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REPORT ON A

COMBINED HELICOPTER BORNE

MAGNETIC, ELECTROMAGNETIC AND VLF

SURVEY

PATTEN RIVER PROPERTY

REINE RIVER PROPERTY

ABBOTSFORD AND HEPBURN TOWNSHIPS

LARDER LAKE MINING DIVISION

PROVINCE OF ONTARIO

FOR
SEAL RIVER EXPLORATIONS LIMITED
BY
AERODAT LIMITED
May 9, 1988

J8802

R.J. de Carle Consulting Geophysicist

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### LIST OF MAPS Scale 1:10,000

- 1. PHOTOMOSAIC BASE MAP;

  prepared from a semi-controlled photo laydown, showing registration crosses corresponding to NTS co-ordinates on survey maps.
- 2. FLIGHT LINE MAP; showing all flight lines, EM anomalies and fiducials with the base map.
- 3. AIRBORNE ELECTROMAGNETIC SURVEY INTERPRETATION MAP; showing flight lines, fiducials, conductor axes and anomaly peaks along with inphase amplitudes and conductivity thickness ranges for the 4600 Hz coaxial coil system with the base map.
- 4. TOTAL FIELD MAGNETIC CONTOURS; showing magnetic values contoured at 2 nanoTesla intervals, flight lines and fiducials with the base map.
- 5. VERTICAL MAGNETIC GRADIENT CONTOURS; showing magnetic gradient values contoured at 0.2 nanoTeslas per metre with the base map.
- 6. APPARENT RESISTIVITY CONTOURS; showing contoured resistivity values, flight lines and fiducials with the base map.
- 7. ELECTROMAGNETIC PROFILES; showing flight lines, low and high frequency coaxial inphase and quadrature and mid frequency coplanar inphase and quadrature traces.

#### 1. INTRODUCTION

This report describes an airborne geophysical survey carried out on behalf of Seal River Explorations by Aerodat Limited. Equipment operated included a three frequency electromagnetic system, a high sensitivity cesium vapour magnetometer, a two frequency VLF-EM system, a video tracking camera and a radar altimeter.

Electromagnetic, magnetic and altimeter data were recorded both in digital and analog form. Positioning data were stored in digital form and recorded on VHS Video Tapes as well as being marked on the flight path mosaic by the operator while in flight.

The survey area, comprised of two blocks of ground in the Abbotsford and Hepburn Township's area of northeastern Ontario, is
located approximately 100 kilometres east of Cochrane. Two (2)
flights, which were flown on March 28 and 31, 1988, were required
to complete the survey with flight lines oriented at an Azimuth of
030-210 degrees and flown at a nominal line spacing of 100 metres.
Coverage and data quality were considered to be well within the
specifications described in the contract.

The survey objective is the detection and location of mineralized zones which can be directly or indirectly related to precious or base metal exploration targets. Of importance, therefore, are poorly mineralized conductors, displaying weak conductivity, which may represent structural features which can sometimes play an essential role in the eventual location of primary minerals. Weak conductors associated with iron formations are also considered primary targets for precious metals. In regard to base metal targets, short, isolated or flanking conductors displaying good conductivity and having either magnetic correlation or no magnetic correlation, are all considered to be areas of extreme interest.

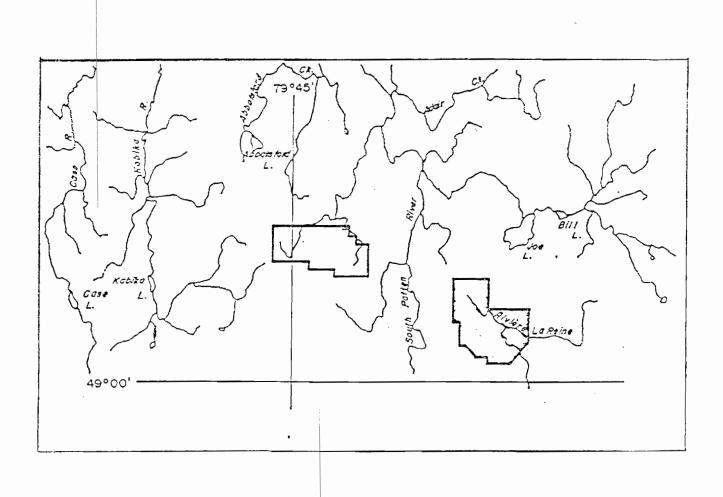
A total of 375 kilometres of the recorded data were compiled in map form and are presented as part of this report according to specifications outlined by Seal River Explorations Limited.

#### 2. SURVEY AREA LOCATION

The survey areas are depicted on the index map shown. The Patten River Property is centred at Latitude 49 degrees 05 minutes north, Longitude 79 degrees 45 minutes west, within the southeast quarter of Abbotsford Township. The Reine River Property, meanwhile, is centred at Latitude 49 degrees 02 minutes north, Longitude 79 degrees 34 minutes west. Both areas are located approximately 100 kilometres east of Cochrane, Ontario, and a similar distance from Rouyn-Noranda, Quebec. They are also located some 15 kilometres north of the Canadian National Railway track which is just to the north of Lake Abitibi. (NTS Reference Map No. 32 E4).

The survey blocks are accessible from a number of lumber roads which lead into the area from both La Sarre, Quebec and Cochrane, Ontario.

The terrain is generally flat with elevations in the order of 50 feet.



#### 3. AIRCRAFT AND EQUIPMENT

#### 3.1 Aircraft

An Aerospatiale A-Star 350D helicopter, (C-GATX), owned and operated by Ranger Helicopters Limited, was used for the survey. Installation of the geophysical and ancillary equipment was carried out by Aerodat. The survey aircraft was flown at a mean terrain clearance of 60 metres.

#### 3.2 Equipment

#### 3.2.1 Electromagnetic System

The electromagnetic system was an Aerodat 3-frequency system. Two vertical coaxial coil pairs were operated at 935 Hz and 4600 Hz and one horizontal coplanar coil pair at 4175 Hz. The transmitter-receiver separation was 7 metres. Inphase and quadrature signals were measured simultaneously for the 3 frequencies with a time constant of 0.1 seconds. The electromagnetic bird was towed 30 metres below the transmitter.

#### 3.2.2 VLF-EM System

The VLF-EM System was a Herz Totem 2A. This instrument measures the total field and quadrature components of two selected transmitters, preferably oriented at right angles to one another. The sensor was

towed in a bird 12 metres below the helicopter. The transmitters monitored were NAA, Cutler, Maine, broadcasting at 24.0 kHz and NLK, Seatle, Washington, at 24.8 kHz. for the Line Station and NSS, Annapolis, Maryland, broadcasting at 21.4 kHz for the Orthogonal Station.

#### 3.2.3 Magnetometer

The magnetometer employed a Scintrex Model VIW-2321 H8 cesium, optically pumped magnetometer sensor. The sensitivity of this instrument was 0.1 nanoTeslas at a 0.2 second sampling rate. The sensor was towed in a bird 12 metres below the helicopter.

#### 3.2.4 Magnetic Base Station

An IFG-2 proton precession magnetometer was operated at the base of operations to record diurnal variations of the earth's magnetic field. The clock of the base station was synchronized with that of the airborne system to facilitate later correlation.

#### 3.2.5 Radar Altimeter

A King Air HRA-100 radar altimeter was used to record

terrain clearance. The output from the instrument is a linear function of altitude for maximum accuracy.

#### 3.2.6 Tracking Camera

A Panasonic video tracking camera was used to record flight path on VHS video tape. The camera was operated in continuous mode and the fiducial numbers and time marks for cross reference to the analog and digital data were encoded on the video tape.

#### 3.2.7 Analog Recorder

An RMS dot-matrix recorder was used to display the data during the survey. In addition to manual and time fiducials, the following data were recorded:

| Channel | Input                             | Scale      |
|---------|-----------------------------------|------------|
| CXI1    | Low Frequency Coaxial Inphase     | 2.5 ppm/mm |
| CXQ1    | Low Frequency Coaxial Quadrature  | 2.5 ppm/mm |
| CXI2    | High Frequency Coaxial Inphase    | 2.5 ppm/mm |
| CXQ2    | High Frequency Coaxial Quadrature | 2.5 ppm/mm |
| CPI1    | Low Frequency Coplanar Inphase    | 10 ppm/mm  |
| CPQ1    | Low Frequency Coplanar Quadrature | 10 ppm/mm  |
| PWRL    | Power Line                        | 60 Hz      |

| Channel | Input                     | Scale     |
|---------|---------------------------|-----------|
| VLT     | VLF-EM Total Field, Line  | 2.5%/mm   |
| VLQ     | VLF-EM Quadrature, Line   | 2.5%/mm   |
| VOT     | VLF-EM Total Field, Ortho | 2.5%/mm   |
| VOQ     | VLF-EM Quadrature, Ortho  | 2.5%/mm   |
| RALT    | Radar Altimeter           | 10 ft./mm |
| MAGF    | Magnetometer, Fine        | 2.5 nT/mm |
| MAGC    | Magnetometer, Coarse      | 25 nT/mm  |

## 3.2.8 <u>Digital Recorder</u>

A DGR 33 data system recorded the survey on magnetic tape. Information recorded was as follows:

| Equipment    | Recording Interval |
|--------------|--------------------|
| EM system    | 0.1 seconds        |
| VLF-EM       | 0.2 seconds        |
| Magnetometer | 0.2 seconds        |
| Altimeter    | 1.0 seconds        |

# 3.2.9 Radar Positioning System

A Motorola Mini Ranger (MRS III) radar navigation system was used for both navigation and flight path

recovery. Transponders sited at fixed locations were interrogated several times per second and the ranges from these points to the helicopter measured to a high degree of accuracy. A navigational computer triangulates the position of the helicopter and provides the pilot with navigation information. The range/range data were recorded on magnetic tape for subsequent flight path determination.

