42A01SW0117 2.11417 OTTO

010

REPORT ON THE AIRBORNE GEOPHYSICAL SURVEYS ON THE PROPERTY OF MID-NORTH ENGINEERING SERVICES LTD. OTTO TOWNSHIP, ONTARIO

June 30, 1988
Val d'Or, Quebec

G.N. Henriksen, B.Sc.
Geologist

2.10136

RECEIVED
JUL 22 1988
MINING LANDS SECTION

REPORT ON THE AIRBORNE GEOPHYSICAL SURVEY ON THE PROPERTY OF MID-NORTH ENGINEERING SERVICES LTD. OTTO TOWNSHIP, ONTARIO

INTRODUCTION

In June 1988, an airborne geophysical survey was carried out on the property of Mid-North Engineering Services Ltd. in Otto Township, Ontario. Magnetic and VLF-electromagnetic data was collected by the airborne division of H. Ferderber Geophysics Ltd. The survey was flown from a base at Val d'Or, Quebec. A total of 29.21 miles of data was collected.

The magnetic survey provides information which helps define underlying geological structures and identifies any potential economic concentrations from variations in accessory magnetic minerals. The VLF-electromagnetic survey outlines any potential economic concentrations from variations in accessory magnetic minerals. The VLF-electromagnetic survey outlines conductive zones which may represent shear zones and/or metallic sulphide deposits containing gold mineralization.

PROPERTY DESCRIPTION, LOCATION AND ACCESS

The Mid-North Engineering Services Ltd. property is comprised of 15 claims in Otto Township, Larder Lake Mining Division, Ontario. The claims cover approximately 240 hectares in Range V, are registered with the Ontario Mining Recorder's Office at Kirkland Lake and are listed in Appendix I.

The property is located about 8 km (5 miles) southwest of the town of Kirkland Lake, 3.3 km (2 miles) south of the town of Swastika and 3.3 km (2 miles) west of the town of Dane.

Access can be obtained by taking a road southward from the town of Swastika about 1.8 km to where it forks. Then by following the eastern fork approximately 1.5 km further south the central part of the north boundary is reached. The west fork can be taken about 1.5 km southward to access the northwestern corner of the property.

About 65% of the property is forested. The northwestern corner of the property has been logged and small areas of agricultural land are situated in the south-central part and the southwest corner of the claim block. A stream lies along the eastern quarter of the northern boundary of the claim block. It flows west-northwestward into Otto Lake. A small lake lies along the east part of the south boundary of the property.

A north-south trending road traverses the central part of the claim block. A southwest trending road traverses the northwest corner of the claim block.

Supplies, services and qualified manpower are available in the Kirkland Lake area.

GEOLOGY

The property lies in the Abitibi Greenstone Belt in the Superior Province of the Canadian Shield. The Ontario Department of Mines Geological Compilation Series Map 2205, Timmins-Kirkland Lake Sheet indicates the property is underlain by metavolcanic rocks. About 60% of the property is underlain by mafic flows and intermediate to mafic pyroclastic rocks. The other 40% is indicated to be underlain by felsic pyroclastic rocks, as a band which trends east-west traversing the south-central part of the claim block. Iron formation and ferruginous chert are associated with the band of felsic pyroclastic rocks which traverses the property. A syenite, nepheline syenite intrusion is situated a few hundred meters south of the property. Radioactive mineral occurrences lie at the metavolcanic syenite intrusive contact. A major north-northwest striking sinestral

fault lies about 1 km east of the property. An east-northeast trending lineament is located about 0.5 km north of the claim block. A gold occurrence located 5 km southwest of the property lies in the band of felsic pyroclastic rocks indicated at traversing the property. Numerous other gold and copper occurrences are indicated in the area.

The Crescent Kirkland Mine, a past gold and silver producer lies about 2 km north of the property.

