		Social sure
Ministry of Energy and Mines BC Geological Survey		Assessment Report Title Page and Summar
TYPE OF REPORT [type of survey(s)]: Airborne Radiometric and Mag	gnetic	TOTAL COST: \$147,565.60
AUTHOR(S): Neil McCallum	SIGNATURE(S)	Melle
NOTICE OF WORK PERMIT NUMBER(S)/DATE(S):		YEAR OF WORK: 2011
STATEMENT OF WORK - CASH PAYMENTS EVENT NUMBER(S)/DATE(S):	: 5115376	
PROPERTY NAME: Tacheeda Property		
CLAIM NAME(S) (on which the work was done): <u>530954, 831263, 831</u>	282, 836327, 836355,	836357, 836359, 836360, 836361
LATITUDE: <u>54</u> ° <u>35</u> '00 " LONGITUDE: <u>122</u> OWNER(S): 1) International Montoro Resources Inc.	<u>1500</u> "	(at centre of work)
MAILING ADDRESS:	-	
#600 – 625 Howe St. Vancouver, BC, V6C2T6		
#600 – 625 Howe St. Vancouver, BC, V6C2T6 OPERATOR(S) [who paid for the work]:	2)	
#600 – 625 Howe St. Vancouver, BC, V6C2T6 OPERATOR(S) [who paid for the work]: 1) International Montoro Resources Inc.		
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#600 – 625 Howe St. Vancouver, BC, V6C2T6 OPERATOR(S) [who paid for the work]: 1) International Montoro Resources Inc. MAILING ADDRESS: #600 – 625 Howe St. Vancouver, BC, V6C2T6 PROPERTY GEOLOGY KEYWORDS (lithology, age, stratigraphy, structure	e, alteration, mineralization,	, size and attitude):

Next Page

TYPE OF WORK IN THIS REPORT	EXTENT OF WORK (IN METRIC UNITS)	ON WHICH CLAIMS	PROJECT COSTS APPORTIONED (incl. support)
GEOLOGICAL (scale, area)			
Ground, mapping			
Photo interpretation			
GEOPHYSICAL (line-kilometres)			
Ground			
Radiometric			
Seismic			
Other			
Airborne 1,066.78 line-km	15		\$147,565.60
GEOCHEMICAL (number of samples analysed for			
Soil			
Silt		i	
Rock			
Other			
DRILLING (total metres; number of holes, siz	e)		
Core			
Non-core			
RELATED TECHNICAL			
Sampling/assaying			
Petrographic			
Mineralographic			
PROSPECTING (scale, area)			
PREPARATORY / PHYSICAL			
Line/grid (kilometres)			
Topographic/Photogrammetric			
(scale, area)			
Legal surveys (scale, area) _			
Road, local access (kilometre	s)/trail		
Trench (metres)			
Underground dev. (metres)			
Other			
		TOTAL COST:	\$147,565.60

BC Geological Survey Assessment Report 32817

## INTERNATIONAL MONTORO RESOURCES INC.

# 2011 EXPLORATION AND FIELDWORK ON THE TACHEEDA PROPERTY

Cariboo Mining Division

Mineral Tenures: 530954, 831263, 831282, 836327, 836355, 836357, 836359, 836360 836361, 836535, 836536, 837662, 837682, 837702, 837722, 837723 837724, 837725, 837726, 837727

> Geographic Coordinates Approximate Centre: 54°35'00" N 122°15'00" W

NTS Sheets 93J/10

Owners & Operator:	International Montoro Resources Inc. #600 – 625 Howe St. Vancouver, BC V6C2T6
Consultant:	Dahrouge Geological Consulting Ltd. Suite 1450, 789 West Pender Street Vancouver, British Columbia, V6C 1H2
Authors:	Neil McCallum, P.Geo
Date Submitted:	January 29, 2012

# TABLE OF CONTENTS

1.	Introduction         1.1       Geographic Setting         1.1.1       Location and Access         1.1.2       Topography, Vegetation, and Climate         1.2       Property         1.3       History and Previous Investigations         1.4       Purpose of Work	1 1 1 2 2 4
2.	Regional Geology	4
3.	Property Geology	4
4.	Results of 2011 Exploration	6 6 6
5.	Discussion and Conclusions	7
6.	References	9

# LIST OF TABLES

Table 1.1 List of Mineral Titles	2
Table 3.1 Stratigraphic Units in the Rocky Mountain Assemblage	5

# <u>Page</u>

# LIST OF FIGURES

Fig. 1.1	Location Map	F1
Fig. 1.2	Location and Access Map	F2
Fig. 1.3	Tenure Map	F3
Fig 2.1	Regional Geology	F3
Fig 4.1	Flight Line Map	F4
Fig 5.1	Lithological and Structural Interpretation	F5
Fig 5.2	Radiometric Interpretation	F6

# LIST OF APPENDICES

Appendix 1:	Itemized Cost Statement	(end)
Appendix 2:	Aeroquest Airborne Logistics and Processing Report & Maps	(end)
Appendix 3	Magnetic Interpretation, Intrepid Geophysics Ltd.	(end)
Appendix 4:	Statement of Qualifications	(end)

### Page

1.

#### INTRODUCTION

The mineral tenures described in this report are registered in the name of International Montoro Resources Corp. The Tacheeda Property consists of twenty mineral tenures, covering an area of 7585.0 ha. Dahrouge Geological Consulting Ltd. (Dahrouge) has been commissioned to conduct exploration for economic mineralization, and in September 2011, Aeroquest Airborne of Mississauga, Ontario conducted a Magnetic Gradiometer and Radiometric Survey on the property. This report will discuss the results of the 2011 exploration program and give a brief interpretation of the results.

### 1.1 GEOGRAPHIC SETTING

### 1.1.1 Location and Access

The Tacheeda Property is located about 80 km northeast of Prince George and 25 km north of the community of Bear Lake (Fig.'s 1.1 & 1.2). Prince George, with a population of around 82,000, is the largest supply centre in northern B.C. and has facilities and services expected for a community of its size. The economy of the region is driven mainly by the forestry industry, although mining and prospecting have shown a steady increase in the area over the last several years.

The property is accessible from Bear Lake by travelling north via highway 97 (John Hart Hwy) for approximately 14.8 kilometres. Then east via the Redrocky Forestry Road for approximately 7 kilometres. Then north via the Colbourne Forestry Road for approximately 12 kilometres to reach the property at Tacheeda Lake where the road meets the railway line. Thenceforth, the property can be explored by foot. The edges of the property are up to 4 kms away from the nearest road access.

