ELECTROMAGNETIC AND MAGNETOMETER SURVEY

BENEDICKSON 1-69

LOCATION

Eighteen claims were staked - PA 249793 to PA 249807 and PA 257508 to PA 257510. The property is on the bottom end of Benedickson Township in the Patricia Mining Division.

ACCESSIBILITY

The property is easily accessible by road from Sioux Lookout to Superior Junction, Alcona and along the newly built road which follows the C.N.R. railroad to Umfreville. The road cuts across the north end of the property - about 26 miles from Sioux Lookout.

GENERAL GEOLOGY

The rocks in the area consist of interbedded acid and intermediate volcanics in contact with argillites to the south. The argillites are graphitic and mineralized with pyrite and pyrrhotite. The rocks dip south at steep angles and strike N 30°W.

There are very few outcrops. In some areas the boulder gravels are sixty feet deep.

LINECUTTING

The baseline was cut on an azimuth of 315°. Lines were cut at 400 foot intervals along the baseline and perpendicular to it. The lines are picketed every 100 feet.

A total of approximately 14.2 miles of line were cut.

ELECTROMAGNETIC SURVEY

PURPOSE

To determine whether there is any sulphide mineralization.

COMPANY CONDUCTING THE SURVEY

Geophysical operators employed by Noranda Exploration Co., Ltd., did the survey under supervision of Peter G. Cooper, Geophysicist, who planned and is responsible for the survey.

INSTRUMENTS & SENSITIVITY

The first Electromagnetic survey was carried out using the Junior Electromagnetic Unit (J.E.M.). This unit is manufactured by Crone Geophysic's Ltd., for Noranda Exploration Co., Ltd., under Patent No. 63156.

Survey data (readings) are obtained by the two man crew alternately acting as transmitter 200 feet apart. Each man is equipped with a receiver, transmitter coil, amplifier and earphones, all powered by an 18 volt battery. Each coil alternately acts as a receiver and transmitter, the latter having an output of 5 watts and operates on 1800 Hz and 480 Hz frequencies providing a 2^{o} to 5^{o} null which is used in measuring the dip angles measured at each station and added together give the resultant. This shoot back method helps to eliminate effects due to relief and orientation. These readings are plotted at chief's position. When the resultant equals zero no conductivity exists. The plane of the transmitting coil is inclined 15^{o} from the vertical to increase penetration and optimize the coupling of the primary electromagnetic fields with conductors.

To gain additional information a second electromagnetic survey was carried out using a vertical loop unit. This unit is also manufactured by Crone Geophysic's Limited.

The survey utilizes a transmitting coil which is hung from a mast in a vertical plane, and a receiving or search coil. An alternating current is passed through the transmitting coil producing an alternating magnetic field (primary field). If a conducting mass is near the coil the current is

induced in the mass, and the induced current will create its own magnetic field (secondary field). The secondary field distorts the primary field, and the distortion is measured by the receiving coil in terms of dip angles. The receiving coil is the J.E.M. unit already discussed.

RESULTS & DISCUSSION

No. of Readings: 1527

The J.E.M. survey indicates an anomalous zone between lines 28E and 40E near the baseline. The area is in low ground which is evident from the anomalous readings--they are all negative. The frequency ratios are not particularly high, but this can be partially explained by the conductive overburden and by the fact that the more overburden there is the smaller the ratios will be. The wideth of the anomaly and jagged peaks of the profile suggest there are several parallel conductors here.

Line 36E proves to be the most interesting portion of the anomaly. The E.M. negative peak is at 2+50N. This is particularly interesting because the peak is flanked by a slight magnetic rise to the north and a slight magnetic depression to the south. The average low/high frequency ratio is .77--fairly good considering the overburden.

There are numerous other very weak crossovers on the property. They are too weak to determine anything definite so more work will have to be done on them.

There is a definite crossover on line 32E at 19+00N. It appears that there may be more than just a one line anomaly here so it was necessary to check this out with the vertical loop.

