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REPORT on the
Magnetic and Electromagnetic Surveys
on
Scholfield Township Property
of
CAN MAC EXPLORATION
by
Greg Hodges, B.Sc.
February, 1988

OM87-5-L-176

M-279

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ABSTRACT

The Scholfield Township property of Can Mac Exploration was surveyed with magnetics and electromagnetics (Max Min) by Robert S. Middleton Exploration.

The survey clearly delineated the conductors on the property and aided in outlining some of the geologic structure (especially the Kaphearst Break).

The geophysical results, combined with the overburden drilling gold anomalies clearly indicate areas on which further exploration should be conducted.

Three diamond drill targets are recommended for an initial phase, with the recommendation that induced polarization surveying be conducted first, to better define the disseminated margins of these conductors before drilling.

INTRODUCTION

During the late autumn of 1987, a program of line cutting and geophysical surveying was conducted on the Scholfield Township property of Can Mac Exploration.

The survey comprised total field magnetics and horizontal loop electromagnetics (Max Min).

The survey was conducted to examine the property for structures and conductors which should be further investigated as possible economic mineral deposits.

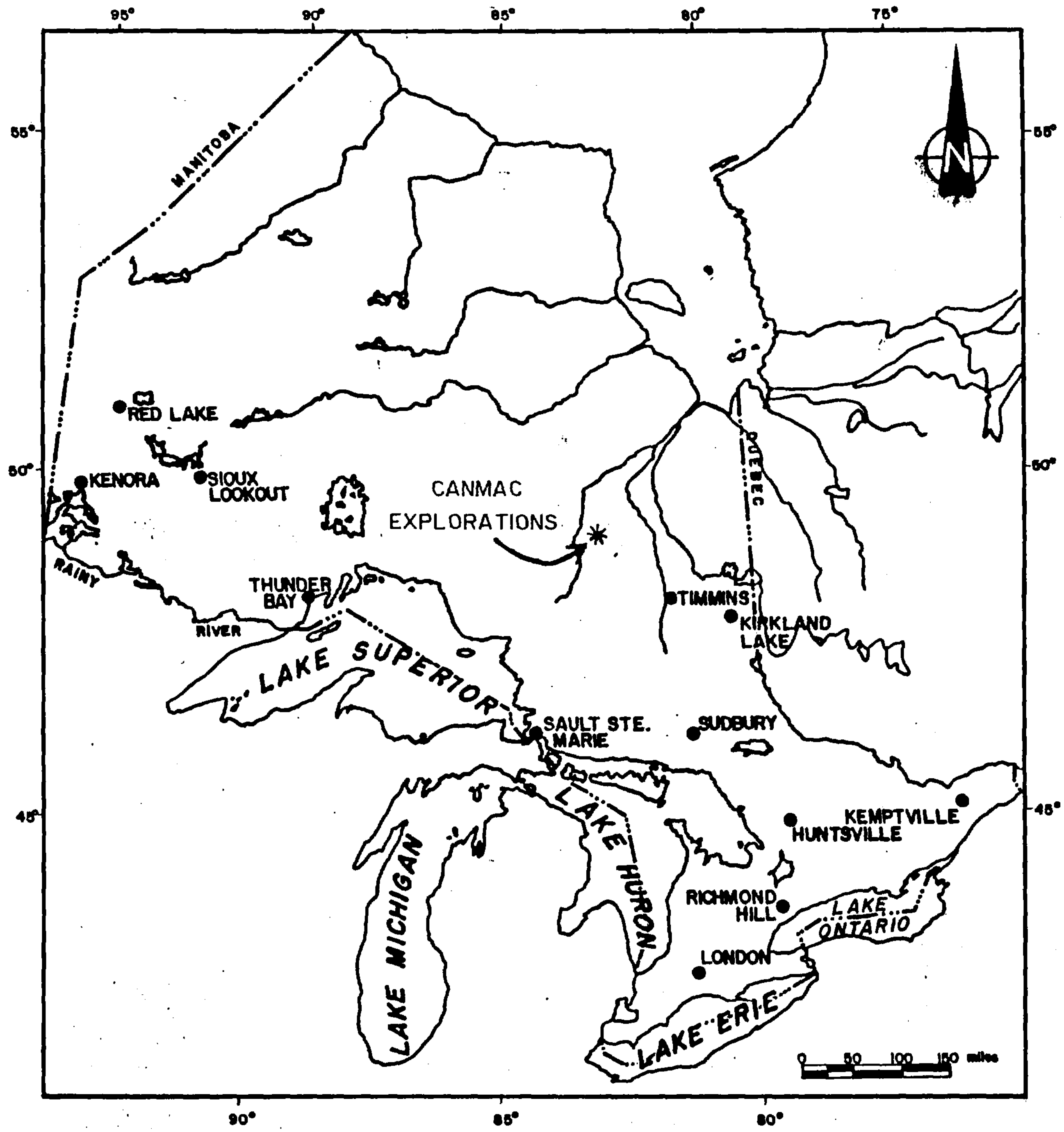
LOCATION AND ACCESS

The property is located in central Scholfield Township, District of Algoma, Ontario (Figures 1 and 2).

The property is approximately 100 km west southwest of Kapuskasing, and 200 km west of Cochrane, the site of the nearest permanent helicopter base.

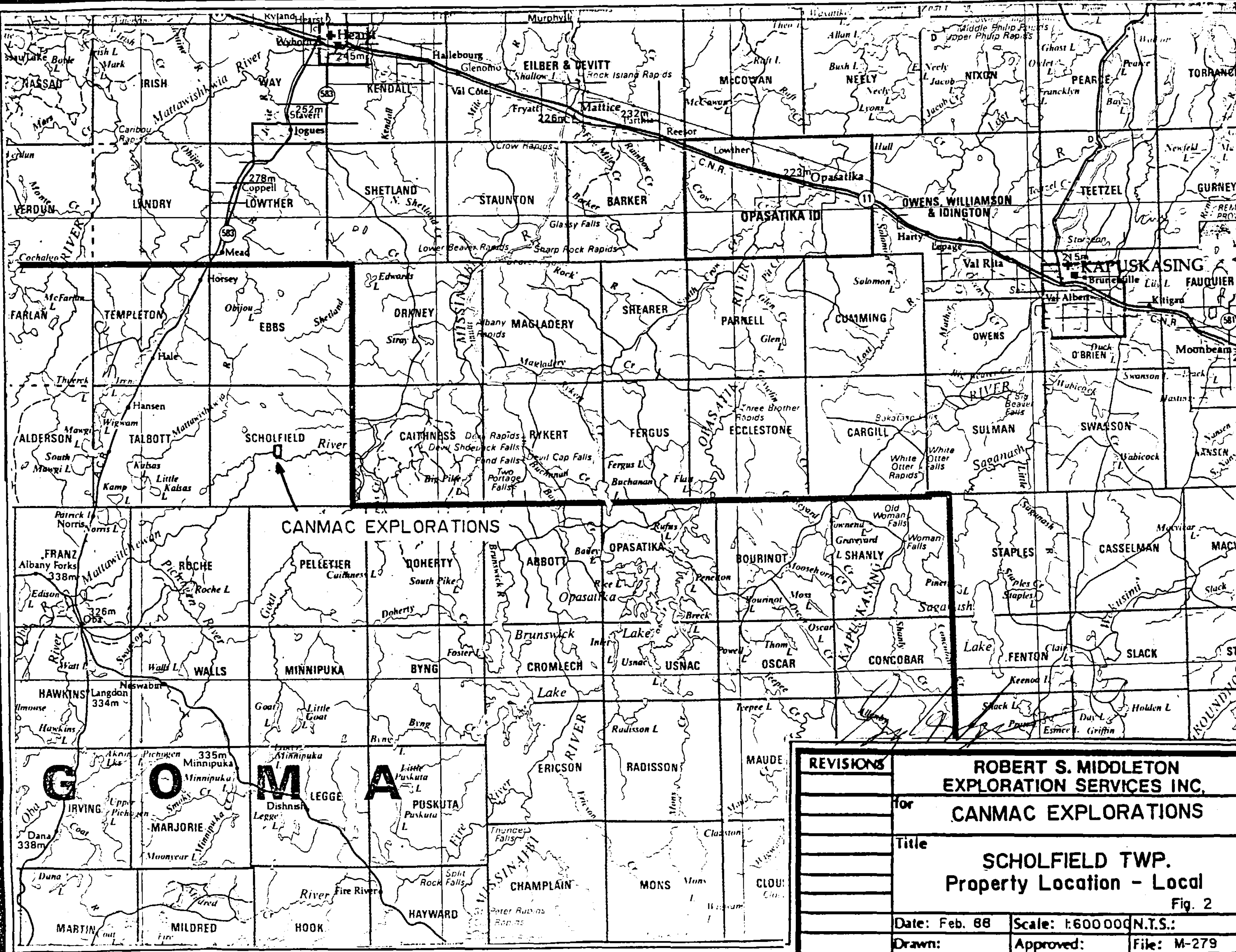
Access to the grid for this work was by helicopter. In winter it is possible to drive to the grid by snowmobile.

The nearest all-weather road is the Caithness Lumber Road, southeast from Jacques, south of Hearst. From the road, winter trails lead east across the property.



PROVINCE OF ONTARIO

REVISIONS	ROBERT S. MIDDLETON EXPLORATION SERVICES INC.		
	for CANMAC EXPLORATIONS		
	Title SCHOLFIELD TWP. Property Location – Regional Fig. 1		
	Date: Feb. 88	Scale: 1"=160ml.	N.T.S.:
	Drawn:	Approved:	File: M-279



REVISIONS	ROBERT S. MIDDLETON EXPLORATION SERVICES INC.		
	for CANMAC EXPLORATIONS		
	Title SCHOLFIELD TWP. Property Location - Local Fig. 2		
	Date: Feb. 88	Scale: 1:600000	N.T.S.:
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CLAIM GROUP

The property consists of 60 unpatented mining claims in Scholfield Township, Porcupine Mining Division, Ontario. The claims are:

CLAIMS	NUMBER	RECORDING DATES
P906031-906090	60	April 22, 1986

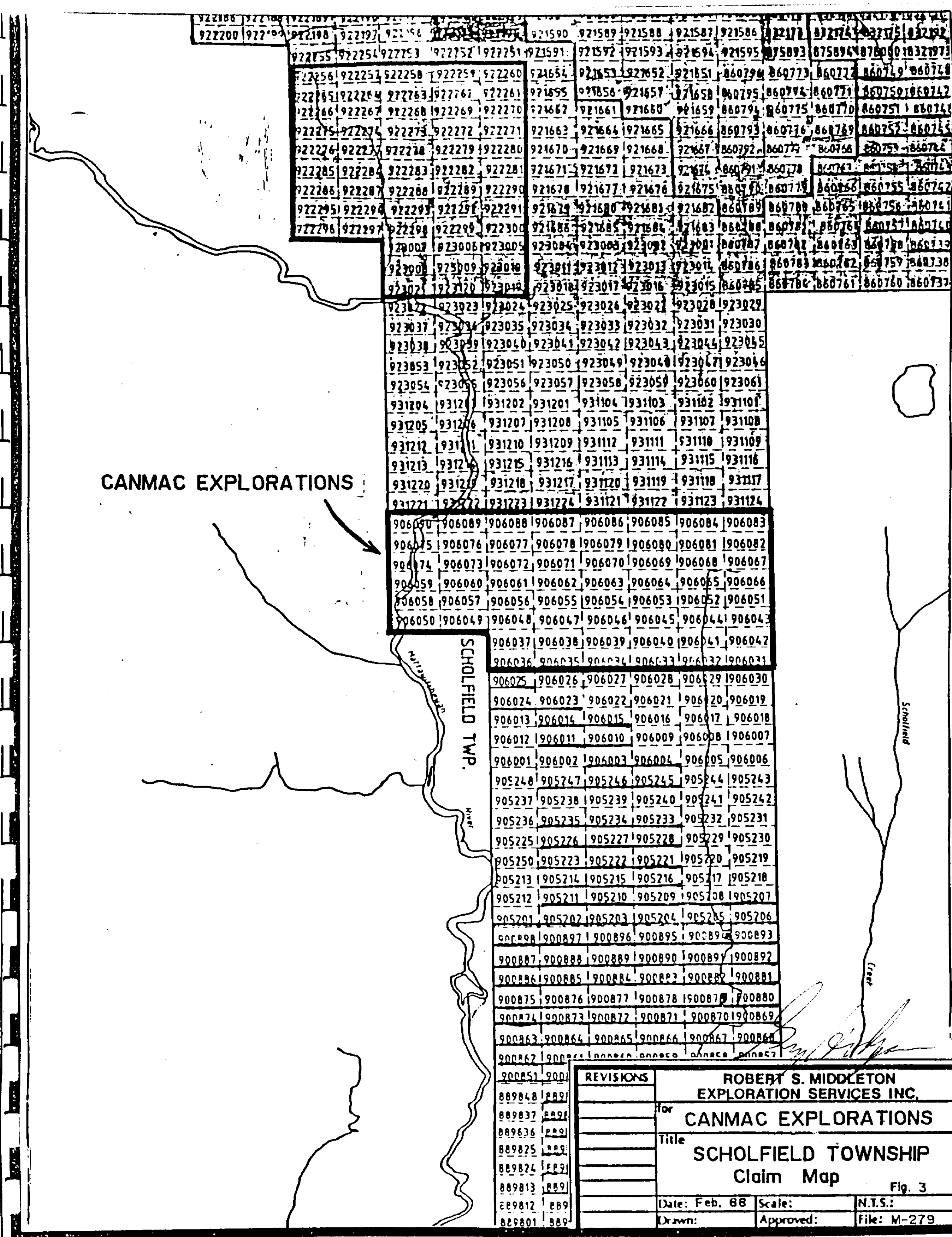
These claims are located in concessions V, VI, VII, VIII and IX and lots 15, 16, 17, 18 and 19 of Scholfield Township.

REGIONAL GEOLOGY

The following is quoted from Baker 1986:

PROPERTY GEOLOGY

"According to Coster (1986) most of the property is underlain by felsic intrusive and metasedimentary rocks. Outcrops observed on the grid were mostly granodiorite. The only area which had significant outcrop were the west central area (around claims 906068-069, 906080-081, 906084) and the south east corner 906036. The west outcrop has a narrow (100m wide) band of metasediments across the south edge of 906081 striking roughly 045°. There are several diabase dikes outcroppin in the area, striking at


CANMAC EXPLORATIONS
SCHOLFIELD TWP.
Scholfield
Creek
River
REVISIONS
ROBERT S. MIDDLETON
EXPLORATION SERVICES INC.
for
CANMAC EXPLORATIONS
Title
SCHOLFIELD TOWNSHIP
Claim Map
Fig. 3
Date: Feb. 88
Scale:
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all angles, and probably more which do not outcrop. For full description of the geology the reader is referred to Coster (1986)."

The map area lies in the northern part of the Early Precambrian Abitibi Belt of the Superior Province near a complexely folded supracrustal sequence. The metavolcanic and metasedimentary rocks have undergone regional and contact metamorphism ranging from upper greenschist to almandine-amphibolite facies. The south and northern parts of the report area are underlain by gneisses and felsic plutons. Archean and Proterozoic diabase dikes intrude all rock types in the area.

The volcanic sequences within this belt comprises varying proportions of mafic, intermediate and felsic flows and pyroclastic rocks. The majority of the volcanic rocks are tholeiitic or calc-alkalic. Minor amounts of komatiitic basalt and ultramafic flows are also present.

Sedimentation often appears to have been contemporaneous with volcanism and the erosion of the volcanic rocks may have provided part of the supply. Algoman type iron formations are present and often associated with turbidites. Small mafic to intermediate plutons of gabbroic to monzonitic composition have intruded the supracrustal rocks.

Since most of the report area is overburden covered, geological interpretations are based primarily from the airborne magnetic data. Narrow, softer bands of iron formation and the mafic volcanic rocks can easily be differentiated from the more felsic volcanics or the sedimentary horizons. As well, the airborne magnetic data is important for detecting major fault zones and regional folding which trend through the report area in an east-northeast direction.