#### 1.1.2 Topography, Vegetation and Climate

The topography on the Tacheeda Property ranges in elevation from 730 m to 1,100 metres above sea level. Glacial deposits cover most of the region, resulting in scarce outcrop exposure. The region northeast of Prince George is characterized by gently rolling hills and small mountains, and the overgrowth consists of moderate to thick, coniferous to deciduous vegetation, including significant amounts of Devils Club.

The Prince George area experiences long winters and short summers. Winter conditions are expected from the end of November to the end of April, with an average snowfall of 216 cm and average temperatures rarely below -20°C. The summer season has an average temperature

ranging from 20°C to 25°C, with approximately 260 mm of precipitation.

#### 1.2 PROPERTY

The Tacheeda Property consists of twenty contiguous mineral tenures (Table 1.1, Fig. 1.3), covering an area of 7585 ha.

Tenure Number	Claim Name	Registered Owner	Issue Date	Current Expiry Date	Area (ha)
530954	QUITE THE LITTLE	International Montoro	2006/mar/31	2014/nov/05	93.4
831263	TRON	International Montoro	2010/aug/09	2014/nov/05	448.7
831282	DROX	International Montoro	2010/aug/09	2014/nov/05	467.4
836327	TACHEEDA	International Montoro	2010/oct/20	2014/nov/05	336.3
836355	MOLYBASTO	International Montoro	2010/oct/20	2014/nov/05	466.9
836357	BASTOMOLY	International Montoro	2010/oct/20	2014/nov/05	466.7
836359	HAMBONE REE	International Montoro	2010/oct/20	2014/nov/05	280.2
836360	HAMBONE	International Montoro	2010/oct/20	2014/nov/05	280.0
836361	HAMBONE REE 2	International Montoro	2010/oct/20	2014/nov/05	466.9
836535	TECKROCKYLASOIL	International Montoro	2010/oct/24	2014/nov/05	448.7
836536	TECKROCKYLASOIL	International Montoro	2010/oct/24	2014/nov/05	448.9
837662	ROCKY REE	International Montoro	2010/nov/05	2014/nov/05	448.9
837682	ROCKY REE 2	International Montoro	2010/nov/05	2014/nov/05	299.0
837702	ROCKY REE 3	International Montoro	2010/nov/05	2014/nov/05	392.3
837722	ROCKY REE 4	International Montoro	2010/nov/05	2014/nov/05	466.8
837723	ROCKY REE 5	International Montoro	2010/nov/05	2014/nov/05	466.7
837724	ROCKYREE6	International Montoro	2010/nov/05	2014/nov/05	466.7
837725	ROCKY REE 7	International Montoro	2010/nov/05	2014/nov/05	186.6
837726	ROCKYREE8	International Montoro	2010/nov/05	2014/nov/05	467.0
837727	ROCKY REE 9	International Montoro	2010/nov/05	2014/nov/05	186.9
The highlighted claims are those on which the work was done					

#### **TABLE 1.1:**

### LIST OF MINERAL TITLES

## 1.3 HISTORY AND PREVIOUS INVESTIGATIONS

Historic exploration on the Tacheeda property was conducted by Cominco Ltd. in 1986 (ARIS report 15322) and by Teck Exploration Ltd. in 1993 (ARIS report 23027).

The Cominco Ltd. work, consisting of geological mapping and lake bottom sampling, was conducted in order to assess the magnetic high feature beneath Tacheeda Lake. The work was carried out, with the goal of identifying a carbonatite or kimberlite diatreme. This brief exploration failed to explain the cause of the magnetic anomaly and the property lapsed.

The Teck Exploration Ltd. work, consisting of a localized soil sampling program and geophysics was conducted in order to locate a base metal and silver mineralization. The

program outlined a very promising coincident Pb, Zn, Ag soil anomaly that corresponds to an S.P. conductor. No follow-up assessment work has been recorded on this anomaly. At the same location as the Pb, Zn, Ag anomaly that the authors of the report identified, one sample returned geochemical analysis which elevated levels of elements which could also be indicative of a carbonatite or alkaline intrusion. Sample L58N 500W returned 5.41% P, 128 ppm La, 2400 ppm Ba, 242 ppm Sr.

#### 1.4 PURPOSE OF WORK

The work described in this report was undertaken to provide information on the geophysical properties of the ground which may be indicative of the presence of rare earth elements or Ta/Nb mineralization.

The magnetic component of the survey is designed to assist in locating intrusive features within a terrain that is expected to have a relatively quiet magnetic background (shale and limestone). The carbonatite and alkaline intrusions to the southeast are known to have a high-magnetic signature. As well, the magnetic survey may assist in structural mapping on a property-wide scale.

The radiometric component of the survey is designed to assist in locating outcrops of alkaline or carbonatite intrusive rocks which are likely to have higher than background concentrations of uranium and thorium. During past exploration of the carbonatite and alkaline intrusions to the southeast, it was noted that these intrusive have a high radiometric signature compared to background, likely due to the presence of thorium. This makes radiometric prospecting on a regional scale an effective exploration tool (Guo and Dahrouge, 2006; Turner, 2011).

2.

### **REGIONAL GEOLOGY**

Glacial deposits of various types, exceeding 100 metres in places, cover much of the area around Prince George and Bear Lake, resulting in sparse outcrop exposure. Various features of the bedrock geology in the Prince George and surrounding area have received attention, mostly from L.C. Struik.

Regional mapping by the Geological Survey of Canada (Muller and Tipper, 1969), at a scale of 1 inch to 4 miles covering the area north and east of Prince George, has been superseded by that of Struik (1994). Details on some features of the regional geology have also been described by Struik and Fuller (1988), Deville and Struik (1989), Struik (1989), and Struik, Fuller, and Lynch (1990).

Struik (1989) indicates there are two strike-slip fault trends in the region. One trend follows the McLeod Lake Fault Zone at approximately 160°. Movement along this feature is interpreted as mid-Tertiary. The other set includes the older northern Rocky Mountain Trench fault system, which trends approximately 140°.

3.

#### **PROPERTY GEOLOGY**

Due to the presence of vast fluvial and glacial deposits in low-relief areas, outcrop exposures on the property are rare; therefore, the bedrock geology of the Tacheeda claims is largely based on the regional mapping.

On Struik's (1994) map, the Tacheeda Property is underlain by the Rocky Mountain Assemblage and the Reynolds Creek Succession (Fig. 2.1). Ranging from Triassic to Precambrian in age, the Rocky Mountain Assemblage contains a wide variety of lithologies, including a Permian cherty tuff/rhyolitic flow, a middle Ordovician quartzite (Monkman Quartzite), a lower Ordovician siltstone/sandstone/limestone/dolostone unit (the Kechika Group), a lower Cambrian Archeocyathid bearing limestone (the Gog Group) and a lower Cambrian olive slate and siltstone unit (Misinchinka Group). The Reynolds Creek Succession is a Paleocene sedimentary unit, which is composed of conglomerate, sandstone and siltstone. The majority of rock units in the Rocky Mountain Assemblage and the Reynolds Creek Succession have undergone a complex system of folding, faulting, and metamorphism that ranges from sub-green schist to amphibolite grade.

