REPORT ON
AN AIRBORNE MAGNETOMETER AND ELECTROMAGNETIC SURVEY
DALHOUSIE OIL AND GAS OPTION

STOUGHTON AND MARRIOT TOWNSHIPS
ONTARIO

PROJECT 049-02

NTS: 32-D-12/5

AMAX MINERALS EXPLORATION

Timmins, Ontario
October 1982

B. Groves
Geophysicist

RECEIVED
NOV - 5 1982
MINING LANDS SECTION
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**FIGURE 1** LOCATION OF AIRBORNE SURVEY

**FIGURE 2** CLAIM SKETCH

**MAP 1** MAGNETOMETER DATA

**MAP 2** ELECTROMAGNETIC DATA

In Back Pocket
SUMMARY

Airborne magnetometer and electromagnetic surveys have been performed over a group of 37 claims in Marriot and Stoughton townships. Three conductive zones were defined which flank magnetic highs. Causative sources of the conductors are thought to be graphitic or pyritic argillaceous sediments within a volcanic flow sequence.
CLAIM SKETCH
Stoughton and Marriott Townships

DALHOUSIE OPTION

Figure 2

049-02

Scale: 1" = 1/2 mile
I. INTRODUCTION

During April 1982, a combined airborne magnetometer and electromagnetic survey was performed by Sander Geophysics Limited of Kanata, Ontario for Amax Minerals Exploration. The survey covered a group of 37 claims which straddle the boundary between Marriot and Stoughton townships, east of Matheson, Ontario. The purpose of the survey was to provide better definition of geological structure in an area considered prospective for gold mineralization.

II. LOCATION OF SURVEY AREA

The location of the airborne survey and the Amax claim group sketch are shown in Figures 1 and 2 respectively. The claim group straddles the boundary between Marriot and Stoughton townships and encompasses part of the Mattawasaga River.

The area lies approximately 65 kilometres east of Matheson in northeastern Ontario. Access to the area is provided by Highway 101 east from Matheson, from which a logging road leads north approximately 1 kilometre to the property.

III. GENERAL GEOLOGY AND EXPLORATION HISTORY

The general geology of the area has been summarized by Jensen (1978). The bedrock underlying the general area is of Archean Age and consists of tholeiitic basalts of the Kinojevis Group. General strike direction of the volcanic sequence is east.

Within the immediate area of the Amax claim group, outcrop is very limited in occurrence. Jensen (1978) has mapped an alternating sequence of magnesium and iron-rich mafic metavolcanics with associated interflow sediments.
Assessment work on file is summarized by Jensen (1978) and indicates that previous work on the Amax property was performed in 1946 by Mining Corporation and Lobanor Gold Mines.

Mining Corporation performed a ground magnetometer survey over the southwestern quadrant of the present claim group. One hole was drilled (within claim L-636705) to test a discontinuous magnetic low thought to be the expression of a fault zone related to the Porcupine-Destor Fault. Pillowed and massive tholeiitic basalts were intersected and no assay results were reported.

Lobanor Gold Mines held a group of claims which overlapped the southeastern corner of the present claim group. Ground magnetometer surveys were performed in an effort to detect the Porcupine-Destor Fault Zone.

Patino Mining Corporation performed ground magnetometer and electromagnetic surveys in 1971 over a group of claims adjacent to the northeastern corner of the Amax property. The ground surveys were completed as follow-up to an airborne electromagnetic survey over Stoughton and northern Marriot townships. A hole was drilled approximately 200 metres northeast of the northeast corner of the Amax group and intersected pyritic graphites associated with argillaceous and cherty tuff within tholeiitic volcanics. Two 3 metre intersections averaging 0.06% copper were reported.
IV. SURVEY EQUIPMENT AND PROCEDURES

Survey equipment consisted of a Sander EM3-A single frequency electromagnetic system, a Sander NPM-5 proton precession magnetometer, a Sander ADR-II digital data acquisition system, a King KRA-10 radar altimeter and 16 mm flight path tracking camera. The aircraft used for the survey was an Aerospatiale AS350D A-Star helicopter (registration C-GSGL). Ground-based equipment included a second NPM-5 magnetometer used as a base station for monitoring diurnal variation and a cassette reader and 6-channel chart recorder. The reader and recorder were used to verify data quality after each flight by the generation of analogue records from the digitally recorded data.