#### 4. DATA PRESENTATION

#### 4.1 Base Map

A photomosaic base at a scale of 1:10,000 was prepared from a photo lay down map, and supplied by Aerodat as a screened mylar base.

#### 4.2 Flight Path Map

The flight path for all blocks was derived from the Mini-Ranger radar positioning system. The distance from the helicopter to two established reference locations was measured several times per second and the position of the helicopter calculated by triangulation. It is estimated that the flight path is generally accurate to about 10 metres with respect to the photomosaic detail of the base map.

The flight path map showing all flight lines, are presented on a Cronaflex copy of the photomosaic base map, with time and navigator's manual fiducials for cross reference to both the analog and digital data.

#### 4.3 Airborne Electromagnetic Survey Interpretation Map

The electromagnetic data were recorded digitally at a sample rate of 10 per second with a time constant of 0.1 seconds. A two stage digital filtering process was carried out to reject major sferic events and to reduce system noise.

Local sferic activity can produce sharp, large amplitude events that cannot be removed by conventional filtering procedures. Smoothing or stacking will reduce their amplitude but leave a broader residual response that can be confused with geological phenomena. To avoid this possibility, a computer algorithm searches out and rejects the major sferic events.

The signal to noise ratio was further enhanced by the application of a low pass digital filter. It has zero phase shift which prevents any lag or peak displacement from occurring, and it suppresses only variations with a wavelength less than about 0.25 seconds. This low effective time constant permits maximum profile shape resolution.

Following the filtering process, a base level correction was made. The correction applied is a linear function of time that ensures the corrected amplitude of the various inphase and quadrature components is zero when no conductive or permeable source is present. The filtered and levelled data were used in the interpretation of the electromagnetics. Interpretation maps were prepared showing flight lines, fiducials, peak locations of anomalies and conductor axes. The data have been presented on a Cronaflex copy of the photomosaic base map.

#### 4.4 Total Field Magnetic Contours

The aeromagnetic data were corrected for diurnal variations by adjustment with the recorded base station magnetic values. No correction for regional variation was applied. The corrected profile data were interpolated onto a regular grid at a 25 metre true scale interval using an Akima spline technique. The grid provided the basis for threading the presented contours at a 2 nanoTesla interval.

The contoured aeromagnetic data have been presented on a Cronaflex copy of the photomosaic base map.

#### 4.5 Vertical Magnetic Gradient Contours

The vertical magnetic gradient was calculated from the gridded total field magnetic data. Contoured at a 0.2 nT/m interval, the gradient data were presented on a Cronaflex copy of the photomosaic base map.

#### 4.6 Apparent Resistivity Contours

The electromagnetic information was processed to yield a map of the apparent resistivity of the ground.

The approach taken in computing apparent resistivity was to assume a model of a 200 metre thick conductive layer (i.e., effectively a half space) over a resistive bedrock. The computer then generated, from nomograms for this model, the resistivity that would be consistent with the bird elevation and recorded amplitude for the 4600 Hz coaxial frequency pair used. The apparent resistivity profile data were interpolated onto a regular grid at a 25 metres true scale interval using an Akima spline technique.

The contoured apparent resistivity data were presented on a Cronaflex copy of the photomosaic base map with the flight path.

#### 5. INTERPRETATION

#### 5.1 Geology

Both survey blocks are underlain with geology that are associated with Early Precambrian or Archean age rock types. The Patten River property is underlain with felsic and mafic metavolcanics, mostly through the centre of the survey block, while the northeastern portion of the area is underlain with both mafic metavolcanics and felsic tuffs. Amphibolite is also known to exist throughout the horizon.

The south and southwestern portions of the Patten River property is apparently underlain with metasedimentary wacke and calc-silicate rocks.

Some exploration work has been carried near the Abbotsford

Township property, just off the northeast corner. Canadian

Javelin Limited, in 1965, carried out some ground horizontal

loop EM surveying, along with some diamond drilling. Pyr
rhotite seems to have been the only sulphide intersected.

Most of the Reine Property is underlain with mafic metavolcanic flows, as well as amphibolite. Towards the southwest corner of the area, clastic metasediments have been indicated, in the form of wacke rocks. To the northeast, is the Patten River Pluton consisting of granodiorite.

The writer is unaware of previous exploration work carried out on the Reine River property.

Both survey blocks are overlain with Pleistocene till deposits consisting of sand, gravel and boulders. There is also believed to be a sequence of clay which is exhibiting a rather conductive signature. Outcrops are rather scarce.

#### 5.2 Magnetics

The magnetics perspective within the Patten River property clearly indicates a high intensity, northwest-southeast trending magnetics feature traversing across most of the survey block. To the south of the main magnetic feature are two and perhaps a third shorter magnetic feature which are

believed to be related to a similar magnetic source as that for the main feature.

Mafic metavolcanic flows have been described as being the rock types in the immediate area of the high magnetic intensity feature with amphibolite thought to be the actual source.

The lower magnetic intensity area towards the southwest corner of the block is believed to be related to clastic metasedimentary rocks.

The portion of a high intensity magnetic feature located towards the northeast corner of the Patten River property is perhaps related to another amphibolite horizon. Just to the east of this magnetic feature, in close proximity to flight line 10230, is believed to be a diabase dyke. There may be other dykes within the survey block but are not as readily noticeable with this set of data.

The Reine River property is underlain with rocks that exhibit high intensity magnetics through the centre portion of the

survey block striking in a northwest-southeast direction. There would seem to be at least three interlayering sequences of amphibolite within the mafic metavolcanic horizon. To the north and in contact with the mafic metavolcanic rocks is the granodiorite complex known as the Patten River Pluton. This region exhibits a rather low intensity magnetic feature. To the south and southwest, clastic metasediments in the form of wacke rocks have been indicated and this geological environment seems to be associated with the lower intensity magnetic feature. The lone, short magnetic feature towards the south central portion of this block may be related to a magnetite rich segment of the metasedimentary rocks.

#### 5.3 Vertical Gradient Magnetics

The areas of high intensity magnetics have been clearly 'broken up' into unique trends as a result of the computation of the vertical gradient. The following interpretation is not as readily obvious when one refers to the magnetic total field map. These are the areas that have been related to the mafic metavolcanic rocks.

It should also be noted that the zero contour interval coincides directly or very close to geological contacts. It is because of this phenomenon that the calculated vertical gradient map can be compared to a pseudo-geological map. This is true for vertical bedding. However, with the bedding dipping at a steep or moderate angle to the south, it will be found that the geological contact will be closer to the magnetic peak by a small distance.

By using known or accurate geological information and combining this data with the vertical gradient data, one can use the presented map as a pseudo-geological map. Obviously, the more that is known about an area geologically, the closer this type of presentation is to what the rock types are.

This type of presentation is an invaluable tool in helping to define complex geology, especially in drift covered areas. The calculated vertical gradient computation has been of exceptional value in areas of complex geology and closely spaced geological formations. Since a good portion of the survey areas are overlain with Pleistocene till deposits,

this particular presentation will be very useful.

The writer has indicated several fault zones on the interpretation map. Magnetic anomalies produced by near surface features are emphasized with respect to those resulting from more deeply buried rock formations on the calculated vertical gradient map. Much more detail is obtained, providing a better opportunity to recognize fault zones. As mentioned, some fault zones have been interpreted by the writer, however, it will become more apparent to the client as more field geological information is obtained, that other fault zones do exist.

This presentation will also, perhaps, change the client's mind about certain geologic horizons and especially the location of contacts.

#### 5.4 Electromagnetics

The electromagnetic data was first checked by a line-by-line examination of the analog records. Record quality was  $g \infty d$  with moderate sferic interference, primarily on the coaxial

conducting overburden. This phenomenon can be related to the previously mentioned clays. It is also observed that areas exhibiting somewhat resistive backgrounds seem to be in areas of thinner overburden, or outcrops. Assumming a somewhat constant or consistent conductivity for the overlying clay in both areas, any change in amplitude for the high frequency coaxial responses should be characteristic of a change in the overburden thickness.

