY SPECIFICATIONS

4.1 Instruments

The survey was carried out using a Cessna 182 aircraft, registration C-FAKK, which carries a magnetometer and a VLF electromagnetic detector.

The magnetometer is a proton precession type based on the Overhauser effect. The Overhauser effect allows for polarization of a proton rich liquid of the sensor by adding a "free radical" to it and irradiating it by RF magnetic field. Strong precession signals are generated with modest RF power. The sensor element is mounted in an extension of the right wing tip. It's specifications are as follows:

Resolution:	0.5 gamma
Accuracy:	0.5 gamma
Cycle time:	0.5 second
Range:	20,000 - 100,000 gammas in 23 overlapping steps
Gradient tolerance:	Up to 5000 gammas per metre
Model:	GSM-9BA
Manufacturer:	GEM Systems Inc., 105 Scarsdale Rd., Don Mills, Ontario, M3B 2R5

The VLF-EM unit uses three orthoganol detector coils to measure (a) the total field strength of the time-varying EM field and (b) the phase relationship between the vertical coil and both the "along line" coil (LINE) and the "cross-line" coil (ORTHO). The LINE coil is tuned to a transmitter station that is ideally positioned at right angles to

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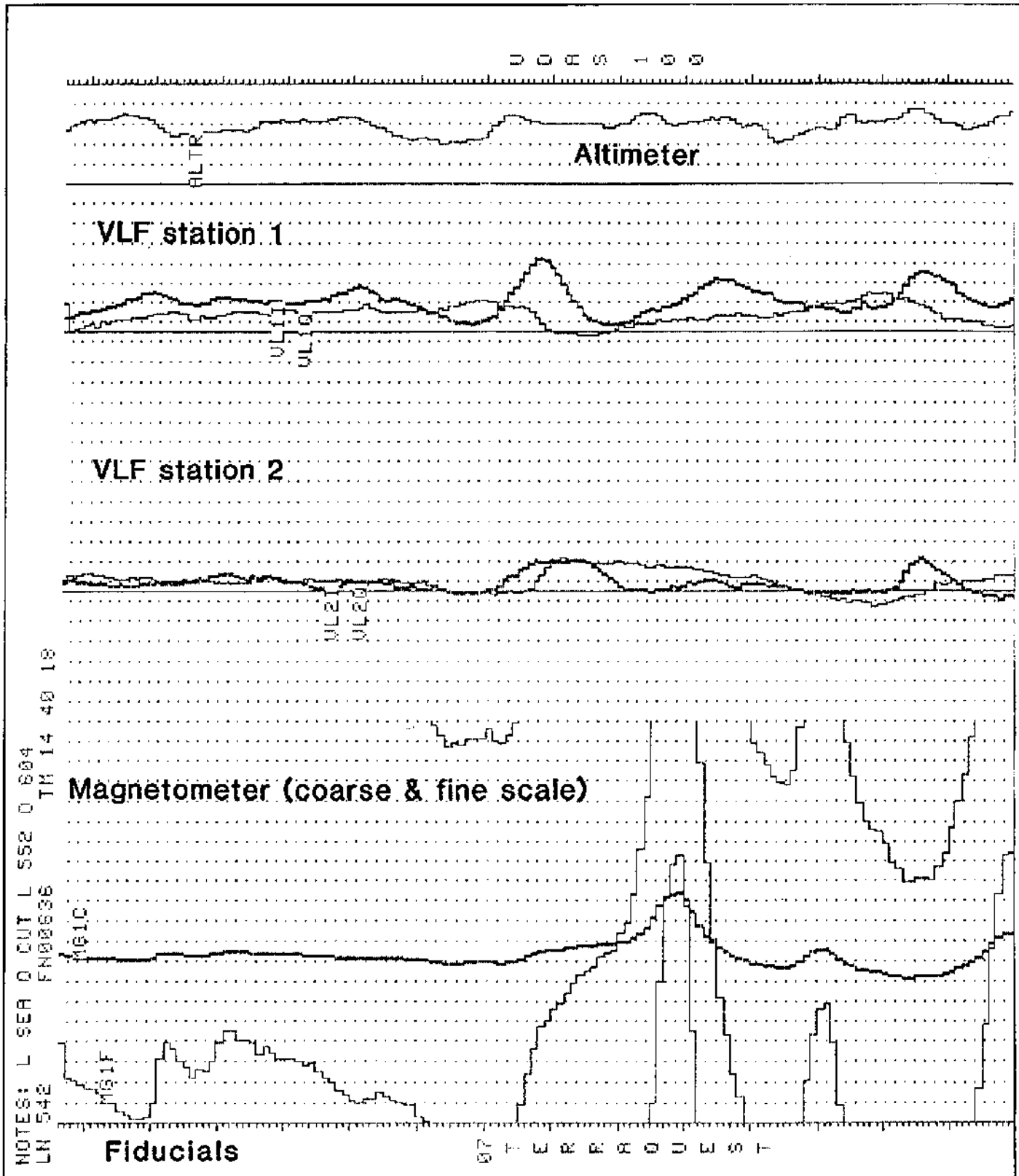