# **TABLE 3.1**

# STRATIGRAPHIC UNITS IN THE ROCKY MOUNTAIN ASSEMBLAGE

Paleogene	-	-	conglomerate and coarse clast sandstone
CKY MOUNTAIN ASS	SEMBLAGE*		
Permian	-	-	cherty tuffs and rhyolitic flows
Carboniferous	-	-	slate, argillite and minor siltstone
Devonian	-	-	limestone, dolostone and minor basalt, syenite and carbonatite
Upper Devonian	-	-	isolated beds of grey limestone in black argillite and chert sequences
Middle Devonian	-	-	light-grey, fossiliferous limestone
Lower Devonian		Tapioca	
Upper Silurian	-	Sandstone	dolostone, sandy dolostone and quartzite
Lower Silurian	-	-	shale, siltstone, limestone and dolostone
Upper Ordovician	-	-	fine to coarse, thinly bedded quartzite, limestone and light grey dolostone
Middle Ordovician	-	Monkman Quartzite	clean white sand to granular quartzite
Lower Ordovician	Kechika Group	-	siltstone, sandstone, limestone, phyllite, and dolostone
Upper Cambrian		-	dolostone, limestone, sandy dolostone, shale, siltstone and quartzite
	Gog Group	-	archeocyathid-bearing limestone and associated quartzite
Lower Cambrian	Misinchinka Group	-	olive slate and siltstone with minor quartzite
Precambrian	Hadrynian	-	siltstone, fine-grained quartzite, and grey to black slate

\* Modified after Struik, 1994

### **RESULTS OF 2011 EXPLORATION**

#### 4.1 Summary of Work

4.

In September 2011, Aeroquest Airborne, on behalf of International Montoro Resources Inc., conducted a magnetic gradiometer and radiometric survey. The survey was completed with lines spaced at 50 metres, at a direction of 45°, with tie-lines spaced at 500 metres at a direction of 135°. In total, 1,066.78 line- kilometres were flown over property. The terrain clearance for the gradiometer bird was 57 metres with speeds of 59 kts/hr. A map of the flight lines in relation to the mineral titles of International Montoro is shown on Figure 4.1

### 4.2 Results

The magnetic gradiometer and radiometric maps are included in Appendix 2. The maps include: Total Magnetic Intensity (TMI), Measured Vertical Gradient (MVG), Total Count radiometrics (TC) and Thorium radiometrics.

## **DISCUSSION AND CONCLUSIONS**

The original objectives of this survey were three-fold:

5.

- facilitate the mapping of bedrock lithologies that may have been created or disrupted during emplacement of economic mineralization,
- facilitate in the structural interpretation of lithologies which may have been created during the emplacement of economic mineralization,
- provide high resolution gamma-ray spectrometry and magnetic data for the indirect detection and delineation of magnetite and thorium-enriched mineralization as path-finders for rare metals.

Enhanced derivative grids of the magnetics were generated and imaged as part of this interpretation; a texture and phase analysis of the magnetics was undertaken in order to identify and map possible zones of structural complexity which may in turn indicate zones of favourable mineralization (Appendix 3).

A systematic approach was given to the magnetic interpretation and was focussed on distinct lithological variations or structural discontinuities. The areas of interest are labelled in Figure 5.1 and are individually described below.

A. This area of moderate magnetic intensity, approximately 300 metres in width appears to roughly follow the regional trend of the basement rocks and may represent a separate lithological unit.

B. This relatively isolated area is in an area of quiet magnetic response. It is roughly parallel to the regional lithological trend, however it does not extend very far along strike. It may be either lithologically controlled or structurally controlled, however, the moderate magnetic response makes it a lower priority target for follow up work.

C. Similar to feature B, this relatively isolated area is in an area of quiet magnetic response. It is roughly parallel to the regional lithological trend, however it does not extend very far along strike. It may be either lithologically controlled or structurally controlled, however, the higher magnetic response makes it a higher priority target for follow up work.

D. This is a cultural feature created by the railway lines.

E. This large feature is highly magnetic, and appears as a strong anomaly in the regional-scale magnetic database. It is centred beneath Tacheeda Lake, and it's source has not yet been explained by mapping. Preliminary modelling mapped by this survey suggests a depth

of ~350 m below surface (Appendix 3); the majority of this buried complex lays outside the mineral claims assigned to IMT.

F. This north-south trending feature cuts the regional lithological trend, and may represent distal phase of the main magnetic feature.

G. This narrow feature follows the regional lithological trend and is remarkably high intensity and narrow. Based on this geometry, it may represent a narrow mafic intrusive sill.

The radiometric results of the survey block show a patchwork like pattern of subtle highs and lows over most of the land-covered areas. Overlaying the radiometric results over the publically available high-resolution satellite imagery reveals that the subtle highs and lows show a very strong correlation with forestry cut-blocks. Areas with higher radiometric response correlate with cleared areas as a result of the lower effect from vegetative cover.

As expected the areas covered by water, or water-saturated soils (features B and E) show a negligible radiometric response.

Most of the lithological and structural features described above do not show any empirical correlations with the radiometric results in any of the three components of the radiometrics (Th, K, U).

