REPORT ON
GEOLOGICAL AND VLF - EM
SURVEYS
QUEST LAKE AREA

November 23, 1979

P.W.A. Severin, B.Sc.

Falconbridge Copper Limited
Geological/Geophysical Report (VLF)
Quest Lake Area
Northwestern Ontario
NTS 52 - G - 15

INTRODUCTION

Linecutting, geological mapping and a VLF survey were completed in June 1979 over 16 contiguous, unpatented mining claims in the Quest Lake Area (M2875), Patricia Mining Division, Province of Ontario.

LOCATION, ACCESS AND OWNERSHIP

The property is located approximately 1.6 Km. west of Quest Lake approximately 11 Km. northeast of Sturgeon Lake Mine in northwestern Ontario. There are 16 contiguous claims in the group numbered 436780 to 436795 incl. The claims are held by Falconbridge Copper Limited, P.O. Box 40, Commerce Court West, Toronto, Ontario.

The claim group may be reached by aircraft from O'Brien's Landing (Sturgeon Lake) to Club Lake if the water level is sufficient. The other option is to fly to Quest Lake and walk 1.6 Km. to the east boundary of the property.

PREVIOUS EXPLORATION

The area west and southwest of Quest Lake has been nearly continuously held since the initial staking rush that resulted from the discovery of Mattabi Mine in 1969. The work done to date in the general area is summarized as follows:

1970	Ground magnetometer, vertical loop EM - KENNCO Expl.	
1971	Input AEM and Aeromag	Conwest-Selco
1971-72	Diamond Drilling	Calmor Iron Bay Mines
1975	Diamond Drilling	Rio Tinto
1975	Ground magnetometer - CEM - Vertical loop EM, Diamond Drilling- Noranda Exploration	

Three diamond drill holes (to test geophysical anomalies) were previously drilled on the current Quest Lake claim group by Selco (H-6, H-7) and Noranda (QT-3) for a total footage of 602 feet.

Massive and semi-massive sulphide exhalites (Po/0.9→2.8ft.) within a volcanic breccia (debris flow) were intersected by the three holes.

PATRICIA
Cu, Ag, Zn, Pb
Marchington River
North River
Lewis Lake
Tiber Lake
Bowl Lake
Port Lake
Savant Lake
Fowler
Miners Lake
Fowler L.
Bent Lake
Tawatinaw Lake
Caribou Lake
Nesbitt
Marion Lake
Ycliff
Robinson
Bungey Lake
Thedsher Lake
Singapore Lake
Sahara Lake
Wrench
Payne Lake
Gort Lake
Lake of Bays R.
Sturgeon
Davies Lake
Kinniwap Lake
Eady Lake
Fourbay Lake
White Falls
River
Paris Lake
North Arm
STURGEON LAKE
6th Baseline
LAKE OF BAYS
Handcuff Lake
Malt Lake
Gibraltar
Ten Mile Lake
Jumping Lake
Divided Lake
Kena Lake
LAKE OF BAYS BLOCK No. 8
Penassi Lake
Cobb Bay
Six Mile Lake
Granite Bay
Shiny Lake
Island Bay
Quest Lake
Wyatt Lake
Towers Lake
Whiterock Lake
STURGEON LAKE
MAP AREA
Ellipse
Crescent Lake
Watcomb Lake
Young Lake
Zn, Ag, Cu, Pb
Darkwater Lake
O'Briens Landing
Cu, Au, Ag
Cu, Mo
Mo, Cu
Watcomb
Hut Lake
Shorty L.
Pike Lake
Moss Lake
Cluster Lakes
Bigger Lake
Bell
BLOCK
Glitter Lake
Valora Lake
Lake
Clarkdon
Au
1" = 4 Miles

DDH QT-3 also intersected 0.21%Cu/12.7ft. No evidence of any additional diamond drilling was observed during the recent survey.

TOPOGRAPHY

The claim area has relatively low relief but has moderate outcrop exposure. Swampy areas are usually marked by alder and cedar bush with a moderate portion of the intervening areas being relatively open with spruce and labrador tea cover. The overburden, which consists of boulder/gravel till, varied from 8 to 19 feet in the three diamond drill holes that were drilled.

LINECUTTING

Approximately 80% of the claim area had been previously surveyed by Noranda Exploration in May 1975. The old grid was essentially overgrown in the areas covered by alder bush and could only be followed with difficulty in some of the open areas. In one or two instances an old picket was located with the picket labels still readable. This enabled us to label the new grid conformable to the previous Noranda grid thus allowing easy comparison of the previous data to the present survey.

Approximately 13 miles of line were re-cut and chained. The baseline and a tie line were established at an azimuth of 135^{o} with "wing-lines" being cut at 400 ft. intervals perpendicular to the baseline. All lines have station pickets at 100 ft. intervals.

GEOLOGY AND GEOPHYSICAL SURVEY

PURPOSE

Mapping of the Quest Lake area by Trowell (O.G.S.) in 1971-72 identified a spatially restricted lenticular to domical sequence of intermediate to felsic agglomerates and lapilli tuffs with minor py-po irregularly distributed throughout.