FIGURE 3. Sample of analogue data

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the flight lines, while the ORTHO coil transmitter should be in line with the flight lines. It's specifications are:

Accuracy:	1%
Reading interval:	1/2 second
Model:	TOTEM 2A
Manufacturer:	Herz Industries, Toronto

The VLF sensor is mounted in the left wing tip extension.

Other instruments are:

- King KRA-10A Radar altimeter
- UDAS-100 data processor with Digidata nine track tape recorder, manufactured by Urtec Ltd., Markham, Ontario.
- Geocam video camera and recorder for flight path recovery, manufactured by Geotech Ltd., Markham, Ontario.

4.2 Lines and Data

a) Line spacing:	100 metres
b) Line direction:	360 degrees
c) Terrain clearance:	100 metres
d) Average ground speed:	156 km/hr.
e) Data point interval:	
Magnetic:	27 metres
VLF-EM:	27 metres
f) Tie Line interval:	1 kilometre
g) Channel 1 (LINE):	NAA Cutler, 24.0 kHz
h) Channel 2 (ORTHO):	NSS Annapolis. 21.4 kHz
i) Line km over total area:	100 kilometres
j) Line km over survey area:	82 kilometres

4.3 Tolerances

a) Line spacing: Any gaps wider than twice the line spacing and longer than 10 times the line spacing were filled in by a new line.
b) Terrain clearance: Portions of line which were flown above 125 metres for more than one km were reflown if safety considerations were acceptable.
c) Diurnal magnetic variation: Less than twenty gammas deviation from a smooth background over a period of two minutes or less as seen on the base station analogue record.
d) Manoeuvre noise: Approximately +/-5 gammas.

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4.4 Photomosaics

For navigating the aircraft and recovering the flight path, mosaics of aerial photographs were made from existing air photos.

5. DATA PROCESSING

Flight path recovery was carried out in the field using a video tape viewer to observe the flight path as recorded by the Geocam video camera system. The flight path recovery was completed daily to enable reflights to be selected where needed for the following day.

The magnetic data was levelled in the standard manner by tying survey lines to the tie lines. The IGRF has not been removed. The total field was contoured by computer using a program provided by Dataplotting Services Inc. To do this the final levelled data set is gridded at a grid cell spacing of 1/10th of an inch at map scale.

The vertical magnetic gradient is computed from the total field data using a method of transforming the data set into the frequency domain, applying a transfer function to calculate the gradient, and then transforming back into the spatial domain. The method is described by a number of authors including Grant, 1972 and Spector, 1968. The computer program for this purpose is provided by Paterson, Grant and Watson Ltd. of Toronto

The VLF data was treated automatically so as to normalize the non conductive background areas to 100 (total field strength) and zero (quadrature). The algorithms to do this were developed by Terraquest and will be provided to anyone interested by application to the company.

All of these dataprocessing calculations and map contouring were carried out by Dataplotting Services Inc. of Toronto.

Grant, F.S. and Spector A., 1970: Statistical Models for Interpreting Aeromagnetic Data; Geophysics, Vol 35

Grant, F.S., 1972: Review of Data Processing and Interpretation Methods in Gravity and Magnetics; Geophysics Vol 37-4

Spector, A., 1968: Spectral Analysis of Aeromagnetic maps; unpublished thesis; University of Toronto

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INTERPRETATION

6.1 General Approach

To satisfy the purpose of the survey as stated in the introduction, the interpretation procedure was carried out on both the magnetic and VLF data. On a local scale the magnetic gradient contour patterns were used to outline geological units which have different magnetic intensity and patterns or "signatures". Where possible these are related to existing geology to provide a geological identity to the units. On a regional scale the total field contour patterns were used in the same way.