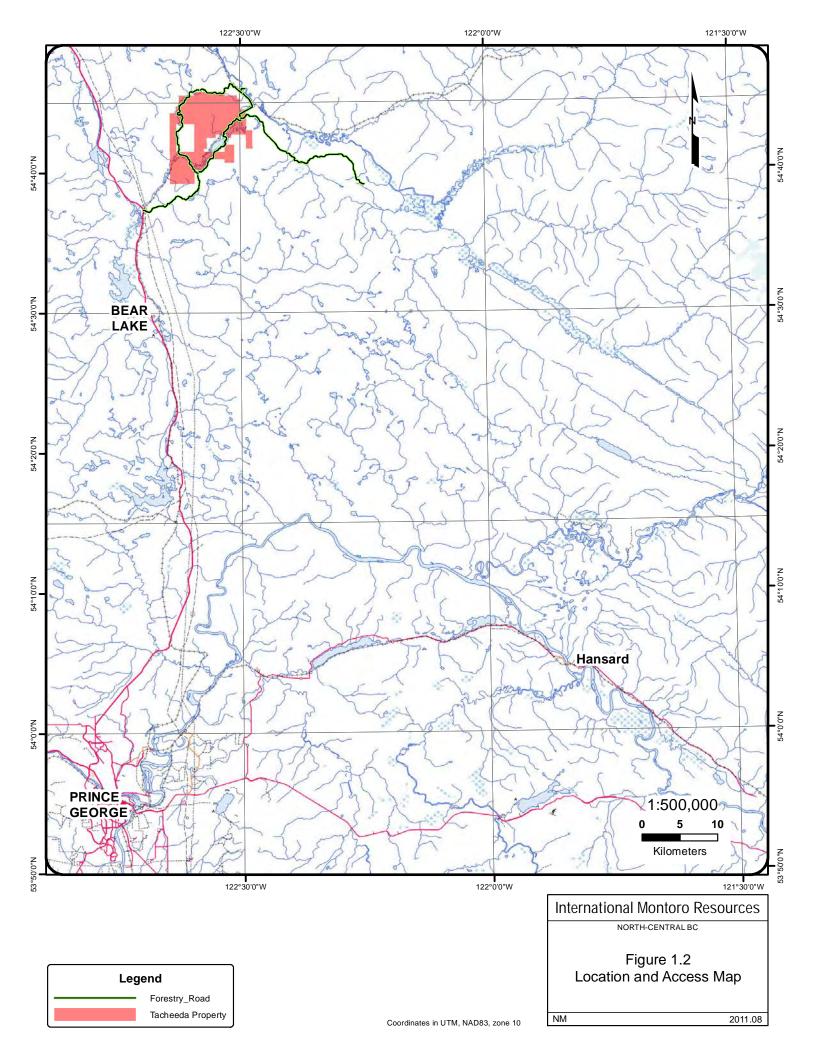
There are three features X, Y and Z with a higher response in the Thorium counts which do not appear to correlate with forestry cut blocks and do not follow the regional lithological trend (Figure 5.2). In addition, features X and Y follow a subtle, but distinct, break in the relatively quiet magnetic response in the immediate area. This break in the magnetics mantles the main magnetic feature E, and may represent a marginal cone-like intrusion of that main intrusive phase. These three features should therefore be the highest priority targets for ground follow-up.