Several types of mineralization are found in the report area:

1) Gold in graphitic fault zones that have been brecciated;
2) Gold in the sulphide portions of interbedded magnetic iron formation chert horizons;
3) Gold in recrystallized chert with low sulphide content;
4) Gold in quartz veins:
   a) in narrow high grade quartz veins with sphalerite and galena mineralization;
5) Molybdenum and uranium in the massive pegmatite veins.

PREVIOUS WORK

The following is quoted from Baker, 1986:

> "In comparison to other greenstone belts, the report area has a relatively sporadic work history. Gold prospecting before the 1950's was restricted to the major water routes which in this case was confined to the south-west corner of the

Kaphearst property. Recent traversing in that area has uncovered old trenches where mineralized quartz veins are exposed. Minor gold values were reported from some of these showings. Systematic prospecting over most of the property was hampered by the lack of outcrop and, probably more importantly, by the poor access to the report area.

Following the discovery of base metals at Manitouwadge by Geco, the report area experienced a fairly extensive series of exploratory work by at least three junior mining firms. The most work was carried out by Northern Canada Mines Ltd. beginning in 1957. Their work covered parts of Scholfield and Ebbs township in areas underlain by metavolcanic and metasedimentary rocks. This work, which consisted principally of completing an airborne survey followed by diamond drilling, was directed toward locating a similar base metal occurrence to the Geco deposit. The strongest and shortest conductors were often selected as prime drill targets and were subsequently drilled. The best gold value recorded in their drilling was 0.01ozs gold per ton. Many other anomalous values of gold were reported in several drill holes.

Apart from Northern Canada Mines, Lundberg Exploration Ltd., Macassa Mines Ltd., Continental Copper and a number of independent prospectors had claims in the report area from 1957 through to 1960. For the most part, the above groups were exploring the report area for base metals. With the revival of metal and gold prices, the area again had a cursory look for base metals between 1973 and 1977. Independent prospector Steve Vukmirovich optioned Macassa Mines' property situated in the southeast corner of Caithness township and drilled three shallow holes in a sulphide zone. Minor gold values in pyritiferous mafic volcanic were intersected in the drilling.

Virtually little or no work was carried out in the report area from 1977 to the present. Following the discovery of the Hemlo stratabound gold deposits in 1982, the area southwest of the report area drew considerable staking because of the geological similarities between the two belts. In 1983, the writer [Baker] supervised gold exploration southwest of the property. During this period, the report area escaped attention primarily due to its inaccessibility and lack of outcrop."

"This summer, while prospecting along a new logging road in Hawkins township a few miles to the south of the report area, Gold Fields Mining Corporation discovered a narrow, pyritiferous quartz vein in a highly folded amphibolite. A sample taken from this vein reportedly ran 0.72 ounces gold across a 3.0 foot width."

From November, 1985 to June, 1986 a total of 2792 contiguous claims were staked for Mr. Don McKinnon to cover a greenstone belt. The property was then optioned to Kaphearst Resource Corp.

The property area was reconnaissance mapped in 1986 by personnel from Robert S. Middleton Exploraion Services Inc., the details of which are recorded in Coster, 1986.

In late 1986 the entire property was flown with INPUT airborne time-domain EM by Questor Surveys, outlining numerous conductors and geologic structures. The report on this survey is by McConnell (1986).

In December, 1986 and January, 1987, 99 reverse circulation overburden drill holes were drilled (Abernethy, 1987) for Kaphearst Resource Corp. Holes 69 through 85 were on or close to the Can Mac Property.

In that series of holes, the highest gold concentrations in the overburden samples were:

HOLE #	SAMPLE #	Au(ppb)	SAMPLE DEPTH (m)
77	KH86-77-6H	210	24
77	KH86-77-7H	260	27
78	KH86-78-1H	230	18
79	KH86-79-3H(B)	310	27
81	KH86-81-2H	180	21

These holes follow a line roughly from 200N, line 200W to BLO at 300E.

SURVEY PROCEDURE

MAGNETICS

Theory

The magnetic method is based on measuring alteration in the shape and magnitude of the earth's naturally ocurring magnetic field caused by changes in the magnetization of the rocks in the earth.

These changes in magnetization are due mainly to the presence of the magnetic minerals, of which the most common is magnetite, and to a lesser extent ilmenite, pyrrhotite, and some less common minerals.

Magnetic anomalies in the earth's field are caused by changes in two types of magnetization: induced and remanent (permanent). Induced magnetization is caused by the magnetic field being altered and enhanced by increases in the magnetic susceptibility of the rocks, which is a function of the concentration of the magnetic minerals.

Remanent magnetism is independant of the earth's magnetic field, and is the permanent magnetization of the magnetic particles (magnetite, etc.) in the rock. This is created when these particles orient themselves parallel to the ambient field when cooling. This magnetization may not be in the same direction as the present earth's field, due to changes in the orientation of the rock or the field.

The most common method of measuring the total magnetic field in ground exploration is with a proton precession magnetometer. This device measures the effect of the magnetic field on the magnetic dipole of hydrogen protons. This dipole is caused by the "spin" of the proton, and in a magnetometer these dipoles in a sample of hydrogen-rich fluid are oriented parallel to a magnetic field applied by an electric coil surrounding the sample. After this magnetic field is removed, the dipoles begin to precess (wobble) around their orientation under the influence of the ambient earth's magnetic field. The frequency of this precession is proportional to the earth's magnetic field intensity.

<u>Field Method</u>

The magnetics data were collected with a proton precession magnetometer, which measures the absolute value of the total magnetic field of the earth to an accuracy of ± 1 n Tesla. The magnetometer is carried down the survey line by a single operator, with the sensor mounted on a short pole to remove it from the surface geologic noise. Readings are normally taken at 25 m intervals, and at 12.5 m intervals where the operator observes a high gradient (anomaly).

The readings are corrected for changes in the earth's total field (diurnal drift) by repeating readings at base stations and "tie points" several times each day.

SURVEY PROCEDURE

MAX-MIN I

Theory

The Max-Min I is a frequency domain, horizontal loop electromagnetic (HLEM) system, based on measuring the response of conductors to a transmitted, time varying electromagnetic field.

The transmitted, or primary EM field is a sinusoidally varying field at any of five different frequencies. This field induces an electromotive force, (emf), or voltage, in any conductor through which the field passes. This is defined by:

$$\oint E.dl = \frac{-\partial \phi}{\partial t} \quad \text{(the Faraday Induction Principle)}$$

where E is the electric field strength in volts/metre (and so $\oint E.dl$ is the emf around a closed loop) and ϕ is the magnetic flux through the conductor loop. This emf causes a "secondary" current to flow in the conductor in turn generating a secondary electromagnetic field.

This changing secondary field induces an emf in the receiver coil (by the Faraday law) at the same frequency, but which differs from the primary field in magnitude and phase. The difference in phase (the phase angle) is a function of the conductance of the conductor(s), both the target and the overburden and host rock. The magnitude of the secondary is also dependant on the conductance, and also on the dimensions, depth, and geometry of the target, as well as on the interference from overburden and the host rock.

These two parameters (phase angle and magnitude) are measured by measuring the strength of the secondary field in two components: the real field or that part "in-phase" with the primary field; and the imaginary field, or that part in "quadrature" or 90° out of phase from the primary field.

The magnitude and phase angle of the response is also a function of the frequency of the primary field. A higher frequency field generates a stronger response to weaker conductors, but a lower frequency tends to pass through weak conductors and penetrate to a greater depth. The lower frequency also tends to energise the full thickness of a conductor, and gives a better measure of its true conductivity-thickness product (conductance).

For these reasons two or more frequencies are usually used; the lower for penetration and accurate measure of good conductors, and the higher frequency for strong response to weak conductors.

Distinction between conductive targets, overburden, and host rock responses are made by studying the shape of the secondary field, and the difference in the frequency responses.

The transmitted primary field also creates an emf in the receiver coil, which is much stronger than the secondary, and which must be corrected for by the receiver. This is done by electronically creating an emf in the receiver, whose magnitude is determined by the distance from receiver to transmitter as set on the receiver, and whose phase is derived from the receiver via an interconnecting wire.

Field Method

The Max-Min II survey was carried out in the "maximum coupled" mode (horizontal co-planar). The transmitter and receiver are carried in-line down the survey line separated by a constant distance (in this case 150 m) with the receiver leading. Three transmitter frequencies were used: 444 Hz, 1777 Hz and 3555 Hz. The transmitter and receiver are connected by a cable, for phase reference and operator communication.

PERSONNEL AND EQUIPMENT

The survey was conducted by two persons from Middleton Exploration: Dave White, Technician/Party Chief, and Ty Fong, Operator. The equipment used were an Apex Parametrics Max Min I and an EDA Instruments Omni IV tie-line magnetometer. Specifications for these instruments are included in Appendix A.

SURVEY STATISTICS

The survey comprised 46.325 line km of magnetics and 39.50 line km of three frequency electromagnetics (Max Min).

INTERPRETATION

The max-min survey outlined two broad zones of conductors (the South and North) crossing the grid trending roughly east west across the central area of the grid (compilation map in back pocket) both zones appear to have disseminated zones about 100m to 200m wide, in which are thin massive zones which are the conductors detected by the EM survey. The compilation map shows the interpreted location of the massive zones within the zones. The edges of the disseminated zone are shown as weak conductors where they are distinguishable from the massive conductors.

Both conductors are "kinked" at roughly line 0 to 100E. On the west half of the grid the north conductor strikes 080° and bends to 045° on the east. The south conductor bends much less, and in the opposite direcion; from 070° on the west half to 080° on the east.

Examination of the Questor INPUT results (McConnell 1986) shows that the ground data matches well with the airborne results. The regional break known as the "Kaphearst Break" appears to cross the grid parallel to the baseline at roughly 200N, but there is not much evidence of it in the ground magnetics. Because the grid covers felsic metavolcanics and metasediments the structure does not show well magnetically. There is a weak magnetic correlation with the north conductor, which follows the kink, which is subdued near the kink itself.

Depth to the conductors at various locations were calculated with the following results:

NORTH CONDUCTOR

LINE	STATION	CONDUCTANCE (S)	DEPTH (m)
0	300N	16	33
1W	325N	80	20
6W	400N	80	15
4W	350N	80	10
4E	475N	>100	15
13E	850N	>100	30

SOUTH CONDUCTOR

LINE	STATION	CONDUCTANCE (S)	DEPTH (m)
8W	125N	28	10
8W	25S	20	15
1W	25N	16	15
2E	75S	4	10
9E	150S	26	30

The dip of the conductors is not definite, as multiple conductors such as are encountered here can give misleading results. The airborne data indicates dips steep to the north, and the apparent dips from the ground EM agree.

The variance in these results is not surprising, considering the variety of overburden depths encountered in the overburden drilling.

A re-analysis of the overburden drilling results shows that the approximate limits of the highest gold concentrations (holes 77 to 81) are controlled by a lack of overburden to the east of #77, and a shift south in location west of hole #82. (Hole #76 encountered 8.5m of overburden, while #77 encountered 33m. Presumably the holes east of #77 did not sample the same till as #77. This also indicates a probable north striking fault between #77 and #76.)

CONCLUSIONS AND RECOMMENDATIONS

The work conducted on this property indicates that it is a very favourable environment for gold mineralization, and is deserving of further exploration on a high priority basis.

The geophysical surveys clearly outlined the conductors detected by the airborne surveys with sufficient accuracy to allow diamond drill testing of the sources of the anomalies. The overburden gold anomalies were sampled between the two conductive zones (north and south zones) which means that if the gold source is one of the conductive zones it must be the north zone. (It could, of course, be both zones!) The east-west limits of the overburden gold anomaly are defined by the location of the holes and the overburden depth, not necessarily by the source of the gold.

The Kaphearst Break is not strongly evident in the data, but is interpreted to cross the grid striking 070° at 200N. The north conductive zone is weakly magnetic.

It is apparent from the EM results that both zones are composed of strong narrow conductors in 100m to 200m wide zones of weaker conductance.

As gold mineralization often occurs in the disseminated alteration zones it is recommended that induced polarization surveying, with its sensitivity to disseminated metallic mineralization, be conducted over portions of the grid. This would serve to delineate the disseminated "haloes" around the conductors, so that diamond drilling of the zones can be planned to section the entire zone.

At the present stage, the area of greatest interest is the northern zone, between 100W and 300E, where it is kinked and closest to the interpreted "break", where the overburden gold anomalies were found, and where the magnetic signature of the zone is reduced, suggesting that it has been altered.

The recommended induced polarization would involve surveying of every line from 100E to 200W inclusive from 400S to 600N, and every second line on the rest of the property, extended north and south to cover both zones. This would amount to a total of 12 km of IP.

Diamond drilling is recommended, on both conductive zones. The central part of the north zone is top priority, followed by step-out drilling on the north zone, and the central portion of the south zone.

The initial targets, picked from the EM are:

LINE	STATION	COLLAR	ANGLE	DEPTH	REASON
100E	300N	360N	180°/-50°	350m	North conductor close to break in region of depleted magnetics. Drill long to cross Kaphearst.
100W	325N	375N	180°/-50°	200m	North conductor in region of depleted magnetics
300E	275-375N	400N	180°/-50°	200m	North zone in broad section and magnetic depletion.

It must be re-stated that the EM does not map out the disseminated zones and that induced polarization be conducted and the results used to refine these target locations. These collars were picked to allow for some disseminated zones, but could easily hit bedrock in the anomalous zones.

Further diamond drilling would be based on the results of this first phase.

Respectfully submitted

Greg Hodges
Geophysicist

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COSTER, IAN
1986 — Geological Report on the 2792 Claim Property of Kaphearst Resource Corp. Caithness, Scholfield, Talbott, Ebbs, Roche and Franz Townships, Kapuskasing Hearst Area, District of Cochrane, Ontario.

HODGES, D. GREG
1987 — Report on the Magnetic and Electromagnetic Surveys on the Talbott and Scholfield Townships Property of Kaphearst Resource Corp., Porcupine Mining District

McCONNELL, TERENCE
1986 — Interpretation Report, INPUT MK VI Electromagnetic/Magnetic Survey, Kaphearst Resources Ltd. Kapuskasing Area, Ontario.

CERTIFICATION

I, D. Greg Hodges, of 136 Cedar Street South, in the city of Timmins, Province of Ontario, certify as follows concerning my report on the Can Mac Exploration property in Scholfield Township, Province of Ontario and dated February 16, 1988:

1. I am a member in good standing of the Society of Exploration Geophysicists

2. I am a graduate of Queen's University at Kingston, Ontario, with a B.Sc. (Hons.) Geological Sciences with Physics, obtained in 1980.

3. I have been practising in Canada, and occasionally in the United States, Europe, and Australia for the past eight years.

4. I have no direct interest in the properties, leases, or securities of Can Mac Exploration, nor do I expect to receive any.

5. The attached report is a product of:

   a) Examination of data included in the report which was collected on the property concerned.