Faults and shear zones are interpreted mainly from lateral displacements of otherwise linear magnetic anomalies but also from long narrow "lows". The direction of regional faulting in the general area is taken into account when selecting faults. Folding is usually seen as curved regional patterns. Alteration zones can show up as anomalously quiet areas, often adjacent to strong, circular anomalies that represent intrusives. Magnetic anomalies that are caused by iron deposits of ore quality are usually obvious owing to their high amplitude, often in tens of thousands of gammas.

VLF anomalies are categorized according to whether the phase response is normal, reverse, or no phase at all. The significance of the differing phase responses is not completely understood although in general reverse phase indicates either overburden as the source or a conductor with considerable depth extent, or both. Normal phase response is theoretically caused by surface conductors with limited depth extent.

Areas showing a smooth response somewhat above background (ie. 110 or so) are likely caused by overburden which is thick enough and conductive enough to saturate at these frequencies. In this case no response from bedrock is seen.

The VLF-EM conductor axes have been identified and evaluated according to the Terraquest classification system (Figure 4). This system correlates the nature and orientation of the conductor axes with stratigraphic, structural and topographic features to obtain an association from which one or more origins may be selected. Alternate associations are indicated in parentheses.

6.2 Interpretation

The magnetic and VLF-EM data are shown in contoured format on maps in the back pocket. An interpretation map is also provided. The following notes are intended to supplement these maps.

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FIGURE 4

TERRAQUEST CLASSIFICATION OF VLF-EM CONDUCTOR AXES

SYMBOL	CORRELATION	ASSOCIATION: Possible Origins
a , A	Coincident with magnetic stratigraphy	Bedrock magnetic horizons: stratabound mineralogic origin or shear zone
b , B	Parallel to magnetic stratigraphy	Bedrock non-magnetic horizons: stratabound mineralogic origin or shear zone
c , C	No correlation with magnetic stratigraphy	Association not known: possible small scale stratabound mineralogic origin, fault or shear zone, overburden
d , D	Coincident with magnetic dyke	Dyke or possible fault: mineralogic or electrolytic
f , F	Coincident with topographic lineament or parallel to fault system	Fault zone: mineralogic or electrolytic
ob , OB	Contours of total field response conform to topographic depression	Most likely overburden: clayey sediments, swampy mud
cul , CUL	Coincident with cultural sources	Electrical, pipe or railway lines

NOTES

1 - Upper case symbols denote a relatively strong total field strength

2 - Underlined symbols denote a relatively strong quadrature response

3 - Mineralogic origins include sulphides, graphite, and in fault zones, gouge

4 - Electrolytic origins imply conductivity related to porosity or high moisture content

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The total magnetic field has a very gentle relief of only 70 gammas and shows east trending units. The vertical magnetic gradient data improves the resolution slightly in some areas and has been used to delineate the stratigraphy and structure. The relative intensities were taken from the total magnetic field.

The gentle magnetic relief is characteristic of the greywackes and argillites (Unit 1). The magnetic horizons within the survey area do not appear to be consistent with the local stratigraphic trends. Therefore these magnetic horizons are interpreted to be alteration zones characterized by increased concentrations of magnetic minerals, probably pyrrhotite or possibly magnetite.

The strongest anomaly along the extreme southern edge of the survey may be related to the Cambro-Ordovician Halifax Formation or more probably the Devono-Carboniferous monzogranite at depth.

Numerous northwest trending faults have been interpreted based on the displacements of the magnetic horizons. Several of these are consistent with ground mapped faults and air photo lineaments.

The VLF-EM data show weak to moderate strength east-west trending conductor axes. The stronger ones to the south are most likely related to salt water conductivity of Wine Harbour Bay. One conductor axis along the east side of the property coincides with a magnetically mapped fault. Conductivity related to faults or shear zones may be caused by minerals such as graphite, sulphides or gouge, or by an ionic effect created by either porosity along the structure or conductive overburden in an overlying depression.