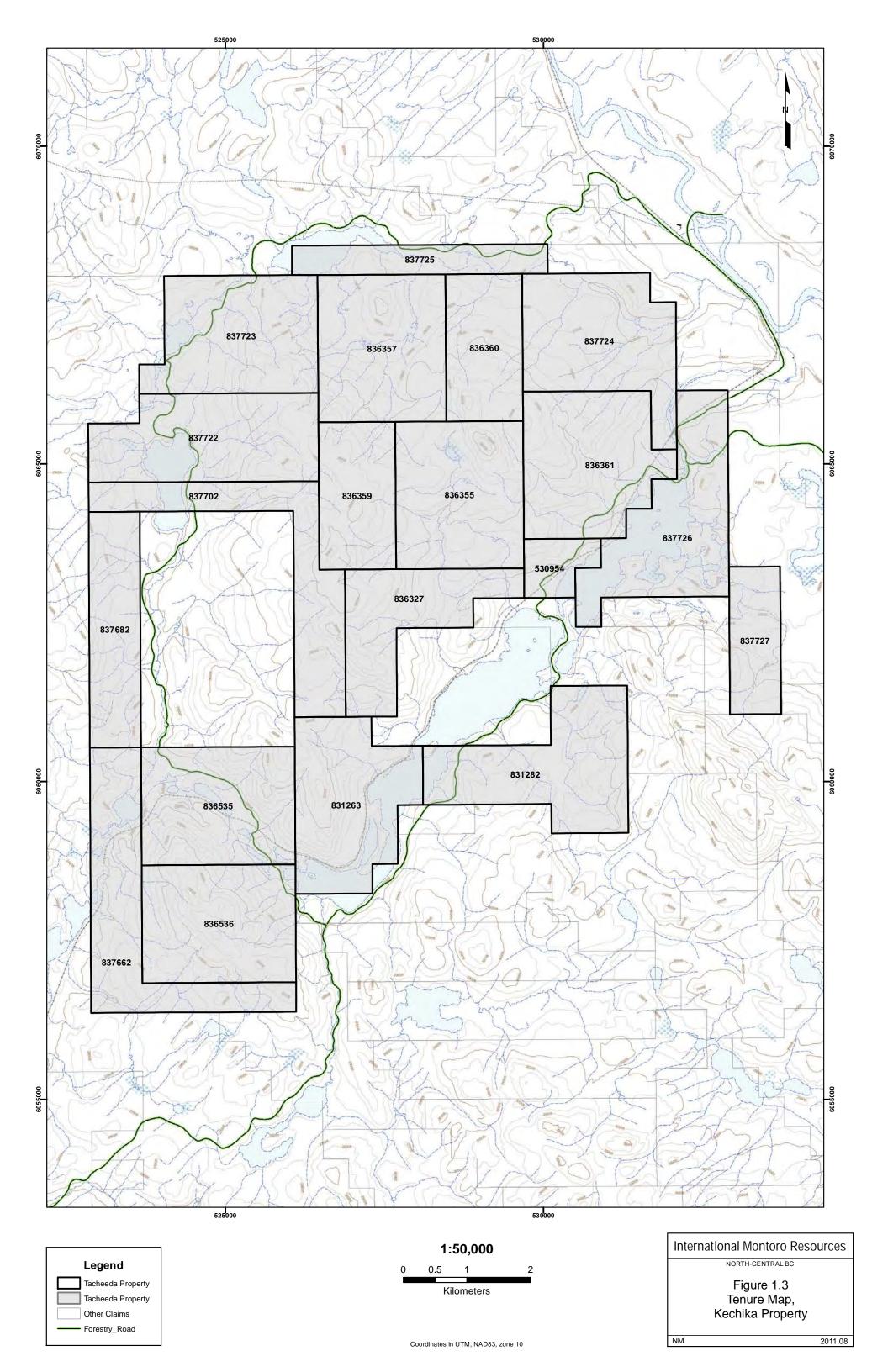
#### REFERENCES

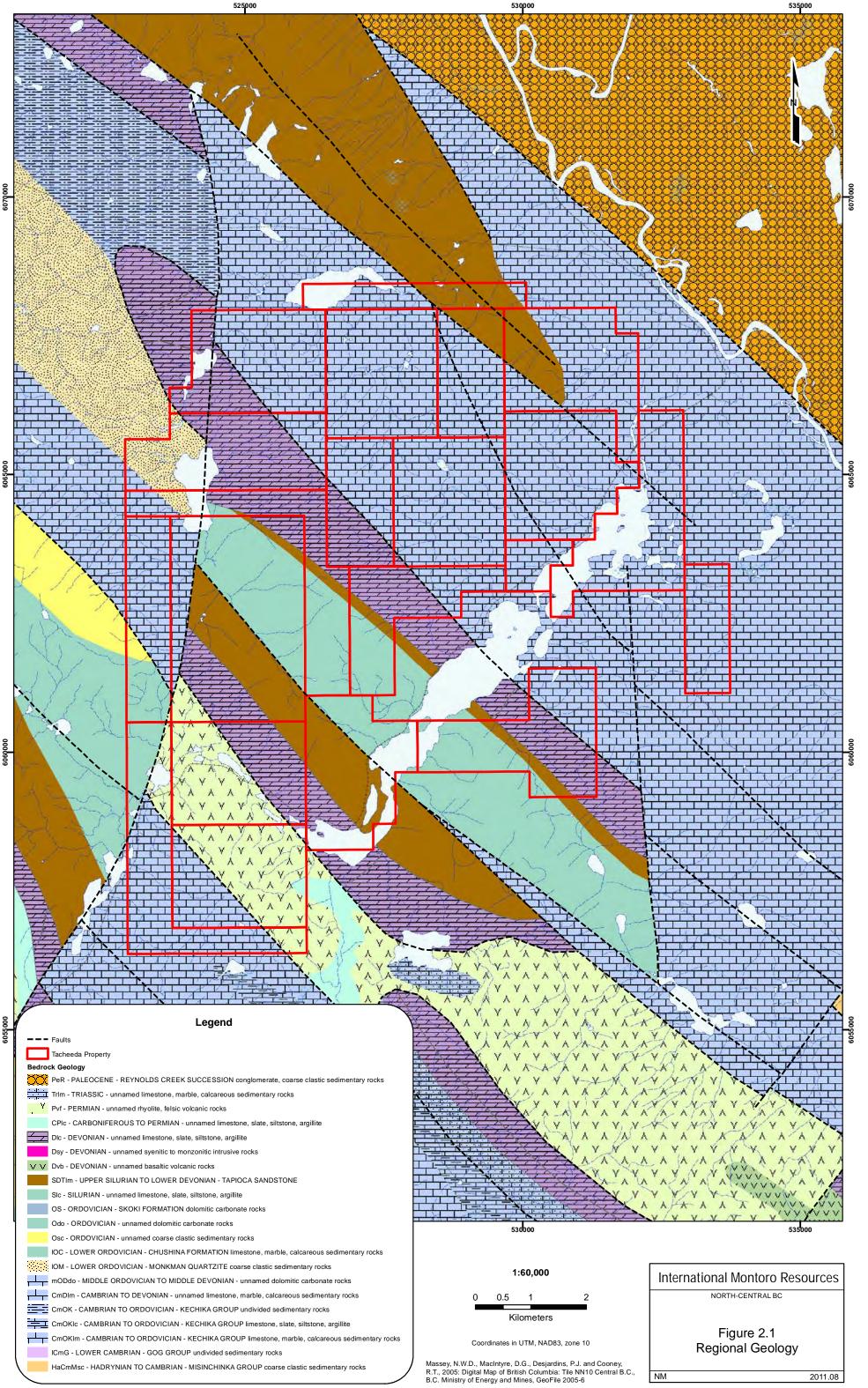
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