Only one target has been outlined on the interpretation map in the Reine River property of Hepburn Township. It is not a very attractive target, in fact, it may not even be a bedrock source. There is a reasonable magnetic trend associated with the conductor but this is thought, by the writer, to be strictly a coincidence. In fact, it is quite possible that the trend is related to an 'edge effect' from the overlying conductive clays. Mafic metavolcanic flows, but more specifically amphibolite, have been indicated to be the rock types in this area.

The electromagnetic responses over the remaining area of the Reine River property are interpreted to be strictly related to conductive overburden.

Zone H1 is strictly a low priority target.

The background electromagnetic responses for the Patten River property indicate an overburden displaying a generally resistive nature. There are some rather weak electromagnetic responses plotted on the interpretation map and they have been interpreted as being bedrock conductors.

Zones A1, A2 and A6 are all expressions of similar conductivity from the same source. There is excellent magnetic correlation for all three conductors, a magnetic source which seems to be possibly related to amphibolite. Pyrrhotite is thought to be the source for the fair conductivity. A dip to the north is interpreted for each of the conductors. There may be some significance between the east end of Zone A6 and the interpreted fault zone.

There is one excellent EM response for Zone A3 and it is located on line 10130. This response also has very good magnetic correlation. It is thought that the short conductor is located on or very close to a geological contact between metasediments and mafic metavolcanic flows. A steep dip to the north is suspected.

Zone A4 is a definite bedrock conductor which is dipping to the north. Previous work has been carried out on this trend by Canadian Javelin Limited in 1965. Two drill holes were put down and pyrrhotite was intersected. The rock types in the area, have been described as being mafic and felsic metavolcanics.

The only reason for Zone A5 being picked is because of the EM response on the low frequency coaxial trace. It is a possibility that a conductor may be at depth. A further investigation may be warranted. It should be noted that Zone A5 is on strike and to the west of an area that has been worked on in previous years by Canadian Javelin Limited. This would be in the area of Zone A4.

Zone A7 is located on the south flank of a magnetic feature suggesting a possible relationship with a geological contact. It is not an attractive trend with only one intercept displaying any characteristics of a bedrock source. Note its location with a suspected fault zone.

Both Zones A10 and A11 display similar electromagnetic characteristics in that there is very little coaxial response from either frequencies but there is a subtle, but well defined, response from the coplanar frequency. The nature of the mineralization or the actual source is not known to the writer. These are certainly low priority targets. Note their association with high intensity magnetic features.

It is very apparent that detection of any bedrock conductors has not been hampered or masked by the effects from the overlying conductive overburden from either area, the Patten River property or the Reine River property.

# 5.5 Apparent Resistivity

It will be seen from this presentation that the overlying conductive overburden is generally giving apparent resistivity

values between 200 and 1000 ohm-metres. It is suggested that in areas that exhibit values higher than 1000 ohm-metres, are areas of rather thin overburden overlying bedrock lithology, which tend to be close to surface or is outcropping.

Generally speaking, the various lithological units within the survey areas are not mappable utilizing this method. It does not seem apparent that one can distinguish between the felsic or mafic metavolcanics or, in fact, the metasedimentary rocks to the south utilizing this data set.

The resistivity highs within the Reine River property of Hepburn Township, especially in areas towards the northeast, seem to coincide with the high intensity magnetic features. Could it be that the amphibolite has been sufficiently resistant to erosion and therefore, representing a ridge within the basement?

#### 5.6 Recommendations

On the basis of the results of this airborne survey, ground follow-up work is recommended for a few of the selected

targets as outlined by the writer on the Patten River property interpretation map. Some of the conductors that should be looked at are Zones A3, A6 and A7.

Zone A3 is considered to be a base metal type target with its short strike length and  $g \infty d$  magnetic correlation.

Zone A6, because of its longer strike length and possible association with an iron formation, could be an interesting trend with respect to its possible precious metal content.

Because of the proximity to Zone A6, it is suggested the Zone A7 also be considered in any future ground program.

Because of the previous work carried out on Zone A4, further work is not suggested for this conductor.

As well, the geological picture, for most of the area, is not clear enough to give a geological-geophysical synopsis. It is strongly recommended to the client that a complete and comprehensive evaluation be made of the magnetic data, and especially the calculated vertical gradient magnetic data, using

all available geological maps, diamond drill holes, and assessment files. Once such information is obtained, a broad scale geological map should be compiled and then, in reference to the calculated vertical gradient magnetic map, a reasonable pseudo-geological map can then be prepared.

As mentioned previously, there is a thin layer of glacial till over most areas within both survey blocks. Over the most favourable areas geologically, till or soil sampling for gold is recommended with any correlation of subsequent anomalous areas and intercepted bedrock conductors being prime targets for drilling. Areas which may give promising results are those conductors in close proximity to the interpreted fault zones as well as the ones in close proximity to the magnetic iron formation.

It is suggested that overburden reverse circulation drilling may be of some merit in areas such as Zones A3, A2, A6, A7, and A11 within the Abbotsford Township property. Within the Hepburn Township property, because of the absence of any conductors, further work could only be carried out based on

other encouraging results from other types of surveys. In the vicinity of the high intensity magnetic features, especially in close proximity to interpreted fault zones, reverse circulation drilling may be considered. The target of course, is auriferous bearing horizons. Zone H1 is still considered a low priority target and does not seem to have much potential.

In regards to a follow-up geophysical system, any of the horizontal loop EM systems can be used. It would seem that detectability should be easy for any of the types of conductors intercepted in the survey area. However, the use of a VLF-EM system is not considered an optimum system because of its lack of penetrating ability or its resolution. An induced polarization (IP) survey could be carried out in areas where anomalous gold values, from overburden drilling, have been obtained but EM systems have not responded. As well, the IP system may also be used in areas where ground EM methods have not defined the conductors fully or if disseminated sulphides are suspected.

There is no question of the existence of bedrock conductors within the survey area. It is a matter of using all resources, including geophysics, drill information and the compilation of a pseudo-geological map. Reverse circulation drilling may render additional information, for some areas, that will lead to an exciting exploration program.

Robert J. de Carle

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Consulting Geophysicist

For

AERODAT LIMITED

May 9, 1988

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#### APPENDIX I

Johns, G.W.

1979: Burntbush Lake - Detour Lake Area (Southern Part)
District of Cochrane; Ontario Geological Survey,
Preliminary Map P. 2243, Geological Services, Scale
1:50,000. Geology 1978.

Lovell, H.L. and Frey, E.D.

1972: Abbotsford Township, District of Cochrane; Ontario Division Mines, Preliminary Map P. 783, Kirkland Lake Data Series, Scale 1 inch to 1/4 mile. Data compiled 1972.

# APPENDIX II

## PERSONNEL

## FIELD

Flown - March, 1988

Pilot - Bob Curiston

Operator - Mark Fortier

## OFFICE

Processing - Kevin Killin, Geophysicist

Report - Robert J. de Carle, Consulting Geophysicist

# APPENDIX III CERTIFICATE OF QUALIFICATIONS

I, ROBERT J. DE CARLE, certify that: -

- 1. I hold a B. A. Sc. in Applied Geophysics with a minor in geology from Michigan Technological University, having graduated in 1970.
- I reside at 28 Westview Crescent in the town of Palgrave, Ontario.
- 3. I have been continuously engaged in both professional and managerial roles in the minerals industry in Canada and abroad for the past eighteen years.
- 4. I have been an active member of the Society of Exploration Geophysicists since 1967 and hold memberships on other professional societies involved in the minerals extraction and exploration industry.
- 5. The accompanying report was prepared from information published by government agencies, materials supplied by Seal River Explorations Limited and from a review of the proprietary airborne geophysical survey flown by Aerodat Limited for Seal River Explorations Limited. I have not personally visited the property.
- I have no interest, direct or indirect, in the property described nor do I hold securities in Seal River Explorations Limited.

Signed,

Robert J. de Carle

Robert J. de Carle

Consulting Geophysicist

Palgrave, Ontario

May 9, 1988

#### APPENDIX IV

#### GENERAL INTERPRETIVE CONSIDERATIONS

#### Electromagnetic

The Aerodat three frequency system utilizes two different transmitter-receiver coil geometries. The traditional coaxial coil configuration is operated at two widely separated frequencies and the horizontal coplanar coil pair is operated at a frequency approximately aligned with one of the coaxial frequencies.

The electromagnetic response measured by the helicopter system is a function of the "electrical" and "geometrical" properties of the conductor. The "electrical" property of a conductor is determined largely by its electrical conductivity, magnetic susceptibility and its size and shape; the "geometrical" property of the response is largely a function of the conductor's shape and orientation with respect to the measuring transmitter and receiver.

