GEOPHYSICAL REPORT
FOR
FALCONBRIDGE LIMITED
ON THE
KEITH PROJECT \#8201
KEITH TOWNSHIP
PORCUPINE MINING DIVISION
2.14069

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## INTRODUCTION


#### Abstract

Falconbridge Limited has $100 \%$ interest in 31 unpatented mining claims located in the northwest corner of Keith Township, Porcupine Mining Division, Timmins, Ontario.

During the months of January and February, 1991, the services of Exsics Exploration were retained to perform a linecutting and geophysical program over the block. The intent of this program was to outline geological structure which may prove a favourable environment for base metal and/or precious metal deposition.


## PERSONNEL

The field crew who were directly responsible for collecting the raw data were as follows:

Robin Mathieu.......................Timmins, Ontario
Dave Clement.........................Timmins, ontario
Paul Edwards..........................Timmins, Ontario
All of the work was carried out under the direct supervision of J. C. Grant.

## LOCATION AND ACCESS

The Keith \#8201 Project is located in the northwest section of Keith Township, Porcupine Mining Division, District of Sudbury, in Northeastern Ontario.

More specifically, it is situated between Slate Rock Lake and Muskego Lake with the 3 most westerly claims situated in Ivanhoe Township. The entire property is situated approximately 8 kilometres south-southeast of the Village of Foleyet. Refer to Figure 2 and 3 of this report.

Access to the property was ideal during the survey period. Highway 101 west travels from Timmins to Foleyet. A good secondary gravel road provides access to the centre of the property. This gravel road was open all winter due to logging operations in the area. Travel time from Timmins to the property is approximately 1.2 hours, one way.



## CLAIM GROUP

The property consists of 31 contiguous unpatented mining claims located in the northwest corner of Keith Township. The following claims make up the Keith \#8201 Property:

$$
\begin{aligned}
& \text { P-1160692 to P-1160681 Inclusive.............. } 12 \\
& \text { P-1159213 to } P-1159208 \text { Inclusive............. } 6 \\
& P-1160651 \text { to } P-1160660 \text { Inclusive.............. } 10 \\
& P-1171206 \text { to } P-1171208 \text { Inclusive............. } 3
\end{aligned}
$$

Total of 31 Claims

Refer to Figure 3 of this report which has been copied from MNDM Plan Map \# G-3238, Keith Township.

## GENERAL GEOLOGY

Keith Township, for the most part, is underlain by mafic to intermediate metavolcanics which have been cut by bands of felsic tuffs, metasediments and ultramafic flows. There are several sulphide iron formation horizons as well as a copper and gold occurrence. There are also a number of graphite occurrences scattered across the northern section of the Township.


PROPERTY GEOLOGY

Generally the property is underlain by mafic to intermediate metavolcanics which have been intruded by a band of felsic flows to the north and a band of ultramafics along the south boundary. A narrow diabase dike crosscuts the property in a northwest to southeast fashion in the vicinity of the western tip extension of Slate Rock Lake.

## GEOPHYSICAL PROGRAM

This program consisted of a total field magnetic survey run in conjunction with a horizontal loop electromagnetic survey. Both programs were completed over the entire property. This program was completed during the months of February and March of 1991.

## LINECUTTING PROGRAM

A detailed grid was first established over the property using a line spacing of 100 meters and a station interval of 20 meters. This grid was cut to provide quality control for the follow-up geophysical program. In all, a total of 57.8 km of grid lines were established.

## GEOPHYSICAL PROCEDURE

Magnetic Survey:
This survey was completed using the EDA Omni IV system. Specifications for this system can be found as Appendix A of this report.

This unit is a rugged compact portable instrument designed specifically for field operation. The unit is extremely accurate and flexible. It contains a microprocessor and associated circuitry for monitoring, storing and processing data. For this project, two Omni IV units were used in the following manner. One unit was set up at a fixed location, in the base station mode where it measures and stores in it's memory the diurnal variations in the earth's magnetic field. Readings were taken automatically at intervals of 30 seconds. The memory has a capacity of 5000 data blocks.