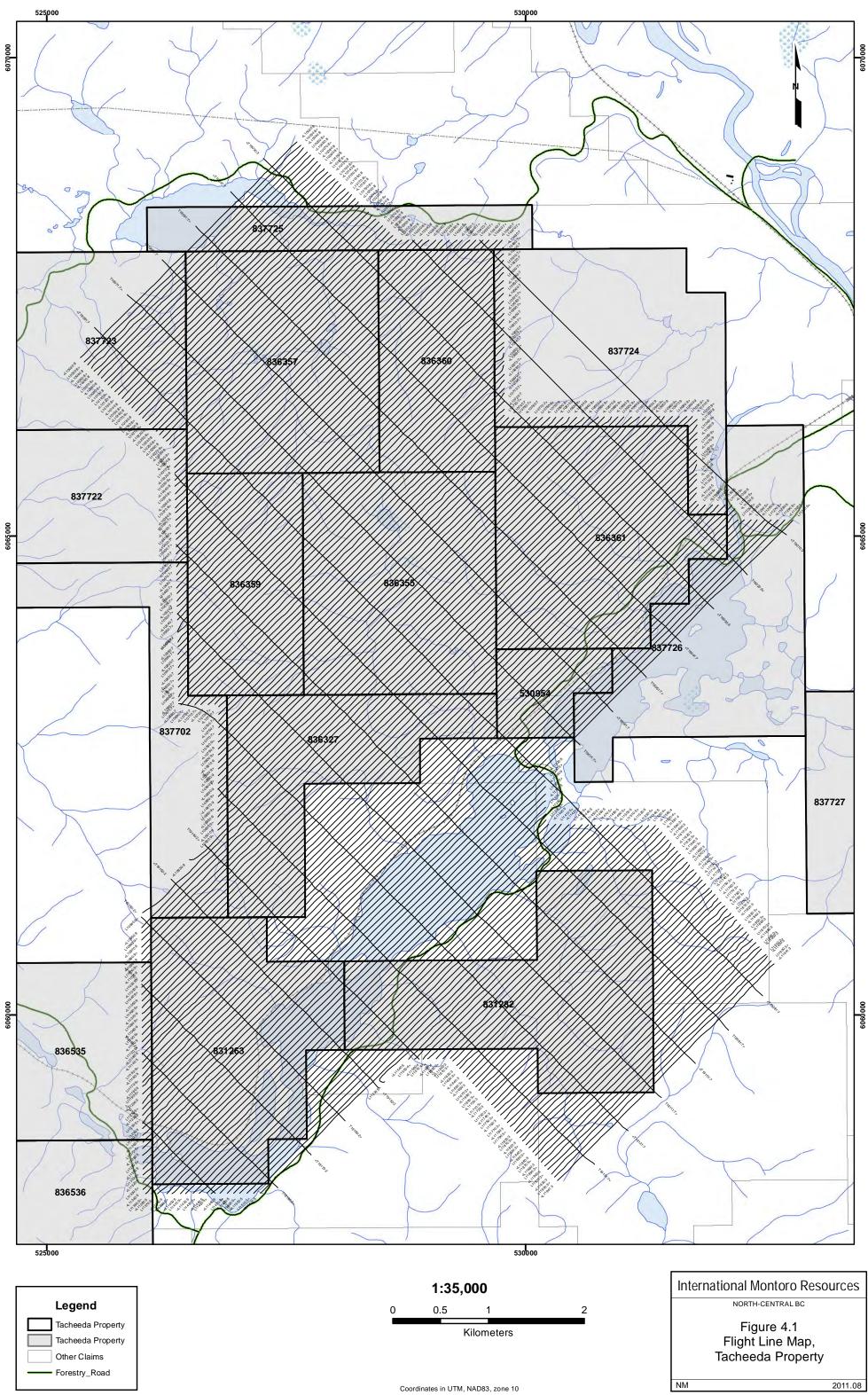
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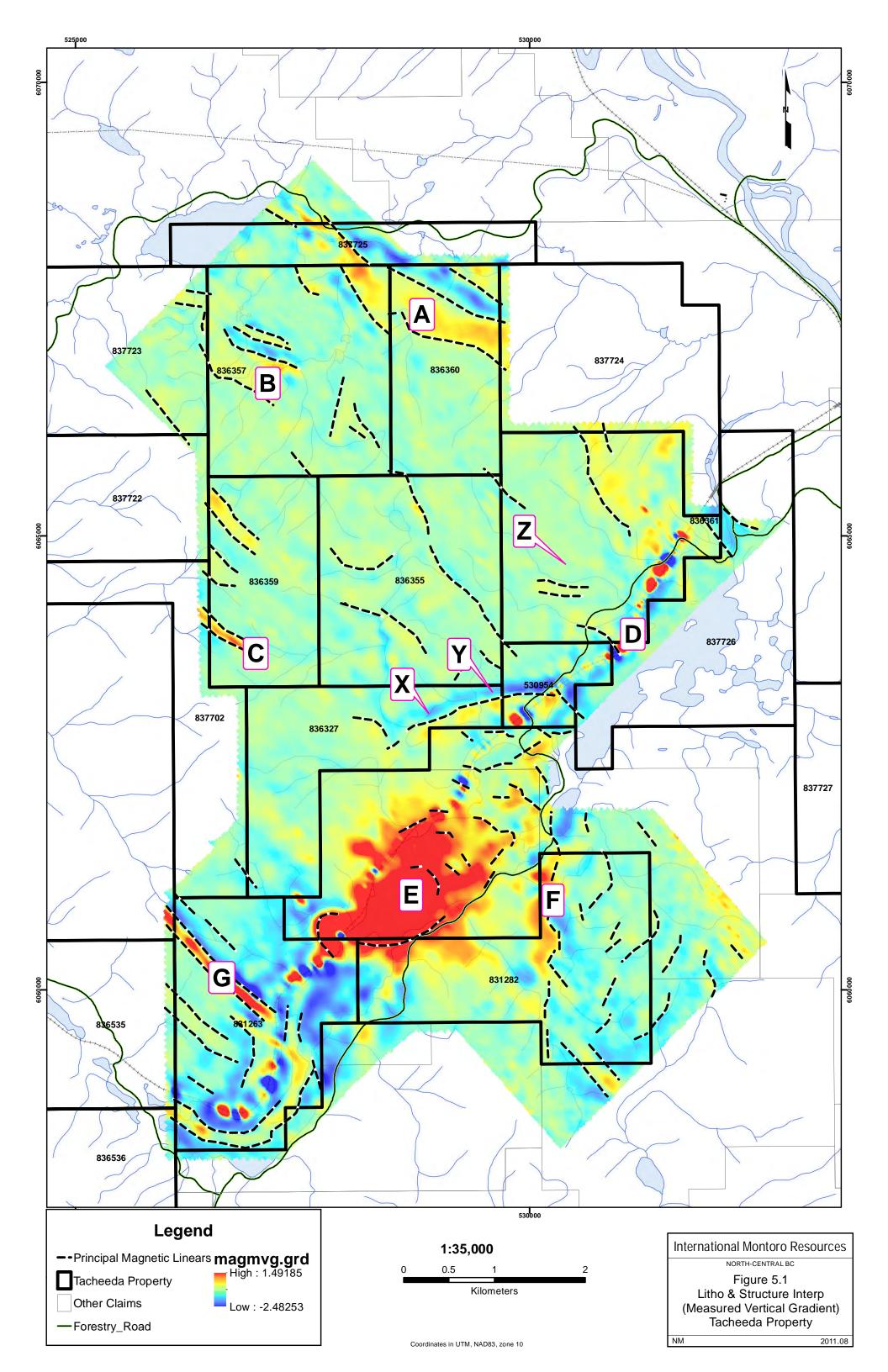