INSTRUMENTATION AND SURVEY METHODS

The survey was completed using a 1972 Cessna 172, fixed-wing aircraft, Registration CK-EWK, owned and operated by H. Ferderber Geophysics Ltd. The pilot and navigator/operator were Y. Saucier and F. Longpre, respectively, of Val d'Or. Geophysical sensors were mounted in modified wing tips. The geophysical, navigation and data acquisition systems are described below.

Magnetometer

The magnetometer used was a GEM Systems GSM-11, high sensitivity airborne proton (Overhauser) magnetometer. The instrument continuously measures the Earth's magnetic field at a 0.01 gamma sensitivity for 1 reading per second to 10 readings

per second at a 0.1 gamma absolute accuracy. For the survey 4 readings per second at an accuracy of 0.04 gammas were read. The analog output is on 3 channels, from 1 to 10,000 gammas full scale.

VLF-EM System

A Herz Totem 2A VLF-EM system was used to measure the changes in the total field and in the vertical quadrature field on two frequencies simultaneously, with an accuracy of 1%. The primary transmitting station of Cutler, Maine, (NAA) frequency 24.0 kHz was employed for the survey.

Radar Altimeter

The ground clearance was measured with a King 10/10 A radar altimeter. The survey was flown at a mean clearance of 300 feet with the altimeter producing an accuracy of 5% (15 feet) at this altitude.

Tracking Camera and Video Centre

A RCA TC-200 colour video camera and a Galaxy 200 video centre was used to record the flight path on standard VHS type

video tapes. Manual fiducials were indicated on the picture frames for reference with the digital printout. Flight path recovery was aided using a Panasonic Colour Video Monitor S1300 and Video Cassette Recorder AG-2500.

Data Acquisition System

A Picodas Group Inc. PDAS 1100 data acquisition system featuring seven analog inputs with two frequency inputs and external interfacing was used. A Termiflex Corp. ST/32 Keyboard control unit and Sharp Corp. LCD display unit are connected to the data acquisition system. At present this system stores the altimeter VLF-1 inphase, VLF-1 quadrature, VLF-2 inphase, VLF-2 quadrature, magnetic field (coarse), magnetic field (fine), and the fourth difference (noise), and fiducials on 3.5 floppy disk drive. The data is then printed out in digital and profile form.

The survey was conducted on north-south lines at an aircraft altitude of 300 feet. The lines were flown at spacings of 440 feet at a speed of approximately 90 miles per hour. Navigation was visual using airphoto mosaics, at a scale of one inch to 1320 feet, manual fiducials and the flight path recovery system as references.

DATA PRESENTATION

Flight lines, fiducial points and geophysical responses were reproduced from the airphoto mosaics on maps at a scale of one inch to 1320 feet (1:15,840). The outline of the claim block and claim map are shown on each map sheet.

The aeromagnetic data was corrected for diurnal variations by using a base line as reference. The data was then reduced to a base level of 58,000 gammas, contoured at 25, 100 and 1000 gamma intervals and presented on Map MG-1.

A base value was determined for the VLF-EM data and the change in the total field strength as a percentage of the base value was calculated. The values were plotted on Map EM-1. The positive values were contoured at intervals of 2%. The conductor axes were determined and labelled A, B, C etc. No priority was attached to the labelling system.

SURVEY RESULTS AND INTERPRETATION

Magnetic Survey Map MG-1

A prominent magnetic high anomaly situated in the southeast part of the property trends east-west and has magnetic values up to and in excess of 4000 gammas above background. It suggests discontinuous iron formation, associated with felsic metavolcanics indicated as underlying the property.

A northwest trending linear anomalous zone is defined by bullet magnetic highs, distortions and breaks in the contour pattern. The zone traverses the central part of the property and appears to represent a fold axes or fault zone.

Magnetic high anomalies which overlie the central part of the western boundary and the western part of the southern boundary trend east-northeast and have magnetic values in excess of 1200 gammas above background. The highs may represent amphibolized mafic flows and rocks considering the proximity of the syenitic intrusive body to the south and the assumed underlying geology.

