

GM 71682

Geophysical report, induced polarization survey, Fenelon property

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Énergie et Ressources
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Québec 

GEOPHYSICAL REPORT
INDUCED POLARIZATION SURVEY

FENELON PROPERTY
Located in the townships of
Jeremie, Caumont, Gaudet, Fenelon
NTS: Rivière Rouget 032L02,
Collines Gaudet 032E15

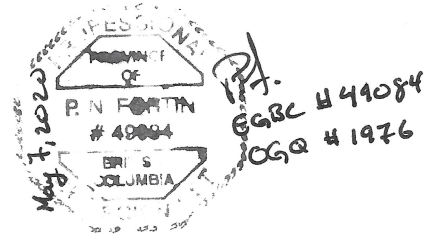
on behalf of

BALMORAL RESOURCES LTD.
Balmoral Resources Ltd.
Suite 1750-700 West Pender Street
Vancouver BC, T5R 3V3

Survey performed:
December 12 to December 22, 2019
and
January 7 to February 9, 2020

by

Philip Fortin, PGeo,
SCOTT GEOPHYSICS LTD.
4013 West 14th Avenue
Vancouver, BC, V6R 2X3



April 30, 2020

<u>Table of Contents</u>	Page
1. Introduction	1
2. Survey Coverage	1
2.1 Location and Access	1
2.2 Property Description	2
2.3 Survey Grid	3
3. Technical Specifications	4
3.1 Overview	4
3.2 Induced Polarization Survey	4
3.2.1 Electrode array	4
3.2.2 Personnel and Equipment	4
3.2.3 Apparent resistivity and chargeability calculations	5
3.3 IP Data processing and plotting	6
3.4 Magnetic Survey	7
3.4.1 Magnetometers and Survey Specifications	7
3.4.2 Magnetic Survey Method and Processing	7
4. Review of Results	7
5. Conclusion	8

Appendices

- A. Bibliography
- B. Statement of Expenditures
- C. Statement of Qualifications
- D. Property claims with work completed
- E. Accompanying Pseudosections (1:2,500 scale)
 - Lines 1650N, 1900N, 2150N, 2400N, 2700N, 3000N, 3300N, 3600N, 3900N, 4300N
 - Lines 8500W, 8350W, 8300W
 - Lines NS2950W, NS2650W, NS2200W, NS2050W, NS1200W, NS1050W, NS950W, NS850W, NS600W, NS0E
- F. Accompanying Maps
 - UTM Coordinates (south at 1:10,000 scale; north at 1:5,000 scale)
 - Chargeability contour plan – 1st 25 m separation
 - Resistivity contour plan – 1st 25 m separation
 - Total Magnetic Field plan
 - Quebec Lambert Projections (south at 1:20,000 scale; north at 1:10,000 scale)
 - Chargeability contour plan – 1st 25 m separation
 - Resistivity contour plan – 1st 25 m separation
 - Total Magnetic Field plan
 - Stacked Magnetic Profiles (Grid Coordinates, 1:5,000 scale)
 - Lines 1650N-4300N
 - Lines NS2950W-NS0E
 - Lines 8500W-8200W

Accompanying Data Files

One (1) CD-ROM with all survey data and plots in Surfer and PDF or GeoTIFF formats

1. INTRODUCTION

As part of their ongoing exploration activities, Balmoral Resources Ltd. contracted Scott Geophysics Ltd. to complete a series of induced polarization (IP) and ground magnetic surveys on their Fenelon property. The property is in northern Québec, 150 km north-northeast of the town of La Sarre, and 80 km west-northwest of the town of Matagami. A total of 45.075 line-kilometres of pole-dipole IP and magnetometer surveying was completed on the property between December 12 to December 22, 2019 and January 7 to February 9, 2020.

Significant mining projects are in the vicinity of the Fenelon property. Wallbridge Mining Company Limited owns the adjacent Fenelon Gold Mine Property, and the survey lines for the southern grid are 700 meters away from the mine, while the lines on the north grid are 2 kilometres away. The past producing Selbaie mine (Cu-Zn-Ag-Au VMS deposit) is located 30 km southwest from the property while the past producing Estrades mine (gold-rich VMS deposit) is located 45 km south-southwest of the property. In addition, the producing Casa Berardi mine (mesothermal gold deposit) is located 65 km southwest of the centre of the property.