The electromagnetic system consisted of two coaxially oriented coils mounted 7 metres apart within a bird. Operating frequency of the system was 1000 Hz. The magnetometer sensor was also mounted within the bird which was suspended 20 metres below the aircraft.

The survey was flown with a line spacing of 150 metres along north-south flight lines. A total of 36.1 line kilometres was flown. Survey airspeed averaged about 110 kilometres per hour and the electromagnetic and magnetometer sensors were maintained at an average terrain clearance of 45 metres.

Survey navigation was based on photomosaics at a scale of 1:10000. Survey lines were visually navigated and fiducial points recorded over recognisable terrain features. Flight paths were finally verified by comparison of the 16 mm tracking film with the photomosaics.
Sander Geophysics personnel involved in the survey were:

Steve Ferguson  Party Chief
Derek Gresham  Operator
Ray Garbutt  Data man
Don Gallienne  Pilot

Amax personnel present during the survey were:

Brian Groves  Geophysicist
Randy Roussain  Project Geologist
V. DATA PRESENTATION

The airborne magnetometer and electromagnetic data are presented in Maps 1 and 2 respectively at a scale of 1:10000. Recovered flight lines are shown, together with principal topographic features and claim boundaries.

Aeromagnetic data are presented in computer contoured plan form and corrected for diurnal variation. A contour interval of 20 nT has been employed and no filtering of data has been performed.

In Map 2, in-phase and quadrature components of the secondary electromagnetic field are plotted as profiles along each flight line using an amplitude scale of 2 ppm equal to 1 mm. The axes of zones of anomalous electrical conductivity are indicated by dashed lines on Map 2. Conductive zones are determined by anomaly shape and line-to-line continuity of response.
VI. DISCUSSION OF RESULTS

a) Magnetometer Data

Map 1 presents the magnetometer data. An easterly strike direction is indicated by the data.

The data are dominated by a series of narrow, dyke-like responses with an average magnetic relief of up to 900 nT above background. This magnetic pattern reflects the alternating sequence of iron-rich and magnesium-rich mafic volcanic flows revealed in outcrop on the property. The iron-rich flows have a stronger magnetic expression manifesting themselves as magnetic highs. The magnesium-rich flows, being less magnetic, appear as relative magnetic lows.

Interflow sediments have been intersected in drill holes to the north-east of the property but do not appear to have definable magnetic expressions. This would suggest that the distribution of sediments within the property may be more widespread than suggested by the magnetic data.

Dislocations and offsets of magnetic trends suggest the presence of several northerly trending faults.

b) Electromagnetic Data

Map 2 presents the electromagnetic data. Three poorly defined conductive zones can be discerned. Conductor zone selection has been based primarily on line-to-line continuity of response and concordance with strike direction defined by the magnetic data.
Zone 1 is a two-line response south of the Mattawasaga River within claim L-636701. Poor electrical conductivity is suggested along the extent of the zone, though an increase in conductivity is noted at the western end, on line 183. The conductor axis flanks a magnetic high which suggests a causative source related to an interflow sedimentary (graphitic or pyritic) horizon.

Zone 2 is characterized by largely quadrature electromagnetic responses on 3 lines within claim L-636695. The conductive source appears to narrow towards the west and a similar trend in increasing conductivity can also be discerned. The conductor axis has a similar magnetic correlation to that of zone 1. A possibly graphitic/pyritic argillaceous sediment is thought to be the causative source.