Dated this February 16, 1988
Timmins, Ontario

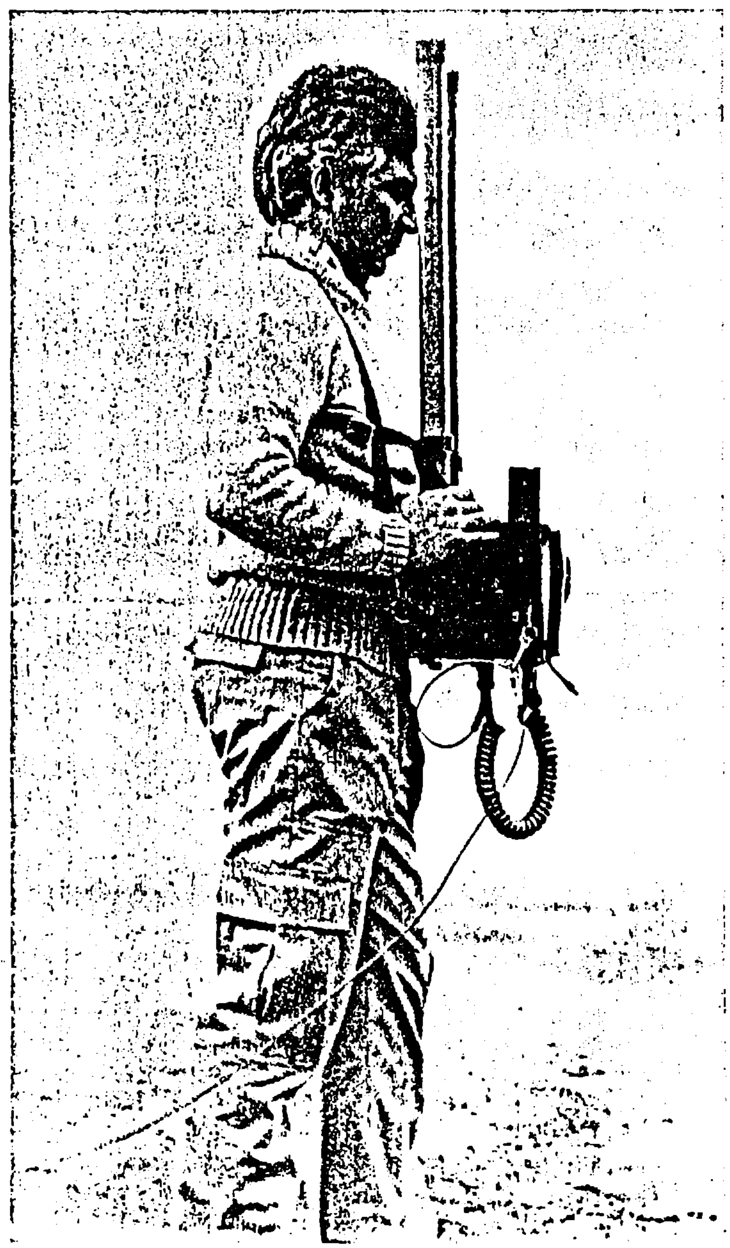
D. Greg Hodges, Geophysicist

APPENDIX A

APEX MAXMIN I PORTABLE EM

The MaxMin I ground EM System is designed for mineral and water exploration and for geoengineering applications. It is an expansion of the highly popular MaxMin II and III EM System concepts. The frequency range is extended to seven octaves from four. The ranges and numbers of coil separations are increased and new operating modes are added. The receiver can also be used independently for measurements with powerline sources. The advanced spheric and powerline noise rejection is further improved, resulting in faster and more accurate surveys, particularly at larger coil separations. Several receivers may be operated along a single reference cable.

Mating plug in data acquisition computer and cassette unit are available for use with the MaxMin I for automatic digital data acquisition and processing. These units are covered in separate data sheet.



MAXMIN I SPECIFICATIONS:

Frequencies: 110, 220, 440, 880, 1760, 3520, 7040 and 14080 Hz, plus 50/60 Hz powerline frequency (receiver only).

Modes: MAX 1: Horizontal loop mode (Transmitter and receiver coil planes horizontal and coplanar).

MAX 2: Vertical coplanar loop mode (Transmitter and receiver coil planes vertical and coplanar).

MAX 3: Vertical coaxial loop mode (Transmitter and receiver coil planes vertical and coaxial).

MIN 1: Perpendicular loop mode 1 (Transmitter coil plane horizontal and receiver coil plane vertical).

MIN 2: Perpendicular loop mode 2 (Transmitter coil plane vertical and receiver coil plane horizontal).

Coil separations: 12.5, 25, 50, 75, 100, 125, 150, 200, 250, 300, & 400 metres (standard).

10, 20, 40, 60, 80, 100, 120, 160, 200, 240 & 320 metres (selected with grid switch inside of receiver).

50, 100, 200, 300, 400, 500, 600, 800, 1000, 1200 & 1600 feet (selected with grid switch inside of receiver).

Parameters measured: In-Phase and quadrature components of the secondary magnetic field, in % of primary (transmitted) field.

Field amplitude and/or tilt of 50/60 Hz powerline field.

Readouts: Analog direct readouts on edgewise panel meters for in-phase, quadrature and tilt, and for 50/60Hz amplitude. (Additional digital LED readouts when using the DAC, for which interfacing and controls are provided for plug-in).

Ranges of readouts: Analog in-phase and quadrature scales: 0±4%, 0±20%, 0±100%, switch activated. Analog tilt scale: 0±75% grade. (Digital in-phase and quad. 0±102.4%).

Readability: Analog in-phase and quadrature 0.05% to 0.5%, analog tilt 1% grade. (Digital in-phase and quadrature 0.1%).

Repeatability: ±0.05% to ±1% normally, depending on frequency, coil separation & conditions.

Signal filtering: Powerline comb filter, continuous spherics noise clipping, autoadjusting time constant and other filtering.

Warning lights: Receiver signal and reference warning lights to indicate potential errors.

Survey depth: From surface down to 1.5 times coil separation used.

Transmitter dipole moments:

110 Hz: 220 Atm²	1760 Hz: 160 Atm²
220 Hz: 215 Atm²	3520 Hz: 80 Atm²
440 Hz: 210 Atm²	7040 Hz: 40 Atm²
880 Hz: 200 Atm²	14080 Hz: 20 Atm²

Reference cable: Light weight unshielded 4/2 conductor teflon cable for maximum temperature range and for minimum friction. Please specify cable lengths required.

Intercom: Voice communication link provided for operators via the reference cable.

Receiver power supply: Four standard 9V batteries (0.5Ah, alkaline). Life 30 hrs continuous duty, less in cold weather. Rechargeable battery and charger option available.

Transmitter power supply: Rechargeable sealed gel type lead acid 12V-13Ah batteries (4x6V-6½Ah) in canvas belt. Optional 12V-8Ah light duty belt pack available.

Transmitter battery charger: For 110-120/220-240VAC, 50/60/400 Hz and 12-15VDC supply operation, automatic float charge mode, three charge status indicator lights. Output 14.4V-1.25A nom.

Operating temp: -40 to +60 deg.C.

Receiver weight: 8 kg, including the two integral ferrite cored antennas (9 kg with data acq. comp.)

Transmitter weight: 16 kg with standard 12V-13Ah battery pack.
14 kg with light duty 12V-8Ah pack.

Shipping weight: 59 kg plus weight of reference cables at 2.5 kg per 100 metres plus other optional items if any.

Standard spares: One spare transmitter battery pack, one spare transmitter battery charger, two spare transmitter retractile connecting cords, one spare set receiver batteries.

Specifications subject to change without notification.

APEX PARAMETRICS LIMITED

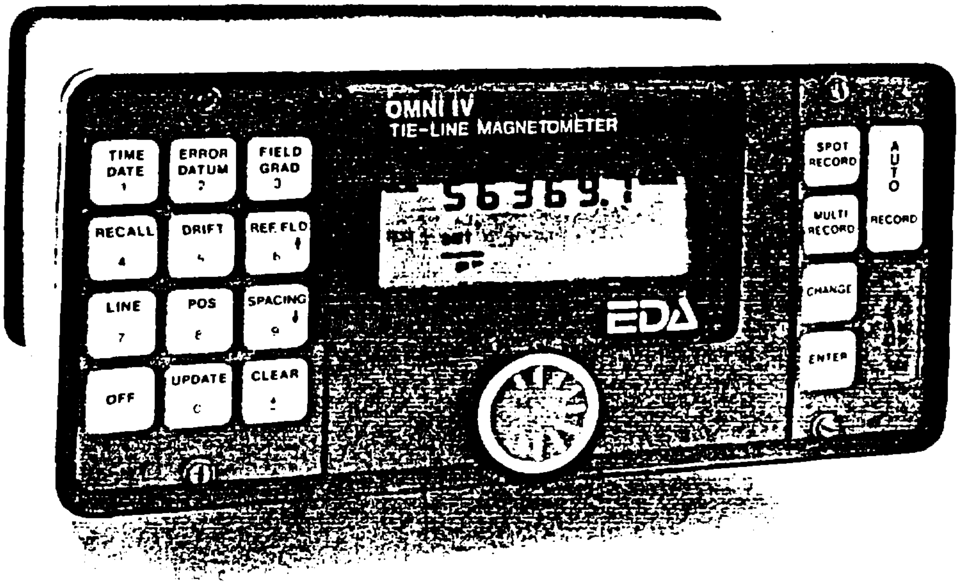
P.O. Box 818, Uxbridge
Ontario, Canada LOC 1KO

Telephones: 416-640-6102
416-852-5875

Cables: APEXPARA TORONTO

Telex: 06-966625 APEXPARA UXB

OMNI IV
"Tie-Line" Magnetometer



Four Magnetometers in One

Self Correcting for Diurnal Variations

Reduced Instrumentation Requirements

25% Weight Reduction

User Friendly Keypad Operation

Universal Computer Interface

Comprehensive Software Packages

ecifications

mic Range	18,000 to 110,000 gammas. Roll-over display feature suppresses first significant digit upon exceeding 100,000 gammas.
ng Method	Tuning value is calculated accurately utilizing a specially developed tuning algorithm
natic Fine Tuning	± 15% relative to ambient field strength of last stored value
ay Resolution	0.1 gamma
essing Sensitivity	± 0.02 gamma
ical Error Resolution	0.01 gamma
ute Accuracy	± 1 gamma at 50,000 gammas at 23°C ± 2 gamma over total temperature range
rd Memory Capacity	
l Field or Gradient	1,200 data blocks or sets of readings
-Line Points	100 data blocks or sets of readings
se Station	5,000 data blocks or sets of readings
	Custom-designed, ruggedized liquid crystal display with an operating temperature range from −40°C to +55°C. The display contains six numeric digits, decimal point, battery status monitor, signal decay rate and signal amplitude monitor and function descriptors.
Serial I/O Interface	2400 baud, 8 data bits, 2 stop bits, no parity
ient Tolerance	6,000 gammas per meter (field proven)
Mode	A. Diagnostic testing (data and programmable memory) B. Self Test (hardware)
	Optimized miniature design. Magnetic cleanliness is consistent with the specified absolute accuracy.
ent Sensors	0.5 meter sensor separation (standard), normalized to gammas/meter. Optional 1.0 meter sensor separation available. Horizontal sensors optional.
or Cable	Remains flexible in temperature range specified, includes strain-relief connector
Time (Base Station Mode)	Programmable from 5 seconds up to 60 minutes in 1 second increments
ating Environmental Range	−40°C to +55°C; 0–100% relative humidity; weatherproof
Supply	Non-magnetic rechargeable sealed lead-acid battery cartridge or belt; rechargeable NiCad or Disposable battery cartridge or belt; or 12V DC power source option for base station operation.
Cartridge/Belt Life	2,000 to 5,000 readings, for sealed lead acid power supply, depending upon ambient temperature and rate of readings
nts and Dimensions	
ment Console Only	2.8 kg, 238 x 150 x 250mm
l or Alkaline Battery Cartridge	1.2 kg, 235 x 105 x 90mm
ad or Alkaline Battery Belt	1.2 kg, 540 x 100 x 40mm
Acid Battery Cartridge	1.8 kg, 235 x 105 x 90mm
Acid Battery Belt	1.8 kg, 540 x 100 x 40mm
sor	1.2 kg, 56mm diameter x 200mm
dient Sensor	
n separation - standard)	2.1 kg, 56mm diameter x 790mm
ent Sensor	
0 m separation - optional)	2.2 kg, 56mm diameter x 1300mm
ard System Complement	Instrument console; sensor; 3-meter cable, aluminum sectional sensor staff, power supply, harness assembly, operations manual.
e Station Option	Standard system plus 30 meter cable
iometer Option	Standard system plus 0.5 meter sensor

E D A Instruments Inc.
4 Thorncliffe Park Drive
Toronto, Ontario
Canada M4H 1H1
Telex: 06 23222 EDA TOR
Cable: Instruments Toronto
(416) 425 7800

In U.S.A.
E D A Instruments Inc.
5151 Ward Road
Wheat Ridge, Colorado
U.S.A. 80033
(303) 422 9112

Printed in Canada

REPORT on the
Magnetic and Electromagnetic Surveys
on the
Talbott Township Property
of
CAN MAC EXPLORATION
by
Greg Hodges, B.Sc.
February, 1988

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ABSTRACT

A program of magnetic and Max-Min surveying was conducted on the Talbot Township property of Can Mac Exploration. The survey was conducted to detail between 200m lines of a similar, previous survey.

The results helped locate several targets for further exploration. The recommended further work is induced polarization surveying, stripping/trenching, and diamond drilling.

INTRODUCTION

During the late autumn of 1987, a program of line cutting and geophysical surveying was conducted on the Talbott Township property of Can Mac Exploration.

The survey comprised total field magnetics and horizontal loop electromagnetics (Max Min).

The survey was conducted to examine the property for structures and conductors which should be further investigated as possible economic mineral deposits.

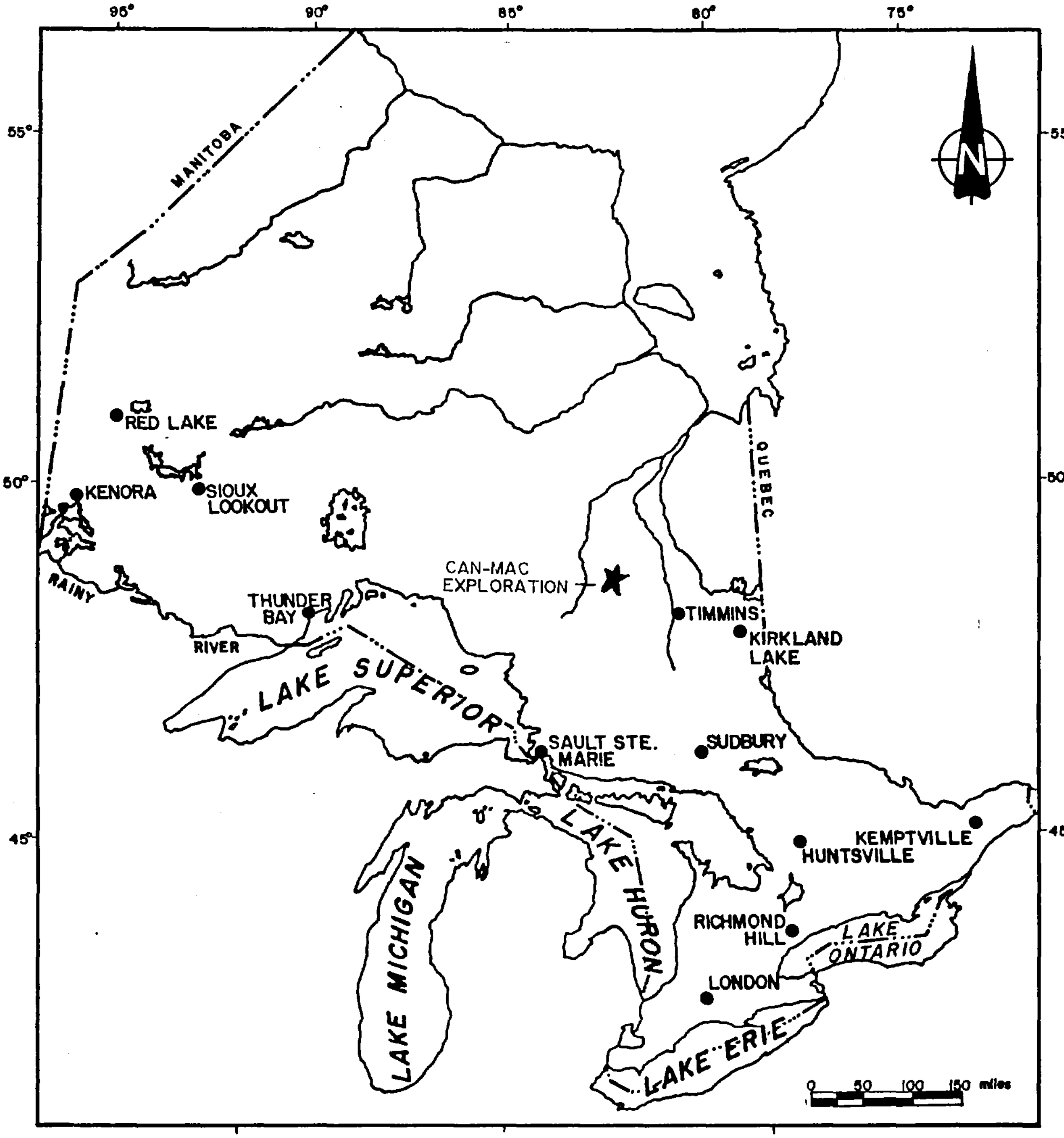
LOCATION AND ACCESS

The property is located in eastern Talbott Township, District of Algoma, Ontario (Figures 1 and 2).

