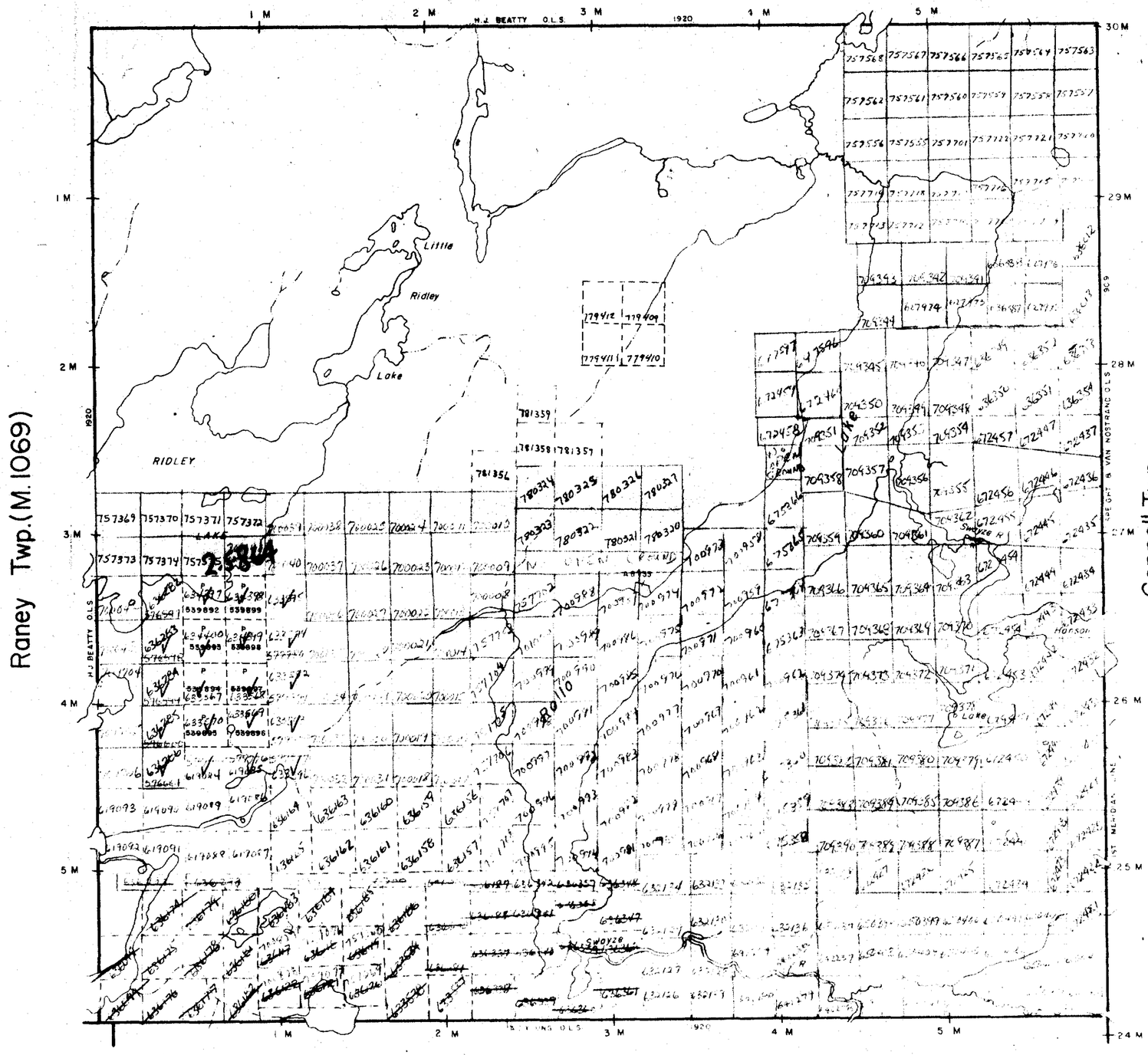
M.1082

Biggs Twp. (M.665)



THE TOWNSHIP
OF

ROLLO

DISTRICT OF
SUDBURY

PORCUPINE
MINING DIVISION

SCALE 1-INCH 40 CHAINS

LEGEND

PATENTED LAND	(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	
CANCELLED	

NOTES

400' SURFACE RIGHTS RESERVATION AROUND ALL LAKES AND RIVERS

DATE OF ISSUE
JAN 20 1984
Ministry of Natural Resources
TORONTO

PLAN NO M.1082

ONTARIO
MINISTRY OF NATURAL RESOURCES
SURVEYS AND MAPPING BRANCH

CARLSON MINES LTD.

RIDLEY LAKE PROPERTY

VLF-EM SURVEY

LEGEND:

——— IN PHASE

– – – QUADRATURE

EM CONDUCTOR

+40% 0 -40% EM RESPONSE SCALE.

Scale: 1 in = 200 ft.

Drawn by: Jill Breithaupt July, 1983

2.5864

RIDLEY LAKE

636282 634397 634398 633595 636283 634400 634399 633594 636284 633567 633568 633592 636285 633570 633569 633593 636286 619084 619085 633596

L36W L34W L32W L30W L28W L26W L24W L22W L20W L18W L16W L14W L12W L10W L8W L6W L4W L2W L0

L42W L40W L38W

10+00 N — 10+00 S — 20+00 S — 30+00 S — 40+00 S — 50+00 S

C.P. 1080' DUE EAST — C.P. 635' DUE EAST — C.P. 320' DUE EAST — C.P. 305' DUE WEST — C.P. 690' DUE WEST — C.P. 925' DUE WEST

WP — C.P.

A B C D E

RIDLEY LK

636282 634397 634398 633595 636283 634400 634399 633594 636284 633567 633568 633592 636285 633570 633569 633593 636286 619084 619085 633596

CLAIM MAP

Scale: 1" = ½ mile

Foleyet 101 Timmins 25 miles 144 CARLSON MINES CNR CPR

LOCATION MAP

Scale: 1" = 16 mile

RIDLEY LAKE

A5

A4

A3

A2

A1

CP 1010' DUE EAST

CP 630' DUE EAST

CP 305' DUE WEST

CP 325' DUE EAST

CP 670' DUE WEST

CP 910' DUE WEST

10+00 N

10+00 S

20+00 S

30+00 S

40+00 S

50+00 S

L42W L40W L38W L36W L34W L32W L30W L28W L26W L24W L22W L20W L18W L16W L14W L12W L10W L8W L6W L4W L2W L0W

CARLSON MINES LTD.

RIDLEY LAKE PROPERTY

TIME DOMAIN INDUCED POLARIZATION SURVEY (DIPOLE-DIPOLE SPREAD)

CHARGEABILITY (MILLISECONDS)

LEGEND:

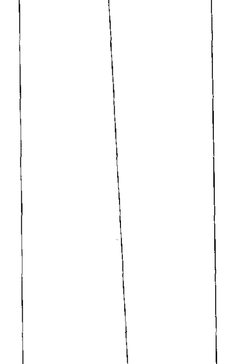
C_1, C_2: Current electrodes
P, P_1, P_2: Potential electrodes
a = 50 ft.

Survey direction

n1 n2

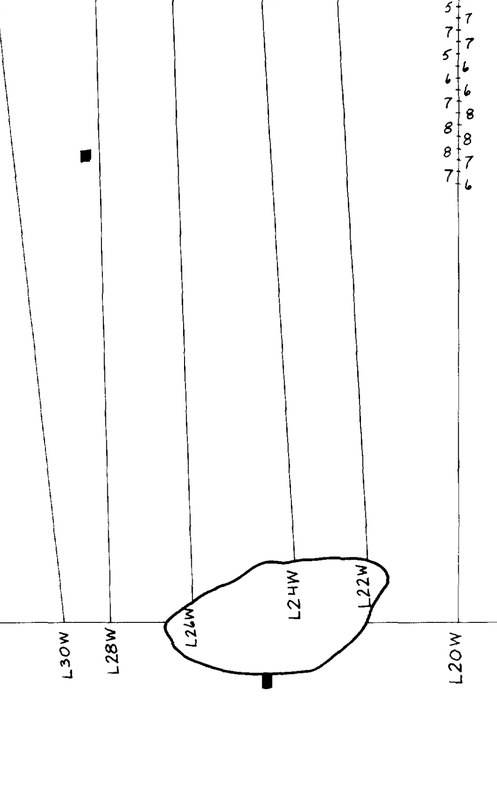
SCALE: 1 in = 200 ft.
DRAWN BY: J.B.

2.5864



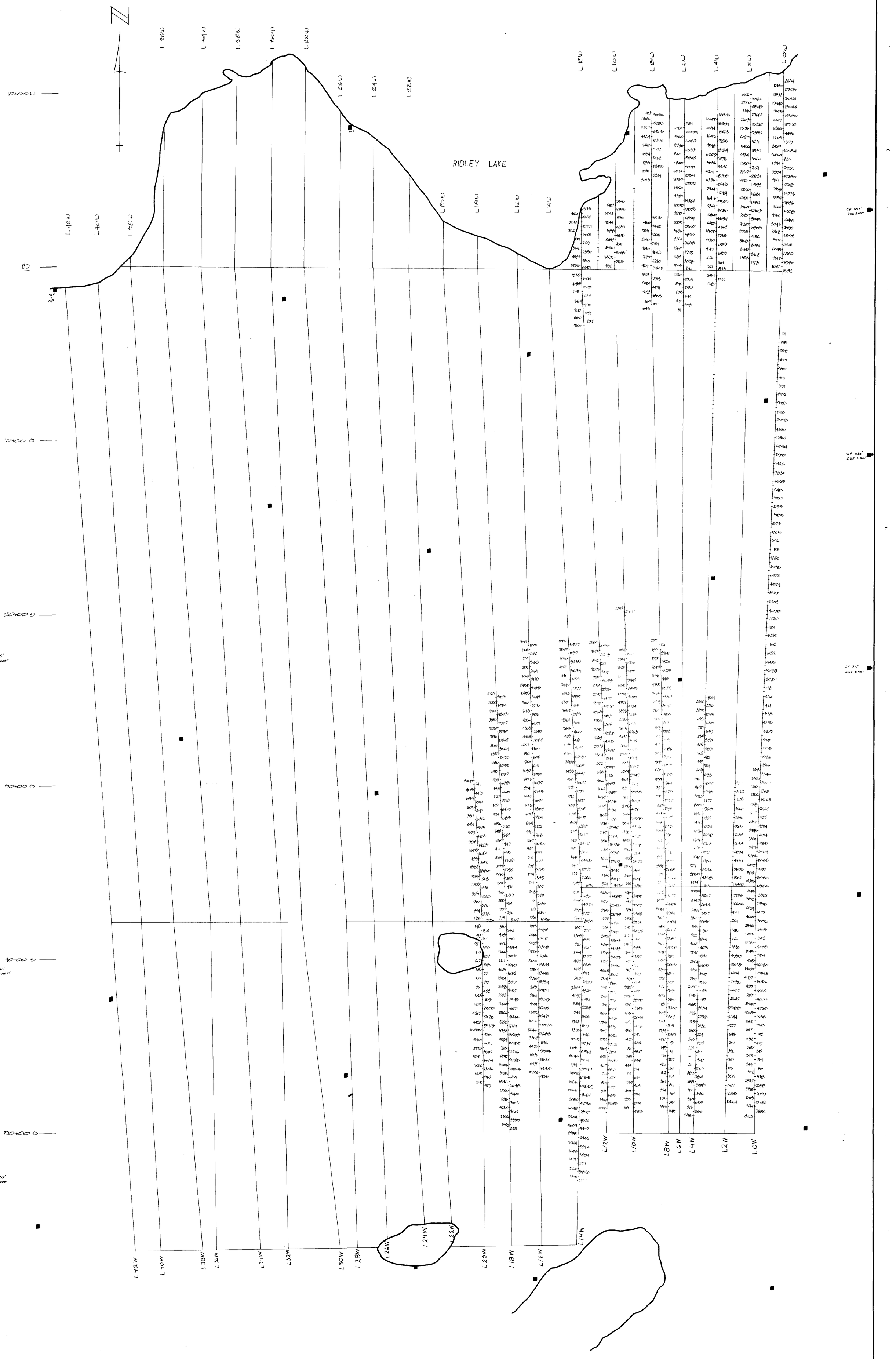
CLAIM MAP

Scale: 1" = 1/2 mi.



LOCATION MAP

Scale: 1" = 16 miles



CARLSON MINES LTD.

RIDLEY LAKE PROPERTY

TIME DOMAIN INDUCED POLARIZATION SURVEY (DIPOLE-DIPOLE)

APPARENT RESISTIVITY (OHM-METERS)

LEGEND:

C1,C2: Current electrodes
P1,P2: Potential electrodes
a=200 ft.

Survey direction

N1 N2

SCALE: 1in=200ft.