Previous work, in this area, by Selco, Noranda, and Rio Tinto (1970-76) indicated that an exhalite horizon composed of massive pyrrhotite carrying anomalous copper values, formed close to the top of this volcaniclastic debris which in itself carried fragmental po-py.

The purpose of the current survey is to obtain a relatively detailed geological "picture" of this geologically anomalous area.

The geological survey was conducted in conjunction with a VLF EM survey such that the VLF anomalies could be immediately investigated during the geological mapping and sampling program.

GEOLOGY SURVEY

A four man crew was responsible for mapping and sampling along the grid lines that were established at 400 ft. intervals over the claim group. Where the outcrop was sparse, the area was traversed at 200ft. intervals. The actual mapping was done by the party chief, and senior assistant employing aerial photos that had been enlarged to a scale of 1" = 400'. The two junior assistants helped strip outcrops and take rock samples.

The Quest Lake claim group is underlain by rocks of Early Precambrian (Archean) age and are overlain by unconsolidated Quaternary (0-25 MY) glacial and glaciofluvial deposits (Trowell 1976).

All the volcanic rock units strike northwest-southeast and are vertical or dip steeply to the north. Tops could be determined from pillow shapes and packing at several locations. The majority of top determinations indicated "tops" to the northeast. Foliation trends, within the map area, are quite consistent at 310^{0}-320^{0} with a vertical dip and generally were only exhibited toward the bottom of the Volcanic Breccia unit. There was no evidence of folding or faulting, within the map area.

The meta-volcanic rocks have undergone lower regional greenschist facies metamorphism.

Four major volcanic units traverse the claim group and have been intruded by younger Gabbro/Diorite sill-like intrusive bodies. These lithologic units are described as follows (from southwest to northeast):

ANDESITE FLOW (1a)

This unit traverses the southwest corner of the property along the north side of Stag Lake. It is a massive, fine grained, medium grey, non-magnetic andesite unit that contains no carbonate and little (Po) or no sulphides. Poorly developed pillows (up to 3 X 4'), pillows selvages (Breccia) and lava ribbons occur locally. It has been affected by regional greenschist facies metamorphic grade and contains weak chlorite, biotite and saussurite.

VOLCANIC BRECCIA/DEBRIS FLOW (1f)

A volcanic breccia overlies the forementioned andesite unit immediately to the northeast and varies in thickness from 900 to 1700 feet. Towards the centre of this assemblage a 150 to 500 foot band of massive andesite exists. It has been described as an unaltered, fg, massive, medium grey featureless unit that contains moderate (5-10%) carbonate, no magnetite and no sulphides. An occasional felsic clast has been reported towards the top of this band.

An "inter-volcanic breccia" bedded cherty tuff occurs in one exposure on line 48W at 3+50N. This 8 inch thick bedded tuff consists of light grey individual cherty bands that vary in thickness from 1mm to 4mm and are void of sulphides. It strikes 320^{0} and dips 82^{0} to the southwest. No top determinations were possible but are assumed to be to the northeast.

The volcanic breccia or debris flow consists of rhyolitic and andesitic fragments that occur in a dacitic to andesitic matrix.

Ash (<2mm) to block (>64mm) size light beige grey to creamish white, massive vesicular and locally pumaceous rhyolitic fragments comprise 10 to 70% (quite often 30-40%) of this assemblage. Some fragments occur as irregular "rags" that exhibit welding and others appear to be flow banded. Cherty fragments occur locally and tend to be angular and <3cm. These fragments generally tend to be angular to subrounded (to a lesser extent rounded) and an occasional clast is weakly to moderately sericitic. There are no sulphides within the rhyolite fragments.

A second population of fragments consist of fg, massive and vesicular andesite that comprises 0 to 20% of the unit and varies from ash to block size. The mafic fragments are also void of sulphides.

An occasional fragment of lapilli tuff has also been observed.

The matrix consists of a dark greenish grey, fine to coarse ash of dacitic to andesitic composition and is weakly to moderately chloritic. An occasional feldspar crystal and/or quartz eye was observed indicating that the matrix is locally partially comprised of crystal tuff. Up to 5% carbonate occurs locally but generally is rather minor. A zone of 1-2% Py-Po occurs SW of Club Lake and occurs as disseminated specks and blebs within the matrix. This assemblage is not noteably magnetic.

An occasional fragment appears to be enveloped by a thin lava skin ("onion skin").

There is no apparent pattern to the distribution of the various fragment types or any size differentiation.

At one or two locations the lapilli and ash size fragments appear to be aligned around larger blocks thus giving a flow appearance. Toward the lower or southwest half of the assemblage, the clast are weakly to locally moderately aligned parallel to the general strike of the lithologic units. In most other locations there is no preferred orientation to the fragments.