The property is approximately 100 km west southwest of Kapuskasing, and 200 km west of Cochrane, the site of the nearest permanent helicopter base.

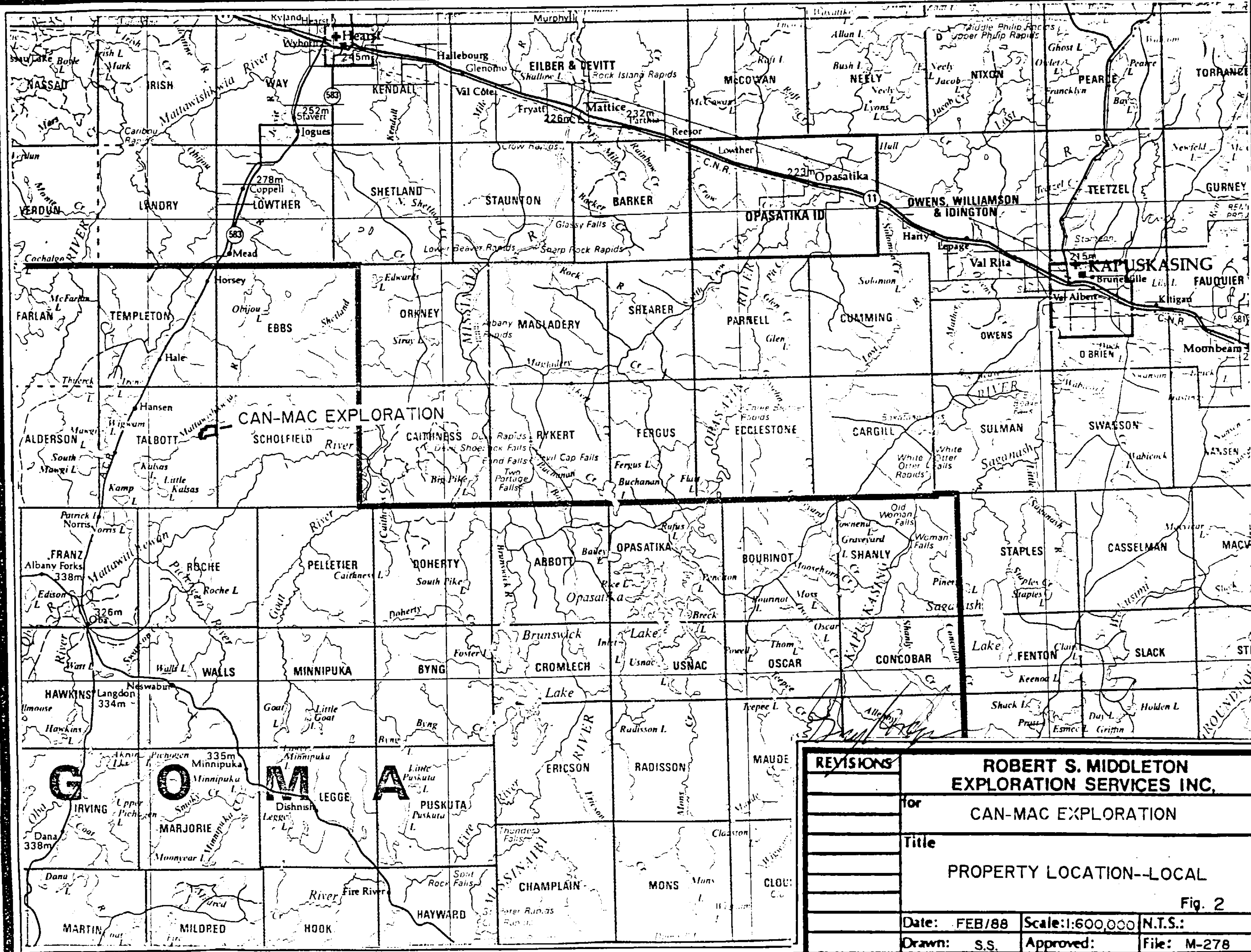
Access to the grid for this work was by helicopter. In winter it is possible to drive to the grid by snowmobile.

The nearest all-weather road is the Caithness Lumber Road, southeast from Jocques, south of Hearst. From the road, winter trails lead east across the property.



PROVINCE OF ONTARIO

REVISIONS	ROBERT S. MIDDLETON EXPLORATION SERVICES INC.		
	for CAN-MAC EXPLORATION		
	Title PROPERTY LOCATION-REGIONAL Fig. 1		
	Date: FEB/88	Scale: 1"=160mi.	N.T.S.:
	Drawn: S.S.	Approved:	File: M-278



REVISIONS	ROBERT S. MIDDLETON EXPLORATION SERVICES INC.		
	for CAN-MAC EXPLORATION		
	Title PROPERTY LOCATION--LOCAL		
	Fig. 2		
	Date: FEB/88	Scale: 1:600,000	N.T.S.:
	Drawn: S.S.	Approved:	File: M-278

CLAIM GROUP

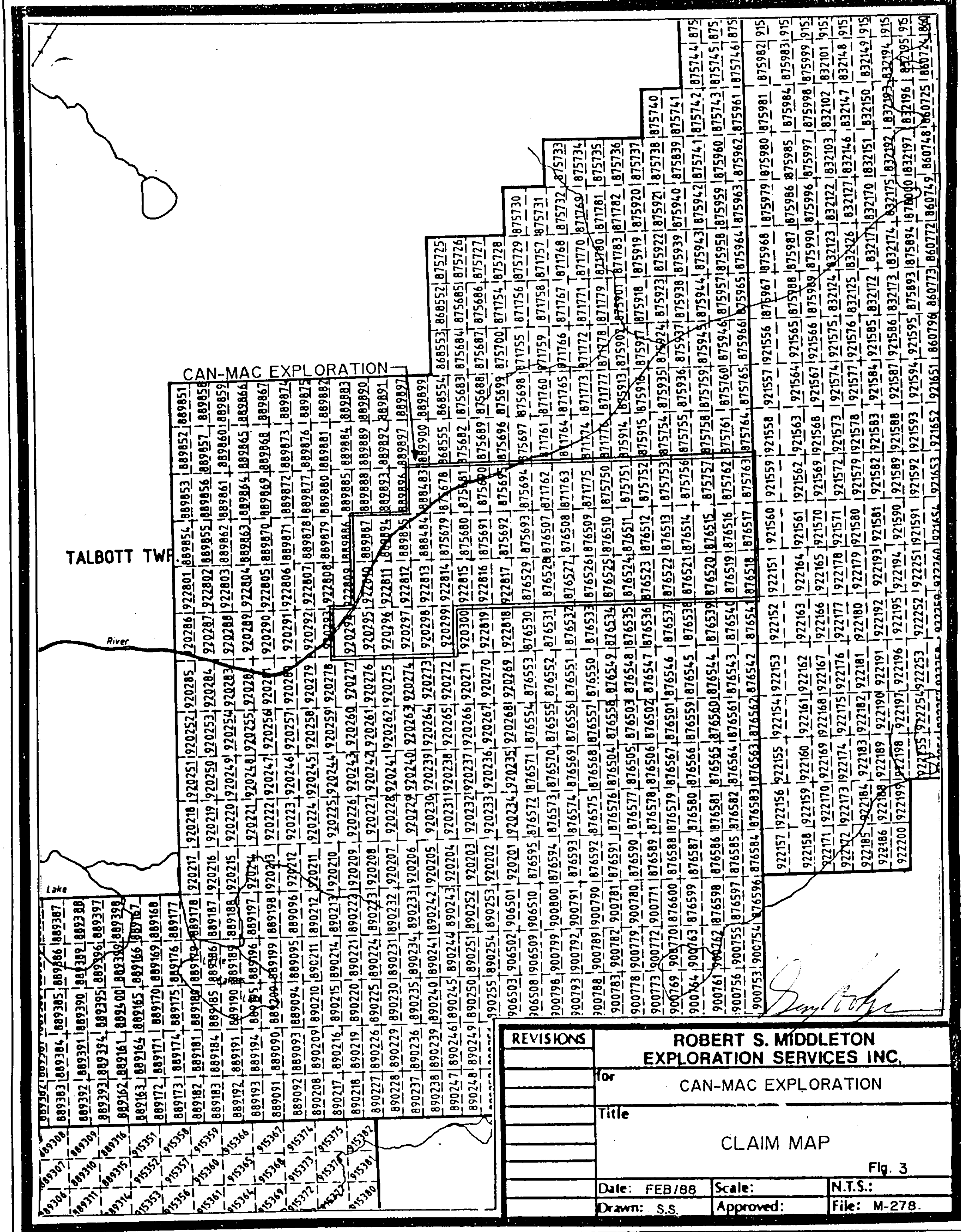
The property consists of 63 unpatented mining claims in Talbott Township, Porcupine Mining Division, Ontario. The claims are:

CLAIMS		NUMBER	RECORDING DATES
871762-871763		2	December 30, 1985
871775		1	December 30, 1985
875750-875753		4	December 30, 1985
875756-875757		2	December 30, 1985
875762-875763		2	December 30, 1985
875678-875681		4	December 30, 1985
875690-875695		6	December 30, 1985
876507-876529		23	December 30, 1985
888483-888484		2	April 02, 1986
889887		1	April 02, 1986
889894-889895		2	April 02, 1986
920294-920299		6	May 20, 1986
922810-922817		8	May 20, 1986
	TOTAL	63	

REGIONAL GEOLOGY

The following is quoted from Baker 1986:

> "According to Coster (1986) most of the property is underlain by felsic intrusive and metasedimentary rocks. Outcrops observed on the grid were mostly granodiorite. The only area which had significant outcrop were the west central area (around claims 906068-069, 906080-081, 906084) and the south east corner 906036. The west outcrop has a narrow (100m wide) band of metasediments across the south edge of



REVISIONS	ROBERT S. MIDDLETON EXPLORATION SERVICES INC.	
	for CAN-MAC EXPLORATION	
	Title CLAIM MAP	Fig. 3
	Date: FEB/88	Scale:	N.T.S.:
	Drawn: S.S.	Approved:	File: M-278.

906081 striking roughly 045°. There are several diabase dikes outcropping in the area, striking at all angles, and probably more which do not outcrop. For full description of the geology the reader is referred to Coster (1986)."

The map area lies in the northern part of the Early Precambrian Abitibi Belt of the Superior Province near a complexely folded supracrustal sequence. The metavolcanic and metasedimentary rocks have undergone regional and contact metamorphism ranging from upper greenschist to almandine-amphibolite facies. The south and northern parts of the report area are underlain by gneisses and felsic plutons. Archean and Proterozoic diabase dikes intrude all rock types in the area.

The volcanic sequences within this belt comprise varying proportions of mafic, intermediate and felsic flows and pyroclastic rocks. The majority of the volcanic rocks are tholeiitic or calc-alkalic. Minor amounts of komatiitic basalt and ultramafic flows are also present.

Sedimentation often appears to have been contemporaneous with volcanism and the erosion of the volcanic rocks may have provided part of the supply. Algoman type iron formations are present and often associated with turbidites. Small mafic to intermediate plutons of gabbroic to monzonitic composition have intruded the supracrustal rocks.

Since most of the report area is overburden covered, geological interpretations are based primarily from the airborne magnetic data. Narrow, softer bands of iron formation and the mafic volcanic rocks can easily be differentiated from the more felsic volcanics or the sedimentary horizons. As well, the airborne magnetic data is important for detecting major fault zones and regional folding which trend through the report area in an east-northeast direction.

Several types of mineralization are found in the report area:

1) Gold in graphitic fault zones that have been brecciated;

2) Gold in the sulphide portions of interbedded magnetic iron formation chert horizons;

3) Gold in recrystallized chert with low sulphide content;

4) Gold in quartz veins:
   a) in narrow high grade quartz veins with sphalerite and galena mineralization;

5) Molybdenum and uranium in the massive pegmatite veins.

PREVIOUS WORK

The following is quoted from Baker, 1986:

"In comparison to other greenstone belts, the report area has a relatively sporadic work history. Gold prospecting before the 1950's was restricted to the major water routes which in this case was confined to the south-west corner of the Kaphearst property. Recent traversing in that area has uncovered old trenches where mineralized quartz veins are exposed. Minor gold values were reported from some of these showings. Systematic prospecting over most of the property was hampered by the lack of outcrop and, probably more importantly, by the poor access to the report area.

Following the discovery of base metals at Manitouwadge by Geco, the report area experienced a fairly extensive series of exploratory work by at least three junior mining firms. The most work was carried out by Northern Canada Mines Ltd. beginning in 1957. Their work covered parts of Scholfield and Ebbs township in areas underlain by metavolcanic and metasedimentary rocks. This work, which consisted principally of completing an airborne survey followed by diamond drilling, was directed toward locating a similar base metal occurrence to the Geco deposit. The strongest and shortest conductors were often selected as prime drill targets and were subsequently drilled. The best gold value recorded in their drilling was 0.01ozs gold per ton. Many other anomalous values of gold were reported in several drill holes.

Apart from Northern Canada Mines, Lundberg Exploration Ltd., Macassa Mines Ltd., Continental Copper and a number of independent prospectors had claims in the report area from 1957 through to 1960. For the most part, the above groups were exploring the report area for base metals. With the revival of metal and gold prices, the area again had a cursory look for base metals between 1973 and 1977. Independent prospector Steve Vukmirovich optioned Macassa Mines' property situated in the southeast corner of Caithness township and drilled three shallow holes in a sulphide zone. Minor gold values in pyritiferous mafic volcanic were intersected in the drilling.

Virtually little or no work was carried out in the report area from 1977 to the present. Following the discovery of the Hemlo stratabound gold deposits in 1982, the area southwest of the report area drew considerable staking because of the geological similarities between the two belts. In 1983, the writer [Baker] supervised gold exploration southwest of the property. During this period, the report area escaped attention primarily due to its inaccessibility and lack of outcrop."

"This summer, while prospecting along a new logging road in Hawkins township a few miles to the south of the report area, Gold Fields Mining Corporation discovered a narrow, pyritiferous quartz vein in a highly folded amphibolite. A sample taken from this vein reportedly ran 0.72 ounces gold across a 3.0 foot width."

From November, 1985 to June, 1986 a total of 2792 contiguous claims were staked for Mr. Don McKinnon to cover a greenstone belt. The property was then optioned to Kaphearst Resource Corp.

The property area was reconnaissance mapped in 1986 by personnnel from Robert S. Middleton Exploration Services Inc., the details of which are recorded in Coster, 1986. Two grab samples were taken from outcrops on the Can Mac property, one from claim 876511 which assayed 1400 ppb gold (#37017), and one from claim 876514 which assayed 950 ppb (#37018).

In late 1986 the entire property was flown with INPUT airborne time-domain EM by Questor Surveys, outlining numerous conductors and geologic structures. The report on this survey is by McConnell (1986).

During the first part of 1987 a program of linecutting, magnetics and horizontal loop electromagnetics was conducted on 200m line spacings by Robert S. Middleton Exploration for Kaphearst Resources Corp. (Hodges 1987). The survey outlined numerous strong conductors on the property, and many magnetic anomalies, and further work, specifically induced polarization, overburden drilling, and diamond drilling was recommended.

SURVEY PROCEDURE

MAGNETICS

Theory

The magnetic method is based on measuring alteration in the shape and magnitude of the earth's naturally ocurring magnetic field caused by changes in the magnetization of the rocks in the earth.