DRAWN BY: mb

Dec/1985

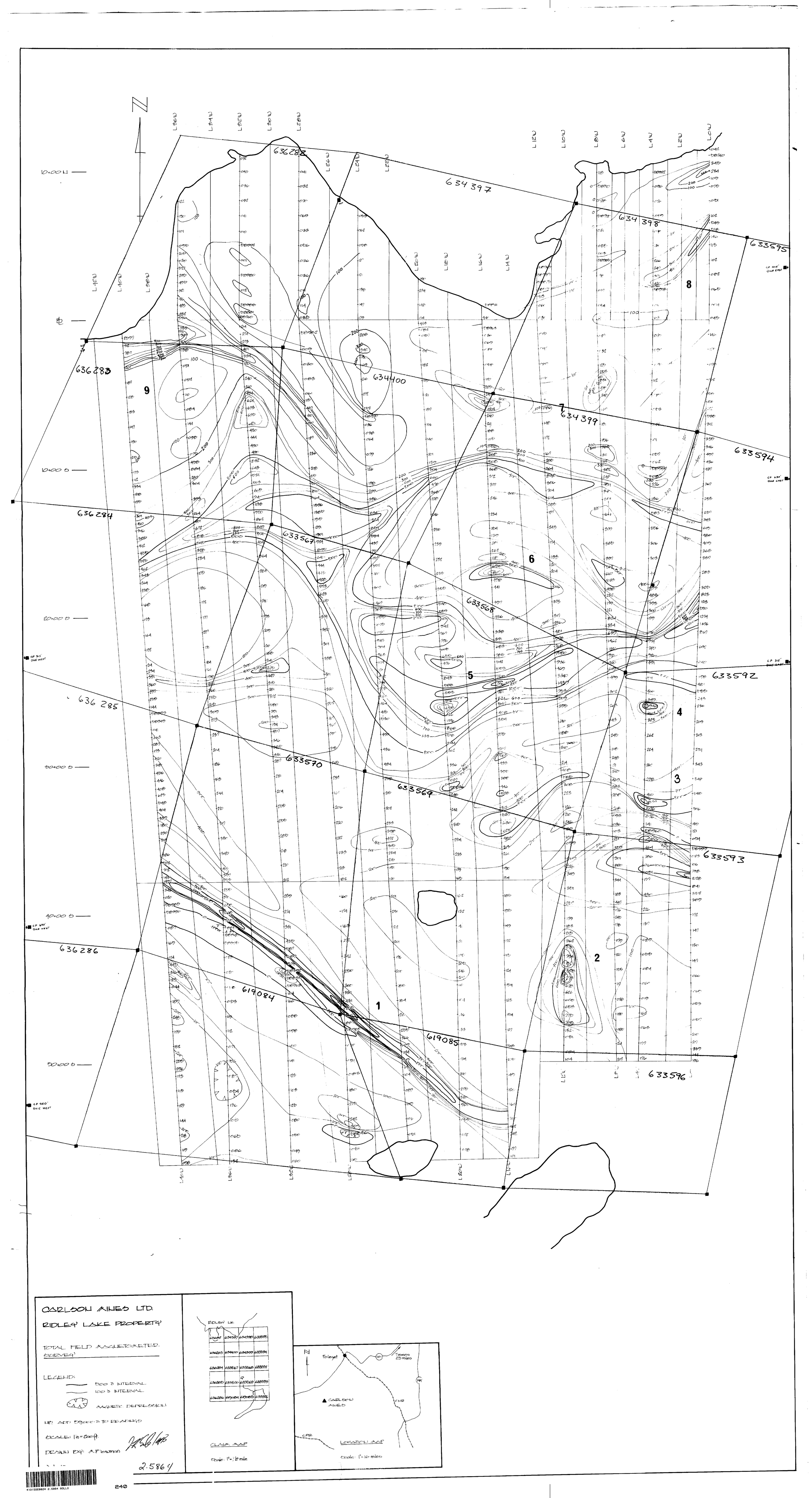
2.5864

KM MAP

Scale: 1"=1/8 mile

LOCATION MAP

Scale: 1"=16 miles


N
636288
634397
634398
633595
636283
634H00
634399
633594
636284
633567
633568
633592
636285
633570
633569
633593
636286
619084
619085
633596
CARLOON MINES LTD.
RIDLEY LAKE PROPERTY
TOTAL FIELD MAGNETOMETER SURVEY
LEGEND:
100 γ INTERVAL
MAGNETIC DEPRESSION
DRAWN BY: A.Pearman
2.5864
CLAIM MAP
scale: 1"=1/2 mile
LOCATION MAP
scale: 1"=10 miles
Timmins
CARLOON MINES
LEWITSKI LAKE

RIDLEY LAKE

636282 634397 634398 633595

636283 634400 634399 633594

636284 633567 633568 633592

636285 633570 633569 633593 633596

636286 619084 619085

GRID NORTH

SCALE 1" = 200'

AGUARA SHOWING

LAC LA KIARA

CLAIM MAP
Scale: 1" = 1/2 mile

KEY

- V_6 - ANDESITE
- V_7 - fine grained, dark mafic volcanics (BASALT)
- V_{7a} - coarse grained, dark mafic volcanics (BASALT)
- V_{7F} - mafic volcanics with felsitic fragments
- V_2 - RHYOLITE fine grained grey-green siliceous volcanic
- V_{10} - FELSIC TUFF Grey colored rock with quartz eyes
- C_1 - CHERT HORIZON
- D_1 - DIORITE - coarse grained, plagioclase, quartz, minor biotite mica
- A_1 - GABBRO - coarse grained & rich in ferro-magnesium minerals
- G_1 - GRANITE G_{1a} - Aplite
- Schistosity, vertical, inclined, foliation
- O.B. TRENCH, outcrop & trench in overburden
- O.B. WIDE TRENCH, outcrop & trench in overburden
- PILLOWS & QUESTIONABLE TOPS
- PITS
- OUTCROP, SCATTERED OUTCROP, SINGLE OUTCROP
- KNOWN CONTACT
- PROJECTED CONTACT
- W.P. POST & WITNESS POST
- SAMPLE LOCATION
- SWAMP
- * NOTE, DETAILED PLOTS OF SHOWING CONTAINED IN REPORT

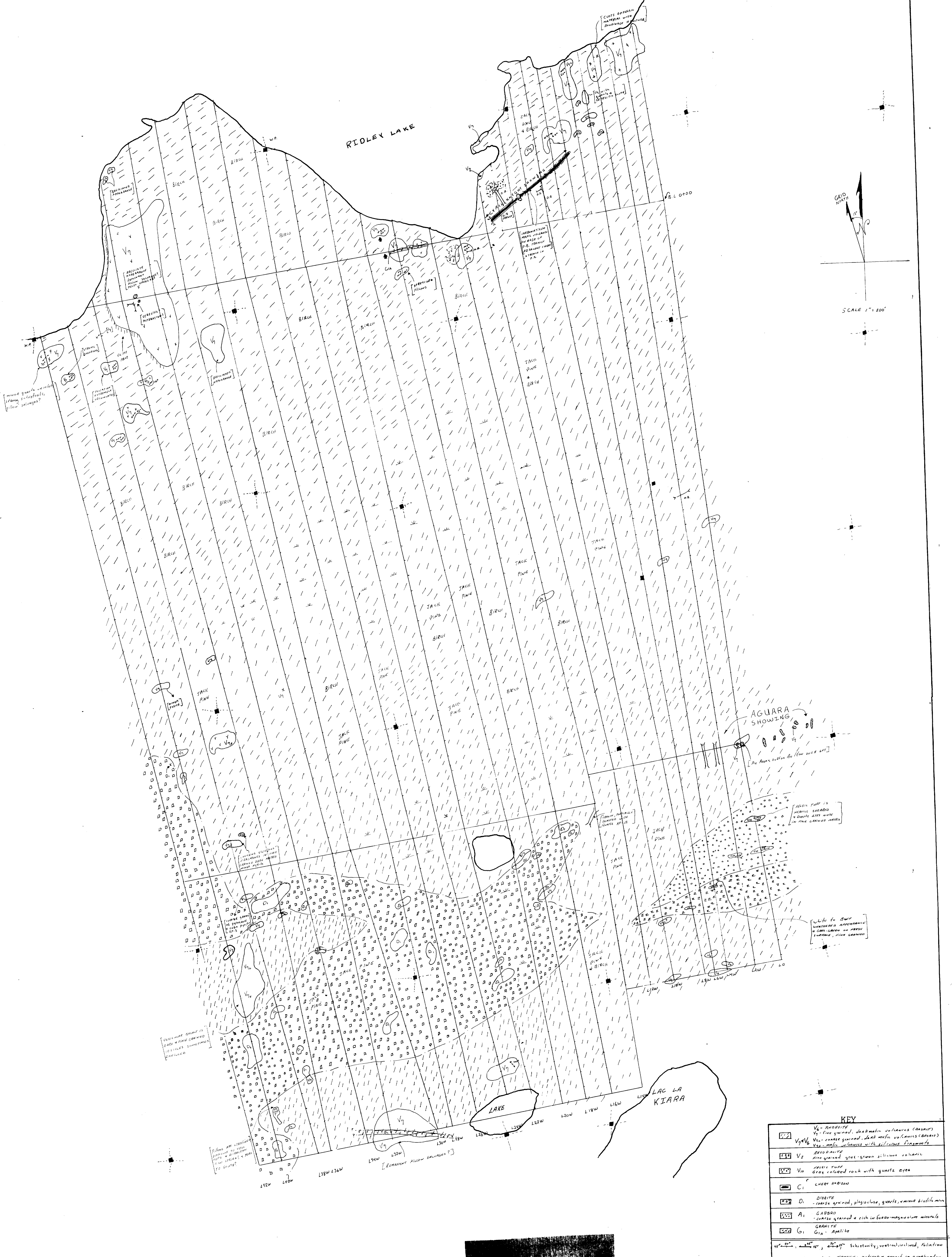
CARLSON MINES LTD

RIDLEY LAKE PROPERTY

GEOLOGY MAP

BY: J.K. FILO

FIGURE #5



CARLSON MINES LTD

RIDLEY LAKE PROPERTY

GEOLOGY MAP

BY: J.K. FILO

KEY

V_7 & V_6	V_6 - ANDESITE; V_7 - fine grained, dark mafic volcanics (BASALT); V_{7C} - coarse grained, dark mafic volcanics (BASALT); V_{7F} - mafic volcanics with siliceous fragments
V_2	RHYODACITE - Fine grained grey-green siliceous volcanic
V_{10}	FELSIC TUFF - Grey colored rock with quartz eyes
C_1	CHERT HORIZON
D_1	DIORITE - coarse grained, plagioclase, quartz, & minor biotite mica
A_1	GABBRO - coarse grained & rich in ferro-magnesium minerals
G_1	GRANITE; G_{1A} - Aplite

45° 90°, 45°, 90° 45° Schistosity; vertical, inclined, Foliation

O.B. TRENCH; outcrop & trench in overburden

O.B. WIDE TRENCH; outcrop & trench in overburden

PILLOWS & QUESTIONABLE TOPS

PITS

OUTCROP, SCATTERED OUTCROP, SINGLE OUTCROP

KNOWN CONTACT

PROJECTED CONTACT

W.P., POST & WITNESS POST

KF-31, SAMPLE LOCATION

SWAMP

* NOTE, DETAILED PLOTS OF SHOWING CONTAINED IN REPORT

FIGURE #5

2.5864

410155E0024 2.5864 ROLLO

260

010

GEOPHYSICAL REPORT
on the
CARLSON MINES LTD.

RIDLEY LAKE PROPERTY

ROLLO TOWNSHIP SUDBURY MINING DIVISION, ONTARIO

July, 1983

Mark Bowman

Rollo 2.5472

TABLE OF CONTENTS

INTRODUCTION

A total field magnetometer, VLF-EM and time-domain induced polarization survey was performed on the Carlson Mines Ltd. Ridley Lake property from May 24 to June 29, 1983.

The surveys were an attempt to define regions of sulphide mineralization believed to be associated with gold deposits in the region.

Survey techniques, results and recommendations for further work are discussed in the following text.

LOCATION AND ACCESS

The Carlson Mines Ltd. Ridley Lake property consists of twenty (20) mining claims numbered as follows:

633593 to 633596 inclusive
633567 to 633570 inclusive
636282 to 636286 inclusive
634397 to 634400 inclusive
619084 to 619085

The claims are located on south east Ridley Lake in Rollo Township, Sudbury Mining Division, situated approximately thirty-five (35) miles north-northeast of Chapleau, Ontario.

Access to the property is by float plane from Ivanhoe Park, located approximately sixty (60) miles east of Chapleau, Ontario.

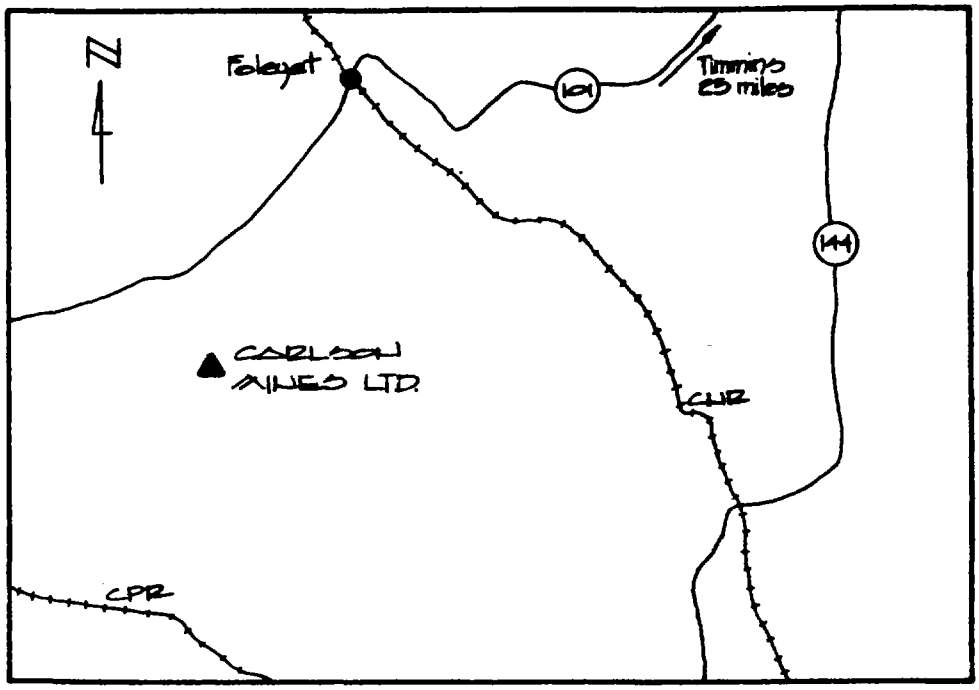


Fig. 1 LOCATION MAP
Scale: 1" = 16 miles.

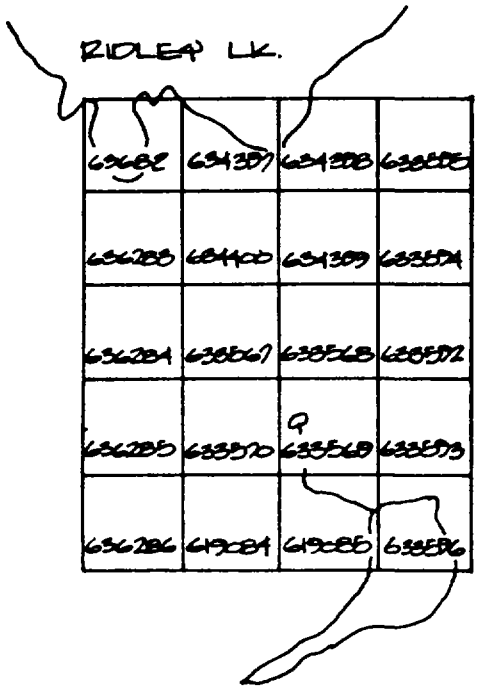


Fig. 2 CLAIM MAP
Scale: 1" = ½ mile

SURVEY PARAMETERS

Grid Description

An approximately east-west baseline along the north of the Carlson Mines Ltd. property was cut. Crosslines were cut on 200 feet centers along the baseline, and extended to the property boundaries. Stations were located at 100 feet intervals along the crosslines.

Approximately 27 line miles were cut and chained for the magnetometer and coinciding VLF-EM survey.

VLF-EM Surveys

Approximately 13 line miles were surveyed with a Geonics EM-16 VLF Electromagnetic unit at 100 feet interval stations along approximatley north-south crosslines. The transmission source was Cutler, Maine, transmitting at 17.8 KHz.

Survey results were recorded and are presented here in Fig. 3.

Proton Magnetometer Survey

Approximately 13 line miles were surveyed with a McPhar model GP-70 magnetometer to determine total magnetic field strength at 100 ft. stations along the crosslines. Station intervals were reduced to 50 and 25 ft. in areas of high magnetic gradient.

Survey results were recorded and are presented here as a series of isomagnetic contours (100 gamma intervals) superimposed on a map of corrected magnetic values in Fig. 4.

Time-Domain Induced Polarization Survey

Approximately 6 line miles were surveyed with a Phoenix Geophysics Limited IPT-1 IP transmitter and Crone Geophysical Company Newmont Type N-IV IP receiver to determine apparent resistivity and chargeability.