ANDESITE FLOW(1a)

The volcanic breccia/debris flow is overlain by a fg, massive, medium to dark grey andesite that exhibits flow structures such as pillows, pillow breccias, volcanic ribbon type flow structures and cooling ribs. The ribbon structures and pillows trend 315^{0} and have vertical dips. This unit characteristically contains: 3-5% minute (<1mm) feldspar phenocrysts, local disseminated biotite specks and clots, local weak carbonate, occasional quartz-carbonate filled vesicules, and is generally non-magnetic. It contains virtually no sulphides and has a thickness in the order of 1900 feet.

An area between L48W and L32W and up to 19N is noteably medium to greenish-beige grey due to moderate saussurite and sericite alteration.

An inter-andesite cherty tuff occurs in one exposure on line 48W at 15+50N. This band which strikes 310^{0} and dips vertically has a width of 7cm and consists of 5mm bands of cherty tuff interbanded with oxidized pyritic bands 1mm thick. It appears to pinch out before it is covered by Club Lake.

BASALT FLOW (1b)

The andesite is overlain to the northeast by a fg, dark greenish grey, massive basalt that exhibits flow structures such as: pillows, pillow breccias and poorly developed pillow selvages and lava ribbons. The bun shaped pillows (up to 2'X4') have a 315^{0} trend and the pillow selvages are often rimmed with vesicules. Hyaloclastic material (and occasional quartz globules) often oocur at pillow junctions. This basalt is non-magnetic, contains 3-10% ubiquitous carbonate and is void of sulphides.

GABBRO/DIORITE (3a, 3b)

The andesite and basalt have been intruded by sill-like bodies of gabbro/diorite that have been described as mg, medium grey, massive units consisting of 10-15% pyroxene laths up to 5mm in a matrix of feldspar and pyroxene. The most northerly intrusive contains a local olive green tinge due to minor olivine? and is locally moderately magnetic. The south intrusive is slightly more leucocratic and tends toward a dioritic composition. Both units contain a trace of disseminated pyrrhotite and virtually no carbonate.

GEOPHYSICAL SURVEY

A VLF-EM survey was carried out using a Crone RADEM instrument that measured the tilt angle of the resultant field in degrees and the horizontal field strength with an approximate normal value of 100. The entire grid was "read" using the Annapolis, Maryland transmitter at 21.4Khz. Readings were taken at 100ft. intervals using the procedure outlined in Appendix 1.

DISCUSSION OF RESULTS

Anomalies A and B

These two anomalies probably form one continuous anomaly between L48W and L32W. It approximately coincides with the narrow pyrite-pyrrhotite exhalites intersected by DDH QT-3. These anomalies have weak to moderate coincident field strengths.

Anomaly C

Anomaly C occurs east of anomaly B on lines 24W and 28W and approximately coincides with a 0.9ft massive pyrrhotite intersection in DDH H-6. This anomaly has a moderate coincident field strength.

Anomaly D

This cross-over occurs east of Club Lake from line 48W to line 36W. It has a moderate to strong coincident field strength only on line 48W and coincides with the pyritic inter-andesite cherty tuff that was located on the shore of Club Lake at 15+50N on Line 48W. This anomaly has not been previously drilled and therefore may be worth drilling.

Anomalies E,F,G,H,I and J.

These anomalies lie within areas of overburden and can not be explained by the recent geology survey nor have they been previously drilled.

Anomaly E has a moderate coincident field strength and may be an extension of anomaly A or possibly anomaly D.

Anomaly F is a two line response with moderate cross-overs and a moderate coincident field strength. It lies relatively close to an Input (AEM) response that was obtained by Selco in 1970.

Anomalies G,H,I and J are weak to moderate cross-overs but have weak or no field strength correlation. Anomalies H and I could possibly be an extension of anomaly D.

Anomaly K

This anomaly is a weak cross-over and has no conincident field strength response. It correlates with 1.1ft of pyrrhotite intersected by DDH H-7.

CONCLUSIONS

Several VLF anomalies have been located, some of which are known to coincide with interesting geology. Considering the anomalous geological environment, it is recommended that a more definitive geophysical survey, such as Dipole-Dipole I.P., be conducted before a drill program is laid out in order to test a number of the more interesting areas.

PERSONNEL

P.W.A. Severin, party chief and P. Lawnikanis, senior assistant, were responsible for the geological mapping and the VLF readings. They were assisted by J. Broad and M. Mente who were employed as junior assistants.