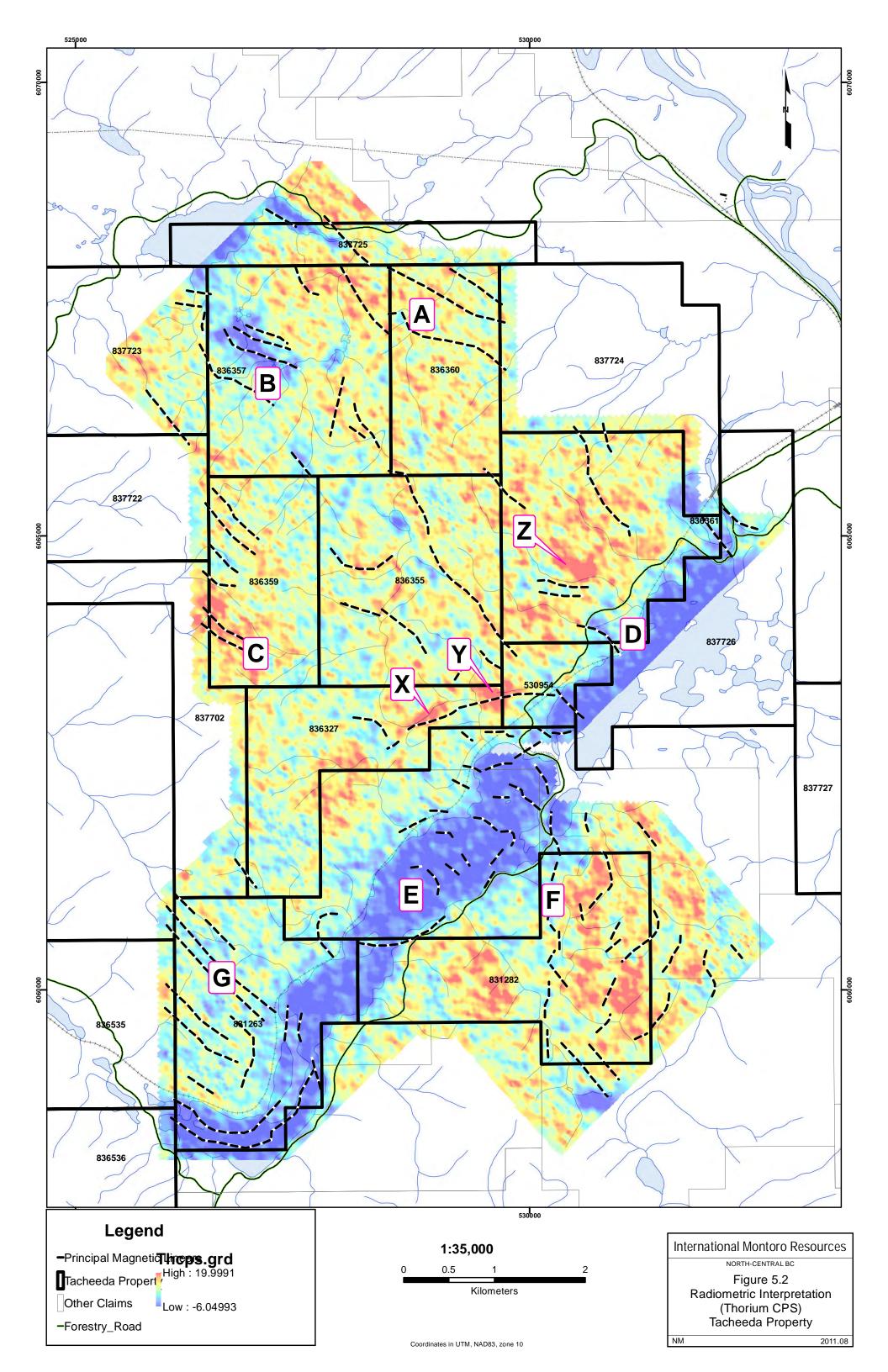












# **APPENDIX 1**

Itemized Cost Statement

# Summary of Invoicing from Aeroquest Airborne

Invoice Description	<u>subtotal</u>	<u>HST</u>	<u>Total</u>	
Deposit, 40% of contract value Mobilization fees Interim Billing, completion of flying final billing	\$48,800.00 \$19,000.00 \$59,300.00 \$4,655.00	\$5,856.00 \$2,280.00 \$7,116.00 \$558.60 Total Survey	\$54,656.00 \$21,280.00 \$66,416.00 \$5,213.60 <b>\$147,565.60</b>	

# **APPENDIX 2**

Aeroquest Airborne Logistics and Processing Report & Maps

# Report on a Helicopter-Borne Magnetic Gradiometer and Radiometric Survey



Aeroquest Job # 11049

For

International Montoro Resources Inc #600 – 625 Howe Street Vancouver, British Columbia Canada V6C 2T6



Report date: December, 2011

# Report on a Helicopter-Borne Magnetic Gradiometer and Radiometric Survey

# Aeroquest Job # 11049

For

International Montoro Resources Inc #600 – 625 Howe Street Vancouver, British Columbia Canada V6C 2T6

by



7687 Bath Road Mississauga, ON, L4T 3T1 Tel: (905) 672-9129 Fax: (905) 672-7083 <u>www.aeroquest.ca</u>

Report date: December, 2011



# TABLE OF CONTENTS

i
2
2
3
3
5
5
5 6 6 7 8 8 8
9
9
9 9 9 10 10 10
10
10 11 11 11 11 11 11 12 12 13 13 13 13 13 14 14



6.4.11. Apparent Radioelement Concentrations	14
6.4.12. Computation of Radioelement Ratios	
APPENDIX 2: Description of Database Fields	16
APPENDIX 3: Radiometrics ptocessing parameters	18

# LIST OF FIGURES

Figure 1. Project Location	3
Figure 2. Survey Flight Path for Tacheeda Lake Block	
Figure 3. Helicopter C-FPTG used as survey platform	6
Figure 4. The Aeroquest HELI-TAG bird	7
Figure 5. Digital video camera typical mounting location.	

# LIST OF MAPS (1:20,000)

- TMI Coloured Total Magnetic Intensity Gradient Enhanced with line contours.
- MVG Measured Vertical Magnetic Gradient with line contours.
- Th Gamma Ray Spectrometer Thorium colour grid with contours.
- TC Gamma Ray Spectrometer Total Count colour grid with contours.



# **1. INTRODUCTION**

This report describes a helicopter-borne geophysical survey carried out on behalf of International Montoro Resources Inc. over their Tacheeda Lake property in British Columbia approximately 90 Km North of Prince George. The principal geophysical sensor was Aeroquest's Bluebird Heli-TAG tri-axial magnetic gradiometer (towedbird) system, which employs four (4) optically pumped caesium magnetometer sensors. The secondary sensor was Aeroquest's Airborne Gamma Ray Spectrometer (AGRS) system, which is installed in the helicopter cabin. The AGRS system utilizes four (4) downward looking Nal crystals used as the main gamma-ray sensors and one upward looking crystal for monitoring non-geologic sources. Ancillary equipment includes a GPS navigation system, radar altimeter, digital video acquisition system, and a base station magnetometer.

The total survey coverage presented on the accompanying maps and digital archive is 1066.78 line-km, of which 1004.01 line-km fell within the pre-defined project area co-ordinates (Appendix 1). Survey flying described in this report took place between September 21<sup>st</sup> and October 1<sup>st</sup>, 2011. This report describes the survey logistics, the data processing, and provides an overview of the results.

## 2. SURVEY AREA

The Tacheeda lake project area is located in central eastern BC, ~90 km north of Prince George, BC. The survey blocks corner-coordinates are tabulated in Appendix 1. The base of survey operations was at Bear Lake, BC, Canada.



### Figure 1. Project Location



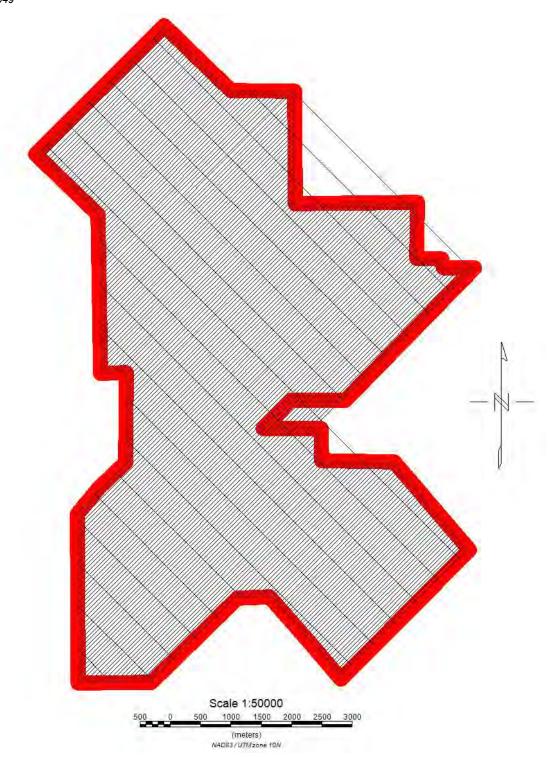


Figure 2. Survey Flight Path for Tacheeda Lake Block



# SURVEY SPECIFICATIONS AND PROCEDURES

The survey specifications are summarised in the following table:

Block name	Line Spacing (metres)	Line Direction	Tie Line Spacing (metres)	Line Direction	Survey Coverage (line-km)	Dates flown
Tacheeda	50	45°/225°	500	135°/315°	1004	September 21 <sup>st</sup> to October 1 <sup>st</sup> , 2011

Table 1. Summary of survey specifications.