Magnetic low anomalies overlie the northeast and northwest corners of the claim block. These lows are in part the result of the dipolar effect of the highly magnetic rocks traversing the

south and central part of the property. The magnetic lows may represent mafic and pyroclastic flows as indicated by the Timmins-Kirkland Lake geological map 2205.

Distortions in the magnetic contour pattern and isolated small magnetic high and low anomalies in the vicinity of claims 954429, 954434 and 954435 suggest fold structures.

VLF-Electromagnetic Survey Map EM-1

Conductive zone A is a short, west-northwest trending conductor situated in the southwest part of the property. It lies along the northwestern shoulder of a magnetic high anomalous zone. It may represent a shear zone.

Conductive zone B is a long, discontinuous, northwest trending conductor which traverses the central part of the claim block. It overlies a linear northwest trending zone defined by the magnetic survey. Its strongest responses coincide with magnetic high anomalies. Conductor B may represent a mineralized shear associated with a deformation zone.

Conductive zone C is a long, continuous, east-west trending conductor located in the southeast part of the property. It

overlies the southern half of an east-west trending magnetic high anomaly interpreted as iron formation. Conductor C may represent iron formation.

A north trending conductor lies north of the northeast part of the claim block. Its southern end appears to extend onto the property. It overlies distortions in the magnetic contour pattern suggestive of folding. It may represent a shear zone.

CONCLUSIONS AND RECOMMENDATIONS

The airborne VLF-electromagnetic and magnetic surveys were successful in outlining possible shear zones and helping define the underlying geology of Mid-North Engineering Services Ltd. in Otto Township, Ontario.

Rocks of high magnetic susceptibility which underlie the southeast part of the property and are probably iron formation bearing felsic metamorphosed pyroclastics. Rocks of high magnetic susceptibility which underlie the extreme west and southwest parts of the claim block are possibly amphibolized mafic flows with interflow pyroclastics.

A northwest trending linear zone defined by bullet magnetic highs, distortions in the contour pattern, traverses the central part of the property. This zone is probably a deformation zone and suggests a possible fold axes or fault zone. The bullet magnetic highs may represent iron formation.

The magnetic contour pattern in the vicinity of claims 954429, 954434 and 954435 suggests underlying fold structures. The rocks of low magnetic susceptibility in the northeast and northwest corners of the property may be mafic flows and pyroclastic rocks as indicated on the Timmins-Kirkland Lake geological compilation series 2205. There resultant relatively low magnetic susceptibility possibly being due to the dipolar effect of the highly magnetic rocks to the south.

Conductive zones A, B and C appear to represent bedrock conductors. Conductors A and B may represent shear zones. Conductor C appears to represent iron formation.

A conductive zone which lies north of the northeast part of the claim block. The conductor appears to represent a shear zone associated with a possible fold structure. It may extend onto the property.

Further work is warranted on the property, especially considering the proximity of the Cresent Kirkland Mines, the numerous gold and base metal occurrences in the surrounding area, and the gold occurrence which lies 5 km southwest along strike of the geology. Areas of particular interest are the above mentioned conductors, and in the vicinity of the northwest trending linear zone which traverses the central part of the property.

An exploration program of ground geophysics and geological mapping and sampling for mineralization should be undertaken. A gradient/total field magnetic survey and VLF-electromagnetic survey should be performed. Geophysical anomalies with corresponding geology should then be tested by diamond drilling.

Respectfully submitted,

H. FERDERBER GEOPHYSICS LTD.

Gordon N Henriksen

G.N. Henriksen, B.Sc.

Geologist.

APPENDIX 1 - CLAIM LIST

Otto Township, Ontario

L-954428
954429
954430
954431
954432
954433
954434
954435
L-954436
954437
954438
954439
954440
954441
954442

KASNER GR(

P.O. BOX 5[illegible]
KIRKLAN[illegible]E, ONTARIO
CANADA P[illegible]3J5
TELEPHONE (705) 642-3291
TELECOPIER (705) 642-3202

MINING EXP



900

July 15, 1988

Lands Management Branch
Ministry of Northern Development & Mines
6th Floor, Whitney Block
Suite 6610, 99 Wellesley St. West
Toronto, Ontario
M7A 1W3

RECEIVED
JUL 22 1988
MINING LANDS SECTION

Gentlemen:

Please find enclosed on behalf of Midnorth Engineering Services, two copies of a report for work conducted on claims L954428 etal Otto Township, Ontario, for your consideration.