These changes in magnetization are due mainly to the presence of the magnetic minerals, of which the most common is magnetite, and to a lesser extent ilmenite, pyrrhotite, and some less common minerals.

Magnetic anomalies in the earth's field are caused by changes in two types of magnetization: induced and remanent (permanent). Induced magnetization is caused by the magnetic field being altered and enhanced by increases in the magnetic susceptibility of the rocks, which is a function of the concentration of the magnetic minerals.

Remanent magnetism is independant of the earth's magnetic field, and is the permanent magnetization of the magnetic particles (magnetite, etc.) in the rock. This is created when these particles orient themselves parallel to the ambient field when cooling. This magnetization may not be in the same direction as the present earth's field, due to changes in the orientation of the rock or the field.

The most common method of measuring the total magnetic field in ground exploration is with a proton precession magnetometer. This device measures the effect of the magnetic field on the magnetic dipole of hydrogen protons. This dipole is caused by the "spin" of the proton, and in a magnetometer these dipoles in a sample of hydrogen-rich fluid are oriented parallel to a magnetic field applied by an electric coil surrounding the sample. After this magnetic field is removed, the dipoles begin to precess (wobble) around their orientation under the influence of the ambient earth's magnetic field. The frequency of this precession is proportional to the earth's magnetic field intensity.

Field Method

The magnetics data were collected with a proton precession magnetometer, which measures the absolute value of the total magnetic field of the earth to an accuracy of $\pm$ 1 n Tesla. The magnetometer is carried down the survey line by a single operator, with the sensor mounted on a short pole to remove it from the surface geologic noise. Readings are normally taken at 25 m intervals, and at 12.5 m intervals where the operator observes a high gradient (anomaly).

The readings are corrected for changes in the earth's total field (diurnal drift) by repeating readings at base stations and "tie points" several times each day.

SURVEY PROCEDURE

MAX-MIN I

Theory

The Max-Min I is a frequency domain, horizontal loop electromagnetic (HLEM) system, based on measuring the response of conductors to a transmitted, time varying electromagnetic field.

The transmitted, or primary EM field is a sinusoidally varying field at any of five different frequencies. This field induces an electromotive force, (emf), or voltage, in any conductor through which the field passes. This is defined by:

$$\oint E.dl = \frac{-\partial \phi}{\partial t} \quad \text{(the Faraday Induction Principle)}$$

where E is the electric field strength in volts/metre (and so $\oint E.dl$ is the emf around a closed loop) and ϕ is the magnetic flux through the conductor loop. This emf causes a "secondary" current to flow in the conductor in turn generating a secondary electromagnetic field.

This changing secondary field induces an emf in the receiver coil (by the Faraday law) at the same frequency, but which differs from the primary field in magnitude and phase. The difference in phase (the phase angle) is a function of the conductance of the conductor(s), both the target and the overburden and host rock. The magnitude of the secondary is also dependant on the conductance, and also on the dimensions, depth, and geometry of the target, as well as on the interference from overburden and the host rock.

These two parameters (phase angle and magnitude) are measured by measuring the strength of the secondary field in two components: the real field or that part "in-phase" with the primary field; and the imaginary field, or that part in "quadrature" or 90° out of phase from the primary field.

The magnitude and phase angle of the response is also a function of the frequency of the primary field. A higher frequency field generates a stronger response to weaker conductors, but a lower frequency tends to pass through weak conductors and penetrate to a greater depth. The lower frequency also tends to energise the full thickness of a conductor, and gives a better measure of its true conductivity-thickness product (conductance).

For these reasons two or more frequencies are usually used;

the lower for penetration and accurate measure of good conductors, and the higher frequency for strong response to weak conductors.

Distinction between conductive targets, overburden, and host rock responses are made by studying the shape of the secondary field, and the difference in the frequency responses.

The transmitted primary field also creates an emf in the receiver coil, which is much stronger than the secondary, and which must be corrected for by the receiver. This is done by electronically creating an emf in the receiver, whose magnitude is determined by the distance from receiver to transmitter as set on the receiver, and whose phase is derived from the receiver via an interconnecting wire.

Field Method

The Max-Min II survey was carried out in the "maximum coupled" mode (horizontal co-planar). The transmitter and receiver are carried in-line down the survey line separated by a constant distance (in this case 150 m) with the receiver leading. Three transmitter frequencies were used: 440 Hz, 1760 Hz and 3520 Hz. The transmitter and receiver are connected by a cable, for phase reference and operator communication.

PERSONNEL AND EQUIPMENT

The survey was completed by three persons from Robert S. Middleton Exploration Services Inc.: Dave White, Technician/Party Chief; Ty Fong, Operator; and Bonnie Edwards, assistant. The magnetics were collected with an EDA Omni IV Tie line magnetometer, and the EM with an Apex Parametrics Max Min I. Specifications for these instruments are included in Appendix A.

SURVEY STATISTICS

Completion of the survey comprised 14.36 km of magnetics and three frequency horizontal loop electromagnetics.

NOTES ON DATA QUALITY

Considerable problems have occurred in the processing and interpreting of the geophysical data due to problems in the grid surveying.

The intention of the surveys was to detail at 100m between 200m lines of data collected in previous surveying (cf. Previous Work). The linecutters did not tie the new grid to the old correctly at the time of cutting. The geophysical crew did attempt to tie the two grids together, but examination of their results after completion of the survey indicated that the tie-ins were not correct.

Mr. Chris Jones, Field Manager of Middleton Exploration and

James Hildebrandt of Noron Exploration returned to the grid at a later date to tie together the two grids, which results were used to produce the maps included in this report.

Confusion exists still in that the plot of the data using the field crews' results match the previous data in a manner closer to what was expected. The second tie-ins (Jones and Hildebrandt) were taken with greater care by more experienced people, but the data does not appear to match as well.

The anomaly locations on each line remain correct within themselves, and the results are referred to in the report as "old lines" or "new lines".

INTERPRETATION

The results of the survey serve mainly to refine some of the results of the initial Max Min and magnetic survey. The uncertainty in the line locations has made it difficult to rely on specific details of the later surveys.

The oxide section of the iron formation at 1000N on lines 4800W to 5200W (IF 1) is less continuous than it appeared on the original surveys, which is good because this suggests that the iron formation is more extensively altered than it previously appeared. Isolated pods of partially-oxide iron formation also appear to exist at 1550N on old line 5800W (IF 2) and at 1450N on new line 5300W (IF 3). Each of the three iron formations has conductors on its flanks, particularly on the north side.

The broad magnetic low which extends from between 1250N and 1550N on new line 6300W to between 1000N and 1350N on new line 5300W is caused by the felsic intrusives mapped in claim 876513 by Coster (1986). The intrusive is important as a heat source to drive the alteration and gold concentration process.

Before further grid work is conducted it is recommended that a very careful tie-in of the two grids be conducted.

CONCLUSIONS AND RECOMMENDATIONS

The most promising targets on this property for further exploration remain the two gold showings described by Coster (1986), being 37018 located at roughly new line 5300, 1000N, and 37017 at old line 5800, 1600N.

Both of these assays come from samples on the north edge of iron formations, 37017 being classed as sulfide IF and 37018 oxide IF by Coster (1986). Both of these locations should be further examined, as well as the iron formation on new line 5300E at 1450N (IF 3).

The areas of the gold showing at IF 1 and IF 2 could be stripped of overburden for more extensive sampling. Diamond drilling under these locations, and at IF 3 is recommended. Before diamond drilling it is recommended that induced polarization surveying be conducted over the areas of highest interest to further define the disseminated zones which represent the most alteration. IP coverage is recommended every 200m between (old grid) lines 4600W and 6200W, from 500S to 1400N east of 5200W and from 500S to 1800N on lines 5200W to 6200W.

If the iron formations are to be diamond drilled at this stage, then drilling south into IF 1 from approximately 1200N on line 5200W (old grid) is recommended. IF 2 and IF 3 should also be drilled from the north. For IF 2 old grid 1350N on line 5800W and IF 3 new grid 1550N on 5300W. It should be stressed that IP surveying and/or stripping/trenching is recommended before diamond drilling.

Further work would be based on the results of the work recommended here.

Respectfully submitted

Greg Hodges, B.Sc.
Geophysicist

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1987 — Report on Reverse Circulation Drilling, Overburden Drilling for Kaphearst Resource Corp. Caithness and Scholfield Townships, Ontario.

BAKER, NELSON W.
1986 — Report on the Kaphearst Gold Property for Kaphearst Resource Inc. Kapuskasing, Hearst Area, Cochrane Mining District, Ontario.

COSTER, IAN
1986 — Geological Report on the 2792 Claim Property of Kaphearst Resource Corp. Caithness, Scholfield, Talbott, Ebbs, Roche and Franz Townships, Kapuskasing Hearst Area, District of Cochrane, Ontario.

HODGES, D. GREG
1987 — Report on the Magnetic and Electromagnetic Surveys on the Talbott and Scholfield Townships Property of Kaphearst Resource Corp., Porcupine Mining District.

McCONNELL, TERENCE
1986 — Interpretation Report, INPUT MK VI Electromagnetic/Magnetic Survey, Kaphearst Resources Ltd. Kapuskasing Area, Ontario.

CERTIFICATION

I, D. Greg Hodges, of 136 Cedar Street South, in the city of Timmins, Province of Ontario, certify as follows concerning my report on the Can Mac Exploration property in Talbott Township, Province of Ontario and dated February 24, 1988:

1. I am a member in good standing of the Society of Exploration Geophysicists

2. I am a graduate of Queen's University at Kingston, Ontario, with a B.Sc. (Hons.) Geological Sciences with Physics, obtained in 1980.

3. I have been practising in Canada, and occasionally in the United States, Europe, and Australia for the past eight years.

4. I have no direct interest in the properties, leases, or securities of Can Mac Exploration, nor do I expect to receive any.

5. The attached report is a product of:

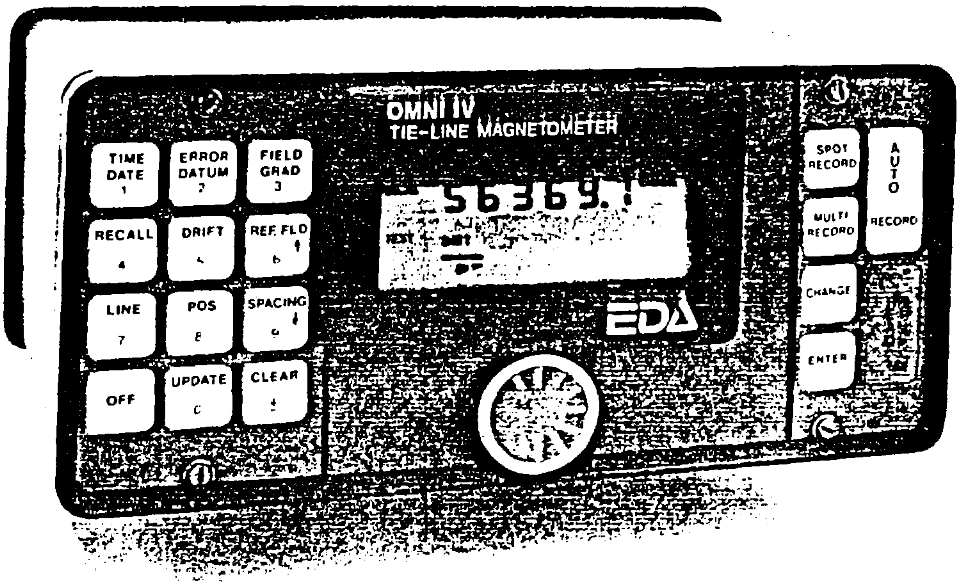
   a) Examination of data included in the report which was collected on the property concerned.

Dated this February 24, 1988
Timmins, Ontario

D. Greg Hodges, Geophysicist

A P P E N D I X   A

OMNI IV "Tie-line" Magnetometer



- Four Magnetometers in One
- Self Correcting for Diurnal Variations
- Reduced Instrumentation Requirements
- 25% Weight Reduction
- User Friendly Keypad Operation
- Universal Computer Interface
- Comprehensive Software Packages

EDA

ecifications

amic Range	18,000 to 110,000 gammas. Roll-over display feature suppresses first significant digit upon exceeding 100,000 gammas.
ing Method	Tuning value is calculated accurately utilizing a specially developed tuning algorithm
matic Fine Tuning	± 15% relative to ambient field strength of last stored value
play Resolution	0.1 gamma
essing Sensitivity	± 0.02 gamma
tical Error Resolution	0.01 gamma
solute Accuracy	± 1 gamma at 50,000 gammas at 23°C ± 2 gamma over total temperature range
ard Memory Capacity	
al Field or Gradient	1,200 data blocks or sets of readings
ie-Line Points	100 data blocks or sets of readings
ase Station	5,000 data blocks or sets of readings
y	Custom-designed, ruggedized liquid crystal display with an operating temperature range from −40°C to +55°C. The display contains six numeric digits, decimal point, battery status monitor, signal decay rate and signal amplitude monitor and function descriptors.
2 Serial I/O Interface	2400 baud, 8 data bits, 2 stop bits, no parity
dient Tolerance	6,000 gammas per meter (field proven)
t Mode	A. Diagnostic testing (data and programmable memory) B. Self Test (hardware)
r	Optimized miniature design. Magnetic cleanliness is consistent with the specified absolute accuracy.
dient Sensors	0.5 meter sensor separation (standard), normalized to gammas/meter. Optional 1.0 meter sensor separation available. Horizontal sensors optional.
sor Cable	Remains flexible in temperature range specified, includes strain-relief connector
g Time (Base Station Mode)	Programmable from 5 seconds up to 60 minutes in 1 second increments
erating Environmental Range	−40°C to +55°C; 0–100% relative humidity; weatherproof
Supply	Non-magnetic rechargeable sealed lead-acid battery cartridge or belt; rechargeable NiCad or Disposable battery cartridge or belt; or 12V DC power source option for base station operation.
t y Cartridge/Belt Life	2,000 to 5,000 readings, for sealed lead acid power supply, depending upon ambient temperature and rate of readings
ights and Dimensions	
ument Console Only	2.8 kg, 238 x 150 x 250mm
d or Alkaline Battery Cartridge	1.2 kg, 235 x 105 x 90mm
iCad or Alkaline Battery Belt	1.2 kg, 540 x 100 x 40mm
e -Acid Battery Cartridge	1.8 kg, 235 x 105 x 90mm
e l-Acid Battery Belt	1.8 kg, 540 x 100 x 40mm
ensor	1.2 kg, 56mm diameter x 200mm
radient Sensor (m separation-standard)	2.1 kg, 56mm diameter x 790mm
r lient Sensor (1.0 m separation-optional)	2.2 kg, 56mm diameter x 1300mm
ndard System Complement	Instrument console; sensor; 3-meter cable, aluminum sectional sensor staff, power supply, harness assembly, operations manual.
ase Station Option	Standard system plus 30 meter cable
radiometer Option	Standard system plus 0.5 meter sensor

E D A Instruments Inc.
4 Thorncliffe Park Drive
Toronto, Ontario
Canada M4H 1H1
Telex: 06 23222 EDA TOR
Cable: Instruments Toronto
(416) 425 7800

In U.S.A.
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Wheat Ridge, Colorado
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APEX MAXMIN I PORTABLE EM

The MaxMin I ground EM System is designed for mineral and water exploration and for geoengineering applications. It is an expansion of the highly popular MaxMin II and III EM System concepts. The frequency range is extended to seven octaves from four. The ranges and numbers of coil separations are increased and new operating modes are added. The receiver can also be used independently for measurements with powerline sources. The advanced spheric and powerline noise rejection is further improved, resulting in faster and more accurate surveys, particularly at larger coil separations. Several receivers may be operated along a single reference cable.

Mating plug in data acquisition computer and cassette unit are available for use with the MaxMin I for automatic digital data acquisition and processing. These units are covered in separate data sheet.

MAXMIN I SPECIFICATIONS:

Frequencies: 110, 220, 440, 880, 1760, 3520, 7040 and 14080 Hz, plus 50/60 Hz powerline frequency (receiver only).