#### Electrical Considerations

For a given conductive body the measure of its conductivity or conductance is closely related to the measured phase shift between the received and transmitted electromagnetic field. A small phase shift indicates a relatively high conductance, a large phase shift lower conductance. A small phase shift results

in a large inphase to quadrature ratio and a large phase shift a low ratio. This relationship is shown quantitatively for a non-magnetic vertical half-plane model on the accompanying phasor diagram. Other physical models will show the same trend but different quantitative relationships.

The phasor diagram for the vertical half-plane model, as presented, is for the coaxial coil configuration with the amplitudes in parts per million (ppm) of the primary field as measured at the response peak over the conductor. To assist the interpretation of the survey results the computer is used to identify the apparent conductance and depth at selected anomalies. The results of this calculation are presented in table form in Appendix II and the conductance and inphase amplitude are presented in symbolized form on the map presentation.

The conductance and depth values as presented are correct only as far as the model approximates the real geological situation. The actual geological source may be of limited length, have significant dip, may be strongly magnetic, its conductivity and thickness may vary with depth and or strike and adjacent bodies and overburden may have modified the response. In general the conductance estimate is less affected by these limitations than is the

depth estimate, but both should be considered as relative rather than absolute guides to the anomaly's properties.

Conductance in mhos is the reciprocal of resistance in ohms and in the case of narrow slab-like bodies is the product of electrical conductivity and thickness.

Most overburden will have an indicated conductance of less than 2 mhos; however, more conductive clays may have an apparent conductance of say 2 to 4 mhos. Also in the low conductance range will be electrolytic conductors in faults and shears.

The higher ranges of conductance, greater than 4 mhos, indicate that a significant fraction of the electrical conduction is electronic rather than electrolytic in nature. Materials that conduct electronically are limited to certain metallic sulphides and to graphite. High conductance anomalies, roughly 10 mhos or greater, are generally limited to sulphide or graphite bearing rocks.

Sulphide minerals, with the exception of such ore minerals as sphalerite, cinnabar and stibnite, are good conductors; sulphides may occur in a disseminated manner that inhibits electrical

conduction through the rock mass. In this case the apparent conductance can seriously underrate the quality of the conductor in geological terms. In a similar sense the relatively non-conducting sulphide minerals noted above may be present in significant consideration in association with minor conductive sulphides, and the electromagnetic response only relate to the minor associated mineralization. Indicated conductance is also of little direct significance for the identification of gold mineralization. Although gold is highly conductive, it would not be expected to exist in sufficient quantity to create a recognizable anomaly, but minor accessory sulphide mineralization could provide a useful indirect indication.

In summary, the estimated conductance of a conductor can provide a relatively positive identification of significant sulphide or graphite mineralization; however, a moderate to low conductance value does not rule out the possibility of significant economic mineralization.

#### Geometrical Considerations

Geometrical information about the geologic conductor can often be interpreted from the profile shape of the anomaly. The change in shape is primarily related to the change in inductive coupling among the transmitter, the target, and the receiver.

In the case of a thin, steeply dipping, sheet-like conductor, the coaxial coil pair will yield a near symmetric peak over the conductor. On the other hand, the coplanar coil pair will pass through a null couple relationship and yield a minimum over the conductor, flanked by positive side lobes. As the dip of the conductor decreased from vertical, the coaxial anomaly shape changes only slightly, but in the case of the coplanar coil pair the side lobe on the down dip side strengthens relative to that on the up dip side.

As the thickness of the conductor increases, induced current flow across the thickness of the conductor becomes relatively significant and complete null coupling with the coplanar coils is no longer possible. As a result, the apparent minimum of the coplanar response over the conductor diminishes with increasing thickness, and in the limiting case of a fully 3 dimensional body or a horizontal layer or half-space, the minimum disappears completely.

A horizontal conducting layer such as overburden will produce a response in the coaxial and coplanar coils that is a function of altitude (and conductivity if not uniform). The profile shape will be similar in both coil configurations with an amplitude ratio (coplanar:coaxial) of about 4:1\*.

In the case of a spherical conductor, the induced currents are confined to the volume of the sphere, but not relatively restricted to any arbitrary plane as in the case of a sheet-like form. The response of the coplanar coil pair directly over the sphere may be up to 8\* times greater than that of the coaxial pair.

In summary, a steeply dipping, sheet-like conductor will display a decrease in the coplanar response coincident with the peak of the coaxial response. The relative strength of this coplanar null is related inversely to the thickness of the conductor; a pronounced null indicates a relatively thin conductor. The dip of such a conductor can be inferred from the relative amplitudes of the side-lobes.

Massive conductors that could be approximated by a conducting sphere will display a simple single peak profile form on both coaxial and coplanar coils, with a ratio between the coplanar to coaxial response amplitudes as high as 8\*.

Overburden anomalies often produce broad poorly defined anomaly profiles. In most cases, the response of the coplanar coils closely follows that of the coaxial coils with a relative amplitude ratio of 4\*.

Occasionally, if the edge of an overburden zone is sharply defined with some significant depth extent, an edge effect will occur in the coaxial coils. In the case of a horizontal conductive ring or ribbon, the coaxial response will consist of two peaks, one over each edge; whereas the coplanar coil will yield a single peak.

\* It should be noted at this point that Aerodat's definition of the measured ppm unit is related to the primary field sensed in the receiving coil without normalization to the maximum coupled (coaxial configuration). If such normalization were applied to the Aerodat units, the amplitude of the coplanar coil pair would be halved.

#### Magnetics

The Total Field Magnetic Map shows contours of the total magnetic field, uncorrected for regional variation. Whether an EM anomaly with a magnetic correlation is more likely to be caused by a sulphide deposit than one without depends on the type of mineralization. An apparent coincidence between an EM and a magnetic anomaly may be caused by a conductor which is also magnetic, or by a conductor which lies in close proximity to a magnetic body. The majority of conductors which are also magnetic are sulphides containing pyrrhotite and/or magnetite. Conductive and magnetic

bodies in close association can be, and often are, graphite and magnetite. It is often very difficult to distinguish between these cases. If the conductor is also magnetic, it will usually produce an EM anomaly whose general pattern resembles that of the magnetics. Depending on the magnetic permeability of the conducting body, the amplitude of the inphase EM anomaly will be weakened, and if the conductivity is also weak, the inphase EM anomaly may even be reversed in sign.

#### VLF Electromagnetics

The VLF-EM method employs the radiation from powerful military radio transmitters as the primary signals. The magnetic field associated with the primary field is elliptically polarized in the vicinity of electrical conductors. The Herz Totem uses three coils in the X, Y, Z configuration to measure the total field and vertical quadrature component of the polarization ellipse.

The relatively high frequency of VLF (15-25) kHz provides high response factors for bodies of low conductance. Relatively "disconnected" sulphide ores have been found to produce measureable VLF signals. For the same reason, poor conductors such as sheared contacts, breccia zones, narrow faults, alteration zones and porous flow tops normally produce VLF anomalies. The method can therefore be used effectively for geological mapping. The only

relative disadvantage of the method lies in its sensitivity to conductive overburden. In conductive ground the depth of exploration is severely limited.

The effect of strike direction is important in the sense of the relation of the conductor axis relative to the energizing electromagnetic field. A conductor aligned along a radius drawn from a transmitting station will be in a maximum coupled orientation and thereby produce a stronger response than a similar conductor at a different strike angle. Theoretically, it would be possible for a conductor, oriented tangentially to the transmitter to produce no signal. The most obvious effect of the strike angle consideration is that conductors favourably oriented with respect to the transmitter location and also near perpendicular to the flight direction are most clearly rendered and usually dominate the map presentation.

The total field response is an indicator of the existence and position of a conductivity anomaly. The response will be a maximum over the conductor, without any special filtering, and strongly favour the upper edge of the conductor even in the case of a relatively shallow dip.

The vertical quadrature component over steeply dipping sheet-like

conductor will be a cross-over type response with the cross-over closely associated with the upper edge of the conductor.

The response is a cross-over type due to the fact that it is the vertical rather than total field quadrature component that is measured. The response shape is due largely to geometrical rather than conductivity considerations and the distance between the maximum and minimum on either side of the cross-over is related to target depth. For a given target geometry, the larger this distance the greater the depth.

The amplitude of the quadrature response, as opposed to shape is function of target conductance and depth as well as the conductivity of the overburden and host rock. As the primary field travels down to the conductor through conductive material it is both attenuated and phase shifted in a negative sense. The secondary field produced by this altered field at the target also has an associated phase shift. This phase shift is positive and is larger for relatively poor conductors. This secondary field is attenuated and phase shifted in a negative sense during return travel to the surface. The net effect of these 3 phase shifts determine the phase of the secondary field sensed at the receiver.

A relatively poor conductor in resistive ground will yield a net positive phase shift. A relatively good conductor in more conductive ground will yield a net negative phase shift. A combination is possible whereby the net phase shift is zero and the response is purely in-phase with no quadrature component.

A net positive phase shift combined with the geometrical crossover shape will lead to a positive quadrature response on the
side of approach and a negative on the side of departure. A net
negative phase shift would produce the reverse. A further sign
reversal occurs with a 180 degree change in instrument orientation as occurs on reciprocal line headings. During digital
processing of the quadrature data for map presentation this is
corrected for by normalizing the sign to one of the flight line
headings.