The survey is designed to cover an untested area of the Sunday Lake deformation zone southward from the Fenelon property boundary. The objective is to trace a possible intermediate intrusive body southward towards a possible truncation with the Sunday Lake deformation zone. The survey covers an area currently interpreted to be dominantly sediments and will investigate this interpretation in hopes to clarify the geology as well as identify any potential prospective anomalies.

This report presents the results of the geophysical survey over the property.

2. SURVEY COVERAGE

2.1 Location and Access

Main access to the Fenelon property is via highway 109 from Amos to Radisson (James Bay region). Approximately 115 kilometres north of Amos, access to the Halte-Cartwright road is on the left. Approximately 12 km on the right is the entrance to the unmaintained but paved road. Then, 12.3 kilometres from Washa Sibi turn northwards on N-810 paved road to the km 123 marker, where a logging road used by Tembec Forest Company provides access to the Fenelon camp.

An all-season, 82-person camp is currently located on a surface rights lease held by Balmoral on the Fenelon property. The camp can be accessed year-round; it has a telecommunication system, including telephone, fax and internet services (satellite) while electricity is produced by a diesel-powered generator and a water well provides drinking water. The camp is currently leased to and operated by Wallbridge Mining Company Limited in support of their activities on the adjacent Fenelon Gold Mine Property. Balmoral maintains ownership and full access rights to the camp facilities.

Average elevation on the property is between 260 metres and 280 metres above sea level. A network of drill roads and lumber roads provides access to the site of the IP survey and other areas of interest on the property during the winter and summer. Large areas of the property are covered by swamps and flat forest.

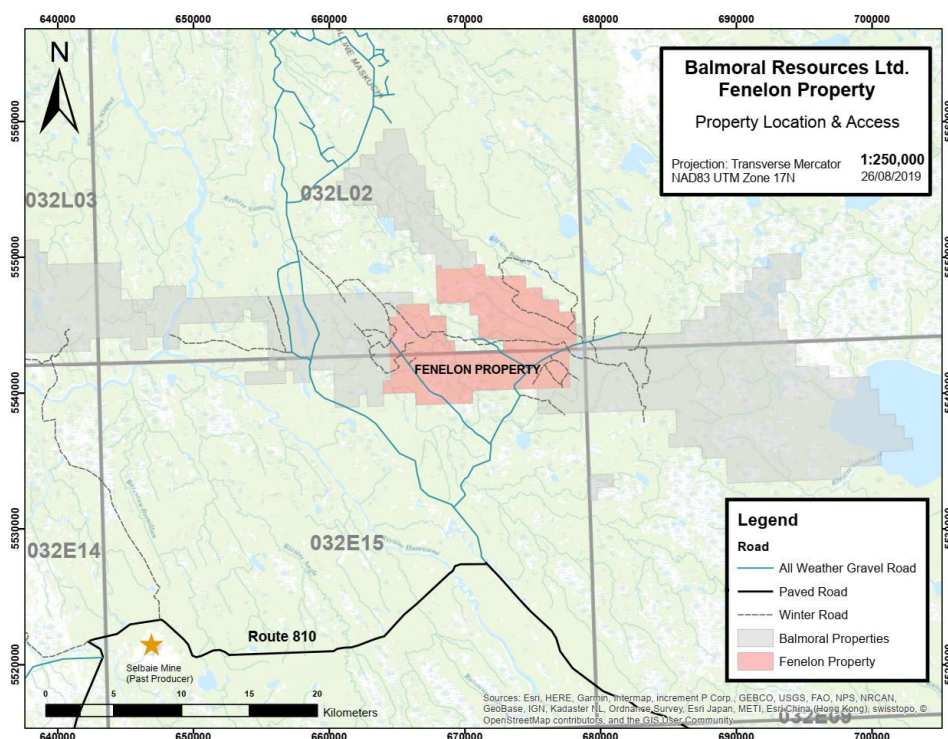


Figure 1 Location and overview of the Fenelon property

2.2 Property Description

The Fenelon Property is in west-central Quebec, centered approximately 80 kilometres WNW from the town of Matagami. It sits on NTS map sheets 32E15 and 32L02 and spans the townships of Fenelon, Caumont, Jeremie and Gaudet. The property is currently comprised of 191 mining claims held 100% in the name of Balmoral. 161 of the claims comprising the Property are subject to a 1.0% NSR royalty payable to Cyprus Canada Inc. A second, privately held, 1.0% NSR royalty is potentially payable on a historic partial interest in certain other claims comprising the Property.