Yours truly,
THE KASNER GROUP OF COMPANIES

Glenn Kasner
Field Supervisor

GK/sl
Encl.

Ministry of Natural Resources
Ontario

Report of Work Land Management
Geophysical, Geological, Geochemical and Expenditures

DOCUMENT No.
W8808·325

The Mining Act 2.11417

Instructions – Please type or print.
– If number of mining claims traversed exceeds space on this form, attach a list.
Note – Only days credits calculated in the "Expenditure" section may be entered in the "Expend. Days Cr." columns.
– Do not use shaded areas below.

Type of Survey(s)
Airborne magnetic and VLF-electomagnetic

Township or Area
Otto Township

Claim Holder(s)
Mid-North Engineering Services Ltd.

Prospector's Licence No.
A-22041

Address
169 Perreault Ave, Val d'Or, Quebec

Survey Company
H. Ferderber Geophysics Ltd.

Date of Survey (from & to)
11 06 88 (Day Mo. Yr.) — 11 06 88 (Day Mo. Yr.)

Total Miles of line Cut
29.21

Name and Address of Author (of Geo-Technical report)
Gordon N. Henriksen

Credits Requested per Each Claim in Columns at right

Special Provisions		Days per Claim
For first survey: Enter 40 days. (This includes line cutting)	Geophysical - Electromagnetic	
	- Magnetometer	
For each additional survey: using the same grid: Enter 20 days (for each)	- Radiometric	
	- Other	
	Geological	
	Geochemical	

Man Days		Days per Claim
Complete reverse side and enter total(s) here	Geophysical - Electromagnetic	
	- Magnetometer	
	- Radiometric	
	- Other	
	Geological	
	Geochemical	

Airborne Credits		Days per Claim
Note: Special provisions credits do not apply to Airborne Surveys.	Electromagnetic	34
	Magnetometer	34
	Radiometric	

Mining Claims Traversed (List in numerical sequence)

Prefix	Number	Expend. Days Cr.
L	954428	
	954429	
	954430	
	954431	
	954432	
	954433	
	954434	
	954435	
	954436	
	954437	
	954438	
	954439	
	954440	
	954441	
	954442	

Prefix	Number	Expend. Days Cr.

RECEIVED
JUL 26 1988
MINING LANDS SECTION

LARDER LAKE MINING DIV.
RECEIVED
JUL 15 1988
AM 7 8 9 10 11 12 1 2 3 4 5 6 PM
1:45 p.m.

ONTARIO GEOLOGICAL SURVEY
ASSESSMENT FILES OFFICE
AUG 10 1988
RECEIVED

Expenditures (excludes power stripping)

Type of Work Performed

Performed on Claim(s)

Calculation of Expenditure Days Credits
Total Expenditures: $ ÷ 15 = Total Days Credits

Instructions
Total Days Credits may be apportioned at the claim holder's choice. Enter number of days credits per claim selected in columns at right.

Total number of mining claims covered by this report of work: 15

For Office Use Only

Total Days Cr. Recorded	Date Recorded	Mining Recorder
1020	July 15/88	
	Date Approved as Recorded: 8 Aug 88	Branch Director

Date: July 8, 1988
Recorded Holder or Agent (Signature): Gordon N. Henriksen

Certification Verifying Report of Work

I hereby certify that I have a personal and intimate knowledge of the facts set forth in the Report of Work annexed hereto, having performed the work or witnessed same during and/or after its completion and the annexed report is true.