Respectfully submitted,

P.W.A. Severin

November 23, 1979

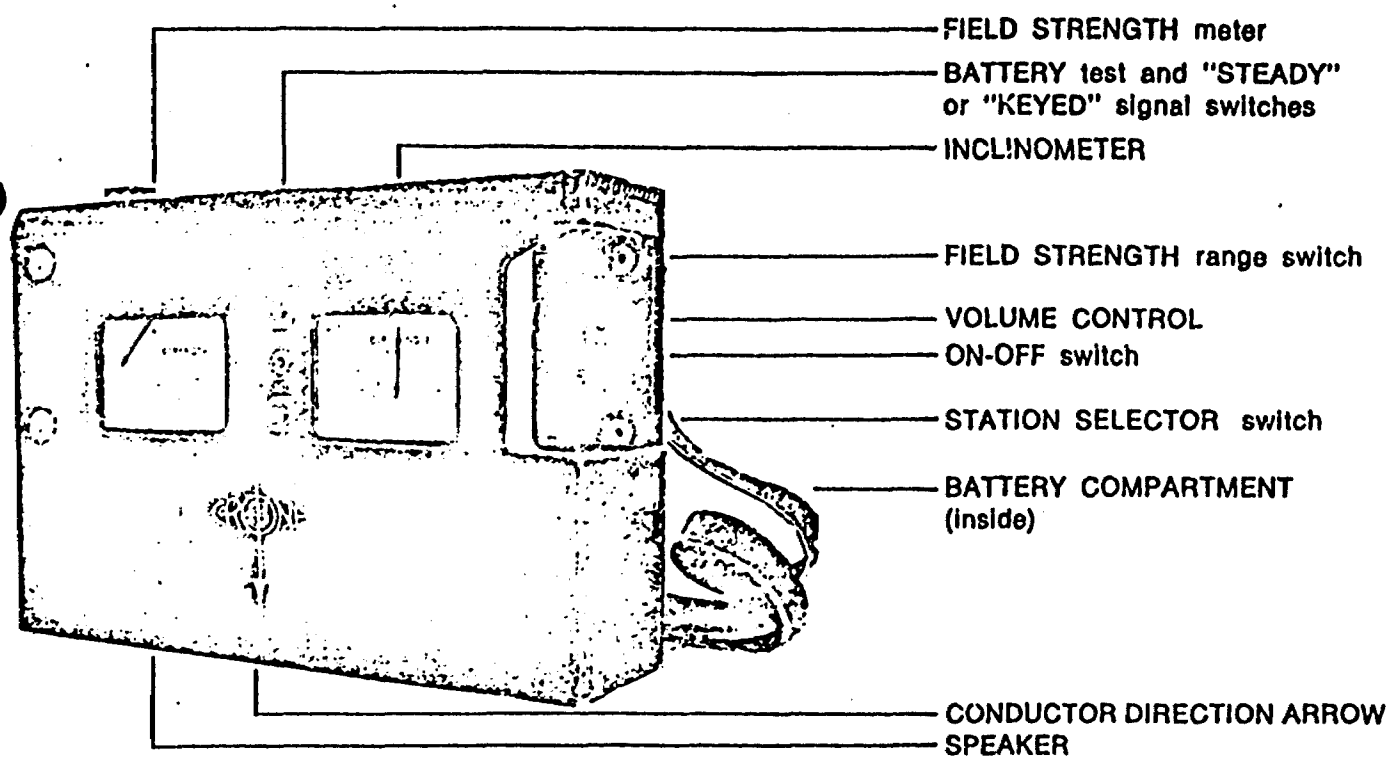
P.W.A. Severin, B.Sc.

Appendix I

CRONE GEOPHYSICS LIMITED

3607 WOLFEDALE ROAD,
MISSISSAUGA, ONTARIO,
CANADA.

Phone: (416) 270-0096



This is a rugged, simple to operate, ONE MAN EM unit. It can be used without line cutting and is thus ideally suited for GROUND LOCATION OF AIRBORNE CONDUCTORS and the CHECKING OUT OF MINERAL SHOWINGS. This instrument utilizes higher than normal EM frequencies and is capable of detecting DISSEMINATED SULPHIDE DEPOSITS and SMALL SULPHIDE BODIES. It accurately isolates BANDED CONDUCTORS and operates through areas of HIGH HYDRO NOISE. The method is capable of deep penetration but due to the high frequency used its penetration is limited in areas of clay and conductive overburden.

The DIP ANGLE measurement detects a conductor from a considerable distance and is used primarily for locating conductors. The FIELD STRENGTH measurement is used to define the shape and attitude of the conductor.

SPECIFICATIONS

Source of Primary Field: VLF Communication Stations 12 to 24 KHz

Number of Stations: 7 switch selectable

Stations Available: The seven standard stations are Cutler, Maine, 17.8; Seattle, Washington, 18.6; Collins, Colorado, 20.0; Annapolis, Md., 21.4; Panama, 24.0; Hawaii, 23.4; England, 16.0. Alternative stations which may be substituted are: Gorki, Russia, 17.1; Japan, 17.4; England, 19.6; Australia, NWC, 22.3 KHz.

Check that Station is Transmitting: Audible signal from speaker.

Parameters Measured and Means:

(1) DIP ANGLE in degrees, from the horizontal of the magnetic component of the VLF field. Detected by minimum on the field strength meter and read from an inclinometer with a range of ±80° and an accuracy of ±½°.

(2) Field Strength (total or horizontal component) of the magnetic component of the VLF field. Measured as a per cent of normal field strength established at a base station. Accuracy ±2% dependent on signal. Meter has two ranges: 0 — 300% and 0 — 600%. Switch for "keyed" or "F.S." (steady) signal.