Modes: MAX 1: Horizontal loop mode (Transmitter and receiver coil planes horizontal and coplanar).

MAX 2: Vertical coplanar loop mode (Transmitter and receiver coil planes vertical and coplanar).

MAX 3: Vertical coaxial loop mode (Transmitter and receiver coil planes vertical and coaxial).

MIN 1: Perpendicular loop mode 1 (Transmitter coil plane horizontal and receiver coil plane vertical).

MIN 2: Perpendicular loop mode 2 (Transmitter coil plane vertical and receiver coil plane horizontal).

Coil separations: 12.5, 25, 50, 75, 100, 125, 150, 200, 250, 300, & 400 metres (standard).

10, 20, 40, 60, 80, 100, 120, 160, 200, 240 & 320 metres (selected with grid switch inside of receiver).

50, 100, 200, 300, 400, 500, 600, 800, 1000, 1200 & 1600 feet (selected with grid switch inside of receiver).

Parameters measured: In-Phase and quadrature components of the secondary magnetic field, in % of primary (transmitted) field.

Field amplitude and/or tilt of 50/60 Hz powerline field.

Readouts: Analog direct readouts on edgewise panel meters for in-phase, quadrature and tilt, and for 50/60Hz amplitude. (Additional digital LED readouts when using the DAC, for which interfacing and controls are provided for plug-in).

Ranges of readouts: Analog in-phase and quadrature scales: 0±4%, 0±20%, 0±100%, switch activated. Analog tilt scale: 0±75% grade. (Digital in-phase and quad. 0±102.4%).

Readability: Analog in-phase and quadrature 0.05% to 0.5%, analog tilt 1% grade. (Digital in-phase and quadrature 0.1%).

Repeatability: ±0.05% to ±1% normally, depending on frequency, coil separation & conditions.

Signal filtering: Powerline comb filter, continuous spherics noise clipping, autoadjusting time constant and other filtering.

Warning lights: Receiver signal and reference warning lights to indicate potential errors.

Survey depth: From surface down to 1.5 times coil separation used.

Transmitter dipole moments:

110 Hz: 220 Atm²	1760 Hz: 160 Atm²
220 Hz: 215 Atm²	3520 Hz: 80 Atm²
440 Hz: 210 Atm²	7040 Hz: 40 Atm²
880 Hz: 200 Atm²	14080 Hz: 20 Atm²

Reference cable: Light weight unshielded 4/2 conductor teflon cable for maximum temperature range and for minimum friction. Please specify cable lengths required.

Intercom: Voice communication link provided for operators via the reference cable.

Receiver power supply: Four standard 9V batteries (0.5Ah, alkaline). Life 30 hrs continuous duty, less in cold weather. Rechargeable battery and charger option available.

Transmitter power supply: Rechargeable sealed gel type lead acid 12V-13Ah batteries (4x6V-6½Ah) in canvas belt. Optional 12V-8Ah light duty belt pack available.

Transmitter battery charger: For 110-120/220-240VAC, 50/60/400 Hz and 12-15VDC supply operation, automatic float charge mode, three charge status indicator lights. Output 14.4V-1.25A nom.

Operating temp: -40 to +60 deg.C.

Receiver weight: 8 kg, including the two integral ferrite cored antennas (9 kg with data acq. comp.)

Transmitter weight: 16 kg with standard 12V-13Ah battery pack.
14 kg with light duty 12V-8Ah pack.

Shipping weight: 59 kg plus weight of reference cables at 2.5 kg per 100 metres plus other optional items if any.

Standard spares: One spare transmitter battery pack, one spare transmitter battery charger, two spare transmitter retractile connecting cords, one spare set receiver batteries.

Specifications subject to change without notification.

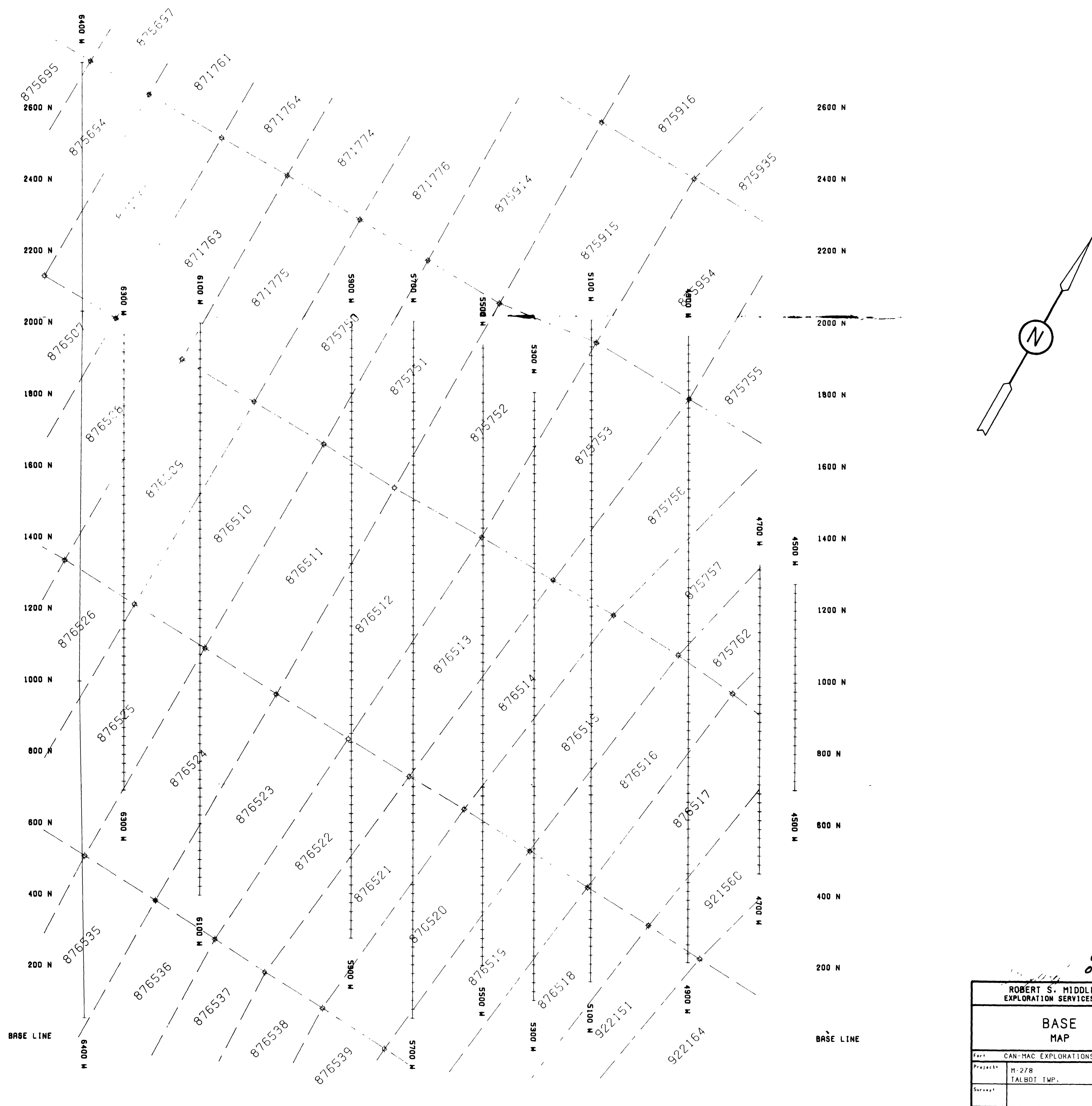
APEX PARAMETRICS LIMITED

P.O. Box 818, Uxbridge
Ontario, Canada LOC 1KO

Telephones: 416-640-6102
416-852-5875

Cables: APEXPARA TORONTO

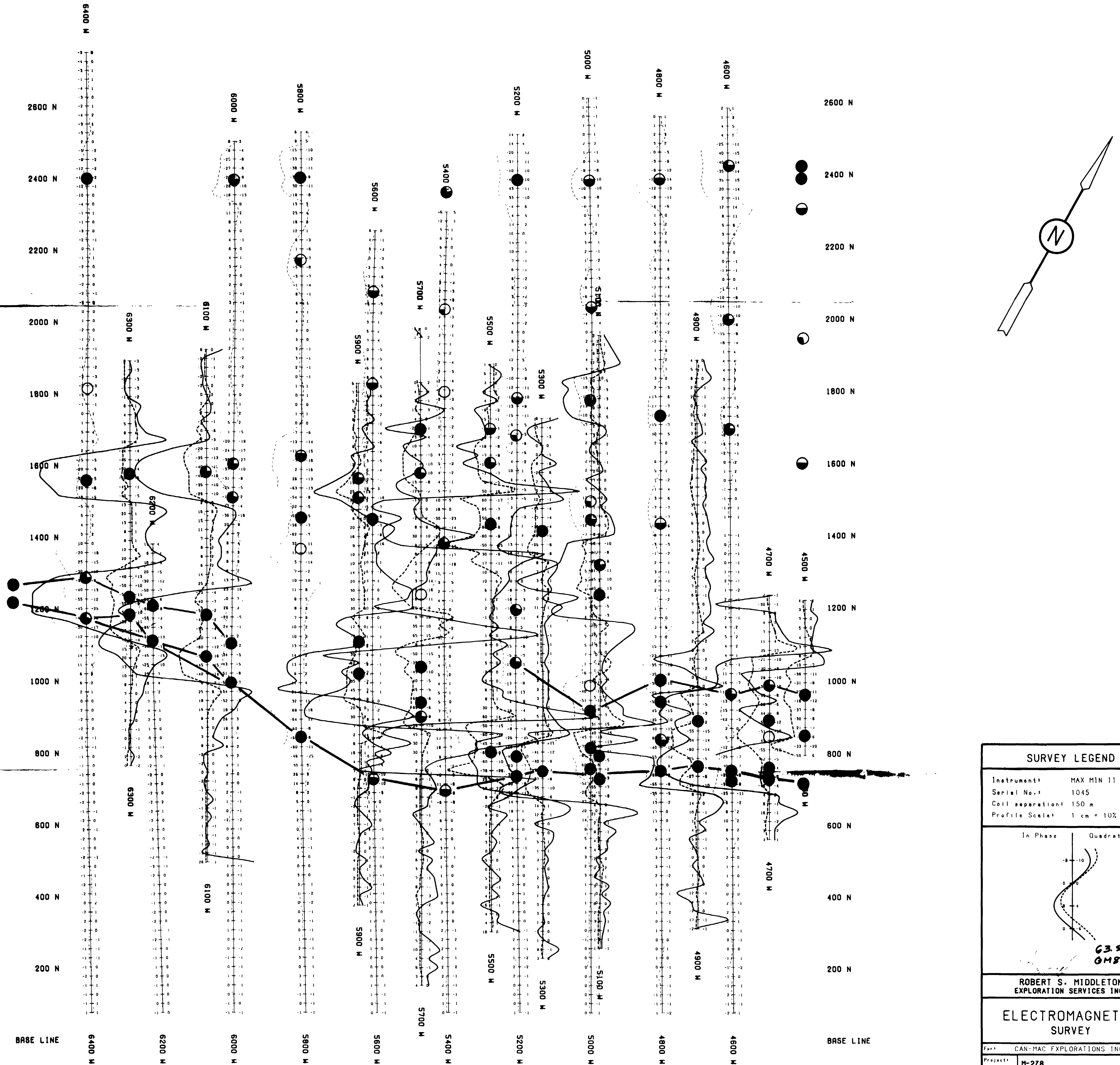
Telex: 06-966625 APEXPARA UXB



63.5100
OM87-176

ROBERT S. MIDDLETON EXPLORATION SERVICES INC.	
BASE MAP	
For	CAN-MAC EXPLORATIONS INC.
Project	M-278 TALBOT TWP.
Survey	
Scale	1:5000
File loct	
Dwg no	
Date	18-FEB-88
Srvy'd by	
Appro'd by	
Chk'd by	
Drawn by	NORTHERN GEOTECH

200



SURVEY LEGEND

Instrument:	MAX MIN II
Serial No.:	1045
Coil separation:	150 m
Profile Scale:	1 cm = 10%

In Phase Quadrature

63.5100
GM87-176

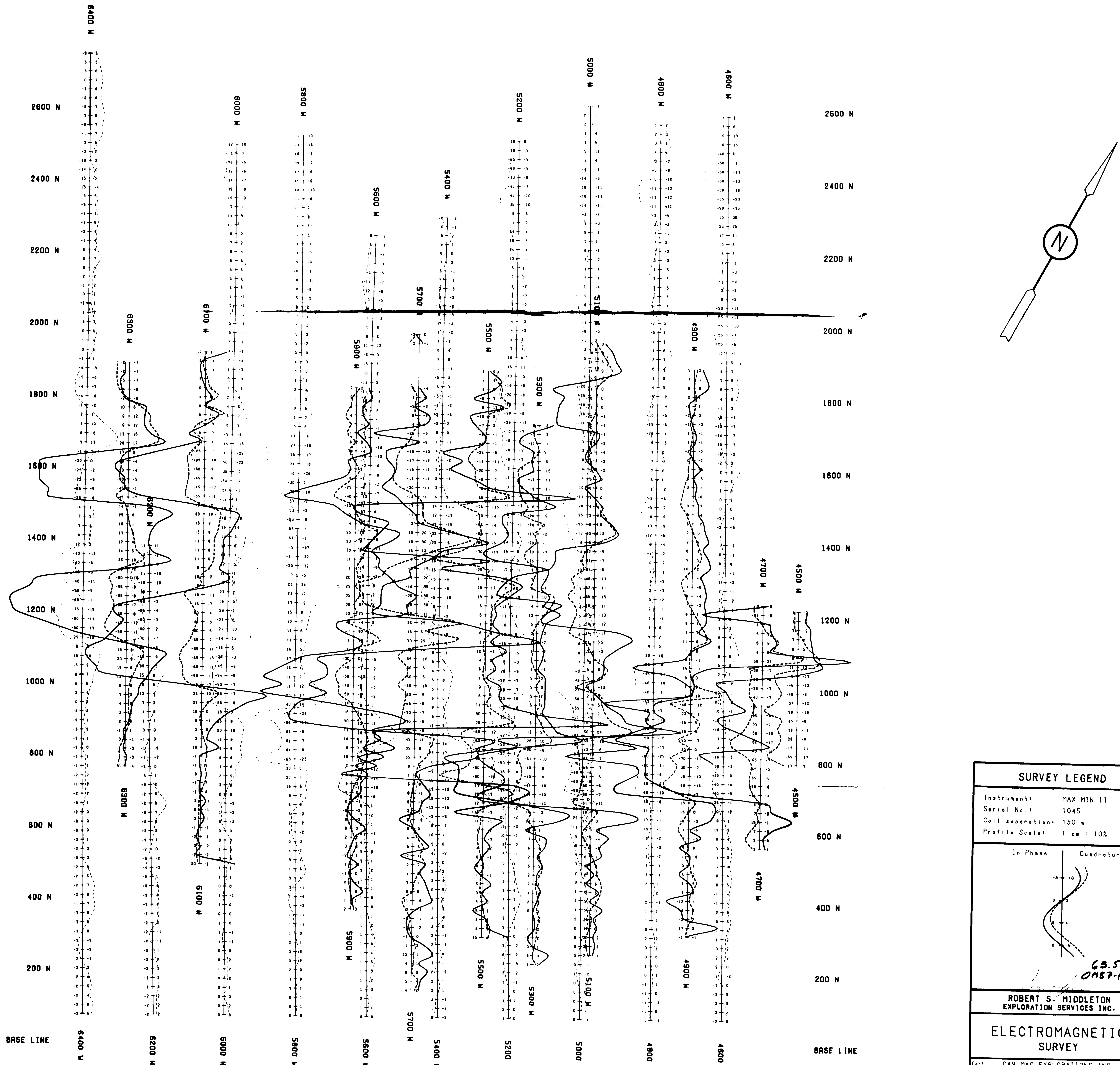
ROBERT S. MIDDLETON EXPLORATION SERVICES INC.