Geologically the Fenelon Property is located along the regional scale Sunday Lake deformation zone and incorporates the intersection of the Sunday Lake – the structural zone which controlled the emplacement of the multi-million ounce Detour Lake gold deposit located 80 kilometres to the west – and the recently identified, gold-bearing Area 51 corridor. The property is thus considered highly prospective for mesothermal gold mineralization.

The northeastern portion of the Fenelon property covers roughly 5-6 kilometres of the Grasset Ultramafic Complex which hosts the Grasset nickel-copper-cobalt-PGE deposit on the adjacent Grasset Property which is also controlled by Balmoral.

Table 1 Claims worked during the Fenelon 2020 IP Program

Claims	NTS Sheets
2182376, 2182386, 2182387, 2271644, 2271645, 2271646, 2271647, 2271648, 2271649, 2271650, 2271662, 2271663, 2271664, 2271665, 2271666, 2271677, 2271678, 2271692, 2271693, 2271694, 2271702, 2271720, 2271721, 2271723, 2271724, 2271725, 2271736, 2271737, 2271739, 2271740, 2271741, 2271753, 2396596, 2399572	32E15, 32L02

2.3 Survey Grid

The IP and magnetic survey grid covers the area shown in figure 2, below.

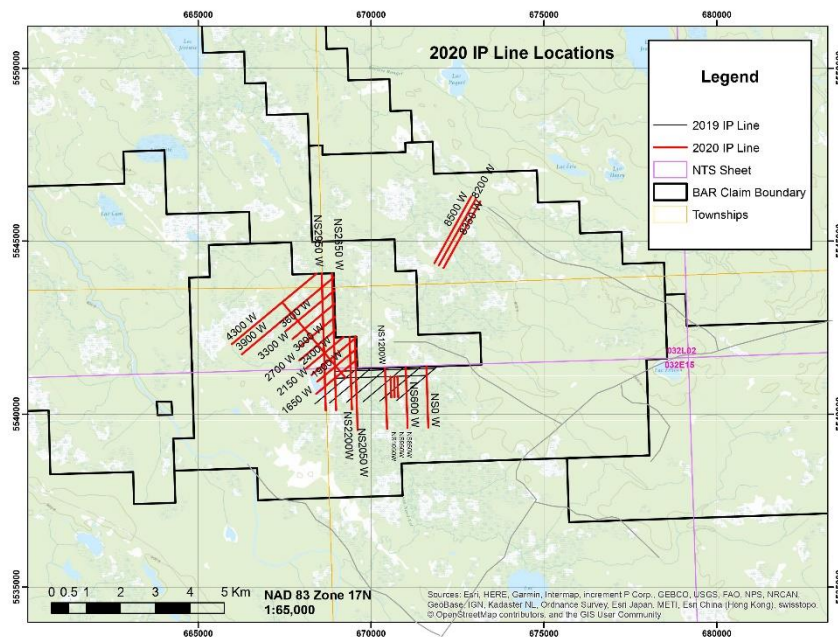


Figure 2 Fenelon survey grid

The Fenelon Grid was implemented along two baselines (each designated as ON). The baseline on the south section runs southeast for three kilometres from 4300N to 2200W and east-west for 2.2 kilometres from 2200W to 0E. The baseline on the northern section is 300 m long from lines 8200W to 8500W. Current electrodes were north of potential electrodes for all lines. Chaining was done every 25 m and wooden pickets were used, with line and station information on each picket. The chargeability and resistivity results are presented on the accompanying pseudosections and plans. All survey data are archived to the accompanying CD-ROM. Table 2 summaries the production for the project.