Name and Postal Address of Person Certifying
Harry Ferderber, 169 Perreault Avenue, Val d'Or, Quebec
J9P 2h1

Date Certified: July 8, 1988
Certified by (Signature): Harry Ferderber

Ministry of Northern Development and Mines

Ontario

Geophysical-Geological-Geochemical Technical Data Statement

File _____

TO BE ATTACHED AS AN APPENDIX TO TECHNICAL REPORT
FACTS SHOWN HERE NEED NOT BE REPEATED IN REPORT
TECHNICAL REPORT MUST CONTAIN INTERPRETATION, CONCLUSIONS ETC.

Type of Survey(s) Airborne magnetic and VLF-electomagnetic

Township or Area Otto Township

Claim Holder(s) Mid-North ~~Engineering Services Ltd~~.

Survey Company H. Ferderber Geophysics Ltd.

Author of Report G. N. Henriksen

Address of Author 169 Perreault Ave., Val d'Or, Que.

Covering Dates of Survey June 11, 1988 (linecutting to office)

Total Miles of Line flown 29.21 miles

SPECIAL PROVISIONS CREDITS REQUESTED

ENTER 40 days (includes line cutting) for first survey.

ENTER 20 days for each additional survey using same grid.

DAYS per claim

Geophysical

—Electromagnetic _____

—Magnetometer _____

—Radiometric _____

—Other _____

Geological _____

Geochemical _____

AIRBORNE CREDITS (Special provision credits do not apply to airborne surveys)

Magnetometer 34 Electromagnetic 34 Radiometric _____ (enter days per claim)

DATE: July 7, 1988 SIGNATURE: Gordon N. Henriksen
Author of Report or Agent

Res. Geol. _____ Qualifications _____

Previous Surveys

File No.	Type	Date	Claim Holder

MINING CLAIMS TRAVERSED
List numerically

(prefix)	(number)
L	954428
	954429
	954430
	954431
	954432
	954433
	954434
	954435
	954436
	954437
	954438
	954439
	954440
	954441
	954442

TOTAL CLAIMS 15

OFFICE USE ONLY

837 (85/12)

SELF POTENTIAL

Instrument _____ Range _____

Survey Method _____

_____

Corrections made _____

_____

RADIOMETRIC

Instrument _____

Values measured _____

Energy windows (levels) _____

Height of instrument _____ Background Count _____

Size of detector _____

Overburden _____

(type, depth – include outcrop map)

OTHERS (SEISMIC, DRILL WELL LOGGING ETC.)

Type of survey _____

Instrument _____

Accuracy _____

Parameters measured _____

_____

Additional information (for understanding results) _____

_____

_____

AIRBORNE SURVEYS

Type of survey(s) ~~Airborne magnetic and VLF-electromagnetic~~

Instrument(s) Hertz Totem 2A and GEM GSM-11

(specify for each type of survey)

Accuracy 1% and 0.1 gammas

(specify for each type of survey)

Aircraft used Cessna 172, fixed wing aircraft (CF-EWK)

Sensor altitude 300 feet

Navigation and flight path recovery method Navigation was visual on ~~airphoto mosaics~~. Flight path recovery was obtained with a RCA colour video camera Panasonic ~~Colour Video Monitor~~

Aircraft altitude 300 feet Line Spacing 440 feet

Miles flown over total area 29.21 Over claims only ~~12.9 miles~~

Ontario Ministry of Northern Development and Mines

Technical Data Statement

File _____

TO BE ATTACHED AS AN APPENDIX TO TECHNICAL REPORT
FACTS SHOWN HERE NEED NOT BE REPEATED IN REPORT
TECHNICAL REPORT MUST CONTAIN INTERPRETATION, CONCLUSIONS ETC.

Type of Survey(s) Airborne magnetic and VLF-electomagnetic

Township or Area Otto Township

Claim Holder(s) Mid-North Engineering Services Ltd.

Survey Company H. Ferderber Geophysics Ltd.

Author of Report G. N. Henriksen

Address of Author 169 Perreault Ave., Val d'Or, Que.