ELECTROMAGNETIC SURVEY

For:	CAN-MAC EXPLORATIONS INC.
Project:	**M-278 TALBOT TWP.**
Survey:	MAX MIN II+ FREQUENCY = 444 Hz
Scale:	1:5000
File loc:	
Dwg no:	
Date:	18-FEB-88
Srvy'd by	
Appro'd by	
Chk'd by	
Drw'n by	NORTHERN GEOTECH

42G05SE0001 63.5100 TALBOT

210



SURVEY LEGEND

Instrument: MAX MIN II
Serial No.: 1045
Coil separation: 150 m
Profile Scale: 1 cm = 10%

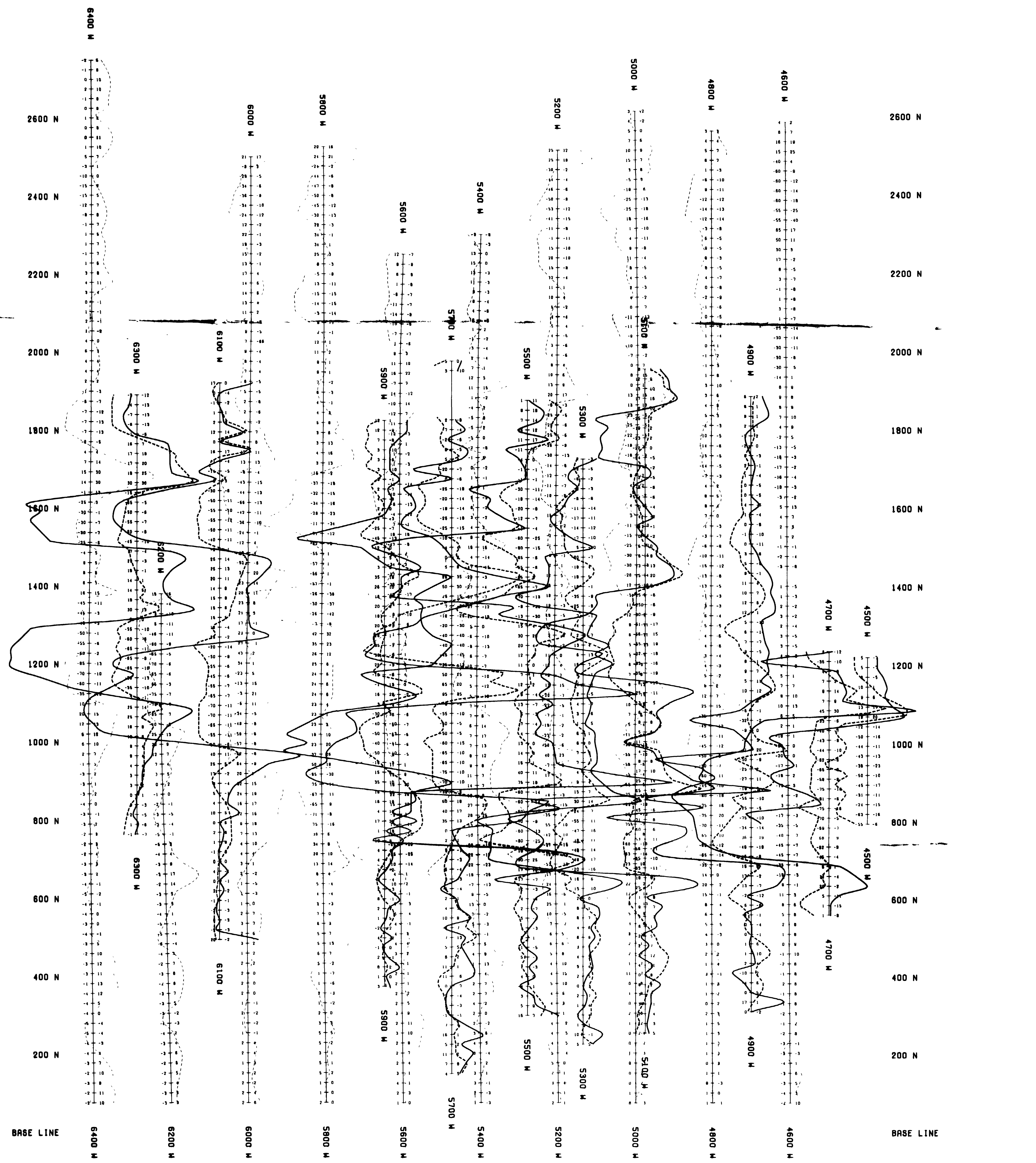
In Phase
Quadrature

63.5100
OM87-176

ROBERT S. MIDDLETON
EXPLORATION SERVICES INC.

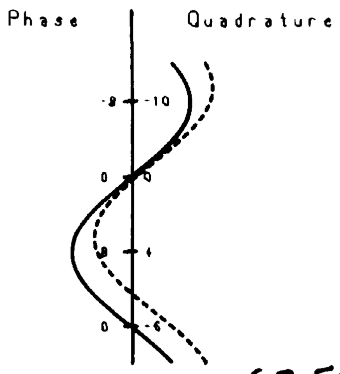
ELECTROMAGNETIC
SURVEY

For:	CAN-MAC EXPLORATIONS INC.
Project:	M-278 TALBOT TWP.
Survey:	MAX MIN II+ FREQUENCY = 1777 Hz
Scale:	1:5000
File loc:	
Dwg no:	
Date:	18-FEB-88
Srvy'd by	
Apprv'd by	
Chk'd by	
Drw'n by	NORTHERN GEOTECH



SURVEY LEGEND

Instrument: MAX MIN 11
Serial No.: 1045
Coil separation: 150 m
Profile Scale: 1 cm = 10%



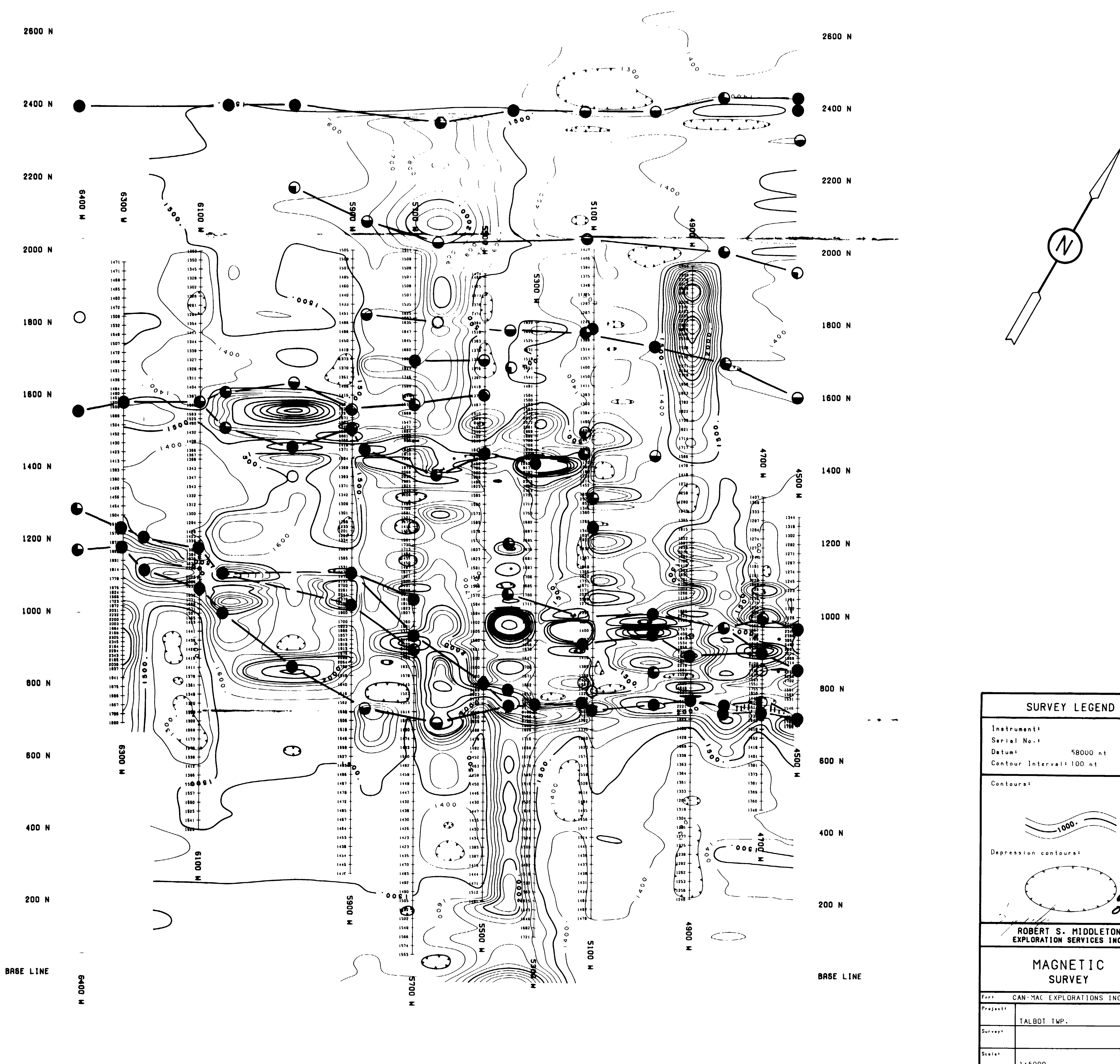
63.5100
OM87-176

ROBERT S. MIDDLETON EXPLORATION SERVICES INC.

ELECTROMAGNETIC SURVEY

For:	CAN-MAC EXPLORATIONS INC.
Project:	M-278 TALBOT TWP.
Survey:	MAX MIN 11 FREQUENCY = 3555 Hz
Scale:	1:5000
File loc:	
Dwg no:	
Date:	18-FEB 88
Srvy'd by	
Apprv'd by	
Chk'd by	
Drwn by	NORTHERN GEOTECH

230



SURVEY LEGEND

Instrument:
Serial No.:
Datum: 58000 nt
Contour Interval: 100 nt

Contours:

Depression contours:

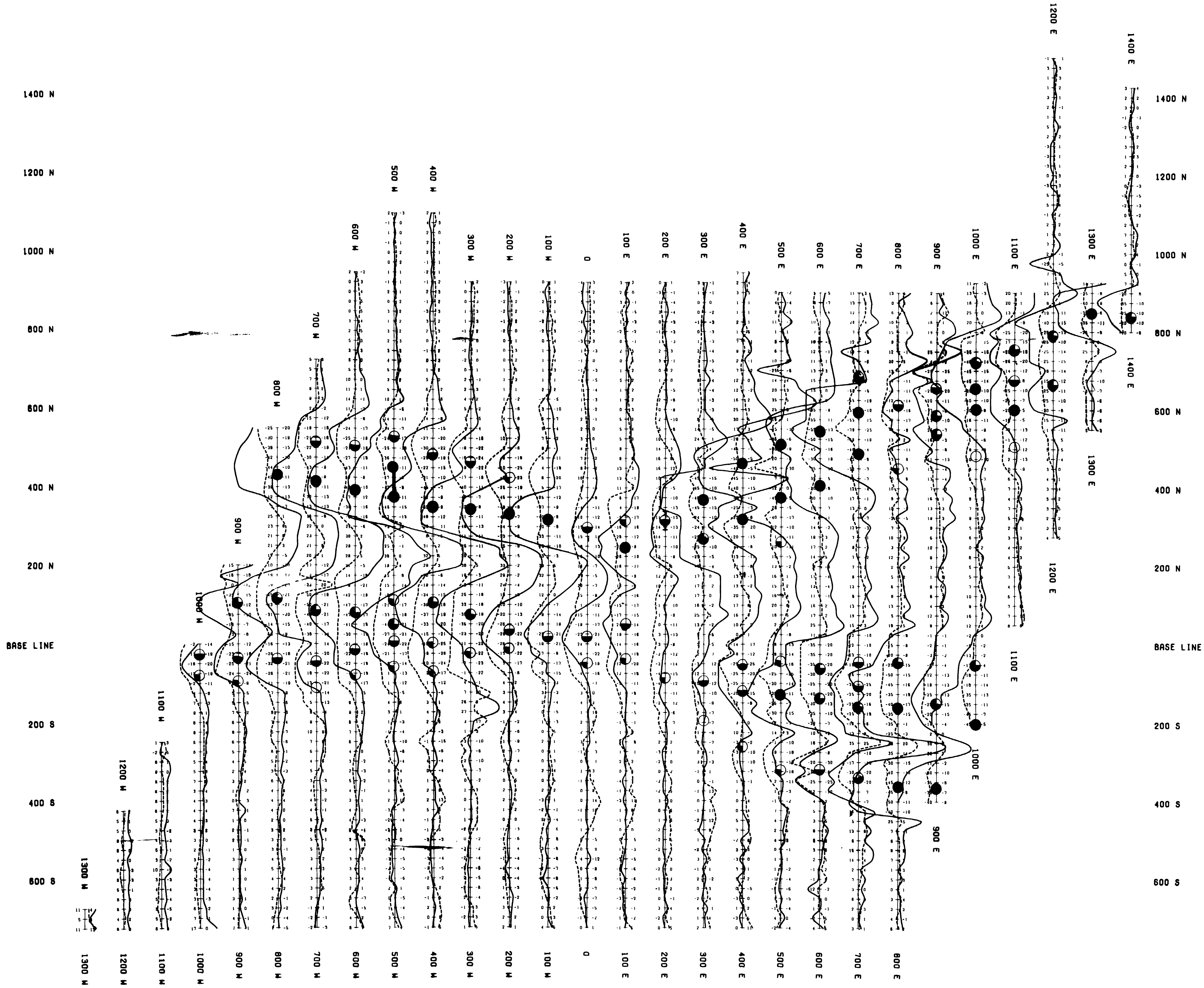
63. 5100
OM87-176

ROBERT S. MIDDLETON
EXPLORATION SERVICES INC.

MAGNETIC
SURVEY

For:	CAN-MAC EXPLORATIONS INC.
Project:	TALBOT TWP.
Survey:	
Scale:	1:5000
File ref:	M-278
Dwg no:	
Date:	18-FEB-88
Srvy'd by	
Appr'd by	
Chk'd by	
Drn by	NORTHERN GEOTECH

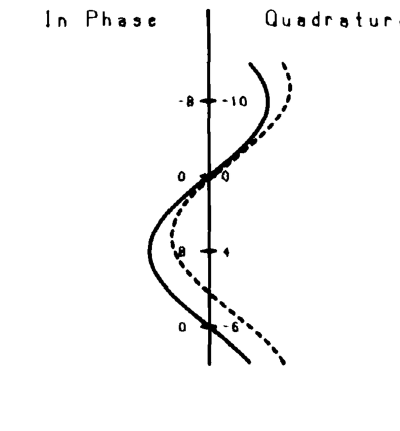
240



63.510C
OM87-1

SURVEY LEGEND

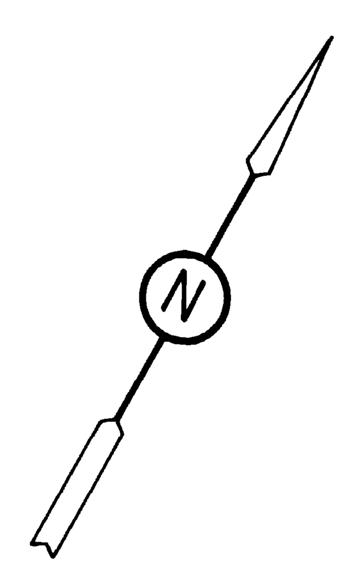
Instrument:	MAX-MIN I
Serial No.:	3393
Coil separation:	150m
Profile Scale:	1cm = 20%



ROBERT S. MIDDLETON
EXPLORATION SERVICES INC.