Transmitter Set up I was situated on L32E. at 18N. approximately on a J.E.M. crossover with the idea of finding the conductor on another line then shooting back to accurately

locate the conductor on line 32E. The anomaly was also followed out to its east-west boundaries. To the east it cuts off rather abruptly between lines 32E. and 36E., and on the west end it fades away somewhere past 16E. Bedrock is not far from the surface around the anomaly at L32E. indicating the conductor to be relatively weak. Its dip is shallow and all this proved to be the case in the drill results.

T-6 was at L 32E at 2N and L 36E was read. There was a J.E.M. indication of a conductor on L 36E. just opposite T-6. As it turned out, T-6 is not on the conductor - but almost 100 feet north of it and this undoubtedly gave us weaker and broader indications of this particular conductor on L 36E. The receiving coil is picking up the magnetic field from more than one conductor on this line - as a result the high frequency crossover is at 3N and the low frequency crossover is at 2N and it turns out that this conductor is not very strong.

The readings from T-6 on L 28E are fairly good since there are not any other interfering conductors.

Line 24E was also read from T-6; however, the conductor picked up is not an extension of the conductor which the transmitter is sitting on and therefore is not accurately located.

T-7 was set up on L 24E at the baseline, and gives an indication of a conductor on L 20 near the baseline. The crossovers are very weak here for two reasons: one is that the transmitter is not exactly over the conductor and the other is that the anomaly is fading away to the west.

This same conductor was picked up on L 28E from T-4. On line 32E the conductor passes through the baseline. There is a good crossover here with high angles. From T-4 the crossover is almost 100 feet to the south, however rather than suspecting two separate conductors in this area - I believe there is one. Because neither transmitter sites are exactly over the conductor and because of interfering magnetic fields from other conductors the readings are broad and subject to error.

T-4, located at L 40W, 3N was situated to pick up the conductor on L 36E around 3N. However this set up indicates that the conductor crosses L 38E around 250N and it crosses L 36E close to the baseline. There is reason to believe that the conductor loops back over L 38E making an S fold before crossing L 36E. For this reason the axial trend is not joined up on the map.

The angles from T-4 on L 36E are strong and give a good indication where the conductor is. The dip is near vertical along this conductor and this proved to be the case from drill results.

On line 32E the readings from T-4 give indications of the parallel conductor at 1N, yet there is no crossover because this is not the conductor on which T-4 is set up. It is difficult to determine the dip due to the interfering conductor, but it is quite likely near vertical. Line 28E was also read to show the conductor near 1S.

T-3 was set up on L 32E at the baseline to read 36E. This set up is a good example of how important it is to be right on the conductor when transmitting or there will be slight error in accurately locating the conductor. In this case the conductor probably crosses L 32E at 50S - a happy medium between the crossovers of T-4 and T-7.

From T-5, at L 36, 0+25N, we tried to determine what happens to the conductor from L 36E near the baseline until it crosses L 38E at 250N. The conductor appears to cross L 38E twice as in a fold before crossing again at 250N. It does cross L 40E near 250N and goes on to L 44E but the readings on L 40E are very broad because of the interfering fields.

The southern most V.E.M. conductor on the property crosses from L 16E to past 44E. The conductor appears weak and the readings are often broad.

MAGNETOMETER SURVEY

The magnetometer survey was conducted at the same time as the E.M. with equally qualified personnel using a McPhar Fluxgate Magnetometer.

The same grid was used with readings every 100 feet, this being reduced to 50 foot readings over anomalous areas.

The idea of the survey was to give additional information to the E.M. survey.

RESULTS & DISCUSSION

No. of Readings: 770

There is a good magnetic correlation over the interesting E.M. area between lines 28E and 44E and the magnetics suggests the limits to this anomalous zone. Certainly the vertical loop indicates the conductors become very weak near line 44E on the east end of the anomalous area and they decrease in magnitude between lines 24E and 28E on the west end.