A dipole-dipole electrode array was used with an "a" spacing of 50 feet, with readings taken at "n" spacings 1 and 2. A two seconds on, two seconds off transmission cycle was used.

Survey results (chargeability and resistivity values) were recorded and are presented here in Fig. 5 and 6.

GENERAL GEOLOGY of the SWAYZE GREENSTONE BELT

The Ridley Lake property lies within the Swayze Greenstone Belt. This belt is composed of folded Archean metavolcanics and metasediments. The metavolcanics can be broken down into two groups:

1) mafic to intermediate volcanics, composed primarily of metamorphosed basalts and andesites

2) felsic to intermediate, composed in part of volcanics of dacite to andesitic composition, and in part of more silicious varieties of rhyodacite and rhyolite.

Numerous sill and plug-like intrusions have intruded both the metavolcanics and metasediments. These intrusions range in composition from felsic to mafic.

Within the metavolcanic-meta sedimentary sequence the general metamorphic rank is greenschist facies. Metamorphic aureoles are adjacent to the above intrusive masses.

The major faults in the Swayze belt are oriented in a north, northeast, and northwest direction.

(O.D.M. Geological Compilation Map 2221)

PROPERTY GEOLOGY

A limited amount of outcrop exists on the Ridley Lake property. Therefore, much of the geological interpretation is somewhat conjectural. The rocks underlying this claim group are mainly intercalated mafic and felsic metavolcanics. The mafic metavolcanics which cover the majority of this property are compositionally andesites and basalts. These rocks are generally medium to fine grained, and dark grey or black in color. Variations in color and texture are a result of mineralogical changes caused by metamorphic effects, or effects due to shearing or original differences in texture. The only structures noted in the mafic units were pillows, crmygladaids, and structures caused by metamorphism and shearing.

The felsic volcanics are limited to the extreme northeast and southeast corners of the group. Included within the felsic volcanic group are felsic flows (rhyodacite), chert, and a felsic tuff.

The rhyodacite unit is light grey-green in color, fine grained, silicious, and weathers to light grey or white. This unit is well foliated.

The felsic tuff is grey in color and contains large quartz eyes in a fine grained matrix. This unit weathers to a light grey color and it is well foliated.

The chert horizon in the northeast corner of the property is bounded by carbonatized mafic volcanics. This chert unit is very silicious, white in color, and it has a sugary texture. A known zone of mineralization is associated with this particular chert unit. This zone will be described in more detail within the economic geology section of this report.

Numerous intrusions in the form of dikes, pods, and irregular stocks intrude the metavolcanic sequence. These intrusives range in composition from felsic to mafic.

The major intrusive on this property is a large diorite stock which covers most of the southwest corner of the property. This intrusive is a typical diorite which is composed of medium grained anhedral phenocrysts of plagioclase feldspar, quartz and biotite mica. "1

"1 geological report on Ridley Lake Prospect in Rollo Township, Sudbury Mining Division for Carlson Mines Ltd. J.K. Filo, 1983.

INSTRUMENTATION

Proton Precession Magnetometer

The proton (or nuclear precession) magnetometer utilizes the precession of spinning protons in a sample of hydrocarbon liquid to measure total magnetic intensity. The protons, or hydrogen nucleii, within the sample are polarized normal to the terrestrial field by means of a current through a surrounding coil. Upon sudden removal of the polarizing field, the protons precess about the direction of the earth's magnetic field at an angular velocity (the Larmar precession frequency) proportional to the magnetic field strength. The precessing protons, being moving charges, induce a voltage in the same coil used to polarize them, which is measured by a digital counter to obtain the Larmar precession frequency. The total magnetic field "F" is then determined from the relation.

$$F = \omega / \gamma_p$$

Where ω = Larmar precession frequence
γ_p = Gyrometric ratio of the proton (ratio of its magnetic moment to its spin angular momentum)

The advantages of the proton magnetometer over other types include its high sensitivity, its lack of mechanical parts in its detector element, and the fact that it has no orientation or levelling requirements.

The McPhar GP-70 proton magnetometer, the model used for this magnetic survey, measures the absolute magnitude of the total magnetic field within the range of 20,000 to 100,000 gammas, to an absolute accuracy of ± 1 gamma. Additional instrument specifications are presented in Appendix I.

VLF-Electromagnetic Unit

The VLF-EM method utilizes the worldwide network of high-powered VLF (very low frequency) transmission stations used for air and marine navigation. The VLF antenna is effectively a grounded vertical wire several hundred feet high, emitting a near vertical electric field. The large power output of the stations (500 - 1000 KW), along with minimal attenuation, make it possible to use VLF transmitters as EM sources at distance of 2000 - 3000 miles. At these distances it is reasonable to consider the magnetic field as being uniform over areas of up to a square mile of ground surface.

When the primary horizontal magnetic field encounters conductive sub-surface bodies, secondary fields are induced. The VLF receiver measures the vertical component of the resulting secondary fields, determining tilt angle and quadrature component by means of two mutually perpendicular coils wound on ferrite cores. That is, if the secondary signals are small in comparison to the primary field, the mechanical tilt angle is an accurate measure of the vertical real-component, and the compensation $\pi/2$-signal from the horizontal coil is a measure of the quadrative vertical signal.

The advantages of the VLF-EM include its relative ease and low cost of operation. Although minimal interpretation of anomaly depth, depth extent, and dip angle is possible, due largely to the lack of control over the primary field direction with respect to conductor strike, the VLF system provides a usually reliable method of defining the conductor strike and extent.

The Geonics EM-16 was used in the VLF-EM survey of the Carlson Mines Ltd., Ridley Lake property, specifications for which are presented in Appendix 1.

The transmission station used was Cutler, Maine, transmitting at 17.8 KHz.

TIME-DOMAIN INDUCED POLARIZATION UNIT

The induced polarization (IP) method involves the abrupt interruption of an artificial current source, introduced into the ground through point electrodes (current electrodes). The resulting potential measured in the vicinity of the induced current flow generally does not drop to zero instantaneously but decays relatively slowly following an initial large decrease from the original steady state value (V_c). The decay time may range from the order of seconds to minutes.

Time-domain IP measures the decay voltage as a function of time.

The voltage decay curve is a result of energy storage during the time of the original induced current flow. The energy storage is predominantly in the form of chemical energy, resulting from a.) membrane or electrolytic polarization and b.) electrode polarization.

Membrane polarization is a result of the variations in the mobility of ions in fluids within the rock structure and therefore may occur in rocks not containing metallic minerals. Undistinguishable from electrode polarization, it constitutes the background or normal IP effect providing a level of geologic noise varying with location.

Electrode polarization results from variations between ionic and electronic conduction in the presence of metallic minerals. Minerals which are electronic conductors exhibit electrode polarization, including most sulphides and some oxides.

The magnitude of electrode polarization is dependant on the current source and the nature of the medium. It varies with the mineral concentration, porosity and fluid content of the rock. Because the IP method is a surface phenomenon, disseminated mineralization generally results in strong IP response.

A Phoenix Geophysics Ltd. IP transmitter and Crone Geophysical Co. IP receiver was used for the Carlson Mines Ltd., Ridley Lake survey, specifications for which are presented in Appendix I. Voltage, current and chargeability were read directly from the transmitter and receiver. Apparent resistivity (ρ_a), being dependant upon the electrode array was determined by following calculation for evenly spaced dipole-dipole spreads:

$$\rho_a = 6\pi a \frac{\Delta V}{I}$$

where ΔV=potential difference
I=current
a=electrode "a" spacing =50 ft.

INTERPRETATION

Total Field Magnetometer Survey

Results indicate an E-W and NW-SE magnetic trend with several distinct relatively strong magnetic anomalies distributed over the property.

Magnetic backgound was found to be slightly in excess of 59,000 gammas.

Magnetic Anomaly 1: exhibits a well defined strong magnetic high extending NW from L40W to L16W (approximately 3000 feet). The contour pattern evident in Fig. 3 suggests a sheet-like structure (dyke) of near vertical dip. Course half-width analysis indicates a depth of approximately 30 to 40 feet.

No directly corresponding VLF-EM conductor is evident, suggesting a possible diabase dyke.

Magnetic Anomaly 2: A moderate magnetic anomaly centered at station 45+00S on line 12W. Depth is estimated at 150 feet.

Moderate to low resistivity with no corresponding chargeability or VLF-EM response tends to suggest a diabase intrusive.

Magnetic Anomaly 3: consists of a relatively strong magnetic high centered at station 36+00S, striking approximately east-west from lines 0 to 16W.

Moderate to high resistivities and chargeabilities evident, with no VLF-EM correspondance, suggests a mafic volcanic (basalt) source.

Magnetic Anomaly 4: shows a strong localized magnetic high on line 4W at station 26+00S.

Moderate to low resistivity, relatively high chargeability and a strong VLF-EM response are seen to coincide with the magnetic anomaly, indicating a possible mafic volcanic (basalt) source with associated sulphides.

Magnetic Anomaly 5: located at station 24+00S on lines 0 to 20W the anomaly is a strong magnetic high of large extent.

Correlating moderate to high resistivity with a moderately low chargeability response and no coinciding VLF-EM conductor evident, the magnetic anomaly appears to be a result of mafic volcanics (basalt) at shallow depth.

Magnetic Anomaly 6: a medium to low strength magnetic high centered at station 17+00S on line 16W.

A weak VLF-EM conductor, though probably an overburden source coincides with magnetic anomaly. No IP data is available for this area. The magnetic response may be due to mafic volcanics with possible associated sulphides.

Magnetic Anomaly 7" two localized moderate magnetic highs are centered at station 5+00S on lines 8W and 16W.

Similar in nature to Magnetic Anomaly 6, a weak coinciding VLF-EM conductor exists, though probably an overburden response. Again, no IP data is available for this area. This magnetic anomaly may also be attributed to basalts with possible associated sulphides.

Magnetic Anomaly 8: a moderate magnetic high located at the northeast corner of the property (Cyril Knight Showing). The anomaly strikes NE-SW for approximately 700 feet.

High resistivity with high chargeability, showing no coinciding VLF-EM response tends to suggest mafic volcanics (basalt) hosting disseminated sulphides (pyrite, as documented in "Geology Report on the Ridley Lake Prospect in Rollo Township, Sudbury Mining Division for Carlson Mines Ltd.";) (June 30, 1983; J.K. Filo).

Magnetic Anomaly 9: a strong anomaly striking NW-SE from the baseline on line 42W, extending approximately 1000 feet at shallow depth.

With no correlating VLF-EM response and no IP data available for this area, the magnetic anomaly may be attributed to mafic volcanics.

VLF-EM SURVEY

Five predominent conductive zones are apparent from the accompanying VLF-EM profile map (Fig. 3.), defining a general E-W trend.

Conductor "A" Striking east-west from line 42W to 24W at station 22+00S, Conductor "A" shows strong in-phase response with negative quadrature, suggesting a bedrock source. Weak magnetic correlation with similar trend may indicate a contact zone (south boundary of basalts). No IP data is available for this area.

Conductor "B" Located just south of the baseline between lines 36W and 24W, Conductor "B" shows moderate to weak in-phase response. The nature of the quadrature profile and the absence of coinciding magnetic response tends to suggest an overburden source.

Conductor "C" Shows a very strong in-phase response of limited extent, striking east-west in the southeast corner of the property. The quadrature profile however appears relatively flat.

High chargeability, low resistivity and minimal magnetic response tends to suggest this to be an argillitic shear zone (graphite) with possible associated disseminated sulphides.

Conductor "D" A strong in-phase conductor at station 26+00S on lines 0 to 12W, striking east-west.

Moderate resistivity, relatively strong chargeability and moderate to high magnetic response indicate possible sulphides. Slightly positive quadrature profiles suggest conductive overburden contribution.

Conductor "E" Located just south of the baseline from line 0 to line 12W, Conductor "E" shows moderate to strong in-phase response. Minimal magnetic correlation is evident.

A positive quadrature profile indicates a surface (overburden) conductor.

INDUCED POLARIZATION SURVEY

IP Anomaly "A1": Located in the south-east corner of the property, the anomaly shows very strong chargeability response with low resistivity and strong coinciding in-phase VLF-EM conductor. Magnetic response is minimal.

Probable causation is a graphite shear zone with possible associated sulphide dissemination.

IP Anomaly "A2": Centered on stations 36+00S, striking east-west from line 0 to 14W, IP Anomaly "A2" exhibits moderate to high chargeability values with coinciding high resistities. No corresponding VLF-EM conductor is evident.

A corresponding magnetic low bounded by magnetic highs immediately to the north and south exists.

The Ip anomaly appears to be a result of disseminated sulphide (pyrite, as documented in "Geology Report on the Ridley Lake Prospect in Rollo Township, Sudbury Mining Division for Carlson Mines Ltd.") (June 30, 1983; J.K. Filo) in a basalt host rock.

IP Anomaly "A3": Striking SW-NE between station 29+00S on line 10W and station 25+00S on line 0, the IP anomaly exhibits moderate to high chargeability with moderate to high resistivity. A strong in-phase VLF-EM conductor and magnetic high of similar trend suggests the presence of sulphides in a basalt host rock.

IP Anomaly "A4": Striking SW-NE between lines 4W to 20W, IP Anomaly "A4" shows very strong chargeability readings with moderate to low resistivity. A high magnetic anomaly immediately to the north with parallel trend exists. No corresponding VLF-EM conductor exists.

Possible causation is a zone of disseminated sulphides (possibly pyrite).

IP Anomaly "A5": A broad zone of high chargeability and coinciding high resistivities is located in the northeast corner of the property north of the baseline (Cyril Knight Showing). A corresponding magnetic high follows the same strike. No VLF-EM conductor is evident.

These results suggest a zone of disseminated sulphides (pyrite) in a basalt host rock.

CONCLUSIONS AND RECOMMENDATIONS

Several significant magnetic, VLF-EM and induced polarization anomalies have been outlined by the geophysical survey of Carlson Mines Ltd., Ridley Lake property in May and June, 1983. Upon initial examination, several coinciding anomalies are evident and appear to be indicative of disseminated sulphide zones, a favourable environment for gold deposits in the region. The most significant of these zones include IP anomalies "A2","A3", "A4" and "A5" (and the corresponding VLF-EM and/or magnetic anomalies).

It is recommended that upon final compilation of results of an overburden stripping program in progress at the time of this writing the above mentioned IP anomalies (noteably "A4" and "A5") be tested by a diamond drill program.

Magnetic anomaly 1 may be further investigated by a limited IP survey as described below to test for the presence of disseminated sulphides.

IP survey: Line 24W, station 40+00S to 55+00S
Line 32W, station 38+00S to 55+00S

REFERENCES

-Breiner, S. (1973). Applications Manual Portable Magnetometers GeoMetrics.

-Filo, J.K. (1983). Geological Report on the Ridley Lake Prospect in Rollo Township, Sudbury Mining Division for Carlson Mines Ltd.