(3) Out of Phase component of the magnetic field, perpendicular in direction to the resultant field, measured without sign, as a per cent of normal field strength. This is the minimum reading of the Field Strength meter obtained when measuring the dip angle. Accuracy ±2%.

Operating Temperature Range: −20° to +110° F.

Dimensions and Weight: 3.5″ × 7.5″ × 10.5″ — 6 lb.

Shipping: Foam lined wooden case — shipping wt. — 15 lb.

Batteries: 2 of 9 volt: Eveready 216, Burgess 2U6, Mallory M-1604

Average life expectancy — 3 weeks to 3 months dependent on amount of usage.

Units Available on a Rental or Purchase Basis.
Contract Services Available for Field Surveys.

CRONE GEOPHYSICS LIMITED

3607 WOLFEDALE ROAD
MISSISSAUGA, ONTARIO
CANADA

PHONE (416) 270-0096

INSTRUCTIONS FOR OPERATION OF THE

RADEM VLF-EM RECEIVER

(1) Transmitter Stations

The VLF Communication Broadcast stations are positioned throughout the world. At present, 12 of these stations broadcast steadily except for maintenance periods usually of 1/2 to 1/3 days per week. The RADEM receives any 7 of these stations with selection by means of a switch. The usable range of the stations varies widely with power and transmission conditions but is usually between 1000 and 5000 miles. Two types of signals are broadcast "keyed" (on and off) and "frequency shift" (FM). Frequency shift provides a steady signal and is most suitable for Field Strength measurements. When a "Keyed" signal is used the receiver must be switched to the keyed signal "K" position for Field Strength Measurements.

A station should be selected that is located in the same direction as the regional strike. If in doubt of the geological strike two orthogonal stations should be read.

(2) Field Measurements

(a) Dip Angle of Resultant Field

Technically the angle in degrees, from the horizontal, of the major axis of the polarization ellipse. This is the easiest measurement to make since it is not dependent on changes in signal strength. The dip angle measurement detects a conductor from a considerable distance - from several hundred to several thousand feet. Direct plotting of the dip angles often does not clearly define the shape or position of the conductor. If strong regional effects occur the conductor may not produce a cross-over and may be defined only by a sharp variation in dip angles.

Two methods are available to overcome this defect in the dip angle measurement: (1) Field Strength measurement and (2) treatment of the Dip Angle data by means of a simple process developed by D. C. Fraser and described in Geophysics Vol. 34, #6, December 1969.

(b) Field Strength Measurements

These measurements do not detect the conductor until they are almost above it. Thus they are independent of regional trends and accurately define the shape and boundries of the conductor. This is simply achieved by contouring the Field Strength readings. Either the Resultant Field Strength or Horizontal Component of the Field Strength are measured, usually the latter, since it is easier to read.

The Field Strength of a VLF station varies with time thus a base station must be established and drift corrections applied as in a magnetic survey. Drift is particularly rapid during sunrise and sunset (50% per hour) and reading is not advised during this period. The primary base station is usually located in a non conductive area where the dip angle is near "0" and the out-of-phase signal is also "0" - the Field Strength is set at 100 at this station and this is the Normal Field Strength standard for the survey.

(c) "Out-of-Phase" Field Strength Measurement

This is in effect the out of phase component perpendicular in direction to the resultant field. The measurement is without sign and is sensitive to very low orders of conductivity. It is simply the minimum reading of the Field Strength meter obtained when reading the Dip Angle. It is expressed in terms of percent of the normal Field Strength. It is not usually recorded unless very low orders of conductivity are of interest.

FIELD PROCEDURE:

(1) Make sure the "Normal" - "K" switch is in the normal position.

(2) Hold the RADEM with the meter faces horizontal. Rotate the instrument in a horizontal plane, by moving the body until a null is observed on the Field Strength meter. This aligns the base of the instrument in the direction of the VLF field and the operator will be facing in the direction of the transmitting station.

(3) Raise the instrument such that the meter faces are vertical and rock it back and forth until a minimum is obtained on the Field Strength meter (switch on 0-300 scale). This minimum is the"Out-of-Phase" reading. Holding the instrument at the minimum position read the inclinometer for the Dip Angle reading. Note that the arrow through the "o" of Crone points towards the conductor. If this is north then the inclinometer reads 17°N and the conductor is towards the north. This convention leaves no doubt as to where the conductor is located. The operator must be able to recognize between a true cross-over and a false cross-over and this convention is established to help simplify this matter.

(4) For a Horizontal Field Strength measurement hold the meter face horizontal and rotate this instrument in a horizontal plane until a maximum reading is obtained. This will be approximately in a direction at right angles to the operator. For a Resultant Field Strength measurement - this is the maximum Field Strength reading obtainable - and is obtained by holding the RADEM at right angles to the operator and inclined at the same angle as the dip angle.

(5) For a Field Strength reading with a "Keyed" VLF signal move the "Normal" - "K" switch to the "K" position. It must be returned to the "Normal" position for the dip angle measurement.