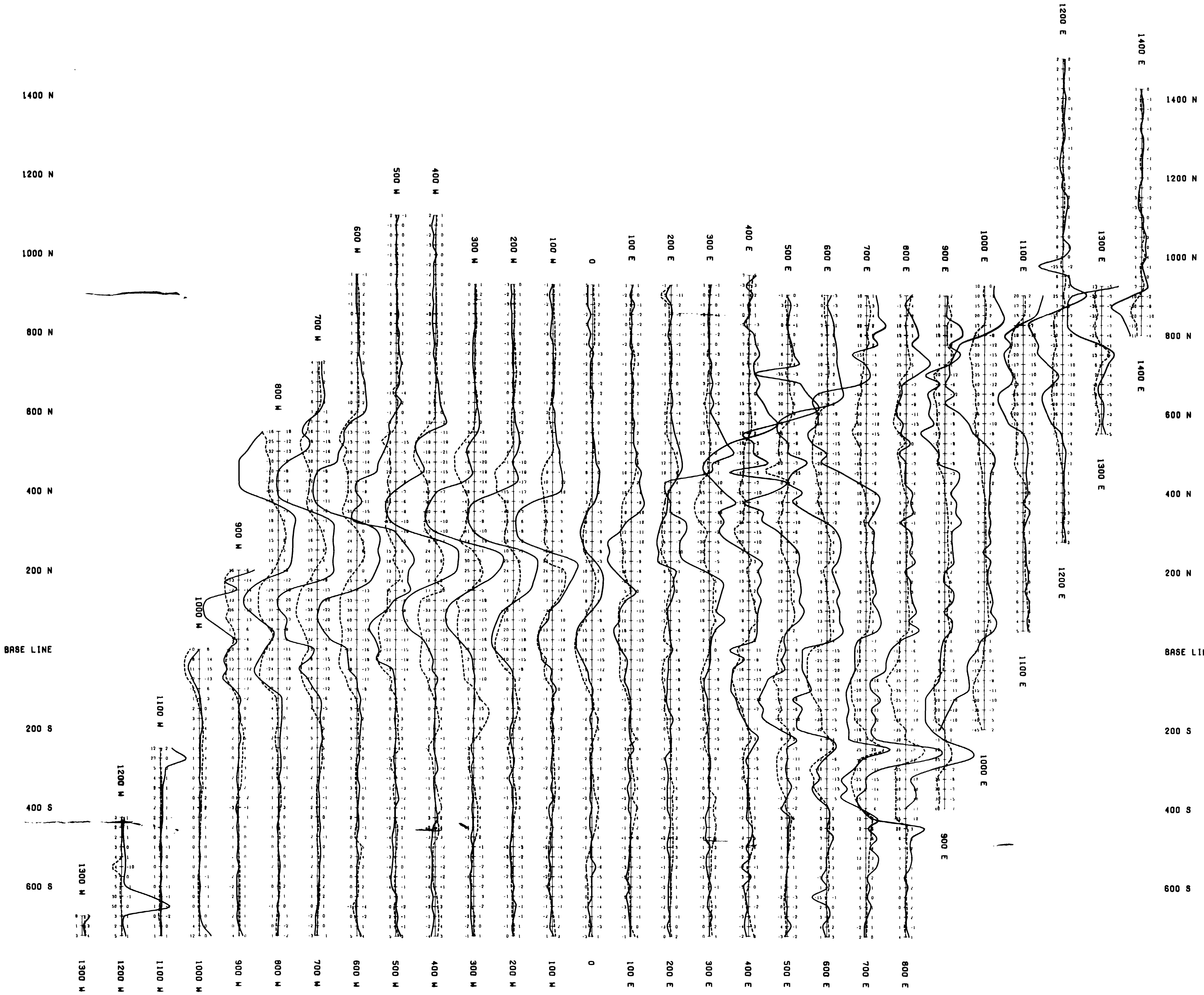
ELECTROMAGNETIC SURVEY

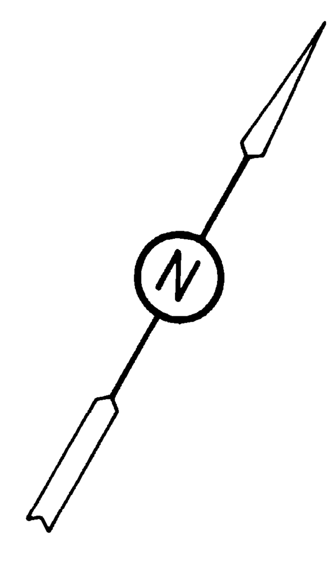
For:	CAN-MAC EXPLORATIONS INC.
Project:	SCHOLFIELD TWP
Survey:	MAX-MIN I FREQUENCY = 440 Hz
Scale:	1:5000
File loc:	M-279
Dwg no:	
Date:	21-JAN-88
Srvy'd by	
Apprv'd by	
Chk'd by	
Drw'n by	NORTHERN GEOTECH



42G05SE0001 53.5100 TALBOT

250



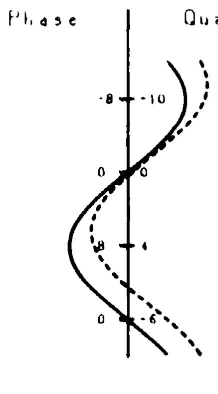


63.5100
OM 87-176

SURVEY LEGEND

Instrument: MAX-MIN I
Serial No.: 3393
Coil separation: 150m
Profile Scale: 1cm = 20%

In Phase | Quadra r



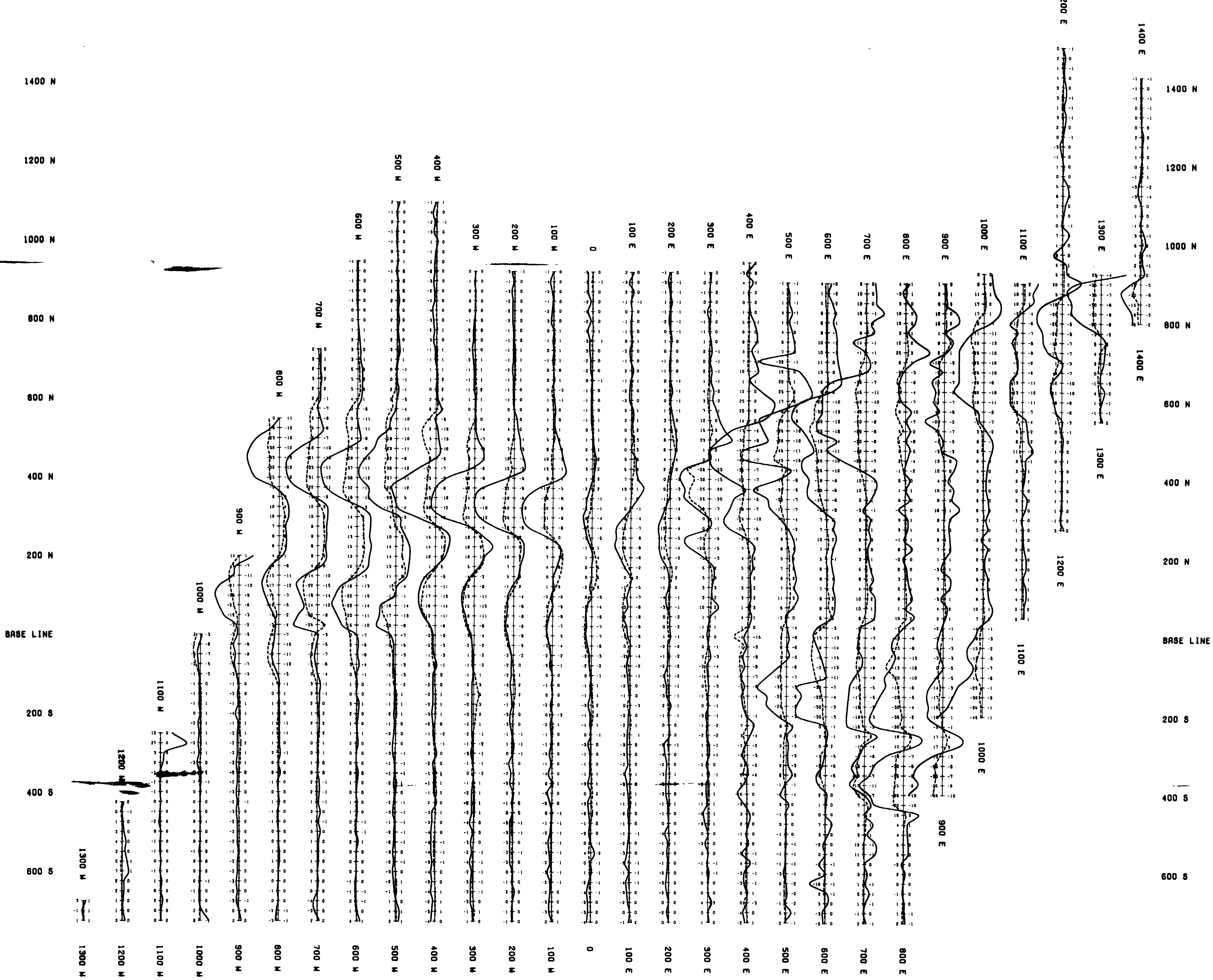
ROBERT S. MIDDLETON
EXPLORATION SERVICES INC.

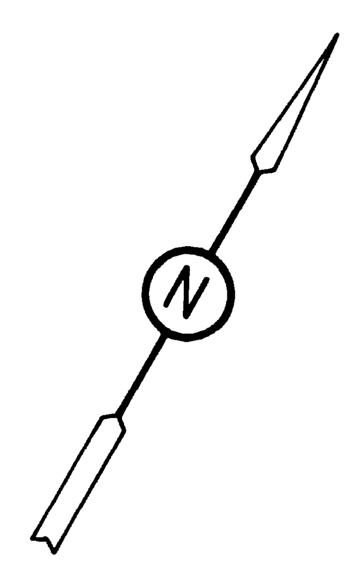
ELECTROMAGNETIC SURVEY

For:	CAN-MAC EXPLORATIONS INC.
Project:	SCHOLFIELD TWP
Survey:	MAX-MIN I FREQUENCY = 1760 Hz
Scale:	1:5000
File loc:	M-279
Dwg no:	
Date:	21-JAN-88
Srvy'd by	
Apprv'd by	
Chk'd by	
Drw'n by	NORTHERN GEOTECH

42G05SE0001 53 5100 TALBOT

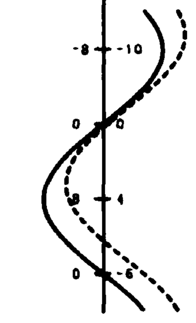
260





63.5100
OM87-17

SURVEY LEGEND	
Instrument:	MAX-MIN 1
Serial No.:	3393
Coil separation:	150m
Profile Scale:	1cm = 20%

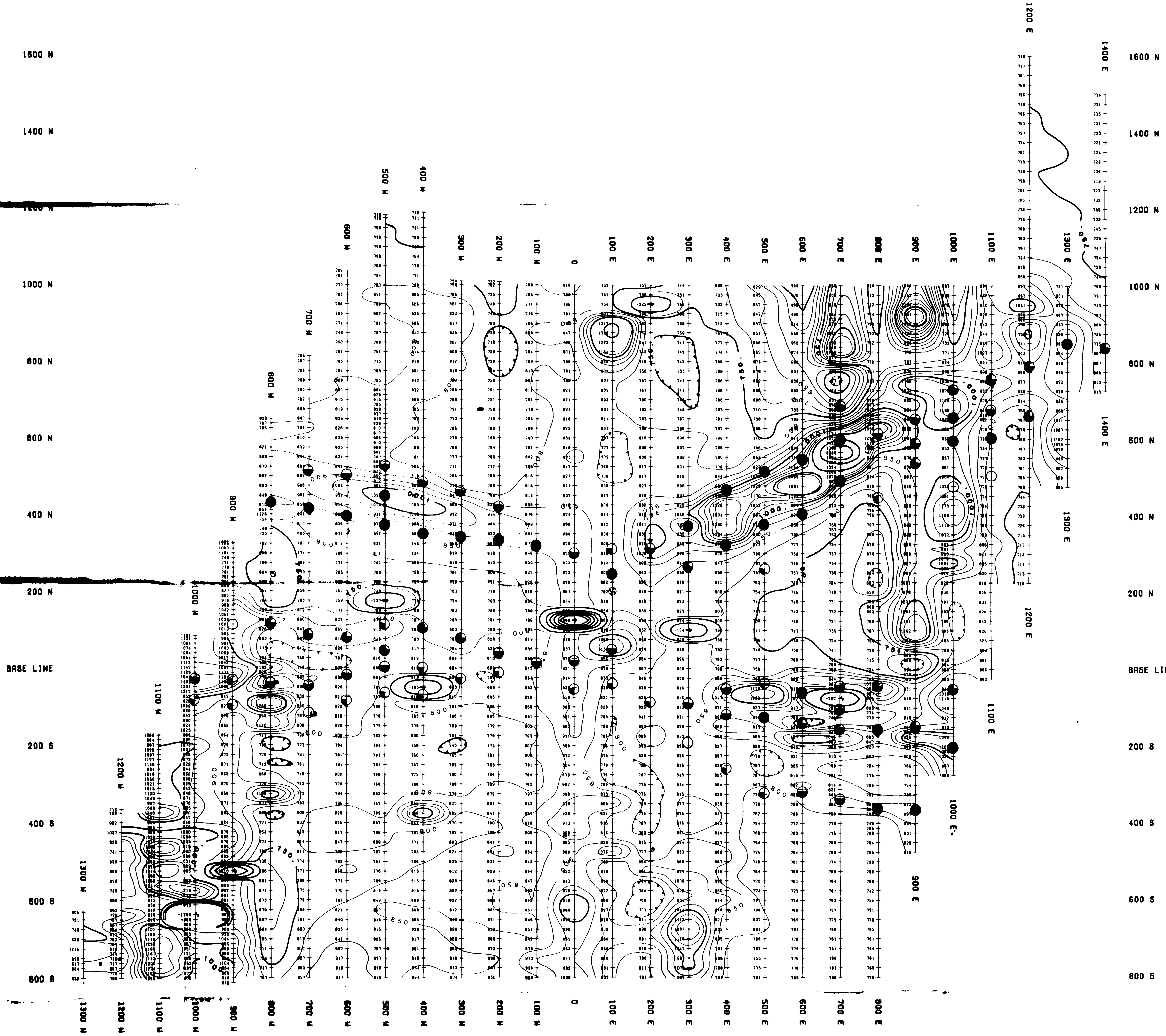


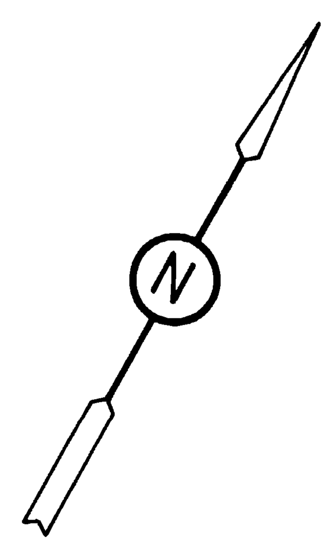
ROBERT S. MIDDLETON EXPLORATION SERVICES INC.

ELECTROMAGNETIC SURVEY

For:	CAN-MAC EXPLORATIONS INC.
Project:	SCHOLFIELD TWP
Survey:	MAX-MIN 1 FREQUENCY = 3520 Hz
Scale:	1:5000
File loc:	M-279
Dwg no:	
Date:	21-JAN-88
Srvy'd by	
Apprv'd by	
Chk'd by	
Drw'n by	NORTHERN GEOTECH

270





63.5100
OM87-176

SURVEY LEGEND	
Instrument:	EDA OMNI IV MAG
Serial No.:	
Datum:	58,000 nt
Contour Interval:	50 nt

Contours:

1000

Depression contours:

ROBERT S. MIDDLETON EXPLORATION SERVICES INC.

TOTAL FIELD MAGNETIC SURVEY

For:	CAN-MAC EXPLORATIONS INC.
Project:	SCHOLFIELD TWP
Survey:	ACCURACY +/- 1nt TIE LINE CORRECTED
Scale:	1:5000
File loc:	M-279
Dwg no:	
Date:	21-JAN-88
Srvy'd by	
Apprv'd by	
Chk'd by	
Drw'n by	NORTHERN GEOTECH

280