-Telfors, W.M., Geldart, P.P. Sheriff, R.E. and Keys, D.A. (1976). Applied Geophysics, Cambridge University Press.

-Thurston, P.C., and assoc., (1974). Chapleau-Foleyet Geological Compilation Series (Map 2221) Ontario Division of Mines.

CERTIFICATE

I, Mark F. Bouman of Montreal, Quebec, hereby certify that:

1) I hold a Bachelor of Science Degree in Solid Earth Geophysics from McGill University, having graduated in December 1982.

2) I have based conclusions and recommendations contained in this report on knowledge of the area, my previous experience, and on results of field work conducted on the property

3) I hold no interest, directly or indirectly in this property other than professional fees, nor do I expect to receive any interest in the property or in Ingamar Explorations Limited, or any of its subsidiary companies.

Mark F. Bouman, B.Sc.

APPENDIX I

McPHAR

GP-70 Proton Magnetometer

Measures absolute magnitude of total magnetic field

1 gamma sensitivity.

10 scale ranges: 20,000 to 100,000 gammas

Digital readout with long life, light emitting diodes.

Noise cancelling toroidal sensor.

Wide operating temperature range.

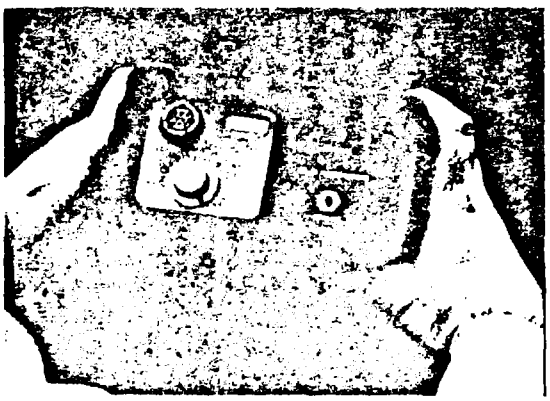
Model GP-70 is a reliable, light weight, proton magnetometer designed for field operation under widely varying environmental conditions. It measures the absolute magnitude of the total magnetic field within the range of 20,000 to 100,000 gammas to an absolute accuracy of ± 1 gamma and ± 15 parts per million of the field under measurement, over the temperature range of -30° to + 50° C.

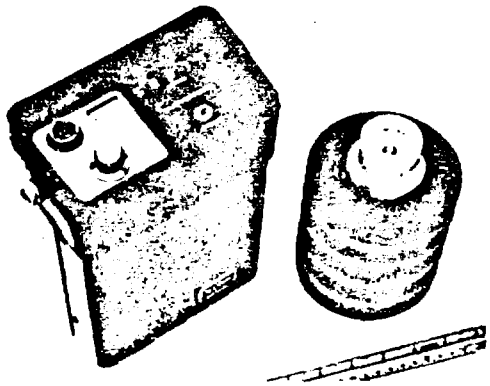
The instrument is simple to operate. A complete reading is obtained in 3.5 seconds by depressing a push button. The field intensity is read directly in gammas from a five digit display consisting of light emitting diodes. A 10 position switch sets the appropriate range.

The instrument is powered by internally mounted size "D" alkaline batteries (standard) or by non-ferrous rechargeable batteries (optional). The rechargeable batteries have virtually zero magnetic effect and permit full use of the magnetometer sensitivity even with close spacing between the sensor and console.

A battery meter shows condition of batteries at all times and allows

Back packed sensor allows for hands-free operation





anticipation of when batteries should be replaced.

The GP-70 noise cancelling toroidal sensor minimizes effect of external interference from man made sources. In high electrical noise areas, further improvement in signal to noise ratio can be achieved by keeping the push button depressed during a reading. This procedure automatically doubles the sensor polarize time, creating a higher signal output from the sensor.

Model GP-70 comes complete and ready for use with console, carrying strap, sensor, extending aluminum staff, spare batteries, instruction manual; all in a sturdy transit case.

An optional feature of the GP-70 is the back pack sensor harness. This option allows for a hands-free operation of the magnetometer, a major benefit in areas of rough terrain or thick vegetation.

Specifications

Sensitivity: 1 gamma

Range: 20,000 to 100,000 gammas in ten switch positions.

Operating Temperature: -40° to 55° C.

Absolute Accuracy: ± 1 gamma and ± 15 parts per million of measured field over range of -30° to + 50° C.

Sensor: Noise cancelling toroidal coil is electro-statically balanced to minimize interference between sensor and console

Read Out: 3.5 seconds total - by push button. Double polarizing time by keeping button depressed.

Display: 5 digits on long life, light emitting diodes.

Electronic Circuits: Integrated circuits complying with military specifications used throughout.

Console: Sturdy aluminum housing with rubber light shield and shock guard.

Dimensions: Console - 3" x 6" x 9.5" (7.5 x 15 x 24 cm)
Sensor - 4.5" x 5" (10.5 x 12.7 cm)
Staff - 5 ft. (1.5 m) extended
2 ft (0.6 m) collapsed

Weights:
Console 3.8 lbs. (1.7 kg)
Sensor and cable 5 lbs. (2.3 kg)
Aluminum staff 1 lb. (0.45 kg)
12 Alkaline "D" cells 3 lbs (1.1 kg)

Power Supply: Standard - 12 internally mounted alkaline "D" cells provide over 10,000 readings at 25° C. decreasing to approximately 1,000 readings at -30°C. **Optional:** Internally mounted rechargeable non-ferrous batteries and charger. Over 3,000 readings between charges.

Battery Indicator: A miniature meter monitors battery life and helps predict battery replacement time.

McPhar Instrument Corporation

Head Office:

55 Tempo Avenue,
Rowdale, Ontario, Canada M2H 2R9
Tel: (416) 497-1700 Telex: 0623541
Cable: McPHAR TOR

Sales agents in:

Africa, Asia, Australia, Europe, North & South America

Contact McPhar Instrument Corp. head office for the agent in your area.

EM16

VLF Electromagnetic Unit

Pioneered and patented exclusively by Geonics Limited, the VLF method of electromagnetic surveying has been proven to be a major advance in exploration geophysical instrumentation.

Since the beginning of 1965 a large number of mining companies have found the EM16 system to meet the need for a simple, light and effective exploration tool for mining geophysics.

The VLF method uses the military and time standard VLF transmissions as primary field. Only a receiver is then used to measure the secondary fields radiating from the local conductive targets. This allows a very light, one-man instrument to do the job. Because of the almost uniform primary field, good response from deeper targets is obtained.

The EM16 system provides the *in-phase* and *quadrature* components of the secondary field *with the polarities indicated.*

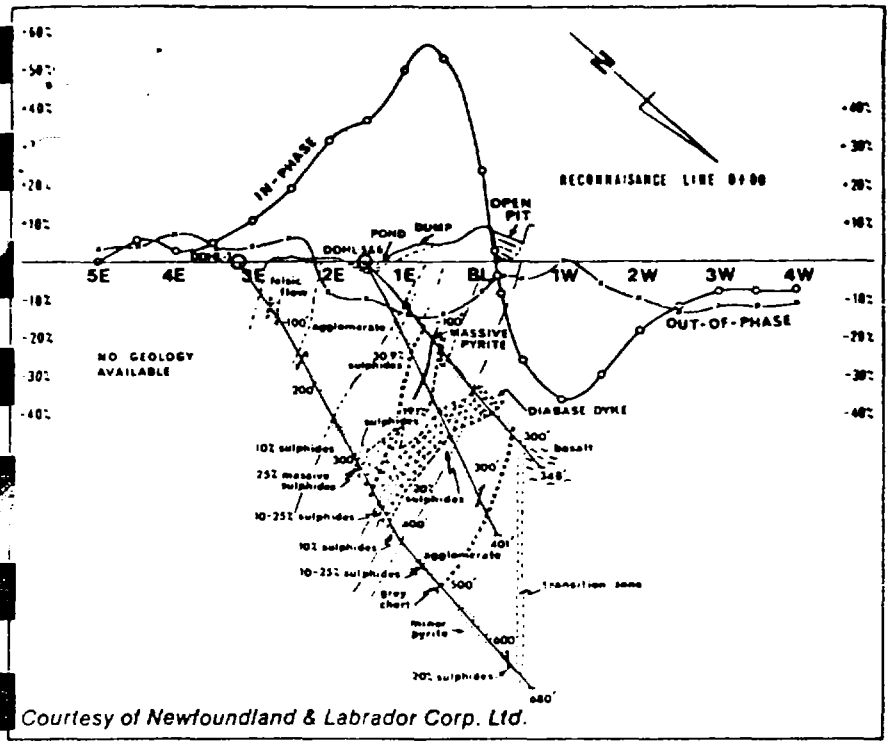
Interpretation technique has been highly developed particularly to differentiate deeper targets from the many surface indications.

Principle of Operation
The VLF transmitters have vertical antennas. The magnetic signal component is then horizontal and concentric around the transmitter location.

Specifications

Source of primary field	VLF transmitting stations.
Transmitting stations used	Any desired station frequency can be supplied with the instrument in the form of plug-in tuning units. Two tuning units can be plugged in at one time. A switch selects either station.
Operating frequency range	About 15-25 kHz.
Parameters measured	(1) The vertical in-phase component (tangent of the tilt angle of the polarization ellipsoid). (2) The vertical out-of-phase (quadrature) component (the short axis of the polarization ellipsoid compared to the long axis).
Method of reading	In-phase from a mechanical inclinometer and quadrature from a calibrated dial. Nulling by audio tone.
Scale range	In-phase ± 150%; quadrature ± 40%.
Readability	± 1%.
Reading time	10-40 seconds depending on signal strength.
Operating temperature range	−40 to 50° C.
Operating controls	ON-OFF switch, battery testing push button, station selector, switch, volume control, quadrature, dial ± 40%, inclinometer dial ± 150%.
Power Supply	6 size AA (penlight) alkaline cells. Life about 200 hours.
Dimensions	42 x 14 x 9 cm (16 x 5.5 x 3.5 in.)
Weight	1.6 kg (3.5 lbs.)
Instrument supplied with	Monotonic speaker, carrying case, manual of operation, 3 station select plug-in tuning units (additional frequencies are optional), set of batteri
Shipping weight	4.5 kg (10 lbs.)

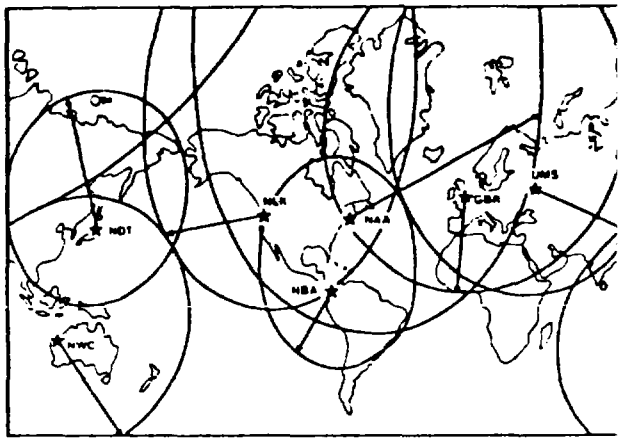
GEONICS LIMITED
Designers & manufacturers of geophysical instruments
subsidiary of
2 Thorncliffe Park Drive,
Toronto/Ontario/Canada
M4H 1H2
Tel: 425-1824
Cables Geonics



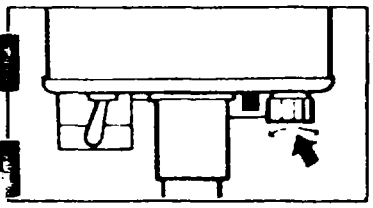
Courtesy of Newfoundland & Labrador Corp. Ltd.

EM 16 Profile over Lockport Mine Property, Newfoundland

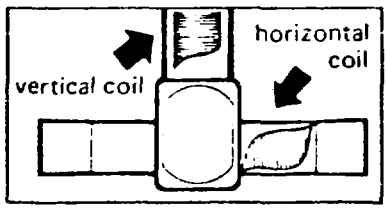
dditional case histories on request.



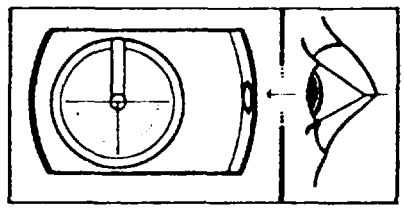
Areas of VLF Signals
Coverage shown only for well-known stations. Other reliable, fully operational stations exist. For full informatio regarding VLF signals in your area consult Geonics Limited. Extensive field experience has proved that the circles of coverage shown are very conservative and are actually much larger in extent.



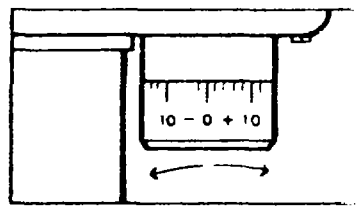
Station Selector
vo tuning units can be plugged at one time. A switch selects her station.



Receiving Coils
Vertical receiving coil circuit in instrument picks up any vertical signal present. Horizontal receiving coil circuit, after automatic 90° signal phase shift, feeds signal into quadrature dial in series with the receiving coil.



In-Phase Dial
shows the tilt-angle of the instrument for minimum signal. This angle is the measure of the vertical in-phase signal expressed in percentage when compared to the horizontal field.



Quadrature Dial
is calibrated in percentage mark ings and nulls the vertical quadrature signal in the vertical coil circuit.

By selecting a suitable transmitter station as a source, the M 16 user can survey with the most suitable primary field imuth.

The EM 16 has two receiving coils, one for the pick-up of the orizontal (primary) field and the other for detecting any nomalous vertical secondary field. The coils are thus orthogonal, and are mounted inside the instrument "handle".

ne actual measurement is done by first tilting the coil ssembly to minimize the signal in the vertical (signal) coil and then further sharpening the null by using the reference signal to buck out the remaining signal. This is done by a calibrated quadrature" dial.

The tangent of the tilt angle is the measure of the vertical in-phase component and the quadrature reading is the signal at right angles to the total field. All readings are obtained in per centages and do not depend on the absolute amplitude of the primary signals present.

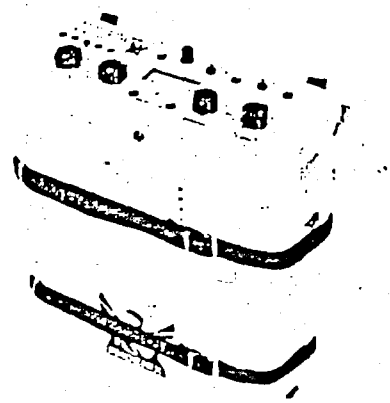
The "null" condition of the measurement is detected by the drop in the audio signal emitted from the patented resonance loudspeaker. A jack is provided for those preferring the use of an earphone instead.

The power for the instrument is from 6 penlight cells. A battery tester is provided.