A field unit was also used and it was tuned to the same reference field as the base unit and at the same location. When the two units are connected together the base unit can correct and dump the total field measurements. These corrections made are for diurnal variations and reference field values.

For this particular survey, a reference field of 58430 gammas was used throughout the program. Also, for ease in plotting, a background level of 58000 gammas has been removed from each value. The resultant data was then plotted onto a base map at a scale of 1:5000 and then contoured at 50 gamma intervals, wherever possible. This contoured map is included in the back pocket of this report.

Electromagnetic Survey:
This survey was completed using the Apex MaxMin II System. Specifications for this unit can be found as Appendix $B$ of this report.

The MaxMin II is a two-man continuously portable EM system. It is designed to measure both the vertical and horizontal inphase (IP) and quadrature (QP), components of the anomalous field from electrically conductive zones. More accurately, the directions of the measured components are perpendicular and parallel to the mean slope between the transmitting coil (Tx) and the receiving coil (Rx). The plane of the transmitter is kept parallel to the mean slope between the transmitter and receiver at all times. This means that the MaxMin is in effect a
horizontal loop (HL) system, when the receiver measures anomalous components perpendicular to the mean slope between the coils.

This system has the following principal features designed into it:

1) Five system frequencies of $222,444,888,1777$ and 3555 Hz to deal effectively with a wide range of overburden and bedrock conductivities.
2) Several transmitter, receiver operations - 50, 100, 150, 200 and 250 meters to cope with a wide range of problems from search for large deep conductive zones to the resolution of shallow, parallel conductive zones.
3) Good intercom system for operator co-ordination.
4) Warning lights to indicate invalid readings.
5) Lightweight portability to reduce operating costs.

For this particular survey, a coil separation of 150 meters was used between the receiver and transmitter operators. The two frequencies read were the 1777 Hz and 444 Hz . The data was then plotted on to base maps, one map for each frequency, and then profiled at 1 cm to $20 \%$. These profile maps are included in the back pocket of this report.

The surveys were successful in outlining a number of anomalies over the property. Several of the zones represent major structural trends which have been somewhat faulted or folded. Each of the targets will be discussed separately and in detail below:

Zone A:
This feature represents one of the major $z$ ones on the grid. It strikes across Lines 8400 ME to L 10800 ME and appears to continue off of the grid to the east. This zone, in fact, may strike as far as L 8000 ME .

The zone lies at a depth range of 30 to 70 meters with a conductivity range of 2 to 20 mhos. The structure appears to be near vertical to slightly south dipping.

The magnetics for the zone is somewhat spotty along most of the western extension with the eastern section of the zone lying along the southern contact of a modest mag high.

## Zone B:

This feature strikes across Lines l0200ME to 10800ME and continues off of the grid to the east. It appears to represent a good legitimate zone at a depth range of 20 to 57 meters with a conductivity range of 4 to 21 mhos. This feature also appears to be dipping near vertical to slightly south.

There is a moderate mag high-low association with the western tip of the response with a very broad mag high to the east.

One major feature noted in the magnetics for the above two zones suggest that there is evidence of a north-northwest to southeast striking diabase dike running parallel to Lines 10500 ME and 10600 ME . The dike does not appear to have disrupted the strike of the EM responses.

Zone C:
This feature also represents a good target zone striking across Lines 10400 ME to 9500 ME . The feature lies at a depth range of 26 to 46 meters with a conductivity range of 6 to 18 mhos.

The feature has good magnetic signature with its' entire strike length.

Zone D:
The feature also represents a good bedrock response, possibly representative of the same source as Zone $C$. It may suggest a fold axis, such that $C$ is the north limb of the fold and $D$ is the south limb. zone $D$ lies along the south flank of the same magnetic unit as zone $C$. The zone lies at a depth range of 25 M to 40 M with a conductivity range of 6 to 15 mhos.

These values represent the same as Zone $C$.

Zone E:
This feature strikes east-west from Line 10000ME to 11000ME just at the south end of the lines.