The remaining conductor axes either parallel or coincide with the magnetic horizons. Therefore these possess potential for bedrock sources either as sulphides or graphite and should be followed up on the ground by EM or IP methods.

An east-west trending zone of low resistivity occurs near the highway across the property. Low resistivity may be a function of lack of conductive overburden or resistive bedrock such as silicification or carbonitization. The central part of this resistive zone appears to correlate well with areas of past gold mining in highly silicified argillites. If this correlation can be verified then future exploration should concentrate along the strike extensions of these resistive zones.

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7. SUMMARY

An airborne combined magnetic and VLF-EM survey has been done on the property at line intervals of 100 metres. The total field and vertical gradient magnetic data, VLF-EM data and interpretation maps are produced at a scale of 1:10,000.

The magnetic data has been used to modify and update the existing geology and has shown some possible alteration zones and numerous faults. A number of VLF-EM conductor axes were found of which some are believed to have potential sulphide origins and have been recommended for additional investigation.

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Geologist

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J.H. MacMillan 11F/10SE - 67, 68, 69

Nova Scotia
Department of Mines and Energy

Report of Work Performed

I, the undersigned, holder of/agent for, Exploration License No. 13303 issued on the 27th day of July 19 87, hereby report work as follows:

I have, under said License, and in conformity with the provisions of The Mineral Resources Act, performed or caused to be performed on the licensed area 345.3 days' work (eight-hour days) not reported before, totalling $ 6,906.00 as per the attached list of expenditures. (Rate is one day's work for each $20.00 spent.)

Expenditures relating to office overhead, transportation, lodging, freight, express, construction of roads, erection of buildings, etc., will be accepted up to a maximum of ten percent (10%) of the required work.

The said work consisted of Airborne Magnetic and VLF-EM Survey

Attached is a geological report with applicable maps, sample results, drill logs, etc., which is submitted as evidence and initialled by me.

My Post Office address is 4198 Dundas St.West, Suite 306

Toronto Ontario M8X 1Y6 Tel. No. 416-231-5603

Dated this 17th day of November 19 87.

Signature of Licensee/Agent
~~A.D. HUNTER~~ — J.H. MacMillan Ltd

I hereby make oath and say that the above statement is true and correct.

Signature of Licensee/Agent
A.D. HUNTER

Sworn to
at Toronto
in the ~~County of~~ Municipality of Metropolitan Toronto
Province of ONTARIO
this 19th day of November A.D. 19 87
Before me Terrance F. O'Donnell
a Notary Public in and
for The Province of Ontario.