IPT-1

Variable Frequency, Time Domai and Phase IP Transmitter

- Reliable: Backed by twenty years experience in the design and worldwide operation of induced polarization and resistivity equipment
- Versatile: Can be used for resistivity, variable frequency IP, time domain IP or phase angle IP measurements
- Stable: Excellent current regulation
- Lightweight, portable
- Wide selection of power sources
- Low cost



Specifications

Power Sources	: Internal DC power module containing 8 45V dry cell batteries, or internal AC power module with external 1 KVA, 2 KVA or 3 KVA motor generator.
Ammeter Ranges	: 30 mA, 100 mA, 300 mA, 1A, 3A and 10A full scale.
Meter Display	: A meter function switch selects the display of current level, regulation status, input frequency, output voltage, control battery voltage or line voltage.
Current Regulation	: The change in output current is less than 0.2% for a 10% change in input voltage or electrode impedance.
Output Waveform	: Either DC, single frequency, two frequencies simultaneously, or time domain (50% duty cycle). Frequencies of 0.078, 0.156, 0.313, 1.25, 2.5, and 5.0 Hz are standard, whereas 0.062, 0.125, 0.25, 1.0, 2.0, and 4.0 Hz are optionally available. The simultaneous transmission mode has 0.313 and 5.0 Hz as standard, whereas 0.156 and 2.5 Hz are optional.
Frequency Stability	: ± 1% from -40° to +60°C is standard. A precision time base is optionally available for coherent detection and phase IP measurements.
Protection	: Current is turned off automatically if it exceeds 150% full scale or is less than 5% full scale.
Case	: Non-conductive, high impact resistant plastic.
Dimensions	: 20 x 40 x 55 cm (9 x 16 x 22 inches).
Weight	: 14 kg (31 lb) with DC power module. 16 kg (35 lb) with AC power module.
Standard Accessories	: Pack frame, manual. At least one of the two possible power modules is required. The AC power module in turn requires one of the external 1KVA, 2KVA or 3KVA motor generators and a connecting cable.

DC POWER MODULE (BPS-1)

Output Voltage	: 8 x 45V dry cell batteries (Eveready 482, Mallory 202 or equivalent) are switched in series or parallel to provide output voltage of 90V, 180V, and 360V.
Output Power	: Recommended maximum output power is 30 watts. Absolute maximum output powe is 100 watts.
Battery Life	: Normal field operation, with low output powe results in an average battery life expectancy one month. Operation with the absolute maximum output power results in much short battery life.
Control Supply	: 4 x 6V lantern batteries (Eveready 409, Mallo 908 or equivalent) connected in series/paralle are used to provide the 40 to 70 mA required f the control circuitry. Average battery life expectancy is six months.
Operating Temperature	: 0°C to +60°C.

AC POWER MODULE (AC-3)

Output Voltage	: 0V, 75V, 150V, 300V, 600V and 1200V.
Output Power	: Maximum continuous output power is 3 kw This requires the 3KVA motor generator.
Input Power	: 350 to 1000 Hz, 60V (45V to 78V) 3 phase is standard. 120V (90V to 156V) and/or single phase may be link selected inside the module.
Current Regulation	: Achieved by feedback to the alternator of the motor generator unit.
Operating Temperature	: -40°C to +60°C.
Thermal Protection	: Thermostat turns off at 65°C and turns back or at 55°C internal temperature.

PHOENIX GEOPHYSICS LIMITED

Geophysical Consulting and Contracting, Instrument Manufacture, Sale and Lease.

Head Office: 200 Yorkland Blvd. Willowdale, Ont., Canada, M2J 1R6. Tel: (416) 493-6350
1424 - 355 Burrard St. Vancouver, B.C., Canada, V6C 2G8. Tel: (604) 684-2285
2430 N. Huachuca Dr., Tucson, Arizona, U.S.A. 85705. Tel: (602) 884-8542

CRONE GEOPHYSICAL COMPANY

NEWMONT TYPE N-IV I.P. RECEIVER

DIMENSIONS: 8" x 4.3" x 12.3" (20 cm x 11 cm x 31 cm)

WEIGHT: 10 lbs., 4.5 kg. (including batteries)

POWER SUPPLY: 5 standard "D" cells, 1.5 volts each, 60 MA drain, 1 of 9 volt standard cell for S.P.

MEASUREMENTS:

Primary Voltage V_p - .0005 - 60 volts, accuracy $\pm$ 5%.

Chargeability "M & N" - Both samples of the decay curve "M" and "N" are taken for 3 current cycles then are automatically averaged, adjusted to the 33^{M}_{1} standard and stored. Measuring cycles both using a 2.0 second off, 2.0 second on current period are:

NORMAL: .45 sec. delay; .45 - .90 sec "M"; .90 - 1.35 sec "N"; ".35 switch": .35 sec. delay; .35 - .70 sec "M"; .70 - 1.05 sec. "N".

SELF POTENTIAL - Range 0 - 1 volt digital, calibrated readout.

Range 0 - 2 volts uncalibrated. Automatic buckout switched in after manual adjustment.

020

GEOLOGICAL REPORT
on the
RIDLEY LAKE PROSPECT
in
ROLLO TOWNSHIP
SUDBURY MINING DIVISION
f o r
CARLSON MINES LTD.

June 30, 1983

J.K. Filo
Timmins, Ont.

Qual
2 3466

TABLE OF CONTENTS

INTRODUCTION

During the summer of 1983, a geological and geophysical exploration program was carried out at Carlson Mines, Ridley Lake Property.

The purpose of this report is to summarize the results of this geological survey. The survey was conducted in order to re-evaluate known gold showings, and the geological environment in which this mineralization is hosted.

PROPERTY & OWNERSHIP

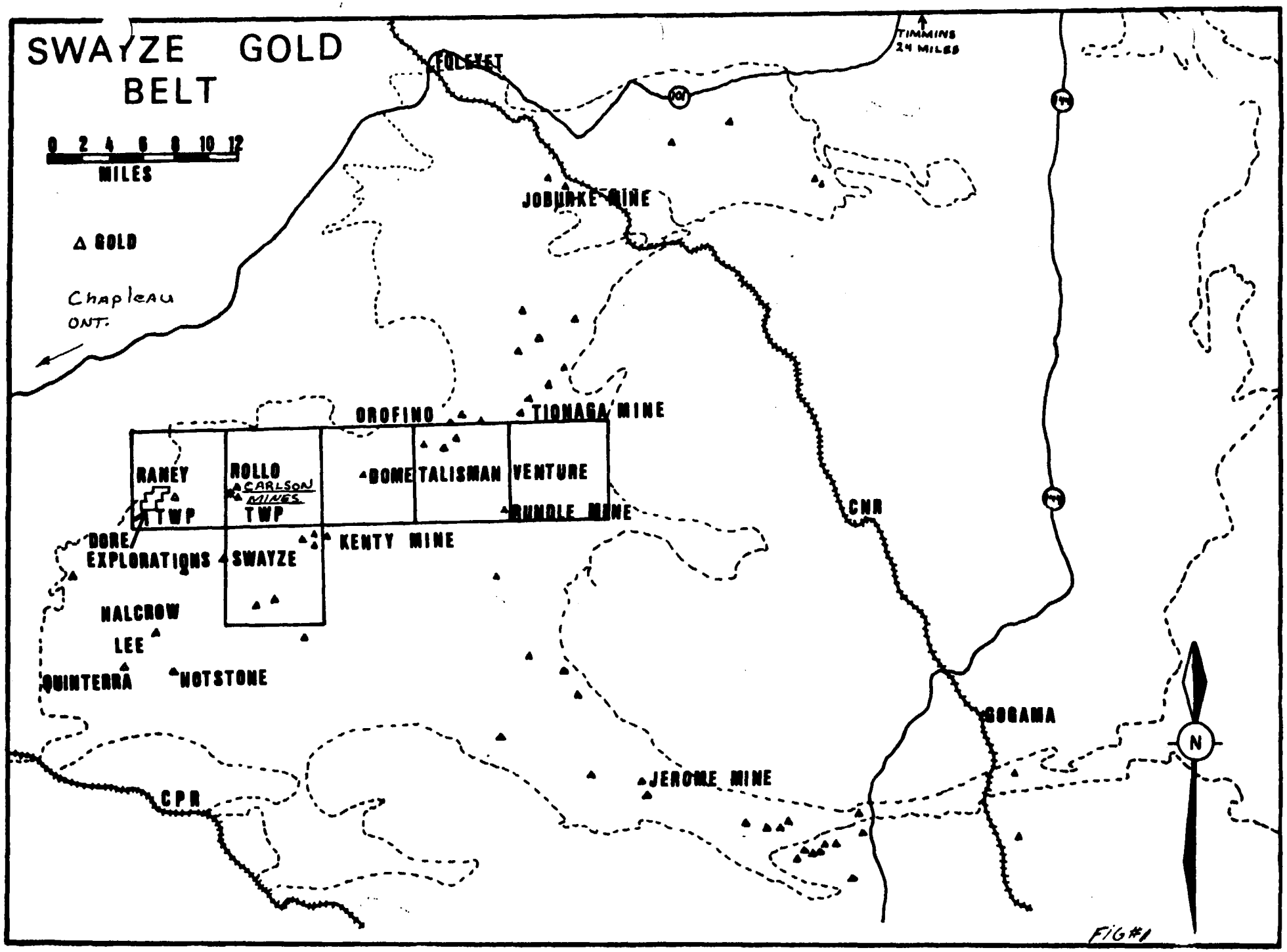
The Ridley Lake Property is situated in Rollo Township, Sudbury Mining Division. The property consists of twenty (20) contiguous mining claims numbered as follows:

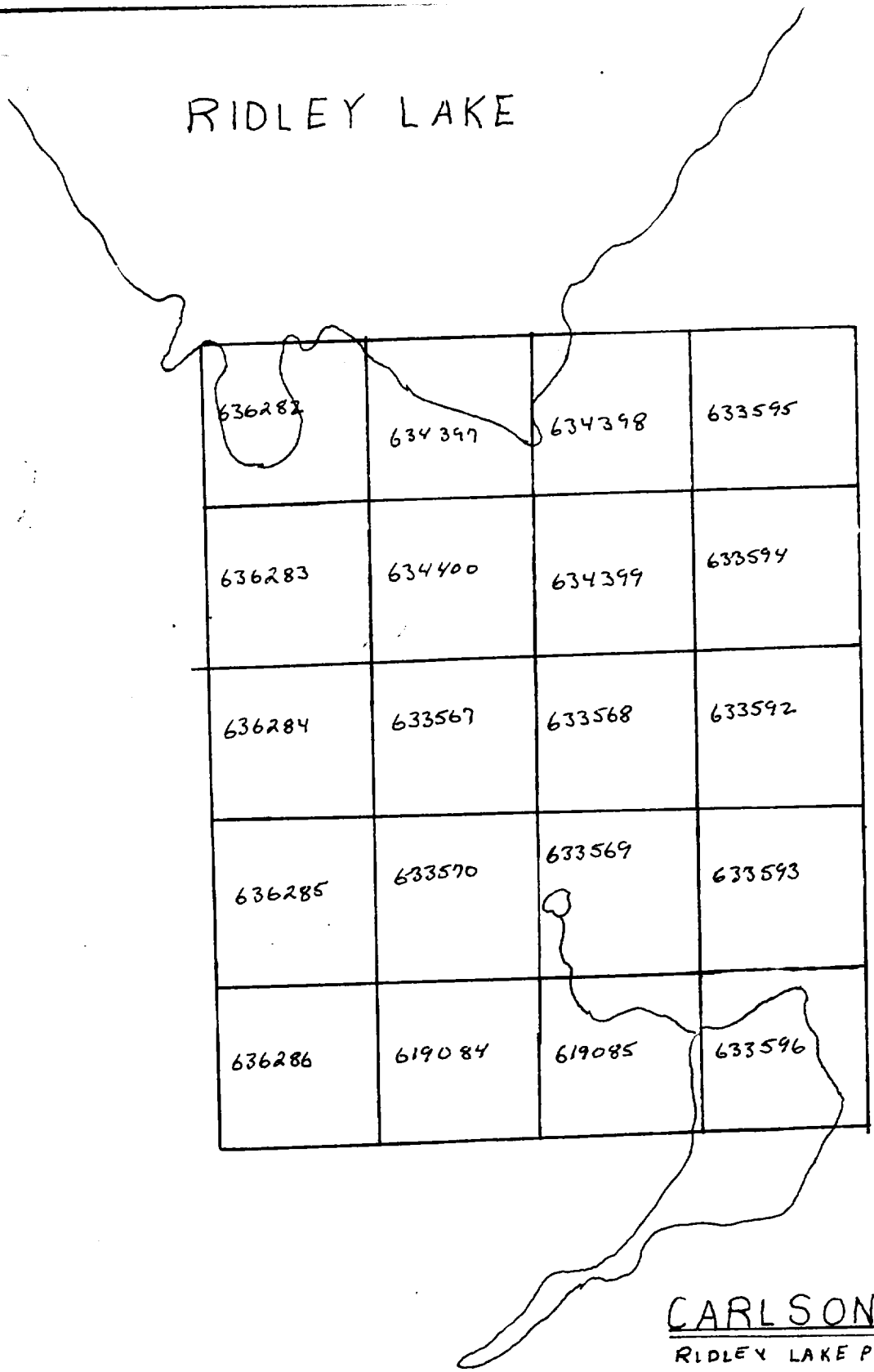
1) 633592 to 633596 inclusive
2) 633567 to 633570 inclusive
3) 636282 to 636286 inclusive
4) 634397 to 634400 inclusive
5) 619084 and 619085

These claims are held in trust by INGAMAR EXPLORATIONS LIMITED for CARLSON MINES LTD.

LOCATION & ACCESS

This property is located approximately thirty-five (35) miles north-northeast of Chapleau, Ontario.


SWAYZE GOLD BELT
0 2 4 6 8 10 12
MILES
GOLD
Chapleau ONT.
FOLGER
TIMMINS 24 MILES
JOBURKE MINE
OROFINO
TIONAGA MINE
RANEY TWP
ROLLO CARLSON MINES TWP
BOME
TALISMAN
VENTURE
RUNDLE MINE
CNR
DORE EXPLORATIONS
SWAYZE
KENTY MINE
HALCROW
LEE
QUINTERRA
HOTSTONE
GOGAMA
JEROME MINE
CPR
N
FIG #1



CARLSON MINES LTD.

RIDLEY LAKE PROPERTY ROLLO TWP.
SUDBURY MINING DIVISION
ONTARIO
SCALE 1" = 1320'

JUNE 30/83

FIG #2: CLAIM LOCATION MAP

* Revised From Engineering Report By:
R. Phandler. P. Eng.

LOCATION & ACCESS continued

Access to this claim group is via float plane from Ivanhoe Park, which is sixty (60) miles east of Chapleau, Ontario, along Highway 101. (Fig. #1)

TOPOGRAPHY & RESOURCES

The majority of this property is covered by low-lying cedar swamp and a number of large sand ridges. Exposure on this property is estimated to range from 10-15%; this outcrop is usually near the edges of the sand ridges or along lakeshores.

At present the only known resources on this property are large stands of timber and an excellent supply of fresh water.