Table 2 Fenelon 2020 Production Summary

Fenelon 2020 Production Summary			
Line	From	To	Production (m)
1650N	600E	950W	1550
1900N	800E	700W	1500
2150N	1000W	700W	1700
2400N	700E	700W	1400
2700N	650E	700W	1350
3000N	875E	425W	1300
3300N	1125E	450W	1575
3600N	1350E	450W	1800
3900N	1600E	1850W	3450
4300N	1300W	1900W	3200
0E	250N	1500S	1750
NS600W	250N	1500S	1750
NS850W	ON	600S	600
NS950W	ON	600S	600
NS1050W	ON	600S	600
NS1200W	225N	1500S	1725
NS2050W	1175N	1500S	2675
NS2200W	1175N	925S	2100
NS2650W	3000N	900S	3925
NS2950W	3000N	925S	3925
8200W	ON	2200S	2200
8350W	ON	2200S	2200
8500W	ON	2200S	2200
Total (m)			45075

3 TECHNICAL SPECIFICATIONS

3.1 Overview

The following section specifies the electrode array, personnel, and equipment used in this survey. Moreover, it details how apparent resistivity and chargeability are measured and calculated and specifies how the data is processed and plotted.

3.2 Induced Polarization Survey

3.2.1 Electrode Array

A pole-dipole array was used for the IP survey. Readings were taken at an a-spacing of 25 metres at n-separations of 1 to 12 (25/1-12). GPS readings were taken at all electrode locations and at the remote (“infinite”) electrode locations, subject to satellite reception. Elevation measurements are barometric altimeter readings, calibrated to GPS altitude at the beginning of each line.

3.2.2 Personnel and Equipment

Gordon Stewart was the primary field supervisor of Scott Geophysics Ltd, based in Rouyn-Noranda, Québec. Darin Wagner was the primary contact for Balmoral Resources Ltd. The following personnel were involved in assisting the field operations for the survey:

- Brad Scott: Operations Manager
- Gordon Stewart: Crew chief
- Philip Fortin, Geophysicist
- Lise Gagnon, Crew Chief
- Liam Kowalski: Technician
- Esteban Zaragoza: Technician
- Isaac Swift-Scott: Field Assistant
- Jeff Edwards: Field Assistant
- Jean-Soleil Boudreault: Field Assistant

Line cutting was performed by MG Explo, based in La Sarre. These people were involved in the line cutting:

- Mario Gauthier
- Jean Robert

The report was written by Philip Fortin, PGeo.

The following instruments were used for the IP Survey:

Receiver: GDD GRx8-32, by GDD Instruments, Québec City, Québec.

The GDD GRx8 time-domain receiver is used to collect and quality control field data. Line, station, chargeability, chargeability error, apparent resistivity, primary voltage (V_p), primary voltage error, IP decays curves, pseudosections, and spontaneous potential (SP) are recorded and monitored for quality control purposes in the field. Both windowed and full-waveform data are recorded for plotting, post-processing, and further quality control after data has been collected.

Transmitter: GDD TxII (5 kW), by GDD Instruments, Québec City, Québec.

The GDD TxII transmitter is used for time-domain induced polarization surveys. For this survey it was set to transmit 2 second on/off cycles. The transmitter produces a constant voltage which can range from 150 to 2400 Volts, as required, set by the user. Output current is measured from the transmitter and is recalculated by the instrument four times per second. Any variations in current greater than 5% are reported, noted, and corrected in the field by the transmitter operator.

GPS: Garmin GPSMap GPS receiver.

Line, station, and infinite locations are recorded using Garmin GPSMap GPS receiver.

The following equipment was used for the magnetic survey:

Scintrex ENVI proton precession magnetometers for base and field measurements.

3.2.3 Apparent Resistivity and Chargeability Calculations

Direct current and induced polarization methods are ways to determine the subsurface distribution of resistivity and chargeability. Measuring resistivity in the earth is done by applying a three-dimensional expression of Ohm's law:

$$\mathbf{J} = \sigma \mathbf{E}$$

Where \mathbf{J} is the current density, σ is the conductivity, and \mathbf{E} is the electric field. For field measurements, resistivity, ρ , the reciprocal of conductivity, is measured, and the electric field potential, ϕ , is measured rather than the electric field.

In practice, multiple sets of four electrodes are used: two electrodes to inject current and two to measure the potential difference. The distance between potential electrodes is referred to as the a-spacing, and the distance between the nearest current electrode to the potential electrodes is a multiple of the a-spacing, n, where n is usually an integer.