APPENDIX V

ANOMALY LIST

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## HEPBURN TOWNSHIP PROPERTY /TITLE

| , |        |       |         |          |                     |                  | CONI        | BIRD          |                |
|---|--------|-------|---------|----------|---------------------|------------------|-------------|---------------|----------------|
| I | FLIGHT | LINE  | ANOMALY | CATEGORY | AMPLITUD<br>INPHASE | E (PPM)<br>QUAD. | CTP<br>MHOS | DEPTH<br>MTRS | HEIGHT<br>MTRS |
| • |        |       |         |          |                     |                  |             |               |                |
|   | 2      | 20070 | A       | 0        | 8.8                 | 17.1             | 0.3         | 0             | 233            |
|   | 2      | 20080 | A       | 0        | 8.7                 | 19.1             | 0.3         | 0             | 222            |
|   | 2      | 20090 | A       | 0        | 9.0                 | 21.8             | 0.2         | 0             | 214            |

Estimated depth may be unreliable because the stronger part of the conductor may be deeper or to one side of the flight line, or because of a shallow dip or overburden effects.

## ABBOTSFORD TOWNSHIP PROPERTY /TITLE

| $\smile$ |                |         |          | AMDI TIIID   | E (PPM)     |            | UCTOR  | BIRD       |
|----------|----------------|---------|----------|--------------|-------------|------------|--------|------------|
| FLIGHT   | LINE           | ANOMALY | CATEGORY |              | QUAD.       |            | MTRS   | MTRS       |
| 3        | 10090          | A       | 0        |              | 7.2         | 0.0        | 0      | 181        |
| 3        | 10100          | A       | 0        |              | 8.8         |            | 0      | 183        |
| 3        | 10110<br>10110 | A<br>B  | 0        | -0.5<br>8.9  | 4.4<br>12.9 | 0.0        | 0      | 177<br>214 |
| 3<br>3   | 10120<br>10120 | A<br>B  | 0        | 6.3<br>1.7   | 12.6<br>4.1 |            | 0      | 215<br>210 |
| 3<br>3   | 10130<br>10130 | A<br>B  | 2        | 17.0<br>12.1 | 8.9<br>19.6 | 2.9<br>0.5 | 0      | 190<br>187 |
| 3<br>3   | 10140<br>10140 | A<br>B  | 0        | 9.8<br>-1.9  | 15.1<br>1.7 | 0.5        | 0      | 204<br>205 |
| 3<br>3   | 10150<br>10150 | A<br>B  | 0<br>0   | -0.2<br>8.5  | 7.9<br>13.8 | 0.0        | 0      | 188<br>193 |
| 3        | 10160          | A       | 0 -      | 0.0          | 8.3         | 0.0        | 0      | 216        |
| 3        | 10170          | A       | 0        | 3.7          | 11.3        | 0.1        | 0      | 185        |
| 3        | 10210          | A       | 0        | 15.5         | 20.5        | 0.8        | 0      | 191        |
| 3        | 10220          | A       | 0        | 6.0          | 11.6        | 0.3        | 0      | 235        |
| 3        | 10230          | A       | 0        | 6.0          | 15.2        | 0.2        | 0      | 213        |
| 3        | 10240<br>10240 | A<br>B  | 0        | 8.5<br>2.0   | 14.6<br>3.0 |            | 0<br>0 | 220<br>195 |
| 3        | 10250<br>10250 | A<br>B  | 1 0      | 6.8<br>2.4   | 4.7<br>6.7  | 1.4        | 0<br>0 | 179<br>185 |
| 3        | 10260<br>10260 | A<br>B  | 0        | 2.5<br>1.7   | 4.2<br>1.6  | 0.2<br>0.5 | 0<br>0 | 197<br>214 |
| 3        | 10270<br>10270 | A<br>B  | 0        | 1.0<br>5.4   | 3.0<br>4.6  | 0.0        | 0<br>0 | 175<br>169 |
| 3        | 10280          | А       | 0        | 3.3          | 3.5         | 0.5        | 0      | 192        |
| 3        | 10290          | A       | 0        | 4.2          | 3.9         | 0.7        | 0      | 180        |

Estimated depth may be unreliable because the stronger part of the conductor may be deeper or to one side of the flight line, or because of a shallow dip or overburden effects.

## ABBOTSFORD TOWNSHIP PROPERTY /TITLE

| ~      |       |         |          | AMPLITUD | E (PPM) | CONI | DUCTOR<br>DEPTH | BIRD<br>HEIGHT |
|--------|-------|---------|----------|----------|---------|------|-----------------|----------------|
| FLIGHT | LINE  | ANOMALY | CATEGORY | INPHASE  | QUAD.   | MHOS | MTRS            | MTRS           |
|        |       |         |          |          |         |      |                 |                |
| 3      | 10300 | Α       | 0        | 7.6      | 31.4    | 0.1  | 0               | 185            |
| 3      | 10300 | В       | 1        | 6.7      | 5.6     | 1.1  | 0               | 203            |
| 3      | 10310 | A       | 1        | 11.0     | 9.4     | 1.3  | 0               | 187            |
| 3      | 10320 | A       | 1        | 4.8      | 3.8     | 1.0  | 0               | 236            |
| 3      | 10330 | A       | 0        | 2.5      | 2.2     | 0.6  | 0               | 221            |
| 3      | 10330 | В       | 0        | 5.6      | 6.8     | 0.6  | 0               | 188            |
| 3      | 10350 | A       | 0        | 6.0      | 10.2    | 0.3  | 0               | 188            |
| 3      | 10360 | A       | 2        | 3.1      | 1.3     | 2.1  | 0               | 212            |
| 3      | 10370 | A       | 0        | 2.2      | 10.5    | 0.0  | 0               | 193            |
| 3      | 10500 | А       | 0        | 5.2      | 13.1    | 0.2  | 0               | 185            |
| 3      | 10510 | A       | 0        | 7.5      | 27.9    | 0.1  | 0               | 177            |

Estimated depth may be unreliable because the stronger part of the conductor may be deeper or to one side of the flight line, or because of a shallow dip or overburden effects.



900

| Type of Survey(s)  |   |                                |                                     |                     | Township             | or Areamett   | epp strettneres               |                     |
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| Survey Company Aerodat Limite                                  |   |                                |                                     | Date of Survey      |                      | Mo.   Yr.     | 188 line                      |                     |
| D.H. Pitcher,  |   | Dr., M                         | ississ                              | auga ON, I          | 4V 1R3               |               | · · · · · ·                   | ·                   |
| Credits Requested per Each                                     | Claim in Columns at r                                 | ight                           |                                     | laims Traversed (   | List in nume         |               |                               |                     |
| Special Provisions   | Geophysical   | Days per<br>Claim              | Prefix                              | lining Claim Number | Expend.<br>Days Cr.  | Prefix        | Number                        | Expend.<br>Days Cr. |
| For first survey:  | - Electromagnetic                                     |                                | L                                   | 1015828             |                      | L             | 1015851                       |                     |
| Enter 40 days. (This includes line cutting)                    | E C ETVED   | ,                              |                                     | 29                  |                      |               | 52                            |                     |
| For each additional survey:                                    | - Radiometric   |                                |                                     | 30                  |                      | vir.          | 53                            |                     |
|  | AY - other 1988                                       |                                |                                     | 31                  |                      |               | 54                            |                     |
|  | Geological  |                                | 35675.65                            | 32                  |                      |               | 55                            |                     |
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| Man Days   | Geophysical   | Days per<br>Claim              |                                     | 34                  |                      |               | 57                            |                     |
| Complete reverse side  | - Electromagnetic                                     | 5.5                            |                                     | 35                  |                      |               | 1015858                       |                     |
| and enter total(s) here  | Nagnetometer  |                                |                                     | 36                  |                      |               | 954511                        |                     |
|  | Badiometric   |                                |                                     | 37                  |                      |               | 12                            |                     |
|  | Other   |                                |                                     | 38                  |                      |               | 13                            |                     |
| APR 18 198   | Geological  |                                |                                     | 39                  |                      |               | 14                            |                     |
| 10:1600  | Geochemical   |                                |                                     | 40                  |                      |               | 15                            | 1 1                 |
| Airporne Credits   |   | Days per<br>Claim              |                                     | 41                  |                      |               | 16                            | 1                   |
| _ Note: Special provisions                                     | Electromagnetic                                       | 40                             |                                     | 42                  |                      |               | 17                            |                     |
| credits do not apply to Airborne Surveys.                      | Magnetometer  | 40                             |                                     | 43                  |                      |               | 18                            |                     |
| to Aliborne Surveys.   | Radiometric   | 1                              |                                     | 44                  | 1                    |               | 19                            |                     |
| Expenditures (excludes pow                                     | <u></u>   |                                |                                     | 45                  |                      |               | 20                            |                     |
| Type of Work Performed   | INTAMIO GEOLOGICAL                                    | SURVEY                         | 8                                   |                     |                      |               |                               |                     |
| Performed on Claim(s)  | ASSESSMENT F  |                                |                                     | 46                  | -                    |               | 21                            |                     |
|  | OFFICE  |                                |                                     | 47                  |                      |               | 22                            | -                   |
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| Certification Verifying Repo                                   |   |                                | ho forter                           | forth in the        | of Work ====         | yed bar       | aving parformed               | he work             |
| I hereby certify that I have a<br>or witnessed same during and | personal and intimate kr<br>d/or after its completion | nowledge of t<br>and the anne: | ne tacts set t<br>xed report is     | true.               | or work anne         | xeu nereeb, f | laving performed to           | IS WOLK             |
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Report of Work (Geophysical, Geological, Geochemical and Expenditures)

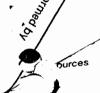
Instructions: - Please type or print.
- If number of mining claims traversed

in the "Expend, Days Cr." columns. Do not use shaded areas below.