PROPERTY HISTORY

Two old showings exist on the Carlson Property. The showings are known as the Cyril Knight and Agaura prospects. During the 1930's these two showings were controlled by two separate mining companies; the Cyril Knight Prospecting Company Ltd; and Agaura Exploration Company Ltd.

The following excerpts from O.D.M. reports detail results of work carried out on these prospects by the two companies:

PROPERTY HISTORY continued

Cyril Knight Prospecting Company, Limited

During the summer of 1932 a group of 15 claims was staked in Rollo township on the southeast side of Ridley lake by Miner Kenty working in the northwest corner of claim S. 22,721 a gold-bearing quartz vein was discovered. The country rock consists of schisted andesitic lavas. The vein has an indicated length of approximately 800 feet, striking N.65° E. and dipping 80° S.E. It is exposed in the main trench for 430 feet with a maximum width of 10 feet, pinching out sharply to the west and narrowing to a series of stringers to the east. The quartz, which is of the white glassy variety, is much fractured in a direction parallel to the strike of the vein. It carried a small amount of pyrite and a little native gold. Channel sampling of the vein is reported to have shown low values in gold.

Agaura Exploration Company, Limited

This group of 15 claims, staked by W.H. Graves on behalf of the Agaura Exploration Company, Limited, lies immediately south of the property of the Cyril Knight, Prospecting Company and extends from the west boundary of Rollo township eastward to within a quarter of a mile of Rollo lake. The main showings occur on Claim S. 22,632 and consist of two zones containing quartz veins mineralized with pyrite. The south zone has three short veins, striking N.70° E., exposed in three trenches extending over a distance of 900 feet. The centre vein, which is the largest, has a maximum width of 13 inches and a length of approximately 70 feet. It is composed of quartz mineralized with pyrite, ankerite, and a little galena. Some native gold was noted, and a channel sample across 8 inches was reported to assay 0.70 ounces per ton in gold. The country rock of the veins in this zone is arkose.

Five hundred feet north in the greenstones is a strongly schisted zone with widths up to 12 feet. The schist is mineralized with coarse pyrite and lenses of quartz. This zone, which has been traced for 500 feet, strikes N.80° E. Fifty feet south and parallel to the zone is a rusty carbonated quartz porphyry dike with a maximum width of 15 feet. Channel samples from this showing were reported to give low values in gold.

Table 1 LITHOLOGICAL UNITS FOR SWAYZE GREENSTONE BELT

CENOZOIC

RECENT

Swamp and stream deposits

PLEISTOCENE

Glacial drift, boulders, gravel, sand

Great Unconformity

PRECAMBRIAN

PROTEROZOIC

LATE MAFIC INTRUSIVE ROCKS

Olivine diabase dikes (Abitibi-type)
Quartz diabase and porphyritic diabase dikes

Intrusive Contact

ARCHEAN

LATE FELSIC INTRUSIVE ROCKS

Biotite-hornblende granodiorite; biotite granodiorite, biotite quartz monzonite; xenolithic granodiorite; diorite, hybrid diorite, syenite; muscovite-albite trondhjemite; leucocratic trondhjemite; pegmatite; migmatite

Intrusive Contact

EARLY FELSIC INTRUSIVE ROCKS

Biotite trondhjemite gneiss; feldspar porphyry, quartz-feldspar porphyry; quartz porphyry; hybrid granodiorite gneiss; migmatite; hornblende-chlorite-feldspar porphyry

Intrusive Contact

ULTRAMAFIC INTRUSIVE ROCKS

Grey to green-grey serpentinite; dark grey to black serpentinite; coarse blade-textured serpentinite (chicken-track rock); mineralogically layered serpentinite; sheared serpentinite; asbestos-bearing serpentinite; chloritic tremolitic serpentinite; talcose serpentinite; rusty carbonatized serpentinite

Intrusive Contact

EARLY MAFIC INTRUSIVE ROCKS

Tremolitic actinolitic amphibolite; hornblendic actinolitic amphibolite; sheared amphibolite; porphyritic amphibolite; garnet amphibolite; dioritic amphibolite

Intrusive Contact

IRON FORMATION

Magnetite-chert iron formation; carbonate-chert iron formation; amphibole-chert iron formation; garnet-magnetite amphibolite; chert; pyritic slate, graphitic slate

DETRITAL METASEDIMENTS

Greywacke; conglomerate; slate, argillite; phyllite, sericite schist, chlorite schist; sandstone

FELSIC TO INTERMEDIATE METAVOLCANICS*

Felsic agglomerate, mafic agglomerate; felsic and mafic lapilli tuff; felsic flows; felsic flow breccia; garnet amphibolite

MAFIC TO INTERMEDIATE METAVOLCANICS*

Light coloured chlorite-tremolite metavolcanics; dark coloured actinolite-hornblende schistose and gneissose metavolcanics; chloritic metavolcanic schist, sericite-carbonate metavolcanic schist; pillowed metavolcanics, epidotized metavolcanics

*These rocks are divided lithologically and their position in this table does not imply relative age.

** Revised from O.D.M. Report on Kukatush Sewell Lake Area & O.D.M. Map #2221

GENERAL GEOLOGY of the SWAYZE GREENSTONE BELT

The Ridley Lake property lies within the Swayze Greenstone Belt. This belt is composed of folded Archean metavolcanics and metasediments. The metavolcanics can be broken down into two groups:

1) mafic to intermediate volvanics, composed primarily of metamorphosed basalts and andesites

2) felsic to intermediate, composed in part of volcanics of dacite to andesitic composition, and in part of more silicious varieties of rhyodacite and rhyolite.

Numerous sill and plug-like intrusions have intruded both the metavolcanics and metasediments. These intrusions range in composition from felsic to mafic.

Within the metavolcanic-meta sedimentary sequence the general metamorphic rank is greenschist facies. Metamorphic aureoles are adjacent to the above intrusive masses.

The major faults in the Swayze belt are oriented in a north, northeast, and northwest direction.

(O.D.M. Geological Compilation Map 2221)

PROPERTY GEOLOGY

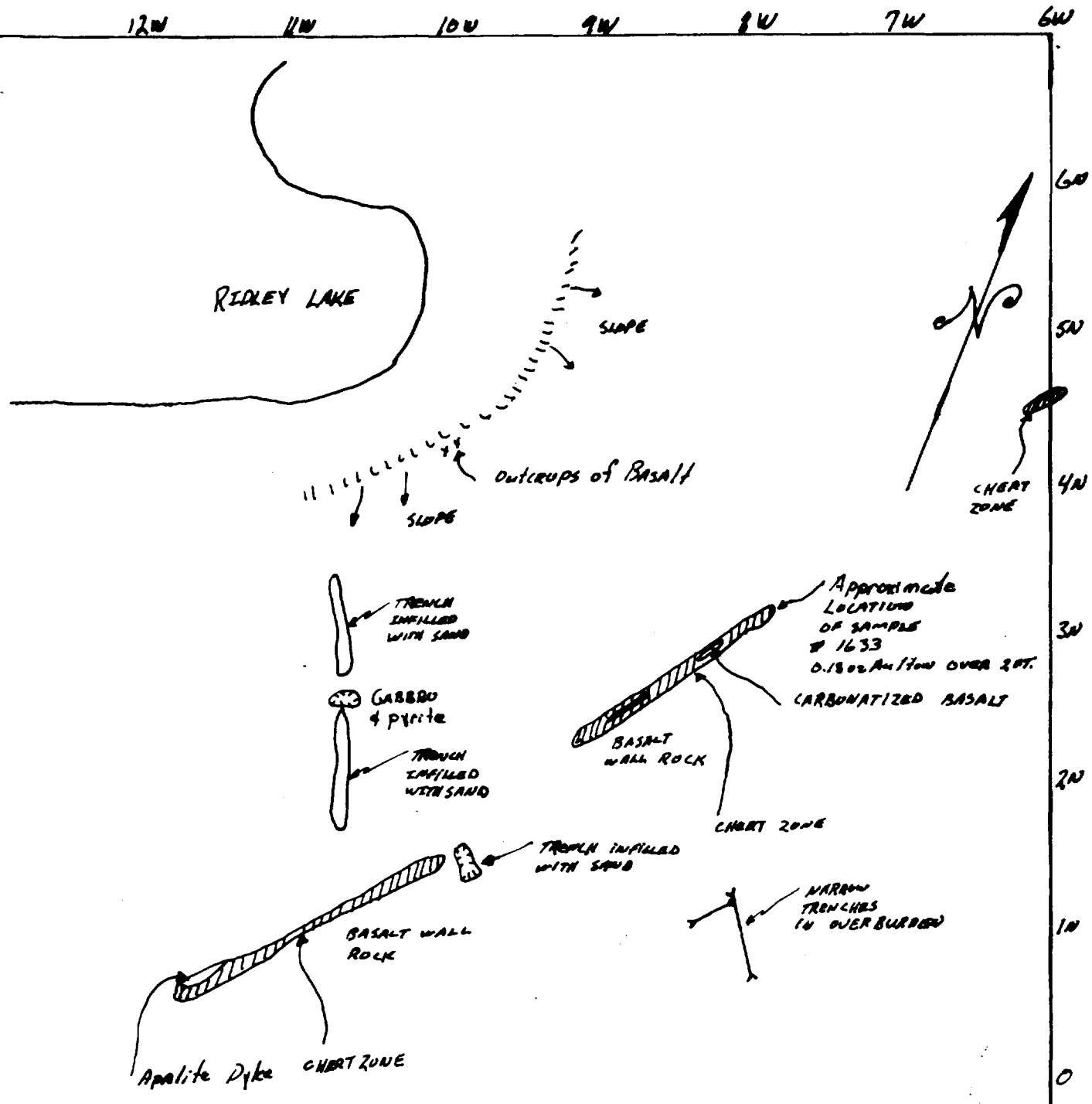
A limited amount of outcrop exists on the Ridley Lake property. Therefore, much of the geological interpretation is somewhat conjectural. The rocks underlying this claim group are mainly intercalated mafic and felsic metavolcanics. The mafic metavolcanics which cover the majority of this property are compositionally andesites and basalts. These rocks are generally medium to fine grained, and dark grey or black in color. Variations in color and texture are a result of mineralogical changes caused by metamorphic effects, or effects due to shearing or original differences in texture. The only structures noted in the mafic units were pillows, amygdaloids and structures caused by metamorphism and shearing.

The felsic volcanics are limited to the extreme northeast and southeast corners of the group. Included within the felsic volcanic group are felsic flows (rhyodacite), chert, and a felsic tuff.

The rhyodacite unit is light grey-green in color, fine grained, silicious, and weathers to light grey or white. This unit is well foliated.

The felsic tuff is grey in color and contains large quartz eyes in a fine grained matrix. This unit weathers to a light grey color and it is well foliated.

The chert horizon in the northeast corner of the property is bounded by carbonatized mafic volcanics. This chert unit is very silicious, white in color, and it has a sugary texture. A known zone of mineralization is associated with this particular chert unit. This zone will be described in more detail within the economic geology section of this report.



CYRIL KNIGHT SHOWING

SCALE 1" = 100'

* Revised From R.S. Middleton (1982)

FIG #3

Numerous intrusions in the form of dikes, pods, and irregular stocks intrude the metavolcanic sequence. These intrusives range in composition from felsic to mafic.

The major intrusive on this property is a large diorite stock which covers most of the southwest corner of the property. This intrusive is a typical diorite which is composed of medium grained anhedral phenocrysts of plagioclase feldspar, quartz and biotite mica.

ECONOMIC GEOLOGY

There are two very interesting gold showings and a number of strong induced polarization (I.P.) anomalies on the Carlson property. These showings and anomalies will be discussed in further detail in the following paragraphs.

CYRIL KNIGHT SHOWING

The Cyril Knight showing was initially described by government geologists as a white, glassy quartz vein. Carlson geologists believe that this zone is in fact a cherty exhalative horizon within a series of schisted carbonatized mafic volcanics. This chert horizon has a strike length of approximately 800 feet, bearing N.70^{o}E. and dipping almost vertically. The horizon has a maximum width of 10 - 12 feet and it gradually pinches out towards the east. (Fig. #3)

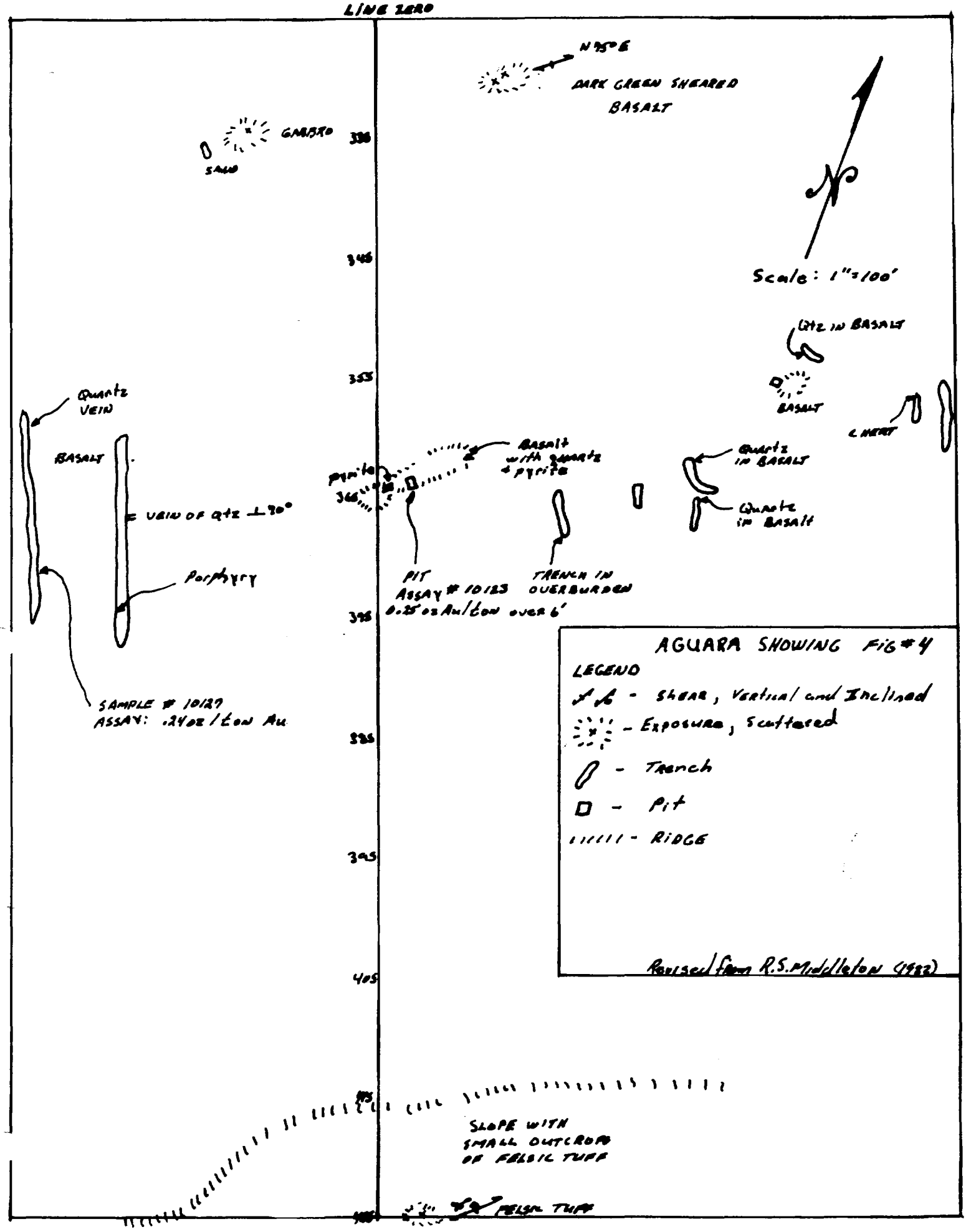
Government geologists also reported that this horizon contained native gold in some instances but channel samples yielded relatively low gold values. No visible gold was observed during the course of surveys but gold values as high as 0.13 oz/ton over two feet were obtained. (R. Phendler 1981)

Initial induced polarization (I.P.) profiles over the chert horizon show that a strong I.P. anomally is associated with this horizon. This suggests that this showing may be much more extensive and that further work will be necessary to properly evaluate this zone.