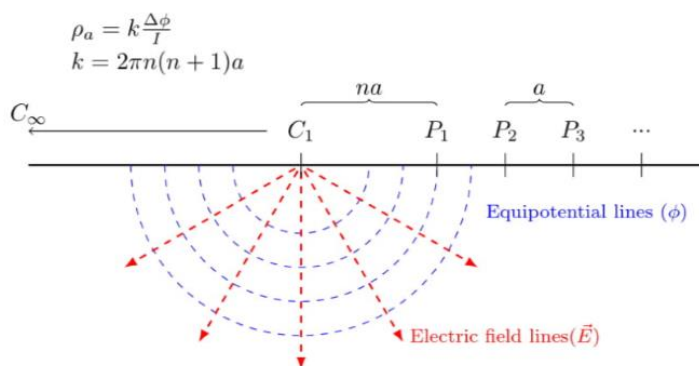


Figure 3 Pole-dipole schematic

Pole-dipole surveys situate one current at a remote location (C_∞ in the schematic above), a second current location (C_1), and pairs of potential electrodes (P_1 , P_2 , etc.). When electricity is turned on, electricity flows through the subsurface (in red), and the potential difference (in blue) can be measured between potential electrodes on the surface. When accounting for the geometry of the array (the geometric factor k in the equation on the above figure) and using a known input current, \mathbf{I} , apparent resistivities (ρ_a) between dipoles are calculated.

Chargeability is a measure of the residual voltage decay observed when electric current is turned off (Sumner, 1976).

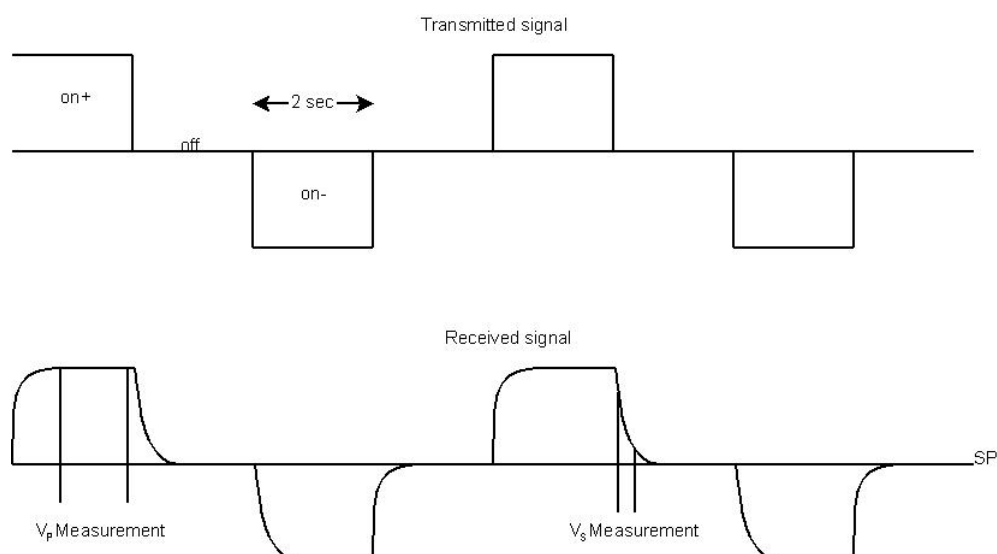


Figure 4 Transmitted and received IP signals

The above figure shows how chargeability is observed on a square wave. The upper signal is the transmitted signal, a square wave alternating on and off and switching polarity between off cycles. The lower signal is the received signal, which, importantly, shows the off-time voltage decaying with time. Chargeability is calculated by specifying a time interval (t_1 and t_2 in the image below) and integrating.

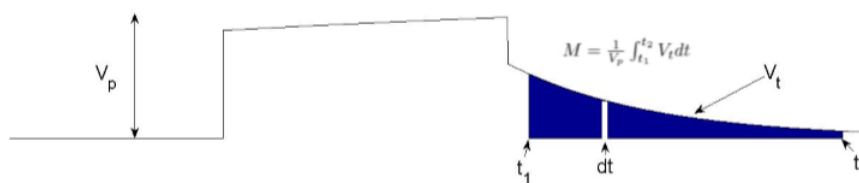


Figure 5 Chargeability calculation

This effect is caused by two mechanisms: membrane polarization and electrode polarization effect (Loke, 2018). Membrane polarization is largely caused by clay minerals present in the rock or sediment. Electrode polarization is caused by conductive minerals in rocks such that the current flow is partly electrolytic and partly electronic.