There is an interesting magnetic correlation with the E.M. conductor on line 32E near 19+00N. The magnetics suggests the conductor would continue to the west to lines 36E and 40E. It does not appear to be the case though since the vertical loop survey did not pick up a conductor to the east but did follow it out to the west.

There are several other anomalous magnetic pockets--concentrated in the northern central portion of the property. One such anomaly on line 40E near 12N was checked with the vertical loop; however an associated conductor was not picked up on this anomaly.

CONCLUSION

The airborne indicates two six channel anomalies which we have not picked up yet. Further work must be done particularly on the southeast portion of this property to discover these conductors.

Submitted by,

PETER G. COOPER, Geophysicist.

PERFORMANCE & COVERAGE CREDITS

ASSESSMENT WORK DETAILS

Township or Area: Benedickson 1-69

Type of Survey: Electromagnetic Survey
A separate form is required for each type of survey

Chief Line Cutter or Contractor: Jean Alix
Name
Val D'or, Quebec
Address

Party Chief: R. Durnin
Name
253 Lincoln Street, Thunder Bay, Ont.
Address

Consultant: P.G. Cooper
Name
253 Lincoln Street, Thunder Bay, Ont.
Address

COVERING DATES

Line Cutting: December 10 - December 20, 1969

Field: December 15 -1969 - January 5, 1970
Instrument work, geological mapping, sampling etc.

Office: January 10 - March 10, 1970

INSTRUMENT DATA

Make, Model and Type: Crone Junior Electromagnetic Unit.

Scale Constant or Sensitivity:
Or provide copy of instrument data from Manufacturer's brochure.

Radiometric Background Count:

Number of Stations Within Claim Group: 1527

Number of Readings Within Claim Group: 1527

Number of Miles of Line cut Within Claim Group:

Number of Samples Collected Within Claim Group:

MINING CLAIMS TRAVERSED
List numerically

PA 249793; PA 249794;
PA 249795; PA 249796;
PA 249797; PA 249798;
PA 249799; PA 249800;
PA 249801; PA 249802;
PA 249803; PA 249804;
PA 249805; PA 249806;
PA 249807; PA 257508;
PA 257509; PA 257510

attach list

TOTAL 10

CREDITS REQUESTED	20 DAYS per claim	40 DAYS per claim	Includes (Line cutting)
Geological Survey	☐	☐	
Geophysical Survey	☒	☒	Show Check ✓
Geochemical Survey	☐	☐	

DATE November 30, 1970

SIGNED [signature]

Send in duplicate to:
FRED W. MATTHEWS
SUPERVISOR-PROJECTS SECTION
DEPARTMENT OF MINES & NORTHERN AFFAIRS
WHITNEY BLOCK
QUEEN'S PARK
TORONTO, ONTARIO

Performance and coverage credits do not apply to airborne surveys

900

PERFORMANCE & COVERAGE CREDITS

ASSESSMENT WORK DETAILS

Township or Area: Benedickson 1-69

Type of Survey: Magnetic Survey
A separate form is required for each type of survey

Chief Line Cutter or Contractor: Jean Alix
Name
Val D'or, Quebec
Address

Party Chief: R. Durnin
Name
253 Lincoln Street, Thunder Bay, Ont.
Address

Consultant: P. G. Cooper
Name
253 Lincoln Street, Thunder Bay, Ont.
Address

COVERING DATES

Line Cutting: December 10 - December 20, 1969

Field: December 15, 1969 - Jaunary 5, 1970
Instrument work, geological mapping, sampling etc.

Office: January 10 - March 10, 1970

INSTRUMENT DATA

Make, Model and Type: McPhar Fluxgate Magnetometer

Scale Constant or Sensitivity: _____
Or provide copy of instrument data from Manufacturer's brochure.