AGUARA SHOWING

The Aguara Showing is made up of a number of narrow pyritic, en-echelon quartz veins hosted within a mafic metavolcanic. During the 1930's a number of pits and trenches were put into this zone but the majority of these workings are now covered by overburden or heavy vegetation. As a result it is difficult to fully assess the dimensions of this showing. The zone of interest appears to have a strike length of approximately 1000 feet and a width of about 150 feet.

Government geologists' samples showed that quartz veins from this showing assayed 0.7 oz.Au/ton over a a width of 8 inches. The values were recently substantiated by Newmont evaluation in July of 1982. (Personnel Comm. with R.S. Middleton)


LINE ZERO
N75°E
DARK GREEN SHEARED BASALT
GABBRO
SAND
336
346
Scale: 1"=100'
Qtz IN BASALT
353
BASALT
CHERT
Quartz VEIN
BASALT
VEIN OF Qtz ⊥ 70°
Porphyry
SAMPLE # 10127
ASSAY: .24oz/ton Au
pyrite
Basalt with quartz + pyrite
366
Quartz in BASALT
Quartz in BASALT
PIT
ASSAY # 10123
0.25 oz Au/ton over 6'
TRENCH IN OVERBURDEN
395
AGUARA SHOWING Fig # 4
LEGEND
- SHEAR, Vertical and Inclined
- Exposure, Scattered
- Trench
- Pit
- RIDGE
Revised from R.S. Middleton (1982)
405
SLOPE WITH SMALL OUTCROP OF FELSIC TUFF
FELSIC TUFF

Assay number 10123 taken in a large pit within the central portion of the showing assayed .25 oz Au/ton over 6 feet. (Fig. #4)

Once again initial I.P. data shows that an excellent anomaly is also associated with this showing.

Consequently further work will be conducted on this showing and detailed sampling and mapping will be carried out upon completion of a stripping and trenching program to be completed within the summer of 1983.

ANOMALOUS I.P. ZONES

Two other anomalous zones exist on the property aside from the zones related to the Aguara and Cyril Knight Showings. These zones were not completely surveyed at the time this report was being written. The anomalies are not associated with any known mineralization but one of them exists over the mafic-felsic volcanic contact in the southeast section of the property. The exact location of those two zones and details about the zones will be given when all geophysical surveys are completed.

CONCLUSIONS

Recent geological and geophysical surveys on the Carlson property have confirmed the existence of two promising gold showings. Geophysical programs to date have outlined four anomalous zones. Two of these are related to known zones of mineralization while the other two zones are over areas of unknown mineral potential.

With such favourable results all of the above mentioned areas will be recommended for further work with top priority being given to the Cyril Knight and Aguara Showings.

RECOMMENDATIONS

1) The Aguara and Cyril Knight zones should be remapped and sampled in detail upon completion of the bull-dozing and stripping program to be completed within the next few weeks.

2) Further I.P. work is recommended west of Line 20W from 2500S to 5000S. This survey would help to delineate the western extension of known anomalies and out-line any new zones in an area of the property that is practically void of outcrop.

3) Diamond drill recommendations will be made at a later date after a re-evaluation of all the survey data is completed.

Respectfully submitted

J.K. Filo, B.Sc. Geology

BIBLIOGRAPHY

Milne, V.G., 1972, Geology of the Kukatush - Sewell Lake Area, District of Sudbury, Ontario Division of Mines.

Phendler, R., Report on the Ridley Lake Property, 1981

Thurston, P.C., and assoc., 1974, Chapleau - Foleyet Geological Compilation Series (Map 2221) Ontario Division of Mines.

CERTIFICATE

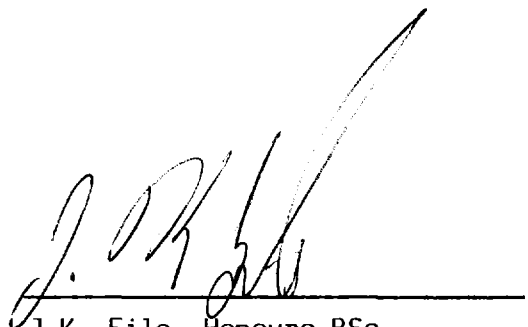
I, John Kevin Filo of Timmins, Ontario hereby certify that:

1) I hold an Honours BSc. (1980) degree in Geology from Laurentian University, Sudbury, Ontario.

2) I have practiced my profession in exploration geology continually since graduation.

3) I have based my conclusions and recommendations contained in this report on my knowledge of the area, my previous experience, and on the results of the program carried out under my supervision.

4) I hold no interest in Carlson Mines Ltd. nor do I expect to receive any interest in the property other than my professional fees.



J.K. Filo, Honours BSc.

Ministry of Natural Resources
Ontario

Report of Work
(Geophysical, Geological, Geochemical and Expenditures)

2.5
P-6190

41015SE0024 2.5864 ROLLO

900

W8306.00259

The Mi

Type of Survey(s): LINES, MAGNETOMETER, GEOLOGICAL SURVEY & VLF-EM-16	Township or Area: ROLLO TOWNSHIP
Claim Holder(s): CARLSON MINES LTD.	Prospector's Licence No.: T-1226
Address: P.O. BOX 220, PORCUPINE, ONTARIO PON 1CO	
Survey Company: INGAMR EXPLORATIONS LIMITED	Date of Survey (from & to): 24 Day 05 Mo. 83 Yr. / 27 Day 07 Mo. 83 Yr.
Name and Address of Author (of Geo-Technical report): J.K. FILO, 143 DOME AVE., PORCUPINE, ONT. / MARK BOWMAN, CEDAR HILL, CONNAUGHT, ONT. PON 1A0	Total Miles of line Cut: 27 miles

Credits Requested per Each Claim in Columns at right

		Days per Claim
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)	Geophysical - Electromagnetic	20
	Geophysical - Magnetometer	20
	Geophysical - Radiometric	
	Geophysical - Other	
	Geological	40
	Geochemical	
Man Days: Complete reverse side and enter total(s) here	Geophysical	Days per Claim
	- Electromagnetic	
	- Magnetometer	
	- Radiometric	
	- Other	
	Geological	
	Geochemical	
Airborne Credits: Note: Special provisions credits do not apply to Airborne Surveys.		Days per Claim
	Electromagnetic	
	Magnetometer	
	Radiometric	

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.

Mining Claims Traversed (List in numerical sequence)

Mining Claim Prefix	Mining Claim Number	Expend. Days Cr.
P	619084	
	619085	
	633592	
	633593	
	633594	
	633595	
	633596	
	633567	
	633568	
	633569	
	633570	
	634397	
	634398	
	634399	
	634400	
	636282	
	636283	
	636284	
	636285	
	636286	
	See revised statement	

Mining Claim Prefix	Mining Claim Number	Expend. Days Cr.

RECORDED
SEP 15 1983
Receipt No.

Total number of mining claims covered by this report of work: 20

For Office Use Only

Total Days Cr. Recorded	Date Recorded	Mining Recorder
1600	Sept 15/83	Regional Mining Recorder
	Date Approved as Recorded	Branch Director

RECEIVED
PORCUPINE MINING DIVISION
SEP 15 1983
A.M. 7 8 9 10 11 12 P.M. 1 2 3 4 5 6

Date	Recorded Holder or Agent (Signature)
Sept. 15/83	Maurice Hibbard (Agent)

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: Maurice Hibbard, Cedar Hill, Connaught, Ont.

Date Certified: Sept. 15/83

Certified by (Signature): Maurice Hibbard

Ministry of Natural Resources
Ontario

Technical Assessment Work Credits

File 2.5864

Date 1984 04 27

Mining Recorder's Report of Work No. 259

Recorded Holder: CARLSON MINES LTD

Township or Area: ROLLO TOWNSHIP

Type of survey and number of Assessment days credit per claim	Mining Claims Assessed
Geophysical	P 619084 - 85 633592 to 96 inclusive 633567 to 70 inclusive 634397 to 400 inclusive 636282 to 85 inclusive
Electromagnetic 16 days	
Magnetometer 16 days	
Radiometric ____ days	
Induced polarization ____ days	
Other ____ days	
Section 77 (19) See "Mining Claims Assessed" column	
Geological 31 days	
Geochemical ____ days	
Man days ☐ Airborne ☐	
Special provision ☒ Ground ☒	
☒ Credits have been reduced because of partial coverage of claims.	
☐ Credits have been reduced because of corrections to work dates and figures of applicant.	

Special credits under section 77 (16) for the following mining claims

No credits have been allowed for the following mining claims

☒ not sufficiently covered by the survey ☐ Insufficient technical data filed

P 636286

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; Section 77(19)—60.

828 (83/6)

Ministry of Natural Resources

Ontario

May 14/84

Your file: 259

1984 04 27 Our file: 2.5864

Mr. Bruce W. Hanley
Mining Recorder
Ministry of Natural Resources
60 Wilson Avenue
Timmins, Ontario
P4N 2S7

Dear Sir:

Enclosed are two copies of a Notice of Intent with statements listing a reduced rate of assessment work credits to be allowed for a technical survey. Please forward one copy to the recorded holder of the claims and retain the other. In approximately fifteen days from the above date, a final letter of approval of these credits will be sent to you. On receipt of the approval letter, you may then change the work entries on the claim record sheets.

For further information, if required, please contact Mr. F.W. Matthews at 416/965-6918.

Yours very truly,

S.E. Yundt
Director
Land Management Branch

Whitney Block, Room 6643
Queen's Park
Toronto, Ontario
M7A 1W3
Phone: 416/965-1316

S. Hurst:mc
Encls.

cc: Carlson Mines Limited
P.O. Box 220
Porcupine, Ontario
P0N 1C0

cc: Mr. G.H. Ferguson
Mining & Lands Commissioner
Toronto, Ontario

B45

Ministry of Natural Resources
Ontario

Notice of Intent

for Technical Reports

1984 04 27

2.5864/259

An examination of your survey report indicates that the requirements of The Ontario Mining Act have not been fully met to warrant maximum assessment work credits. This notice is merely a warning that you will not be allowed the number of assessment work days credits that you expected and also that in approximately 15 days from the above date, the mining recorder will be authorized to change the entries on his record sheets to agree with the enclosed statement. Please note that until such time as the recorder actually changes the entry on the record sheet, the status of the claim remains unchanged.

If you are of the opinion that these changes by the mining recorder will jeopardize your claims, you may during the next fifteen days apply to the Mining and Lands Commissioner for an extension of time. Abstracts should be sent with your application.

If the reduced rate of credits does not jeopardize the status of the claims then you need not seek relief from the Mining and Lands Commissioner and this Notice of Intent may be disregarded.

If your survey was submitted and assessed under the "Special Provision-Performance and Coverage" method and you are of the opinion that a re-appraisal under the "Man-days" method would result in the approval of a greater number of days credit per claim, you may, within the said fifteen day period, submit assessment work breakdowns listing the employees names, addresses and the dates and hours they worked. The new work breakdowns should be submitted direct to the Lands Management Branch, Toronto. The report will be re-assessed and a new statement of credits based on actual days worked will be issued.

2.5864

1984 05 15

Your File: 259
Our File: 2.5864

Mr. Bruce Hanley
Mining Recorder
Ministry of Natural Resources
60 Wilson Avenue
Timmins, Ontario
P4N 2S7

Dear Sir:

RE: Notice of Intent dated April 27, 1984.
Geophysical (Electromagnetic & Magnetometer)
& Geological Survey on Mining Claims
P 619084 et al in the Township of Rollo

The assessment work credits as listed with the above mentioned Notice of Intent, have been approved as of the above date.

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

Yours sincerely,

S.E. Yundt
Director
Land Management Branch

Whitney Block, Room 6643
Queen's Park
Toronto, Ontario
M7A 1W3
Phone: (416) 965-6918

S. Hurst:sc

cc: Carlson Mines Limited
P.O. Box 220
Porcupine, Ontario
P0N 1C0

cc: Mr. G.H. Ferguson
Mining & Lands Commisisoner
Toronto, Ontario

cc: Resident Geologist
Timmins, Ontario

1984 02 07 Our File: 2.5864

Carlson Mines Limited
P.O. Box 220
Porcupines, Ontario
P0N 1C0

Dear Sir:

Re: Geophysical (Electromagnetic and Magnetometer) and Geological Survey submitted on Mining Claims P 619084 et al in the Township of Rollo

Enclosed are the Electromagnetic and Magnetometer plans for the above-mentioned surveys. Please show all claim lines and numbers and return all maps to this office as soon as possible.

For further information, please contact Mr. F. W. Matthews at (416) 965-1380.

Yours very truly,

J.R. Morton
Acting Director
Land Management Branch

Whitney Block, Room 6643
Queen's Park
Toronto, Ontario
M7A 1W3
Phone: 416/965-1380

M. E. Anderson

Encls:

cc: Mining Recorder
Timmins, Ontario.

Ministry of Natural Resources
Ontario

Geotechnical Report Approval

File 2.5864

Nov. 9/83

Mining Lands Comments

Requ[illegible]

☑ To: Geophysics Mr. Barlow.

Comments

☑ Approved ☐ Wish to see again with corrections | Date Jan 3/83 | Signature R Barlow

☑ To: Geology - Expenditures Mr. Kustra

Comments

☑ Approved ☐ Wish to see again with corrections | Date Dec 7/83 | Signature C Kustra

☐ To: Geochemistry

Comments

L.D.

☐ Approved ☐ Wish to see again with corrections | Date | Signature

☐ To: Mining Lands Section, Room 6462, Whitney Block. (Tel: 5-1380)

1593 (81/10)

1983 10 18 2.5864

Mr. William L. Good
Mining Recorder
Ministry of Natural Resources
60 Wilson Avenue
Timmins, Ontario
P4N 2S7

Dear Sir:

We have received reports and maps for a Geophysical (Electromagnetic & Magnetometer) and Geological Survey submitted under Special Provisions (credit for Performance and Coverage) on mining claims P 619084 et al in the Township of Rollo.