3.3 IP Data Processing and Plotting

Field data for all IP and resistivity pseudosections is processed and quality controlled using in-house software, then plotted using Golden Software's Surfer. Resistivity and chargeability plan maps are plotted using Surfer for the $n=1$ dipole in UTM coordinates as well as using the Quebec Lambert Projection (QLP). Data was gridded by kriging. A summary of the windows used for chargeability calculations is summarized in the table below.

Table 3 Chargeability window summary

Number of windows: 20
Delay: 200 ms
Timing: 1000 ms
Window lengths: 50, 50, 50, 50, 50, 50, 50, 50, 50, 50, 50, 50, 50, 50, 50, 50, 50, 50, 50, 50

The chargeability and resistivity results are included in Appendix 3 and are additionally submitted in PDF format. The results consist of pseudosections and contoured plan maps.

3.4 Magnetic Survey

3.4.1 Magnetometers and survey specifications

Scintrex Envi proton precession magnetometers were used throughout the survey. Readings were taken at 12.5-meter intervals in most cases, except in locations where there were steep magnetic gradients, in which 5-meter spaces were used for better refinement. Readings for the survey were set to record for 2 seconds per reading.

GPS readings were taken at all 25 m stations, subject to satellite reception, and the locations and altitudes for intermediate 12.5 m and 5 m stations were interpolated using linear interpolation.

3.4.2 Magnetic Survey Method and Processing

A proton precession magnetometer uses a proton-rich fluid (usually a hydrocarbon) filled into a vessel surrounded by a solenoid. A direct current is applied to the solenoid, and the protons in the hydrocarbon are subjected to an artificial magnetic field, causing the protons in the fluid to align with this field. When the current is turned off and the artificial field is removed, the protons gradually precess back to their original orientation, and the precession frequency is measured. The total field strength can be calculated by relating the precession frequency to the strength of the earth's magnetic field.

Since the earth's magnetic field is subject to diurnal variations, a stationary base station magnetometer is positioned to record the diurnal magnetic variation. Both the field magnetometer and base station are synchronized to GPS time, and the base station data is used to correct the field data for these variations.

The magnetic profiles and plan maps provided in the appendices are of the total magnetic field strength after having been corrected for diurnal variations.

4 REVIEW OF RESULTS

The north grid shows agreement between the magnetic profiles with the chargeability and resistivity pseudosections. A magnetic peak occurs on all three lines at approximately 1050S with the weakest response on 8500W. The chargeabilities on the northern portions of the pseudosections are generally less than 2 mV/V, and a chargeability anomaly lies on the southern portion, from 1050S to 2200S for all lines. The deepest chargeability anomaly is on 8500W, which is in accord with the weaker magnetic signal. Resistivities are generally planar and sub-horizontal on the northern half, from 0N to 1000S, and variable on the southern end.

The southeastern lines running north-south include 0E, 600W, 850W, 950W, 1050W, and 1200W. The magnetic profile throughout the area is characterised by gradual changes rather than sharp, narrow signatures. Lines 1200W, 600W, and 0W have magnetic high regions on both the northern and southern ends, with magnetic lows in or near the center of these lines, while the short lines 1050W, 950W, and 850W are in the northern magnetic high region. The chargeability and resistivity pseudosections mimic this trend, with chargeability highs at the north and south ends of the three longer lines, while the higher resistivity regions correspond with the lower magnetic and chargeability values.

The southwestern area has four north-south lines (2950W, 2650W, 2200W, 2050W) and ten lines running north-east, approximately 50° from north: 4300N, 3900N, 3600N, 3300N, 3000N, 2700N, 2400N, 2150N, 1900N, and 1650N. There is no significant magnetic signature on lines 2950N and 2650N, yet both show broad chargeability anomalies on the southern ends. There is a chargeability anomaly on 2050W, centered at 250S and another on 2200N, centered at 300S.

Lines 4300N and 3900N were extended to increase the survey area. Line 4300N covers a chargeability anomaly with a magnetic high and resistivity low from 750W to 1400W. Line 3900N has higher values for all magnetic, chargeability, and resistivity responses from 1450W to 1750W. Lines 3600N, 3300N, and 3000N show no significant

magnetic response, save on the east end of 3600N, and has generally low chargeabilities with horizontal, planar resistivities increasing with depth. Lines 2700N, 2400N, 2150N, 1900N, 1650N are in a region of relatively low magnetic values, and these lines have a chargeability anomaly of varying breadth and intensity on their western ends.