RECEIVED
NOV 24 11 23 87
MINES AND ENERGY

August 24, 1987

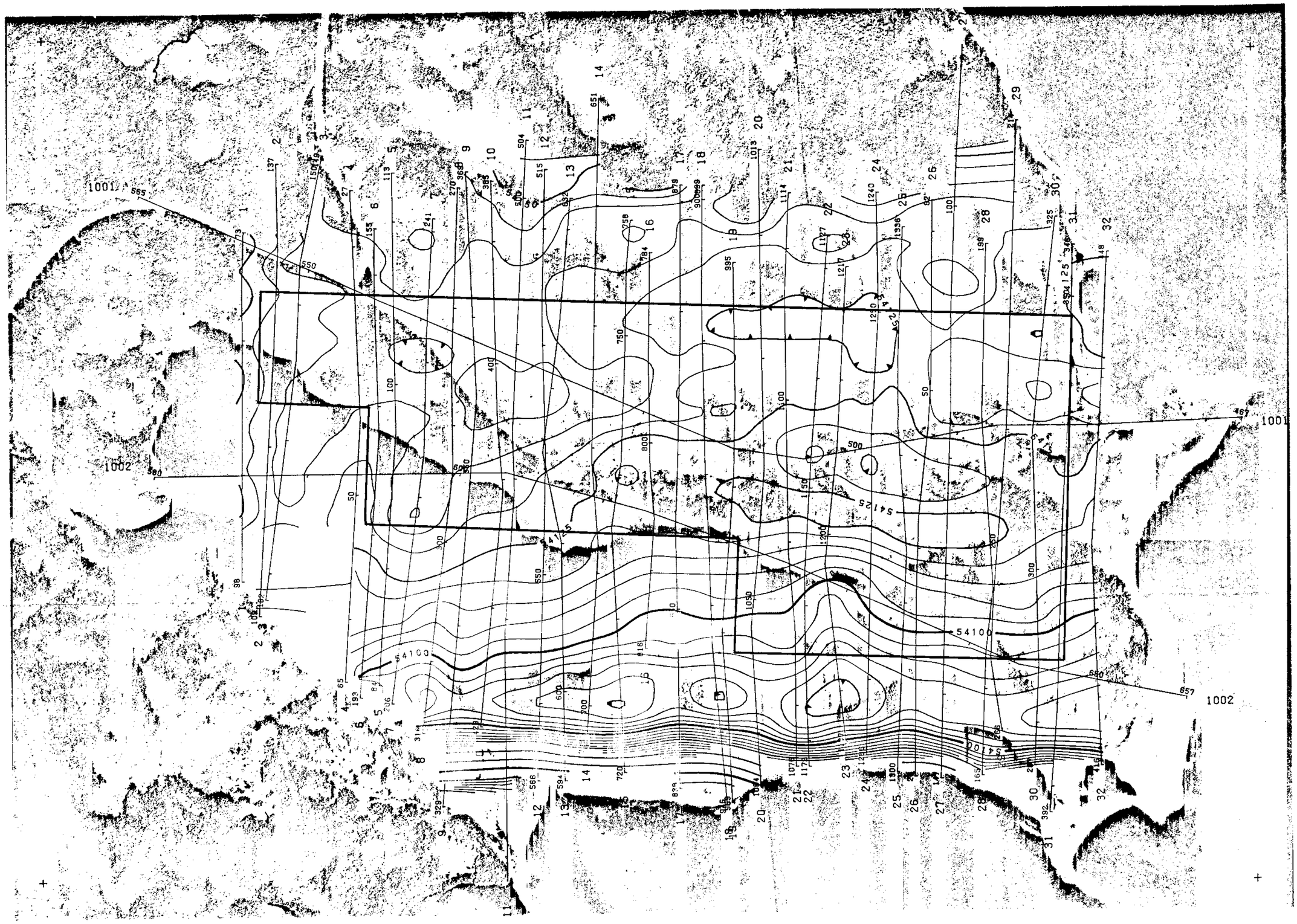
TERRAQUEST LTD.

The NAMES and ADDRESSES of the men who performed the said work and the DATES upon which each man worked in its performance are as follows:

NAME	ADDRESS	MONTH	DATES
Terraquest Ltd.	Suite 905 121 Richmond St.	July 12 - August, 1987	Interpretation & Reporting
	Toronto Ont. Canada 416-869-0010	July 11,1987 -	Field Survey

PLEASE REFER TO TERRAQUEST LTD. REPORT(2 SETS PROVIDED)

FOR DETAILS OF WORK PERFORMED.