Since the Field Strength varies with time this reading must be tied to a base station with drift corrections applied similar to a magnetometer survey. If possible the primary base station should be established in a non-conductive area where the dip angle is near "0" with out of phase near "0" and where the volume control is adjusted such that the Field Strength reading is "100".

EXAMPLE OF FIELD SHEET

Station L 6+00W	Out of Phase-%	Dip Angle Degrees	Reading	Field Strength Time	Drift	Corr.	Remarks
10N-Base	2	0	100	9:00	0	100	
10+50N	2	0	100	.02	0	100	Lake
11N	0	2N	99	.04	-1	98	Lake
11+50N	0	6N	101	.06	-1	100	
12N	0	12N	102	.08	-2	100	Road
12+50N	4	22N	118	.10	-2	116	
13N	6	20N	185	.12	-2	187	
13+50N	6	8N	263	.14	-3	260	X'over
14 N	0	1S	247	.17	-3	245	
14+50N	0	12S	164	.20	-4	162	
/							
10N-Base			114	10:10	-14	100	

TRANSMITTER STATION SHUT DOWN TIMETABLE (All times Eastern Standard)

Monday	8:00 a.m. to 2:00 p.m.	Annapolis, Maryland
Tuesday	12:00 a.m. to 5:00 p.m.	Hawaii
Wednesday	7:00 a.m. to 1:00 p.m.	Balboa, Panama
Thursday	11:00 a.m. to 7:00 p.m.	Seattle, Washington
Friday	9:00 a.m. to 1:00 p.m.	Cutler, Maine

BATTERIES

For units up to #100 - 2 of 9 volt batteries required. For units above #100 - 1 only battery is required but plugs for 2 batteries are supplied for cold weather operation.

File________

Ontario

Ministry of Natural Resources

GEOPHYSICAL – GEOLOGICAL – GEOCHEMICAL TECHNICAL DATA STATEMENT

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) VLF-EM, GEOLOGICAL

Township or Area QUEST LAKE AREA

Claim Holder(s) Falconbridge Copper Limited

P.O. Box 40, Commerce Court West, Toronto

Survey Company Falconbridge Copper Limited

Author of Report P.W.A. Severin

Address of Author Suite 206, 2281 Portage Ave., Winnipeg

Covering Dates of Survey June-July 1979 (linecutting to office)

Total Miles of Line Cut 13.5 Miles or 21.6 km.

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	40
--Magnetometer	
--Radiometric	
--Other	
Geological	20
Geochemical	

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

Magnetometer____ Electromagnetic____ Radiometric____ (enter days per claim)

DATE: November 23, 1979 SIGNATURE: P.W.A. Severin
Author of Report or Agent

Res. Geol. L.D. Qualifications 2.256 / on file

Previous Surveys

File No.	Type	Date	Claim Holder

OFFICE USE ONLY

MINING CLAIMS TRAVERSED
List numerically
Geological

(prefix)	(number)
1/4 Pa	436780
✓	436781
✓	436782
3/4	436783
✓	436784
✓	436785
1/3	436786
✓	436787
1/4	436788
✓	436789
✓	436790
✓	436791
✓	436792
✓	436793
✓	436794
✓ Pa	436795

EM: full credits except for Pa 436783 only partly traversed 1/2 credits

TOTAL CLAIMS 16

If space insufficient, attach list

006

52G15NE0008 52G15NE0021A1 QUEST LAKE

GEOPHYSICAL TECHNICAL DATA

GROUND SURVEYS – If more than one survey, specify data for each type of survey

Number of Stations 614 Number of Readings 1228 (VLF)

Station interval 100 ft. Line spacing 400 ft.

Profile scale 0.25" = 10°

Contour interval

MAGNETIC

Instrument

Accuracy – Scale constant

Diurnal correction method

Base Station check-in interval (hours)

Base Station location and value

ELECTROMAGNETIC

Instrument Crone Radem

Coil configuration N/A

Coil separation N/A

Accuracy ± 1°; ± 5%

Method: ☒ Fixed transmitter ☐ Shoot back ☐ In line ☐ Parallel line

Frequency Annapolis, Maryland 21.4 Khz.
(specify V.L.F. station)

Parameters measured Dip Angle of the Resultant Field; Horizontal Field Strength

GRAVITY

Instrument

Scale constant

Corrections made

Base station value and location

Elevation accuracy

INDUCED POLARIZATION RESISTIVITY

Instrument

Method ☐ Time Domain ☐ Frequency Domain

Parameters – On time Frequency

– Off time Range

– Delay time

– Integration time

Power

Electrode array

Electrode spacing

Type of electrode

Ministry of Natural Resources
Ontario

Your file:

Our file: 2.3157

1980 08 22

Mr. Albert Hanson
Mining Recorder
Ministry of Natural Resources
Box 669, Court House
Sioux Lookout, Ontario
P0V 2T0

Dear Sir:

Re: Mining Claims Pa. 436780 et al. Quest Lake and Sixmile Lake
File 2.3157

The Geophysical (Electromagnetic) and Geological assessment work credits as listed with my Notice of Intent dated July 18, 1980 have been approved as of the above date.