Mining Act

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| Type of Survey(s)  | _                           |                    |                   |                  | Township o    | or Area     |   |          |
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| Claim Holder(s)  |                             |                    |                   | İ                |               | ,           | r's Licence No.                         |          |
| Seal River Exp   | <u>lorations Li</u>         | .mited             |                   | _                |               | T-18        | <b>41</b>                               |          |
|  |                             |                    |                   |                  |               |             |   |          |
| Survey Company   |                             |                    |                   | Date of Survey   | (from & to)   |             | Total Miles of line                     | Cut      |
|  |                             |                    |                   | Day Mo.          | Yr. Day I     | Mo.   Yr.   |   |          |
| Name and Address of Author (o  | f Geo-Technical report)     |                    |                   |                  |               |             |   |          |
| Credits Requested per Each (   | Claim in Columns at r       | ight               | Mining Clai       | ms Traversed (   | List in nume  | rical seque | ence)                                   |          |
| Special Provisions   | Geophysical                 | Days per           | Min               | ing Claim        | Expend.       | M           | lining Claim                            | Expend.  |
| For first survey:  |                             | Claim              | Prefix<br>L       | 954526           | Days Cr.      | Prefix      | 954549                                  | Days Cr. |
| Enter 40 days. (This   | - Electromagnetic           |                    | 203/2020          | ,                |               |             |   |          |
| includes line cutting)   | Magnetometer                |                    |                   | 27               |               |             | 954550                                  |          |
| For each additional survey:  | - Radiometric               |                    | 3 (A)             | 28               |               |             | 954864                                  |          |
| using the same grid:   | - Other                     |                    |                   | 29               |               |             | 954865                                  |          |
| Enter 20 days (for each)   | Geological                  |                    |                   | 30               |               |             | 954868                                  | _        |
|  |                             |                    |                   |                  |               |             | · · · · · · · · · · · · · · · · · · ·   |          |
| Man Days   | Geochemical                 |                    |                   | 31               |               |             | 69                                      |          |
|  | Geophysical                 | Days per<br>Claim  | 7 7 7 7           | 32               |               | 2           | • 70                                    |          |
| Complete reverse side . and enter total(s) here DN:Sign  | • Electromagnetic           |                    | 4                 | 33               |               |             | 71                                      |          |
| IS BELLEVIN  | Magneto meter               |                    |                   | 34               |               | 44.5        | 72                                      |          |
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| 10.16an  | Geological                  |                    |                   | 37               |               |             | 75                                      |          |
|  | Geochem cal                 |                    |                   | 38               |               | 4.5         | 76                                      |          |
| Airborne Credits   |                             | Days per<br>Claim  |                   | 39               |               |             | ; 77                                    |          |
| Note: Special provisions   | Electromagnetic             |                    |                   | 40               |               |             | 78                                      |          |
| credits do not apply to Airborne Surveys.  | Magnetometer                |                    |                   | 41               |               |             | 79                                      |          |
|  | Radiometric                 |                    |                   | 42               |               |             | 80                                      |          |
| Expenditures (excludes power   | er stripping)               |                    |                   | 43               |               |             | 81                                      |          |
| Type of Work Performed   |                             |                    |                   | 44               |               |             |   |          |
| Performed on Claim(s)  |                             |                    |                   |                  | ++            |             | 82                                      |          |
| Performed on Claim(s)  |                             |                    |                   | 45               | ļ             |             | 83                                      |          |
|  |                             |                    |                   | 46               |               |             | 84                                      |          |
| Color de la constitución de Co | Condition                   |                    |                   | 47               |               |             | 85                                      |          |
| Calculation of Expenditure Days Total Expenditures   |                             | Total<br>s Credits |                   | 954548           |               |             | 954886                                  |          |
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| or witnessed same during and   | /or after its completion    | and the ann        | exed report is tr | e.               |               |             | periorned ti                            | .5       |
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# Report of Work (Geophysical, Geological, Geochemical and Expenditures)

Instructions: 

Please type or print.

If number of mining claims traversed exceeds space on this, form, attach a list.

Note: 

Only days credits calculated in the "Expenditures" section may be entered in the "Expend. Days Cr." columns.

Do not use shaded areas below.

Mining Act

| Type of Survey(s)  | _   |                             |  |                         | Township o          | or Area              |                     |                     |
|--|---|-----------------------------|--|-------------------------|---------------------|----------------------|---------------------|---------------------|
| Claim Holder(s)  |   |                             |  |                         |                     | Prospector's         |                     |                     |
|  | cplorations Li  | .mited                      |  |                         |                     | T-184                | 1                   |                     |
| Address  |   |                             |  |                         |                     |                      |                     |                     |
| Survey Company   |   |                             | _                                      | Date of Survey          | (from & to)         | Т                    | otal Miles of li    | ne Cut              |
|  |   |                             |  | Day Mo.                 | Yr. Day I           | Mo.   Yr.            | ;<br>               |                     |
| Name and Address of Author                                 | r (of Geo-Technical report)                                 |                             |  |                         |                     |                      |                     |                     |
| Credits Requested per Eac                                  | ch Claim in Columns at r                                    | ight                        | Mining Clai                            | ms Traversed (          | List in nume        | rical sequenc        | ce)                 |                     |
| Special Provisions   | Geophysical   | Days per<br>Claim           |  | ing Claim<br>Number     | Expend.<br>Days Cr. |                      | ing Claim<br>Number | Expend.<br>Days Cr. |
| For first survey:  | - Electromagnetic   | Claim                       | L                                      | 955064                  | 3373 0              | Frenz                | Namber              | 30,500              |
| Enter 40 days. (This includes line cutting)                | - Magnetometer  |                             |  | 955065                  |                     | X                    |                     |                     |
|  |   |                             | Carlo mand in self in such as          |                         | +                   |                      | - :                 |                     |
| For each additional survey using the same grid:            | y: - Radiometric  |                             |  | 955069                  |                     |                      |                     |                     |
| Enter 20 days (for eac                                     | - Other   |                             |  | 70                      |                     |                      |                     |                     |
|  | Geological  |                             | A POST DATE                            | 71                      |                     |                      |                     |                     |
|  | Geochemical   |                             |  | 72                      |                     |                      |                     |                     |
| Man Days   | Geophysical   | Days per<br>Claim           |  | 955073                  |                     |                      | •                   |                     |
| Complete reverse side                                      |   | Ciaiiii                     |  | 777-17                  |                     | Andread or continued |                     |                     |
| end entertrocation precedivisi                             | ر المال   |                             |  |                         | +                   |                      |                     |                     |
|  | Magnetometer  |                             |  |                         |                     |                      |                     |                     |
|  | adiometric  |                             |  |                         |                     |                      | <u> </u>            |                     |
| L APR 18 19  |   |                             |  |                         |                     | [ T ] X              | 1                   |                     |
| 102160   | MGeological   |                             |  |                         |                     |                      | İ                   |                     |
|  | - Geochemical   |                             |  |                         |                     |                      |                     |                     |
| Airborne Credits   |   | Days per<br>Claim           |  |                         |                     |                      |                     |                     |
| Note: Special provisions                                   | Electromagnetic   | Ciaiiii                     |  |                         | 1                   |                      |                     |                     |
| credits do not apple                                       | у   |                             |  |                         |                     |                      | T.                  |                     |
| to Airborne Survey   | Magnetometer  |                             |  |                         |                     |                      |                     |                     |
|  | Radiometric   |                             |  |                         |                     |                      | T.                  |                     |
| Expenditures (excludes po                                  | ower stripping)   |                             |  |                         |                     |                      | *                   |                     |
| Type of Work Terrormed                                     |   |                             |  |                         |                     |                      |                     |                     |
| Performed on Claim(s)                                      |   |                             | 20.6                                   | •                       |                     |                      |                     |                     |
|  |   |                             |  |                         |                     | 200                  |                     |                     |
|  |   |                             |  |                         |                     |                      |                     |                     |
| Calculation of Expenditure D                               | Pays Credits  | Total                       |  |                         | -                   | _                    |                     |                     |
| Total Expenditures   |   | s Credits                   | * 3 7 7                                |                         |                     | 757                  |                     |                     |
| \$   | ÷ [15] = [  |                             |  |                         |                     | Total numbe          | er of mining        |                     |
| Instructions   |   |                             |  |                         |                     | report of wo         |                     |                     |
|  | e apportioned at the claim has been to a select.            |                             |  | or Office Use C         |                     |                      |                     |                     |
| in columns at right.                                       |   |                             | Recorded                               | r. Date Recorded        |                     | Mining Reco          | raer                |                     |
| Date   | Recorded Holder or Agent (                                  | Signature)                  |  | Date Approved           | as Recorded         | Branch Direc         | tor                 |                     |
|  |   |                             |  |                         |                     |                      |                     |                     |
| Certification Verifying Re                                 |   |                             | aha facta car                          | ah in ah - B :          | of West asset       | and herese to        | ina                 | d the work          |
| I hereby certify that I have<br>or witnessed same during a | e a personal and intimate ko<br>and/or after its completion | nowledge of<br>and the anno | tne tacts set for<br>exed report is tr | tn in the Report<br>ue. | or work annex       | ed nereto, hav       | ving pertormed      | a the Work          |
| Name and Postal Address of I                               |   | ```                         |  |                         |                     |                      |                     |                     |
|  |   |                             |  | In., 6                  |                     | In.                  | /6/                 |                     |
|  |   |                             |  | Date Certified          |                     | Certified by         | (Signature)         |                     |
| 1362 (81/9)  |   |                             |  |                         |                     |                      |                     |                     |