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LEGEND

Terrain Clearance	100 meters
Line Spacing	100 meters

TOTAL MAGNETIC FIELD

500 gammas	———
100 gammas	———
25 gammas	———
5 gammas	———

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AIRBORNE MAGNETIC SURVEY
TOTAL MAGNETIC FIELD

WINE HARBOUR GOLD PROPERTY
NOVA SCOTIA

N.T.S. NO. 11F/4	DRAWING NO. A-707-1
SCALE: 1:10,000	DATE: August 1987

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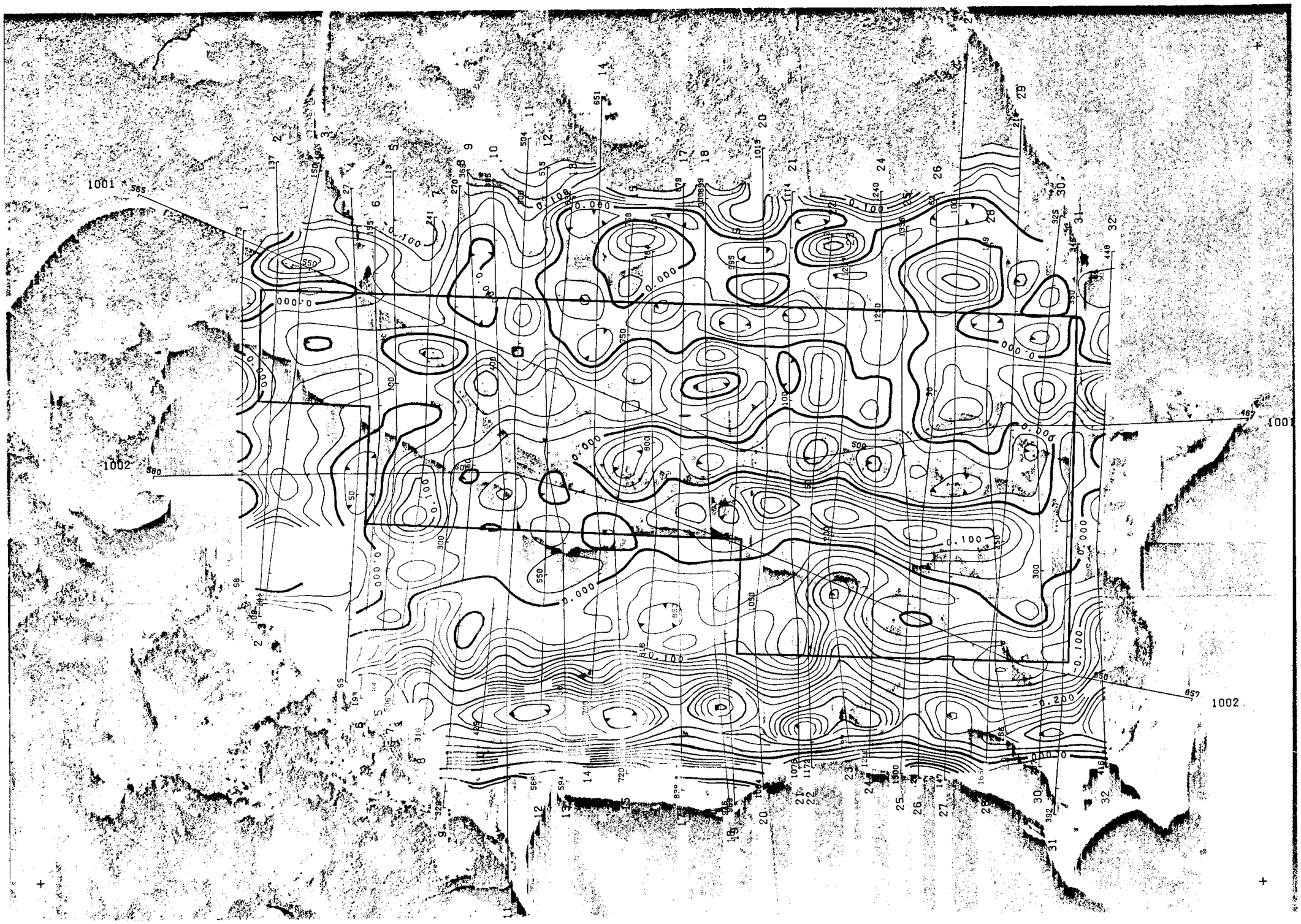

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LEGEND

Terrain Clearance	100 meters
Line Spacing	100 meters

VERTICAL MAGNETIC GRADIENT

2.500 gammas/meter	———
.500 gammas/meter	———
.100 gammas/meter	———
.025 gammas/meter	———