Covering Dates of Survey June 11, 1988 (linecutting to office)

Total Miles of Line flown 29.21 miles

SPECIAL PROVISIONS CREDITS REQUESTED

ENTER 40 days (includes line cutting) for first survey.

ENTER 20 days for each additional survey using same grid.

	DAYS per claim
Geophysical	
—Electromagnetic	
—Magnetometer	
—Radiometric	
—Other	
Geological	
Geochemical	

AIRBORNE CREDITS (Special provision credits do not apply to airborne surveys)

Magnetometer 34 Electromagnetic 34 Radiometric _____ (enter days per claim)

DATE: July 7, 1988 SIGNATURE: Gordon N. Henriksen
Author of Report or Agent

Res. Geol. _____ Qualifications _____

Previous Surveys

File No.	Type	Date	Claim Holder

MINING CLAIMS TRAVERSED
List numerically

(prefix)	(number)
L	954428
	954429
	954430
	954431
	954432
	954433
	954434
	954435
	954436
	954437
	954438
	954439
	954440
	954441
	954442

TOTAL CLAIMS 15

OFFICE USE ONLY

837 (85/12)

TECK TP. - M.392

12 11 10 9 8 7 6 5 4 3 2 1

VI

V

IV

EBY TP. - M.345

BOSTON TP. - M.332

MARQUIS TP. - M.362

Otto

Lake

Virgoss

Blanche River

Round Lake

DANE TOWNSITE

Not Open for Staking O.C. Jan 10, 1911

Rosegrove Beach

THE TOWNSHIP OF

OTTO

DISTRICT OF TIMISKAMING

LARDER LAKE MINING DIVISION

SCALE: 1-INCH=40 CHAINS

LEGEND

- PATENTED LAND — ● or (P)
- CROWN LAND SALE — C.S.
- LEASES — (L)
- LOCATED LAND — Loc.
- LICENSE OF OCCUPATION — L.O.
- MINING RIGHTS ONLY — M.R.O.
- SURFACE RIGHTS ONLY — S.R.O.
- ROADS
- IMPROVED ROADS
- KING'S HIGHWAYS
- RAILWAYS
- POWER LINES
- MARSH OR MUSKEG
- MINES — C.
- CANCELLED
- PATENTED S.R.O.

NOTES

400' surface rights reservation along the shores of all lakes and rivers.

(R1) Sec 36/80, w.9/80d 24/01/80, M+S withdrawn

* Applic. under the Public Lands Act - Sec 31(b) of The Mining Act.

FL5029 DISPOSITON OF CROWN LAND

NOTICE OF FORESTRY ACTIVITY

THIS TOWNSHIP / AREA FALLS WITHIN THE TIMISKAMING MANAGEMENT UNIT AND MAY BE SUBJECT TO FORESTRY OPERATIONS. THE MNR UNIT FORESTER FOR THIS AREA CAN BE CONTACTED AT: P.O. BOX 129- SWASTIKA, ONT. POK 1TO 705-642-3282