Please inform the recorded holder of these mining claims and so indicate on your records.

Yours very truly,

E.F. Anderson
Director
Land Management Branch

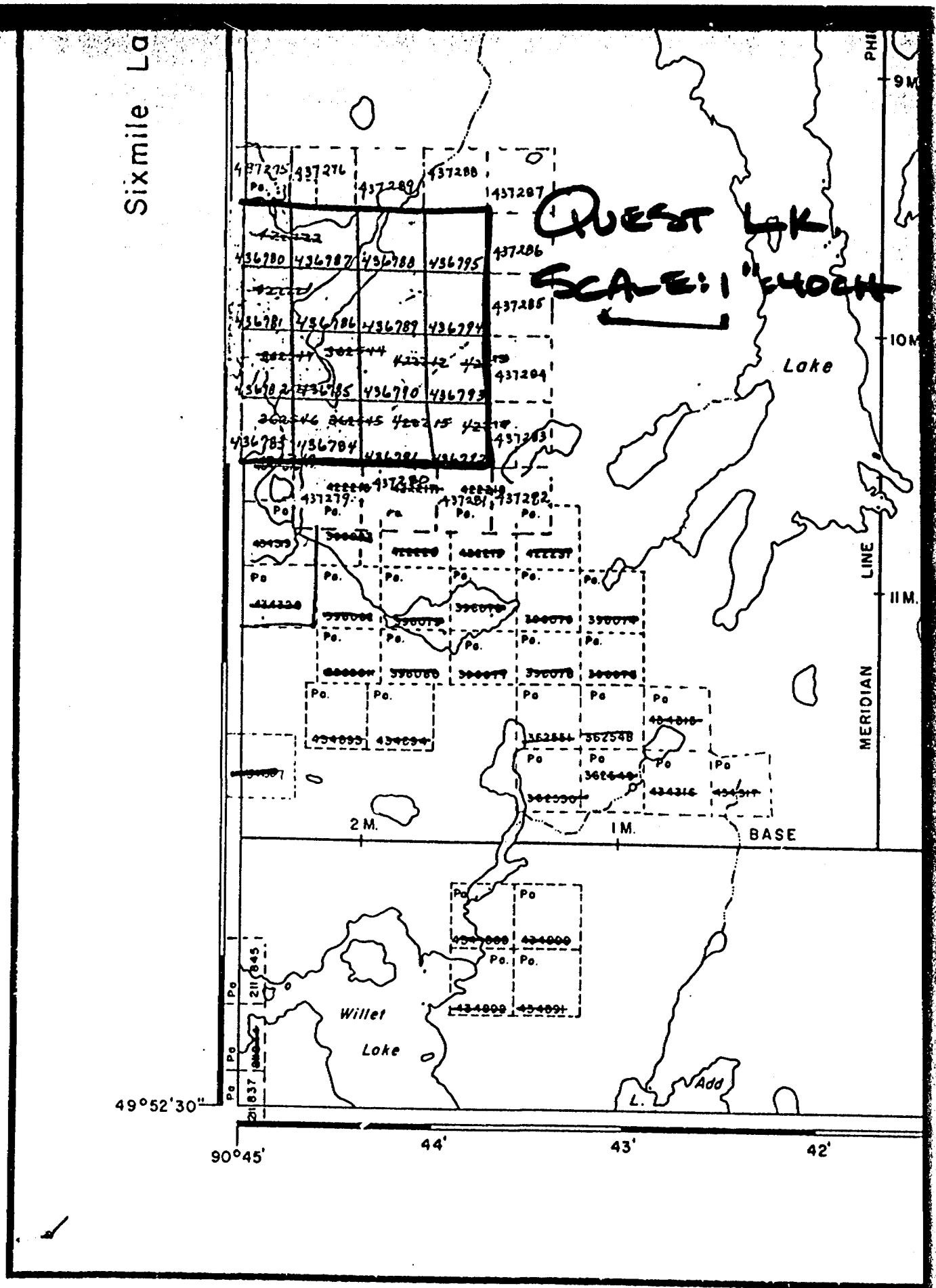
Whitney Block, Room 6450
Queen's Park
Toronto, Ontario
M7A 1W3
Phone: 416/965-1316

MINISTRY OF NATURAL RESOURCES
RECEIVED
AUG 25 1980
RESIDENT GEOLOGIST'S OFFICE
SIOUX LOOKOUT

FWM:ie

cc: Falconbridge Copper Limited
Toronto, Ontario

Resident Geologist
Sioux Lookout, Ontario


Sixmile La
QUEST LAK
SCALE: 1"=40CH
Lake
LINE
MERIDIAN
9M.
10M.
11M.
2M.
1M.
BASE
Willet
Loke
Add
L.
49°52'30"
90°45'
44'
43'
42'