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AIRBORNE MAGNETIC SURVEY

VERTICAL MAGNETIC GRADIENT
Calculated From Total Field

WINE HARBOUR GOLD PROPERTY
NOVA SCOTIA

N.T.S. NO. 11F/4	DRAWING NO. A-707-2
SCALE: 1:10,000	DATE: August 1987

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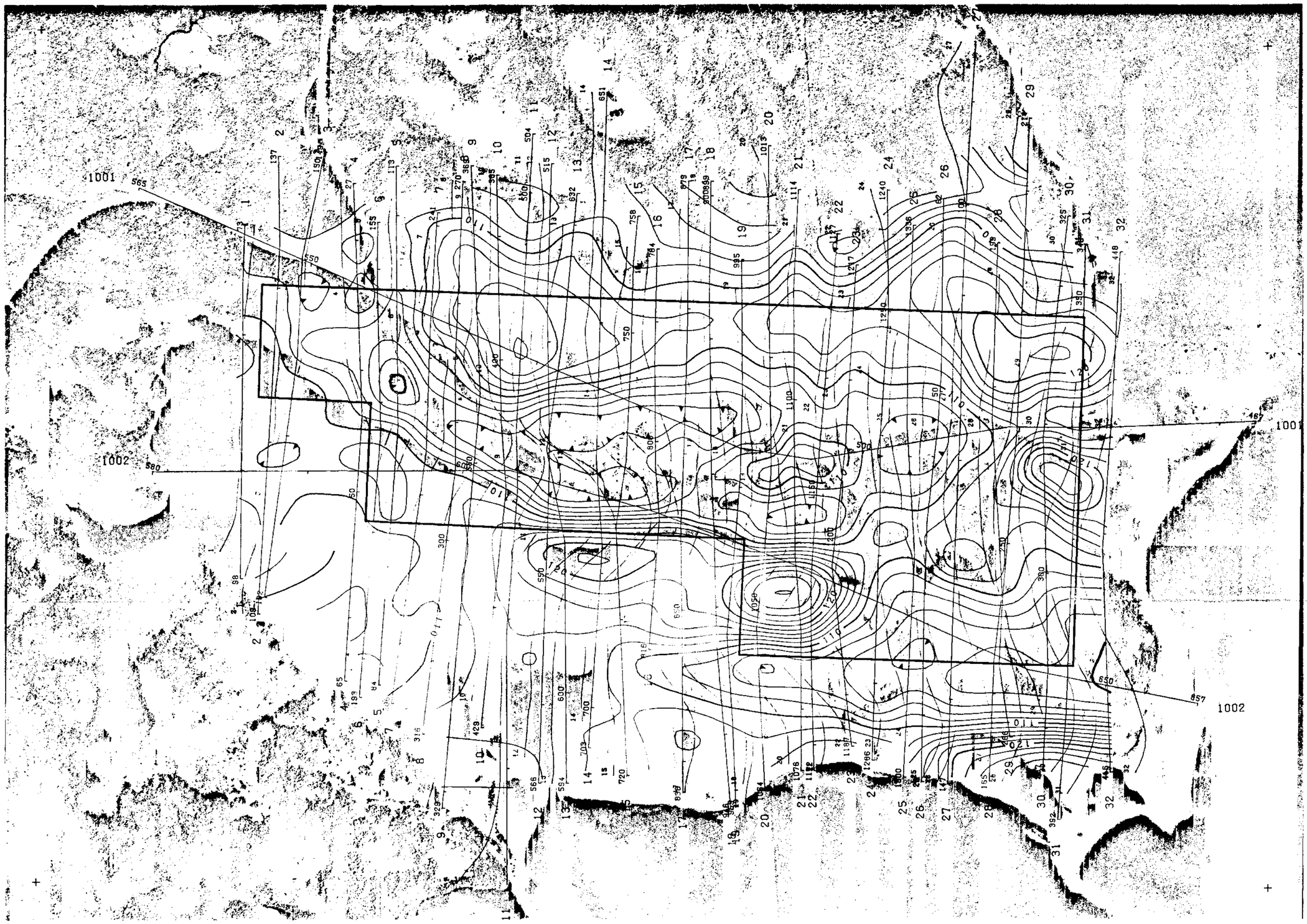

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VLF Transmitter
NAA Cutler, 24.0 kHz
Azimuth 227