Zone 3 is located in the northern half of claim L-636682. The zone is defined on three survey lines and trends in an easterly direction off the claim group. Poor to intermediate conductivities are typical of the zone with the best conductivity displayed on line 196. This zone displays a flanking magnetic association similar to the other zones and would appear to be the strike extension of zone 2. A graphitic, interflow sedimentary unit is thought to be the causative source of zone 3.
VII. CONCLUSIONS

The airborne magnetometer survey data have enabled the definition of a sequence of mafic volcanic flows underlying the property. Offsets in magnetic trends suggest the presence of numerous northwesterly and northeasterly trending faults.

Three poorly conductive zones have been defined by the electromagnetic survey. All zones flank magnetic highs and are thought to be the response to graphitic interflow sedimentary units.

Limited ground geophysical surveying is suggested to better define the three conductive zones.

Respectfully submitted,

Brian J. Groves
VIII. REFERENCES

Jensen, L. S.
1978: Geology of Stoughton and Marriot Townships, District of Cochrane; Ontario Geological Survey Report 173
## APPENDIX A

### SCHEDULE OF CLAIMS

**PROJECT 049-02**

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**Ministry of Natural Resources**

**Report of Work**

(Geophysical, Geological, Geochemical and Expenditures)

---

**Type of Survey(s)**

- Airborne Magnetometer and Electromagnetic Surveys

**Claim Holder(s)**

Amax of Canada Limited

**Address**

255 Algonquin Blvd. West, Timmins, Ontario. P4N 2R8

**Survey Company**

Sander Geophysics Ltd.

**Prospector's Licence No.**

A-38495

**Township or Area**

Stoughton and Marriot

**Prospector's Licence No.**

636680

**Data of Survey**

Oct. 18, 82

**Day | Mo. | Yr. | Day | Mo. | Yr.**

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**Name and Address of Author (of Geo-Technical report)**

Brian Groves, 255 Algonquin Blvd. West, Timmins, Ontario. P4N 2R8

**Credits Requested per Each Claim in Columns at right**

**Special Provisions**

- For first survey: Enter 40 days. (This includes line cutting)
- For each additional survey: using the same grid: Enter 20 days (for each)

**Expenditures (excludes power stripping)**

**Mine Claims Traversed (List in numerical sequence)**

**Total number of mining claims covered by this report of work.**

37

**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.

Brian Groves

255 Algonquin Blvd. W., Timmins, Ont. P4N 2R8

Date Certified: 18/10/82

Certified by (Signature): [Signature]

---

**Details:**

**Name and Address of Author (of Geo-Technical report):** Brian Groves, 255 Algonquin Blvd. West, Timmins, Ontario. P4N 2R8

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**Total Expenditures:**

$ + 15 = 37

**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.

---

**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.

Brian Groves

255 Algonquin Blvd. W., Timmins, Ont. P4N 2R8

Date Certified: 18/10/82

Certified by (Signature): [Signature]
To: Geophysics

Mr. Benchmark

To: Geology - Expenditures

To: Geochemistry

To: Mining Lands Section, Room 6462, Whitney Block. (Tel: 5-1380)
Mining Recorder
Ministry of Natural Resources
4 Government Road East
P.O. Box 984
Kirkland Lake, Ontario
P2N 1A2

Dear Sirs,

We have received reports and maps for an Airborne (Electromagnetic and Magnetometer) Survey submitted on Mining Claims L 636680 et al in the Townships of Stoughton and Narriot.

This material will be examined and assessed and a statement of assessment work credits will be issued.

Yours very truly,

E.F. Anderson
Director
Land Management Branch

Whitney Block, Room 6450
Queen's Park
Toronto, Ontario
M7A 1W3
Phone: 416/965-1380

cc: Amax of Canada Limited
Timmins, Ontario
Attn: Brian Groves.
Dear Sir:

Re: Mining Claims L.636680 et al.,
Stoughton and Harriot Townships

Enclosed herewith please find two (2) copies of a report and accompanying survey plans concerning an Airborne Magnetometer and Electromagnetic survey which was carried out over a group of thirty-seven (37) contiguous mining claims located in Stoughton and Harriot townships, northeastern Ontario.