|         | · //C       |
|---------|-------------|
|         | Ministry of |
| (CO)    | Natural     |
|         | Resources   |
| Ontario | 1           |

Land 11 Kernegenent. Report of Work

(Geophysical, Geological, Geochemical and Expenditures)

W8808.

Instructions: -

Note: -

Please type or print.

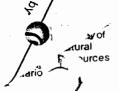
If number of mining daims traversed exceeds space on this form, attach a list.

Only days credits calculated in the "Expenditures" section may be entered in the "Expend. Days Cr." columns.

Do not use shaded areas below.

or Area

| Type of Survey(s)  | Type of Survey(s)        |                   |  |                        |                  |              |                              | Township or Area    |  |  |  |
|--|--------------------------|-------------------|--|------------------------|------------------|--------------|------------------------------|---------------------|--|--|--|
| Airborne VLF-  | Em, Em and M             | agneto            | ometer   | :                      | Appor            | tsford       |                              |                     |  |  |  |
| Claim Holder(s)  | nlonetions I             | imitod            |  |                        |                  | Prospector   | 's Licence No.               |                     |  |  |  |
| Seal River Ex  | proractons in            | TIIIT CEC         |  | · ·                    |                  | 1-10         | :                            |                     |  |  |  |
| 2372 Sinclair  | Circle, Bur              | lingto            | on ON,   |                        |                  |              | <del></del>                  |                     |  |  |  |
| Survey Company Aerodat Limit                                   | o đ                      |                   |  | 31 Survey              |                  |              | Total Miles of line 187 line |                     |  |  |  |
| Name and Address of Author (o                                  |                          |                   |  | Day Mo.                | Yr. Day          | Mo. Yr.      |                              | 12                  |  |  |  |
| D.H. Pitcher,  | 3883 Nashua              | Dr.,              | Missis   | sauga ON,              | L4V 1R           | 3            |                              |                     |  |  |  |
| Credits Requested per Each (                                   |                          |                   | Mining C   | laims Traversed (      |                  | rical seque  |                              |                     |  |  |  |
| Special Provisions   | Geophysical              | Days per<br>Claim | Prefix   | lining Claim<br>Number | Expend. Days Cr. | Prefix       | ining Claim<br>Number        | Expend.<br>Days Cr. |  |  |  |
| For first survey:  | - Electromagnetic        |                   | L  | 895497                 |                  | L            | 954661                       |                     |  |  |  |
| Enter 40 days (This includes line putting)                     | V Magnetometer           | `                 |  | 98                     |                  |              | 954797                       |                     |  |  |  |
| For each additioned survey using the same gradi                | - Radiometric            |                   | -  | 99                     |                  |              | 98                           |                     |  |  |  |
| Enter 20 days (for each)                                       | - Other                  |                   |  | 895500                 |                  |              | 99                           |                     |  |  |  |
| MINING LANDS   | SECTION                  |                   | westad   | 954642                 |                  |              | 954800                       |                     |  |  |  |
|  | Geochemical              |                   |  | 43                     |                  |              | 1                            |                     |  |  |  |
| Man Days   | Geophysical              | Days per<br>Claim |  | 44                     |                  |              | . 2                          |                     |  |  |  |
| Complete reverse side  | ्र - Electromagnetic     |                   |  | 45                     |                  |              | 3                            |                     |  |  |  |
|  | Megnetometer             |                   |  | 46                     |                  |              | 4                            |                     |  |  |  |
| :  | Rediometric              |                   | ant.   | 47                     |                  |              | 5                            |                     |  |  |  |
| APR 18 19  | BE . Other               |                   | Sh. Arrest planes yet feet   | 48                     |                  |              | 954806                       |                     |  |  |  |
| 10.160   | Geologica<br>Geologica   |                   | An and a share say a share<br>word and a share say a share<br>graphing a | 49                     |                  | A CAMPAGNA   | 960901                       |                     |  |  |  |
| X5   | Geochemical              |                   |  | 50                     |                  |              | 2                            |                     |  |  |  |
| Airborne Credits   |                          | Days per<br>Claim |  | 51                     |                  |              | 3                            |                     |  |  |  |
| Note: Special provisions                                       | Electromagnetic          | 40                |  | 52                     |                  |              | 4                            |                     |  |  |  |
| credits do not apply<br>to Airborne Surveys.                   | Magnetometer             | 40                |  | 53                     |                  |              | 5                            |                     |  |  |  |
|  | Radiometric              |                   |  | 54                     |                  |              | 6                            |                     |  |  |  |
| Expenditures (excludes power Type of Work Performed            | er stripping)            |                   |  | 55                     |                  |              | 7                            |                     |  |  |  |
| Type of Work Fertormed   |                          | 1                 |  | 56                     |                  |              | 8                            |                     |  |  |  |
| Performed on Claim(s)  |                          |                   |  | 57                     |                  |              | 9                            |                     |  |  |  |
|  |                          |                   |  | 58                     |                  |              | 10                           |                     |  |  |  |
| Calculation of Expenditure Days                                | Credits                  |                   |  | 59                     |                  |              | 11                           |                     |  |  |  |
| Total Expenditures   | 7                        | otal<br>Credits   |  | 954660                 |                  | 1.24         | 960912                       |                     |  |  |  |
| \$   | ÷ [15] =                 |                   |  |                        |                  | Total num    | Tinued on                    | 00 T                |  |  |  |
| Instructions   |                          |                   |  |                        |                  | report of    | ered by this<br>work.        | 90                  |  |  |  |
| Total Days Credits may be ap choice. Enter number of days      |                          |                   |  | For Office Use (       |                  | Mining Re    | 6040x 17 -4                  |                     |  |  |  |
| in columns at right.   |                          |                   | Recorded   | Cr. Date Recorded      | 13/38            | Villing New  | A TI                         | D.                  |  |  |  |
| April 15/1988 Rec  | orded Holder or Agent (S | Signature)        | 7841   | Dete Approved          | as Recorded      | Branch Dir   | ect                          |                     |  |  |  |
| Certification Verifying Repo                                   | rt of Work               |                   |  | 1 July                 | 700              | )-K.         | where                        |                     |  |  |  |
| I hereby certify that I have a<br>or witnessed same during and |                          |                   |  |                        | of Work annex    | ed hereto, h | naving performed t           | he work             |  |  |  |
| Name and Postal Address of Pers<br>F.J. Sharpley,              | on Certifying            |                   | -  |                        | ON, L7           | P 3C3        |                              |                     |  |  |  |
|  |                          |                   |  | Date Certified April   |                  |              | (Signature)                  |                     |  |  |  |
| 1362 (81/9)  | <u> </u>                 |                   |  | April                  | 12/1900          | レナ           | myslay                       |                     |  |  |  |



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

Instructions: —

ctions: — Please type or print.

— If number of mining claims traversed exceeds space on this form, attach a list.

Note: — Only days credits calculated in the "Expenditures" section may be entered in the "Expend. Days Cr." columns.