LEGEND

Terrain Clearance ..... 100 meters
Line Spacing ..... 100 meters

TOTAL FIELD STRENGTH (Contours)
50%
10%
2%

QUADRATURE (Profiles)
Normal Slope
Reverse Slope

+10% −10% +10% −10%

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AIRBORNE VLF-EM SURVEY

CONTOURS OF TOTAL FIELD STRENGTH
PROFILES OF QUADRATURE

WINE HARBOUR GOLD PROPERTY
NOVA SCOTIA

N.T.S. NO. 11F/4	DRAWING NO. A-707-3
SCALE: 1:10,000	DATE: August 1987

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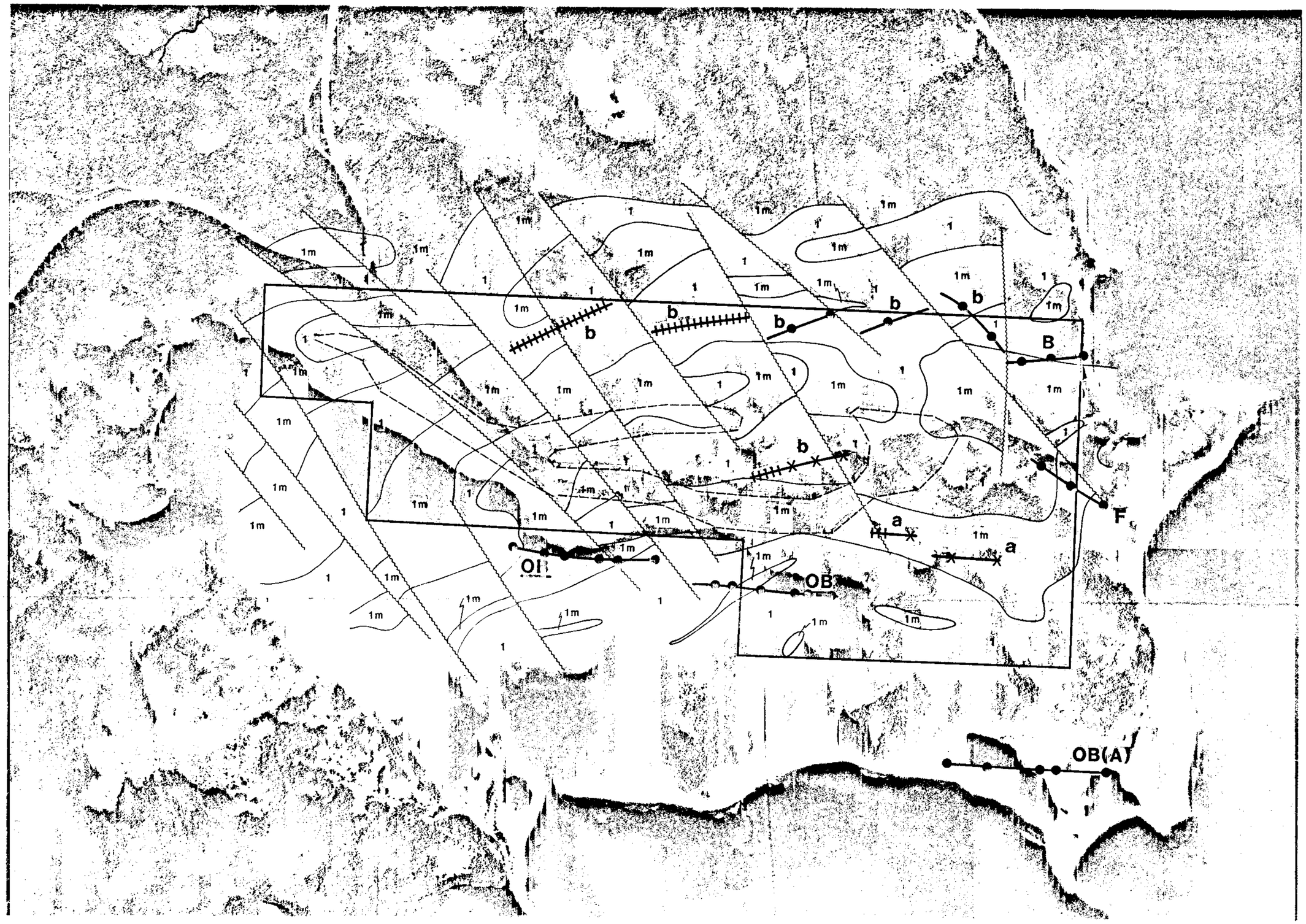

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LITHOLOGY

GOLDENVILLE FORMATION

1m	Magnetic unit within 1.
1	Greywacke

VLF Transmitter
NAA Cutler, 24.0 kHz
Azimuth 227

LEGEND

Terrain Clearance ..... 100 meters
Line Spacing ..... 100 meters

INTERPRETATION

- Contact
- Fault
- Property Boundary
- Resistive Zone

VLF-EM Conductor Axes

- normal quadrature
- reverse quadrature
- total field only

See text for classification of VLF-EM conductor axes

WILCO MINING COMPANY LIMITED

INTERPRETATION

WINE HARBOUR GOLD PROPERTY
NOVA SCOTIA

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SCALE: 1:10,000	DATE: August 1987

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