Radiometric Background Count: _____

Number of Stations Within Claim Group: 770

Number of Readings Within Claim Group: 770

Number of Miles of Line cut Within Claim Group: _____

Number of Samples Collected Within Claim Group: _____

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List numerically

PA 249793; PA 249794;
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PA 249801; PA 249802;
PA 249803; PA 249804;
PA 249805; PA 249806;
PA 249807; PA 257508;
PA 257509; PA 257510

If space insufficient, attach list

TOTAL: 18

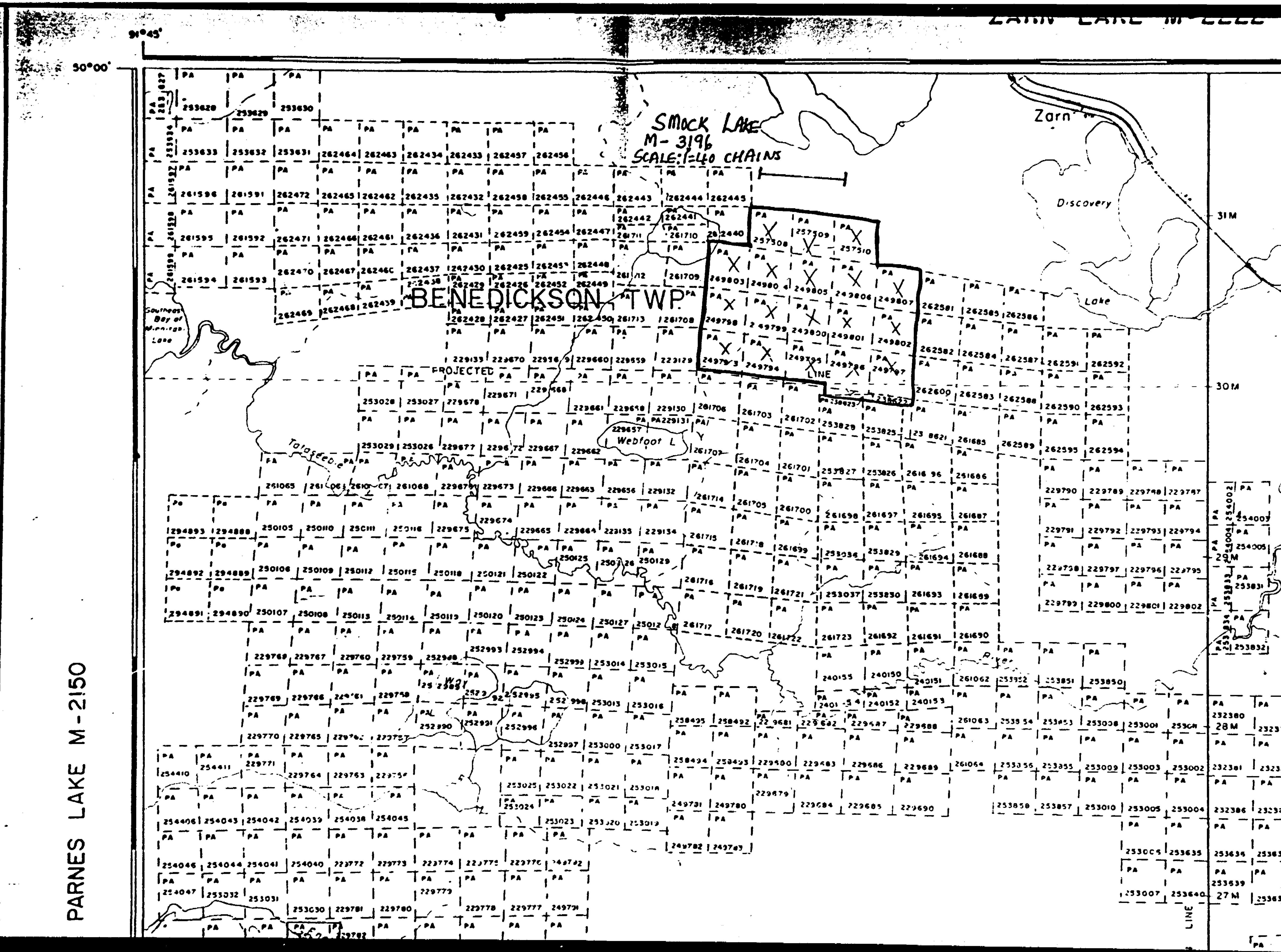
CREDITS REQUESTED	20 DAYS per claim	40 DAYS per claim	Includes (Line cutting)
Geological Survey	☐	☐	
Geophysical Survey	☒	☒	Show Check ✓
Geochemical Survey	☐	☐	