PLAN NO.- M-379

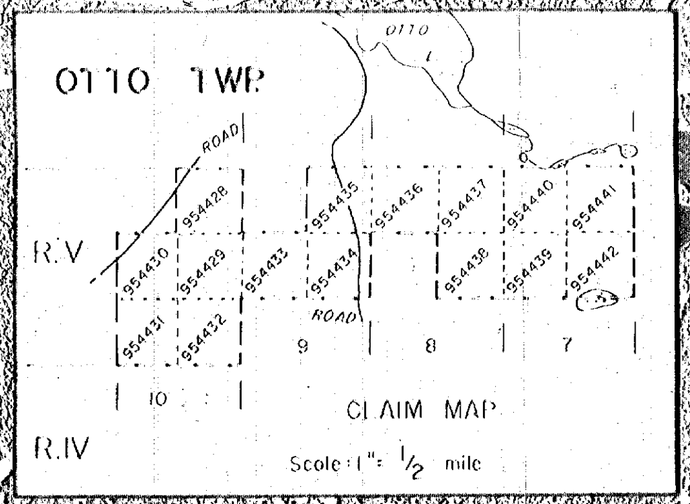
ONTARIO

MINISTRY OF NATURAL RESOURCES

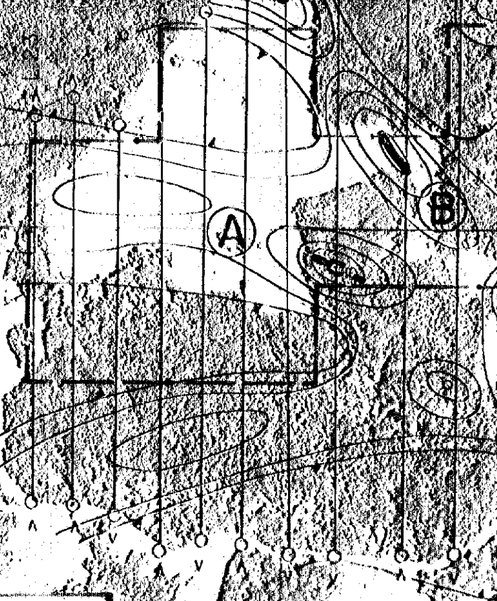
SURVEYS AND MAPPING BRANCH

42A01SW0117 2.11417 OTTO

200







LEGEND

TOTAL FIELD CONTOUR INTERVAL: 2 %
CONDUCTOR AXIS
FIDUCIAL POINT
LINE DIRECTION
STATION USED: CUTLER, MAINE, USA. (NAA 24.0kHz)
LESS THAN ZERO
10%
2%
0%

42A01SW0117 2.11417 0110

210

TYPE OF WORK

AIRBORNE V.L.F.-EM SURVEY.

CLIENT

2.11417

MID NORTH ENG. SERVICES LTD.

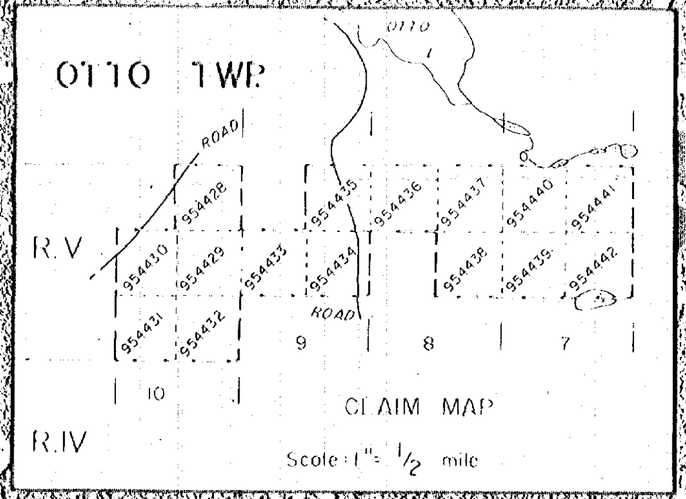
DATE	MAP NO.	AREA
JUNE 1988	EM-1	OTTO TWP. ONT.

Gordon M Hamilton

H. Ferderber Geophysics Ltd.

SCALE 1" = 1/4 mile

DRAWN BY W.H.





LEGEND

TOTAL FIELD CONTOUR INTERVAL: 25 GAMMAS
FIDUCIAL POINT
LINE DIRECTION
BASE VALUE: 58000 GAMMAS
MAGNETIC LOW
1000 GAMMAS
100 GAMMAS
25 GAMMAS

42A01SW0117 2.11417 OTTO

220

TYPE OF WORK

AIRBORNE MAGNETIC SURVEY

2.11417

CLIENT

MID NORTH ENG. SERVICES LTD.

DATE	MAP NO.	AREA
JUNE 1988	MG-1	OTTO TWP. ONT.

H. Ferderber Geophysics Ltd.

SCALE 1" = 1/4 mile

DRAWN BY