— Do not use spaded areas below.

|  |                           |                   | Mining                                   | Act                    | _                   | Do not use   | shaded areas belo                     | w.                  |
|--|---------------------------|-------------------|--|------------------------|---------------------|--------------|---------------------------------------|---------------------|
| Type of Survey(s)  |                           |                   |  | -                      | Township            | or Area      | )                                     |                     |
| Claim Holder(s)  |                           |                   |  |                        |                     | Prospector   | 's Licence No.                        |                     |
| Seal River Exp   | lorations Li              | mited             |  |                        |                     | T-18         |                                       |                     |
| Address  |                           |                   |  |                        |                     |              |                                       |                     |
| 0  |                           | A sussession a    |  | Data of Surve          | y (from & to)       |              | Total Miles of line                   | Cut                 |
| Survey Company   |                           |                   |  |                        |                     |              |                                       | · Cut               |
| Name and Address of Author (c                              | of Geo-Technical report)  |                   |  | Day Mo.                | Yr. Day             | Mo. Yr.      |                                       | <u> </u>            |
| ,  |                           |                   |  |                        |                     |              | i                                     |                     |
| Credits Requested per Each                                 | Claim in Columns at r     | ight              | Mining Cl                                | aims Traversed         | (List in nume       | rical seque  | nce)                                  |                     |
| Special Provisions   | Geophysical               | Days per<br>Claim | Prefix                                   | lining Claim<br>Number | Expend.<br>Days Cr. | Prefix       | ining Claim<br>Number                 | Expend.<br>Days Cr. |
| For first survey:  | - Electromagnetic         |                   | L  | 960913                 |                     | L            | 960936                                |                     |
| Enter 40 days. (This includes line cutting)                |                           |                   |  |                        |                     |              |                                       | <del></del>         |
|  | - Magnetometer            |                   | The paper section and                    | 14                     |                     |              | 37                                    |                     |
| For each additional survey:                                | - Radiometric             |                   |  | 15                     |                     |              | 38                                    |                     |
| using the same grid:<br>Enter 20 days (for each)           | - Other                   |                   |  | 16                     |                     |              | 39                                    |                     |
| Line: 20 days (for each)                                   | Geological                |                   | And the second                           | 17                     |                     |              | 40                                    |                     |
|  |                           |                   | 2.7                                      | <del>-</del>           |                     |              |                                       |                     |
| Man Days   | Geochemical               |                   |  | 18                     |                     |              | 41                                    |                     |
|  | Geophysical               | Days per<br>Claim | ما الله الله الله الله الله الله الله ال | 19                     |                     |              | ' 42                                  |                     |
| Complete reverse side                                      | 5 Electromagnetic         |                   | Same Book Server                         | 20                     |                     |              | 43                                    |                     |
|  | Magnetometer              |                   |  | 21                     |                     |              | 44                                    |                     |
|  |                           | _                 | N. M. Carlotte                           |                        |                     |              |                                       |                     |
| APR 13 1<br>10.16a   | Hadipmetric               |                   |  | 22                     |                     | Addition 2   | 45                                    |                     |
| 10.160   | M- Othe                   |                   |  | 23                     |                     |              | 46                                    |                     |
| 1 Co   | Geologica                 |                   | manage of the same of the                | 24                     |                     |              | 47                                    |                     |
|  | Geochemical               |                   |  | 25                     |                     | 200          | 48                                    |                     |
| Airborne Credits   |                           | Days per          |  |                        |                     |              |                                       |                     |
|  |                           | Claim             |  | 26                     |                     |              | 49                                    | -                   |
| Note: Special provisions credits do not apply              | Electromagnetic           |                   |  | 27                     |                     |              | 960950                                |                     |
| to Airborne Surveys.                                       | Magnetometer              |                   |  | 28                     |                     |              | 968201                                |                     |
|  | Radiometric               |                   |  | 29                     |                     |              | 968288                                |                     |
| Expenditures (excludes pow                                 | rer stripping)            |                   |  |                        |                     |              | 89                                    |                     |
| Type of Work Performed                                     |                           |                   |  | 30                     |                     |              | · · · · · · · · · · · · · · · · · · · |                     |
|  |                           |                   |  | 31                     |                     |              | 90                                    |                     |
| Performed on Claim(s)                                      |                           | ŀ                 |  | 32`                    |                     |              | 91                                    |                     |
|  |                           | -                 | 3.0                                      | 33                     |                     |              | 92                                    |                     |
|  |                           |                   |  | 34                     |                     |              | 93                                    |                     |
| Calculation of Expenditure Day                             | 7                         | Total             |  |                        |                     |              |                                       |                     |
| Total Expenditures   | Day:                      | s Credits         |  | 960935                 |                     |              | 968294                                | <u> </u>            |
| \$   | ÷ [15] = [_               |                   |  |                        |                     |              | ber of mining<br>ered by this         |                     |
| Instructions   |                           |                   |  |                        |                     | report of    |                                       |                     |
| Total Days Credits may be a<br>choice. Enter number of day |                           |                   |  | For Office Use         | Only                |              | <u> </u>                              |                     |
| in columns at right.                                       |                           |                   | Total Days<br>Recorded                   | Cr. Date Recorde       | d                   | Mining Red   | corder                                |                     |
| Date Re  | corded Holder or Agent (  | Signatura         |  | Date Approve           | d as Recorded       | Branch Dir   | ector                                 |                     |
| Date The   | colded Holder of Agent (S | Jigriature)       |  | Sole Approve           |                     | 2.2          |                                       |                     |
| Certification Verifying Repo                               | ort of Work               |                   |  |                        |                     |              |                                       |                     |
| I hereby certify that I have a                             | personal and intimate kr  |                   |  |                        | t of Work annex     | ed hereto, h | naving performed                      | the work            |
| or witnessed same during and                               |                           | and the ann       | exed report is                           | true.                  |                     | •            |                                       |                     |
| Name and Postal Address of Per                             | son Certifying            |                   |  |                        |                     |              |                                       |                     |
|  |                           |                   |  | Date Certified         | 3                   | Certified b  | y (Signature)                         |                     |
|  |                           |                   |  |                        |                     |              |                                       |                     |
| 1362 (81/9)  |                           |                   |  |                        |                     |              |                                       |                     |

1362 (81/9)

# Report of Work

(Geophysical, Geological, Geochemical and Expenditures)

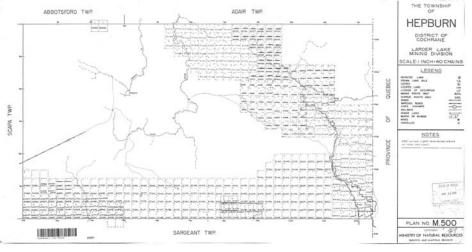
Instructions: — Please type or print.


— If number of mining claims traversed exceeds space on this form, attach a list.

Note: — Only days credits calculated in the "Expenditures" section may be entered in the "Expend, Days Cr." columns. Mining Act Do not use shaded areas below. Township or Area Type of Survey(s) Prospector's Licence No. T-1841 Claim Holder(s)
Seal River Explorations Limited Address Total Miles of line Cut Date of Survey (from & to) Survey Company Day Mo. Yr. Day Mo. Yr. Name and Address of Author (of Geo-Technical report) Credits Requested per Each Claim in Columns at right Mining Claims Traversed (List in numerical sequence) Mining Claim Numbe Mining Claim Days per Claim Expend. Days Cr. Special Provisions Expend. Days Cr. Geophysical Number For first survey: 968295 Ŀ Electromagnetic Enter 40 days. (This 6 includes line cutting) Magnetometer 7 - Radiometric For each additional survey: using the same grid: 8 - Other Enter 20 days (for each) 9 Geological 68 L. T. L. A 968300 Geochemical Man Days Days per Claim Geophysical Complete reverse side Electromagnetic and enter total(s) here Magnetometer - Radiometric Geolodical Geoch mical Airborne Credits Days per Claim Note: Special provisions Electromagnetic credits do not apply Magnetometer to Airborne Surveys. Radiometric Expenditures (excludes power stripping) Type of Work Performed Performed on Claim(s) Calculation of Expenditure Days Credits Total Days Credits Total Expenditures \$ 15 Total number of mining claims covered by this report of work. ÷ Total Days Credits may be apportioned at the claim holder's For Office Use Only choice. Enter number of days credits per claim selected Total Days Cr. Date Recorded Recorded Mining Recorder Date Approved as Recorded Branch Director Date Recorded Holder or Agent (Signature) 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)





LEGEND

\_\_\_\_\_ \_\_\_\_\_ ----RAILWAY AND RIGHT OF WAY -0-0-0 \_\_\_\_\_\_ FLOODING OR FLOODING RIGHTS SUBDIVISION OR COMPOSITE PLAN ........ 

SYMBOL PATENT, SURFACE & MINING RIGHTS. , SURFACE RIGHTS ONLY ... LEASE, SURFACE & MINING RIGHTS\_ SURFACE RIGHTS ONLY. MINING RIGHTS ONLY.

SCALE 1:20 000

THIS TOWNSHIP / AREA FALLS WITHIN THE \_\_\_\_

M.N.R. ADMINISTRATIVE DISTRICT MINING DIVISION LARDER LAKE