A Report of Work has been filed with Mr. George Koleszar, Mining Recorder for the Larder Lake Mining Division.

Thank you.

Yours truly,

AMAX OF CANADA LIMITED

Rosemary Tittley (Mrs.)
Land Recorder

Encs. 2

c.c. K. Clemiss/E. Barclay, Toronto
Type of Survey(s) Airborne Magnetometer & Electromagnetic

Township or Area Stoughton and Harriot

Claim Holder(s) Amax of Canada Limited

Survey Company Sander Geophysics Ltd.

Author of Report Brian Groves

Address of Author 255 Algonquin Blvd. W., Timmins, Ont.

Covering Dates of Survey April 9, 1982

Total Miles of Line Cut

SPECIAL PROVISIONS
CREDITS REQUESTED

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

ENTER 20 days for each additional survey using same grid.

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

Magnetometer 40 Electromagnetic 40 Radiometric

DATE: 19/10/82 SIGNATURE: B. Groves

Res. Geol. Qualifications 2. 3655

Previous Surveys

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MINING CLAIMS TRAVERSED
List numerically

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SELF POTENTIAL
Instrument
Survey Method
Corrections made

RADIOMETRIC:
Instrument
Values measured
Energy windows (levels)
Height of instrument
Size of detector
Overburden

OTHERS (SEISMIC, DRILL WELL LOGGING ETC.):
Type of survey
Instrument
Accuracy
Parameters measured

AIRBORNE SURVEYS
Type of survey(s) _Airborne Magnetometer and Electromagnetic_
Instrument(s) _Sander NPM-5 Proton Mag; Sander FM3-A E.M. System - operating frequency-1000 Hz_
(Airborne Magnetometer and Electromagnetic)
Accuracy _Mag: 1nT E.M. : 2ppm_
(Airborne Magnetometer and Electromagnetic)
Aircraft used _Aerospatiale AS350D Helicopter (C-GSGL)_
Sensor altitude _E.M. & Mag : 45 metres_
Navigation and flight path recovery method _Visual navigation from 1:10000 scale photo mosaics, Manual fiducial recording. Flight line verified by 16 mm tracking camera._
Aircraft altitude _65 metres_ Line Spacing _150 metres_
Miles flown over total area _300 line kilometres_ Over claims only _85 line kilometres_
MINING CLAIMS TRAVERSED

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Total: 37 Claims
GEOCHEMICAL SURVEY – PROCEDURE RECORD

Numbers of claims from which samples taken:

Total Number of Samples
Type of Sample (Nature of Material)
Average Sample Weight
Method of Collection

Soil Horizon Sampled
Horizon Development
Sample Depth
Terrain

Drainage Development
Estimated Range of Overburden Thickness

ANALYTICAL METHODS
Values expressed in: per cent ☐
                      p. p. m. ☐
                      p. p. b. ☐

Cu, Pb, Zn, Ni, Co, Ag, Mo, As, (circle)

Others

Field Analysis (tests)
Extraction Method
Analytical Method
Reagents Used

Field Laboratory Analysis
No. (tests)
Extraction Method
Analytical Method
Reagents Used

Commercial Laboratory (tests)
Name of Laboratory
Extraction Method
Analytical Method
Reagents Used

SAMPLE PREPARATION
(Includes drying, screening, crushing, ashing)
Mesh size of fraction used for analysis

General


**MAP 2 - ELECTROMAGNETIC DATA**

**LEGEND**

- **Claim post location**
- **In-phase (I) & Quadrature (Q) EM components (1 mm ± 2 ppm)**
- **Flight line and fiducial**

**E.M. conductor axis**

**SCALE - 1:10000**