DATE: November 30, 1970

SIGNED: [signature]

Send in duplicate to:
FRED W. MATTHEWS
SUPERVISOR-PROJECTS SECTION
DEPARTMENT OF MINES & NORTHERN AFFAIRS
WHITNEY BLOCK
QUEEN'S PARK
TORONTO, ONTARIO

Performance and coverage credits do not apply to airborne surveys



SMOCK LAKE
M-3196
SCALE: 1=40 CHAINS
BENEDICKSON TWP.
PARNES LAKE M-2150
Zarn
Discovery
Lake
Webfoot L
Southeast Bay of Minnitaki Lake
PROJECTED
LINE
50°00'
31M
30M
29M
28M
27M

PROJECTS SECTION DEPARTMENT OF MINES AND NORTHERN AFFAIRS FILE: 2.197

TECHNICAL ASSESSMENT WORK CREDITS

Recorder Holder: Noranda Exploration Company Limited

Township or Area: Benedickson Township

Type of Survey and number of Assessment Days Credits per claim	Mining Claims
GEOPHYSICAL Airborne ☐ Ground ☒	PA. 249793 to 249807 Inclusive
Magnetometer 20 days	PA. 257508 - 09 - 10
Electromagnetic 40 days	
Radiometric ..... days	
.....	
GEOLOGICAL ..... days	
GEOCHEMICAL ..... days	
SECTION 84 (14) ..... days	
Special Provision ☒ Man days ☐	

NOTICE OF INTENT TO BE ISSUED

☐ Credits have been reduced because of partial coverage of claims.

☐ Credits have been reduced because of corrections to work dates and figures of applicant.

☐ NO CREDITS have been allowed for the following mining claims as they were not sufficiently covered by the survey:

_____

_____

_____

_____

_____

The Mining Recorder may reduce the above credits if necessary in order that the total number of approved assessment days recorded on each claim does not exceed the maximum allowed as follows: Geophysical – 80; Geological – 40; Geochemical – 40;

AREA CODE — 416
TELEPHONE — 365-6918

ONTARIO

WHITNEY BLOCK
QUEEN'S PARK
TORONTO 182, ONT.

DEPARTMENT OF MINES AND NORTHERN AFFAIRS
MINING LANDS BRANCH

March 31st, 1971.

Mr. W.A. Buchan,
Mining Recorder,
Court House,
Sioux Lookout, Ontario.

Re: Mining Claims PA. 249793 et al,
Benedickson Township, File No. 2.197

Dear Sir:

The Geophysical (Magnetometer & Electromagnetic) assessment work credits as shown on the attached list have been approved as of the date above. Please inform the recorded holder and so indicate on your records.

Yours very truly,

Fred W. Matthews,
Supervisor,
Projects Section.

c.c. Noranda Exploration Co., Ltd.,
253 Lincoln Street,
Thunder Bay, Ontario.

c.c. Noranda Exploration Co., Ltd.,
1700 - 44 King St., W.,
Toronto 1, Ontario.

c.c. Mr. P.G. Cooper,
253 Lincoln Street,
Thunder Bay, Ontario.

c.c. Mr. H.L. King,
Resident Geologist,
808 Robertson Street,
Kenora, Ontario.

FWM/mr

SEE ACCOMPANYING

MAP(S) IDENTIFIED AS

52G/13 NE - 0034 #1-3

LOCATED IN THE MAP CHANNEL IN THE FOLLOWING SEQUENCE (x)