The interruption in the zone between Lines 105 and 10600 ME is caused by the diabase dike crosscutting the zone.

There is no direct magnetic association with the feature.

Zone $F$ :
This feature strikes from Line 7700ME up to and including Line 9600 ME and appears to continue off of the grid to the east. This structure basically parallels Zone A.

Again, the magnetics for the structure is represented by a somewhat spotty correlation along the western portion of the zone to north flanking along the eastern section. This feature is relatively weak and narrow in comparison to the above zones.

Zone G:
This structure generally strikes east-west across Lines 9100 ME to 9600 ME and may continue off of the grid to the east. The zone lies at a depth range of 42 M to 57 M with a conductivity of 2 to 23 mhos.

The zone lies along the south flank of a moderate magnetic high feature.

Zone $H$ :
This feature was just noted on the north end of Lines 9300 ME to 9600 ME . It appears to lie within a broad weak magnetic high.

Zone J:
This feature is entirely continued within Muskego Lake and strikes across Lines 7100 ME to 7300 ME . The zone appears to represent a legitimate target at a depth of 50-55 meters with a mho value of 14.

There does not appear to be any definite magnetic correlation.

## RECOMMENDATIONS AND CONCLUSIONS

The surveys were successful in outlining a number of good target zones over the survey area.

Certainly the most interesting areas are represented by the possible fold structure in the area of Zones $C$ and $D$. Also, Zones A, B and G represent good legitimate bedrock zones.

Zones $F$ and $J$ are questionable at this writing, or at least of lower priority. They do appear to represent structures, generally parallel to the more predominant zones.

A follow-up program should consist of detailed mapping over the better zones followed up by drilling of the stronger sections of each zone which have been interpreted for this report.


## CERTIFICATE OF QUALIFICATIONS

I, John Charles Grant do hereby certify:

1. that I am a geophysicist and reside at Lot 2 Martineau Avenue, Kamiskotia Lake, Timmins, Ontario.
2. that I am a Fellow of the Geological Association of Canada.
3. that I am a member of the Certified Engineering Technologist Association.
4. that I graduated from Cambrian College of Applied Arts and Technology, Sudbury Campus in 1975 with an Honour's diploma in Geology Technology.
5. that I have practised my profession continuously for 16 years.
6. that my report on the KEITH PROJECT \#8201, KEITH TOWNSHIP for FALCONBRIDGE LIMITED, is based on work carried out under my supervision.
7. I hold no specific or special interest in the described property. I have been retained as a Consulting Geophysicist for "the property".

Dated this l2th day of April, 1991 at Timmins, Ontario

John C. Grant, C.E.T., F.G.A.C.



## OMINI IV's Major Benefits

- Four Magnetometers in One
- Seif Correcting for Diurnal Variations
- Reduced Instrumentation Requirements
- 25\% Weight Reduction
- User Friendly Kevpad Operation
- Universal Computer Interface
- Comprehensive Software Packages
$\square$


## IMAXIVIN II PORTABLE EIV

- Five frequancies: ReP, 444, 日EB, 1777 and 3EEE Hz.
- Maximum couplad Chorizontal-loop 3 oparation with reference cable.
- Minimum coupled oparation with referance cable.
- Vertical-loop oparation without reference cable.
- Coil separations: RE, 50, $70 \square, 150$, 200 and 250 m

- Pellable data from depths of up to TEDm (EDD ftJ.
- Built-in voice communication circuitery with cable.
- Tilt meters to control coll orientation.


Ministry of Northern Development and Mines

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.


$\qquad$



Res. Geol. $\qquad$ Qualifications $\qquad$
Previous Surveys
File No. Type
Date
Claim Holder



Ministry of Northern Development and Mines

DGCUMENT No.
Report of Work

Mining Act
(Geophysical, Geological and Geochemical Surveys)


42B0INW0034 é. 14069 IVANHOE


Credits Requested per Each Claim in Columns at right Mining Claims Traversed (List in numerical sequence)








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