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

We do not have a copy of the report of work which is normally filed with you prior to the submission of this technical data. Please forward a copy as soon as possible.

Yours very truly,

E.F. Anderson
Director
Land Management Branch

Whitney Block, Room 6610
Queen's Park
Toronto, Ontario
M7A 1W3
Phone: 416/965-1380

R. Pichette:sc

cc: Carlson Mines Limited
P.O. Box 220
Porcupine, Ontario
P0N 1C0

cc: Ingamar Explorations Limited
Cedar Hill
Connaught, Ontario
P0N 1A0

INGAMAR EXPLORATIONS LIMITED

CEDAR HILL CONNAUGHT, ONTARIO P0N 1A0
TEL. (705) 433-3551 or (705) 264-3100
TELEX 067-81502

September 27, 1983

Land Management Branch
Ministry of Natural Resources
Whitney Block, Room 6450
Queen's Park
TORONTO, ONTARIO
M7A 1W3

ATTENTION: MR. E.F. ANDERSON

SUBJECT: Claims P619084, P619085; P633592 to P633570 inclusive; P634397 to 634400 inclusive and P636282 to P636286 inclusive in Rollo Twp.

Dear Sir:

Enclosed are two copies of Geophysical & Geological Reports and Report of Work on the above property.

Thank you.

Sincerely,
INGAMAR EXPLORATIONS LIMITED

Maurice Hibbard, President

Enc.
MH/ab

**Carlson

Ministry of Natural Resources
Ontario

Report of Work
(Geophysical, Geological, Geochemical and Expenditures)

The Mining Act

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

Type of Survey(s): LINES, MAGNETOMETER, GEOLOGICAL SURVEY & VLF-EM-16

Township or Area: ROLLO TOWNSHIP

Claim Holder(s): CARLSON MINES LTD.

Prospector's Licence No.: T-1226

Address: P.O. BOX 220, PORCUPINE, ONTARIO PON 1CO

Survey Company: INGAMR EXPLORATIONS LIMITED

Date of Survey (from & to): 24 Day | 05 Mo. | 83 Yr. | 27 Day | 07 Mo. | 83 Yr.

Total Miles of line Cut: 27 miles

Name and Address of Author (of Geo-Technical report): J.K. FILO, 143 DOME AVE., PORCUPINE, ONT. / MARK BOWMAN, CEDAR HILL, CONNAUGHT, ONT. PON

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	20
	Geophysical - Magnetometer	20
For each additional survey: using the same grid: Enter 20 days (for each)	Geophysical - Radiometric	
	Geophysical - Other	
	Geological	40
	Geochemical	

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

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

Mining Claims Traversed (List in numerical sequence)

Mining Claim Prefix	Mining Claim Number	Expend. Days Cr.
P	619084	
	619085	
	633592	
	633593	
	633594	
	633595	
	633596	
	633567	
	633568	
	633569	
	633570	
	634397	
	634398	
	634399	
	634400	
	636282	
	636283	
	636284	
	636285	
	636286	

Mining Claim Prefix	Mining Claim Number	Expend. Days Cr.

Total number of mining claims covered by this report of work: 20

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.

For Office Use Only

Total Days Cr. Recorded	Date Recorded	Mining Recorder
	Date Approved as Recorded	Branch Director

PORCUPINE MINING DIVISION
RECEIVED
SEP 15 1983
A.M. P.M.
7 8 9 10 11 12 1 2 3 4 5 6

Date: Sept. 15/83

Recorded Holder or Agent (Signature): [signature] (Agent)

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: Maurice Hibbard, Cedar Hill, Connaught, Ont.

Date Certified: Sept. 15/83

Certified by (Signature): [signature]

Ministry of Natural Resources
Ontario

Report of Work
(Geophysical, Geological, Geochemical and Expenditures)

The Mining Act

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

Type of Survey(s)	Township or Area
LINES, MAGNETOMETER, GEOLOGICAL SURVEY & VLF-EM-16	ROLLO TOWNSHIP

Claim Holder(s)	Prospector's Licence No.
CARLSON MINES LTD.	T-1226

Address: P.O. BOX 220, PORCUPINE, ONTARIO PON 1CO

Survey Company	Date of Survey (from & to)	Total Miles of line Cut
INGAMR EXPLORATIONS LIMITED	24 05 83 (Day Mo. Yr.) 27 07 83 (Day Mo. Yr.)	27 miles

Name and Address of Author (of Geo-Technical report)
J.K. FILO, 143 DOME AVE., PORCUPINE, ONT. / MARK BOWMAN, CEDAR HILL, CONNAUGHT, ONT. PON

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	20
	Geophysical - Magnetometer	20
For each additional survey: using the same grid: Enter 20 days (for each)	Geophysical - Radiometric	
	Geophysical - Other	
	Geological	40
	Geochemical	

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

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

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.

Mining Claims Traversed (List in numerical sequence)

Mining Claim Prefix	Mining Claim Number	Expend. Days Cr.
P	619084	
	619085	
	633592	
	633593	
	633594	
	633595	
	633596	
	633567	
	633568	
	633569	
	633570	
	634397	
	634398	
	634399	
	634400	
	636282	
	636283	
	636284	
	636285	
	636286	

Mining Claim Prefix	Mining Claim Number	Expend. Days Cr.

Total number of mining claims covered by this report of work: 20

For Office Use Only		
Total Days Cr. Recorded	Date Recorded	
	Date Approved as Recorded	Branch Director

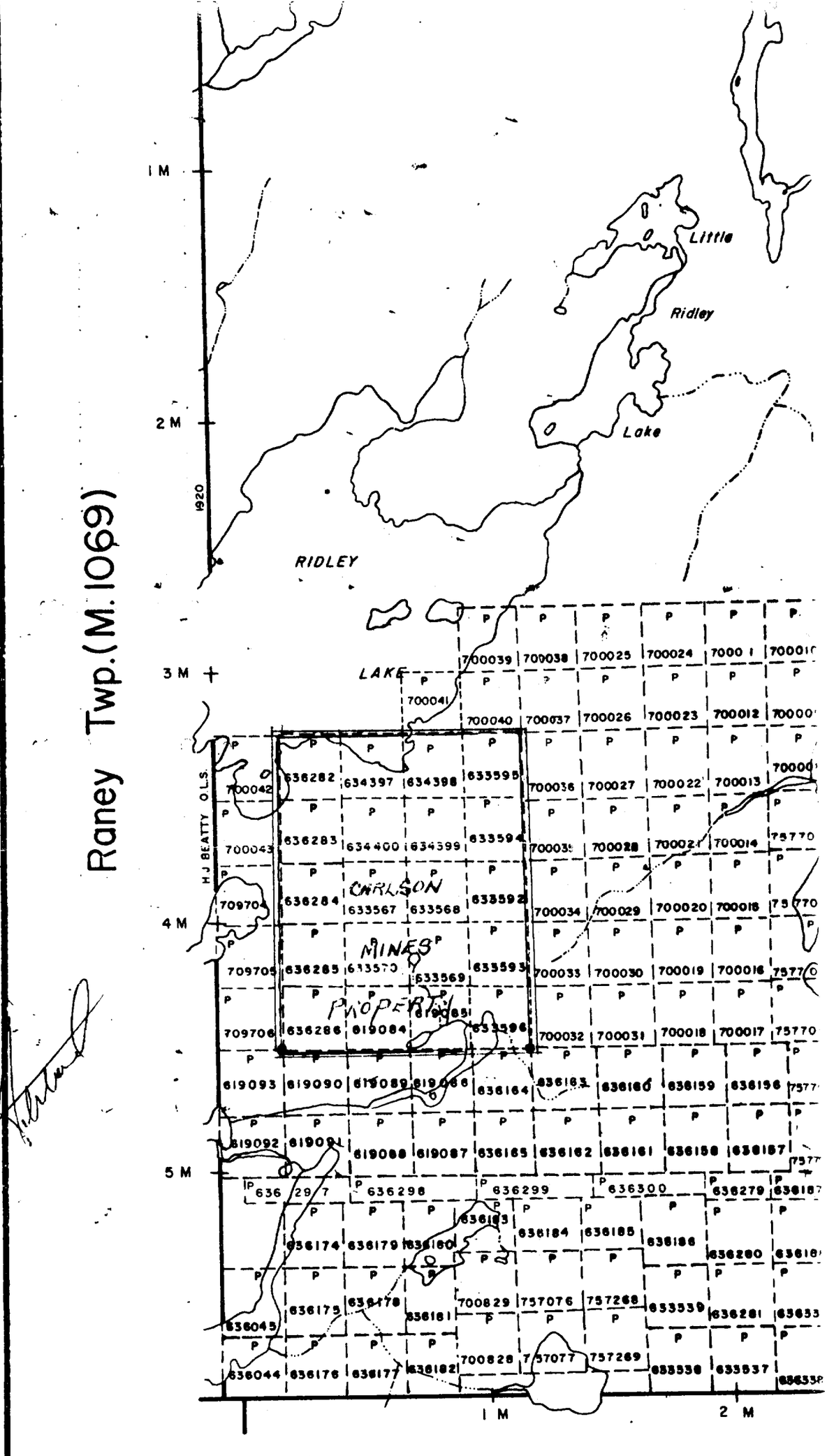
PORCUPINE MINING DIVISION
Mining Recorder
RECEIVED
SEP 15 1983
A.M. P.M.
7 8 9 10 11 12 1 2 3 4 5 6

Date	Recorded Holder or Agent (Signature)
Sept. 15/83	M. Hibbard (Agent)

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.

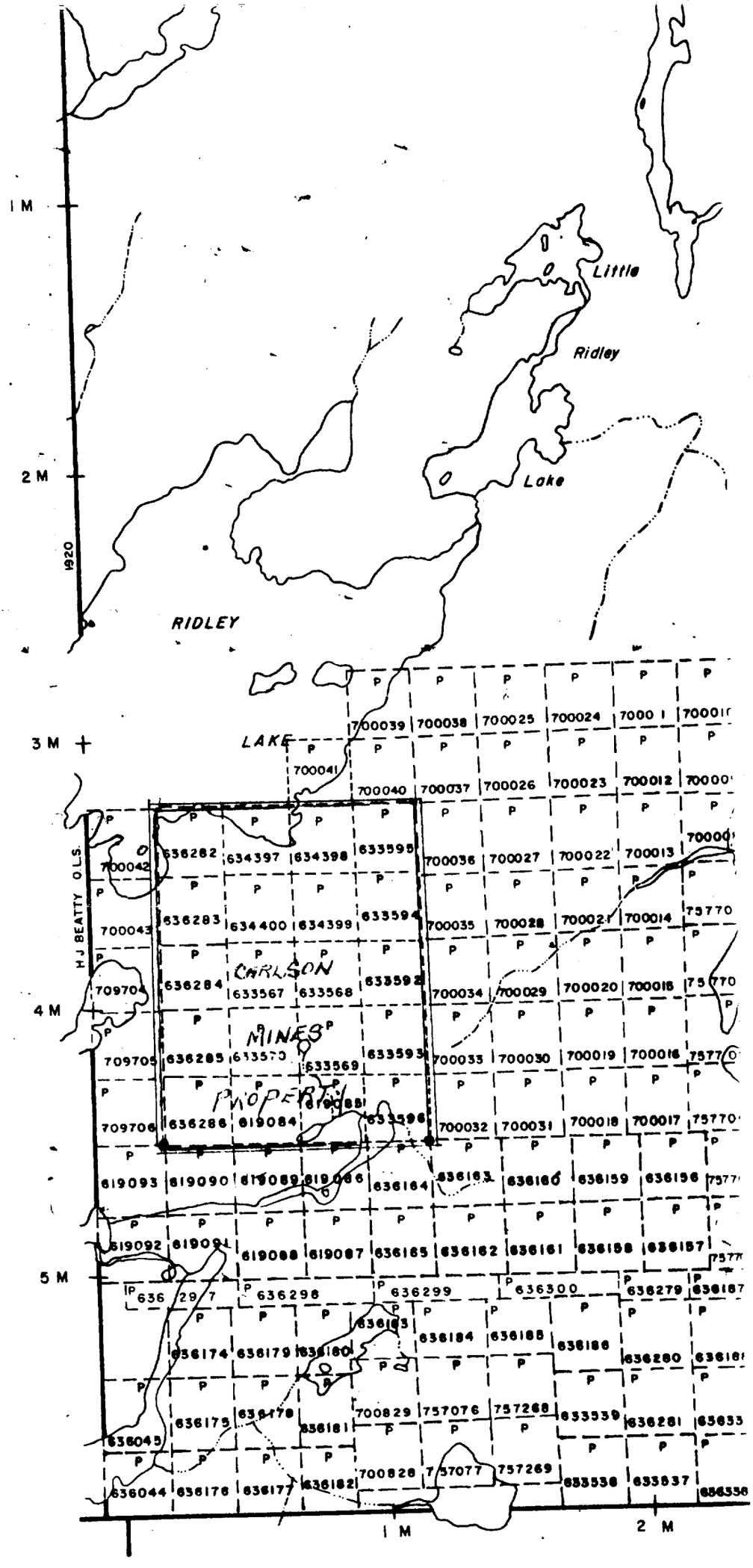
Name and Postal Address of Person Certifying	Date Certified	Certified by (Signature)
Maurice Hibbard Cedar Hill, Connaught, Ont.	Sept. 15/83	M. Hibbard



Denyes Twp
(M.758)

PART OF
RANEY TWP
M-1069

25864



Denyes Twp
(M.758)

2.5864

	EM	MAG		GEOL			
P 619084				✓			
85				✓			
633 592				1/2			
93				✓			
94				3/4			
95				—			
96		3/4		3/4			
633 597				✓			
68				✓			
69				✓			
70				✓			
634 397				✓			
98				✓			
99				✓			
634 400				✓			
634 282				✓			
83				1/4			
84				1/2			
85				3/4			
86				—			

2·5864

	m	em	G·			
619084	1/4	1/4	1/4			
85	1/4	1/4	1/4			
633592	1/2	1/2	1/2			
93	1/4	1/4	1/4			
94	3/4	3/4	3/4			
95	3/4	3/4	3/4			
96	3/4	3/4	3/4			
633567	✓	✓	✓			
68	✓	✓	✓			
69	✓	✓	✓			
70	✓	✓	✓			
634397	1/2	1/2	1/2			
98	✓	✓	✓			
99	✓	✓	✓			
400	✓	✓	✓			
636282	1/4	1/4	1/4			
83	1/4	1/4	1/4			
84	1/2	1/2	1/2			
85	1/2	1/2	3/4			
86	∅	∅	∅			
mag - EM.						
~~20~~ 19×20 = 380			5 1/2 NC.		~~EM 19×20~~	
380 = 15.5						
24.5						
= (16)						
GEOL. 19×40 = ~~380~~ 760						
760 = ~~15.35~~			30.7			
24.75	~~(15)~~		(31)			