SEE ACCOMPANYING

MAP(S) IDENTIFIED AS

526115NE-0021-A1-#1

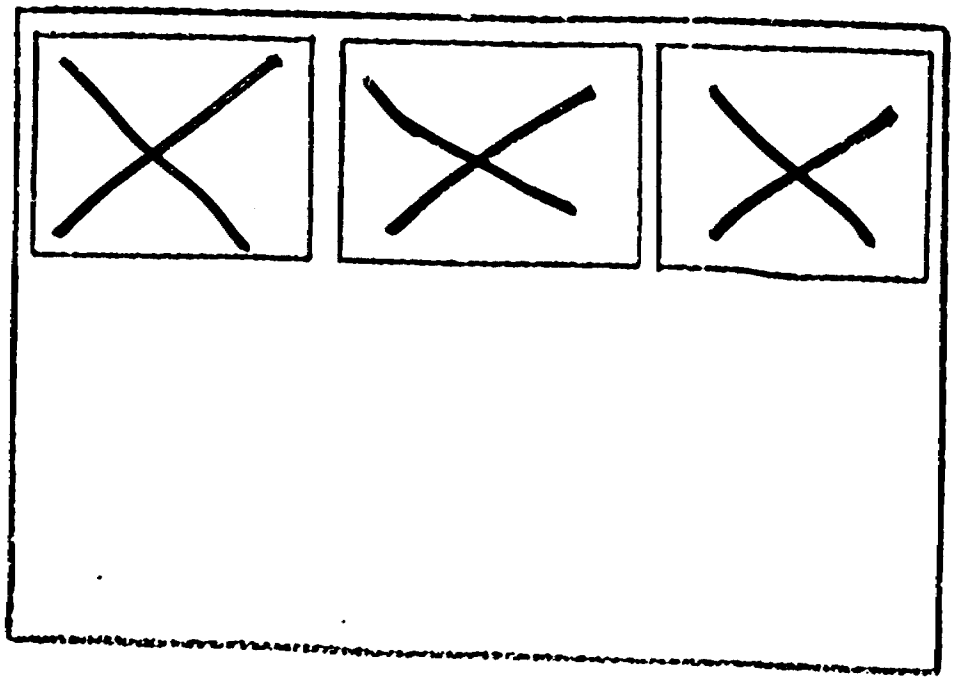
#2

#3

LOCATED IN THE MAP

CHANNEL IN THE FOLLOWIN(

SEQUENCE (X)



FALCONBRIDGE COPPER LIMITED
QUEST LAKE PROJECT 671
Geology Survey
1"= 400'
P.W.A.S
Aug. 1979

52G/15NE-0021-A1-#1

LEGEND

MAFIC INTRUSIVE ROCKS

- 3a Gabbro / Diorite
- 3b Gabbro

FELSIC TO INTERMEDIATE VOLCANIC ROCKS

- 2a Cherty Tuff
- 2b Quartz 'Eye' Tuff

INTERMEDIATE VOLCANIC ROCKS

- 1a Andesite
- 1d Andesite Tuff
- 1f Volcanic Breccia Debris Flow (Dacitic)
  - c Pillow Lava
  - e Crystal Tuff
  - g Pillow/ Flow Breccia
  - j Lapilli Size Fragments
  - k Agglomerate Size Frags.

BASIC VOLCANIC ROCKS

- 1b Basalt
  - c Pillow Lava
  - g Pillow/Flow Breccia
  - h Amygdaloidal

- Se Sericitized
- Sa Saussuritized
- Cc Carbonatized
- Ch Chlorite
- Bi Biotite
- Mt Magnetite
- Qz Quartz Veining
- Fl Float
- Py Pyrite
- Po Pyrrhotite

Pillows (Tops unknown, Top from pillow shape and packing)

Foliation

Bedding (Tops unknown, vertical, inclined)

Lava Ribbons / Poorly Defined Pillow Selvages

JASON LAKE

CLUB LAKE

STAG LAKE

TIE LINE

BASE LINE

10+00N

0+00

L60W

L40W

L20W

436780

436781

436782

436783

436784

436785

436786

436787

436788

436789

436790

436791

436792

436793

436794

436795

CAMP SITE

Mt Fe Form. 3% Py

QT-3

H-6

N (Astro.)

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Radem VLF EM Survey

Dip Angle of Resultant Field in Degrees

1"=400' STATION - Annapolis, Md. 21.4 KHZ

P.W.A.S. Aug. 1979

Left of grid line = NE Dips

Right of grid line = SW Dips

30°
20°
10°
0°
Vertical Scale

52G/15NE-0021-A1-2

L60W
L40W
L20W
TIE LINE
10+00N
BASE LINE
0+00
436780
436781
436782
436783
436784
436785
436786
436787
436788
436789
436790
436791
436792
436793
436794
436795
A
B
C
D
E
F
G
H
I
J
K
N

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Radem VLF EM Survey

Horizontal Field Strength (% of Normal)

1"= 400' STATION - Annapolis, Md. 21.4 KHZ P.W.A.S Aug. 1979

52G/15NE-0021-A1-#3

L60W

L40W

L20W

TIE LINE

10+00N

BASE LINE

0+00

436780

436781

436782

436783

436784

436785

436786

436787

436788

436789

436790

436791

436792

436793

436794

436795

N