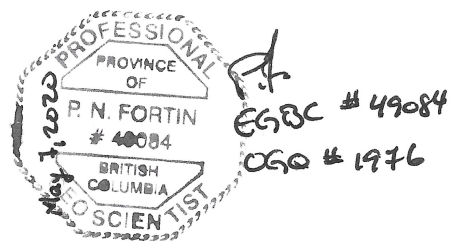
5 CONCLUSION

The interpretation of the geophysical data embodied in this report is a basic geophysical appraisal of the Fenelon property. As such, it incorporates only as much geoscientific information as the author has on hand. Geologists from Balmoral Resources Ltd., who have access to geological information, are in a better position to evaluate the geological significance of the various geophysical signatures. Nevertheless, results from the 2020 Fenelon survey highlight a few IP anomalies that prove encouraging and may warrant further processing, planning, and investigation.

Respectfully Submitted,



Philip Fortin, PGeo, (EGBC – 49084, OGQ - 1976)



Appendix A: Bibliography

Loke, M.H., 2018. Tutorial: 2-D and 3-D Electrical Imaging Surveys.
<http://www.geotomosoft.com/>

Sumner, J.S., 1976. Principles of induced polarization for geophysical exploration,
Developments in Economic Geology. Elsevier, New York.

Appendix B: Statement of Expenditures

Fenelon IP Geophysics Campaign 2019

Staff Salaries	\$5,002.21
Geophysical Contractor	\$185,802.93
Service Contractors	\$5,495.30
Accommodation	\$29,981.46
Fuel	\$391.64
Line Cutting	\$30,893.25
TOTAL COST	\$257,566.79

Appendix C: Statement of Qualifications

for

Philip Fortin, PGeo

of

75-1195 Falcon Drive
Coquitlam BC, V3E 2H1

I hereby certify the following statements regarding my qualifications and involvement in the program of work on behalf of Balmoral Resources Ltd., and as presented in this report of April 30, 2020.

The work was performed by individuals qualified for its performance.

I have no material interest in the property under consideration in this report.

I graduated from the University of British Columbia with a Bachelor of Science degree (Geophysics) in 2015.

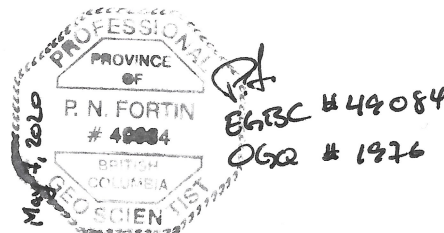
I am a Professional Geoscientist of the Association of Professional Engineers and Geoscientists of the Province of British Columbia (# 49084) as well as with the OGQ (member 1976).

I have been practising my profession as a Geophysicist in the field of Mineral Exploration since 2015.

Respectfully submitted,



Philip Fortin, PGeo



Appendix D: Property Claims with Work Completed

Appendix E. Accompanying Pseudosections (1:2500 scale)

Lines 1650N, 1900N, 2150N, 2400N, 2700N,
3000N, 3300N, 3600N, 3900N, 4300N

Lines 8200W, 8350W, 8500W

Lines NS0E, NS600W, NS850W, NS950W, NS1050W,
NS1200W, NS2050W, NS2200W, NS2650W, NS2950W

Carte(s) de dimensions hors standard placée(s) à la suite du présent document ou disponible en GeoTIFF sur la Carte interactive.

Non standard size map(s) positioned after this document or available in GeoTIFF on the Interactive map.

Appendix F: Accompanying Maps

UTM Coordinates

(southern grid at 1:10000 scale; northern grid at 1:5000 scale)

Chargeability contour plan – 1st 25 m separation

Resistivity contour plan – 1st 25 m separation

Total Magnetic Field plan

Quebec Lambert Projections

(southern grid at 1:20000 scale; northern grid at 1:10000 scale)

Chargeability contour plan – 1st 25 m separation

Resistivity contour plan – 1st 25 m separation

Total Magnetic Field plan

Stacked Magnetic Profiles (Grid Coordinates)