The survey coverage was calculated by adding up the survey and control (tie) line lengths as presented in the final Geosoft database.

The average gradiometer bird terrain clearance for each block was 57m. Variations of bird terrain clearance are due to the terrain and the capability of the aircraft.

Average survey speed over relatively flat terrain was 59 kts/hr.

The sampling rate for the gradiometer data acquisition system is 10 Hertz. The 10 samples per second translate to a gradiometer reading about every 4 metres along the flight path.

### 2.1. NAVIGATION

Navigation is carried out using a GPS receiver installed on the aircraft and an AGNAV Guia system for navigation control. The three-dimensional position of the aircraft, as reported by the GPS is recorded at 0.2 second intervals (5 Hz). The system has a published accuracy greater than 3 meters. A recent static ground test of the Mid-Tech RX400p WAAS GPS yielded a standard deviation in x and y of under 0.6 metres and for z under 1.5 metres over a two-hour period.

## 3. AIRCRAFT AND EQUIPMENT

### 3.1. AIRCRAFT

An Aerospatiale AS 350 BA helicopter, registration C-FPTG was used as the survey platform (Figure 3). The helicopter was owned and operated by Hi-Wood Helicopters of Okotoks, AB. Installation of the geophysical and ancillary equipment was carried out by Aeroquest personnel. The survey aircraft was flown at a nominal terrain clearance of ~90 metres.





Figure 3. Helicopter C-FPTG used as survey platform.

## 3.2. MAGNETIC GRADIOMETER SYSTEM

## 3.2.1. Overview

The Aeroquest HELI-TAG (Helicopter-borne Tri-Axial Gradiometer) system (Figure 4) employs four (4) Geometrics G-823A optically pumped caesium-vapour magnetometers. The four sensors allows for measurements of the total field, vertical gradient, longitudinal gradient and transverse gradient. Three sensors are configured in a tri-axial configuration at the rear of the bird and the fourth sensor is located in the nose of the bird to provide a longitudinal (horizontal) gradient measurement. The magnetic data is collected at a rate of 10Hz, and recorded by a dedicated Windows-based computer.

## 3.2.2. Magnetometer Sensors

The specifications of the caesium vapour magnetometer sensors are as follows\*:

Sensitivity:<0.004 nT/rt-Hz</td>Absolute Accuracy:< +/- 1.5 nT throughout operating range</td>Sampling Rate:10 HzDynamic Range:20,000 - 100,000 nTHeading Error:less than 0.15 nT combined for sensor spins on all axesOperating Temperature:-35°C to +50°C\*Specifications are provided by the sensor manufacturer

### 3.2.3. Bird Design

Sensor Standoffs:	
- Horizontal:	5.70 metres
- Vertical:	3.07 metres



- Longitudinal:	3.55 metres
Tow Cable:	30.9 metres long, with Kevlar strain member and weak-link
Terrain Clearance:	30 metres (nominal)

Refer to Figure 4.

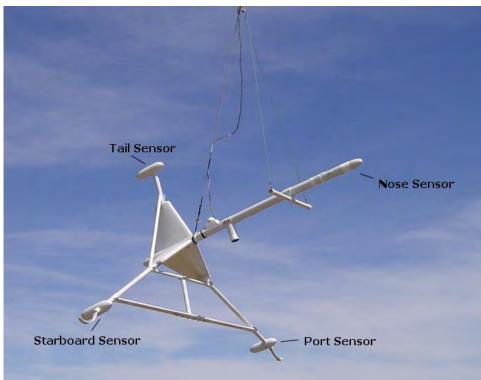


Figure 4. The Aeroquest HELI-TAG bird

## **3.3. MAGNETOMETER BASE STATION**

An integrated GPS and magnetometer base station is set up to monitor and record the diurnal variations of the Earth's magnetic field. The sensor, GPS and magnetic, receiver/signal processor is a dedicated unit for purposes of instrument control and/or data display and recording. The unit uses a common recording reference using the GPS clock.

The base magnetometer was an ENVI/MAG (Scintrex) proton precession magnetometer with internal clock synchronised with GPS time. Data logging and UTC time synchronisation was carried out within the magnetometer. The data logging was configured to measure at 5.0 second intervals. Digital recording resolution was 0.1 nT The sensor was placed on a tripod in an area of low magnetic gradient and free of cultural noise sources. A continuously updated display of the base station values was available for viewing and regularly monitored to ensure acceptable data quality and diurnal variation.



### **3.4. RADAR ALTIMETER**

A Terra TRA 3500/TRI-30 radar altimeter is used to record terrain clearance. The antenna was mounted on the outside of the helicopter beneath the cockpit. Therefore, the recorded data reflect the height of the helicopter above the ground. The Terra altimeter has an altitude accuracy of +/- 1.5 metres.

### 3.5. VIDEO TRACKING AND RECORDING SYSTEM

A high resolution digital colour video camera is used to record the helicopter ground flight path along the survey lines (Figure 5). The video is recorded digitally and overlain with GPS position and time and can be used to verify ground positioning information and cultural causes of anomalous geophysical responses.



Figure 5. Digital video camera typical mounting location.

### **3.6. GPS NAVIGATION SYSTEM**

The navigation system consists of an Ag-Nav Incorporated AG-NAV Guia GPS navigation system comprising a PC-based acquisition system, navigation software, a deviation indicator in front of the aircraft pilot to direct the flight, a full screen display with controls in front of the operator, a Mid-Tech RX400p WAAS-enabled GPS receiver mounted on the instrument rack and an antenna mounted on the aircraft. WAAS (Wide Area Augmentation System) consists of approximately 25 ground reference stations positioned across the United States that monitor GPS satellite data. Two master stations located on the east and west coasts collect data from the reference stations and create a GPS correction message. This correction accounts for GPS satellite orbit and clock drift plus signal delays caused by the atmosphere and ionosphere. The corrected differential message is then broadcast through one of two geostationary satellites, or satellites with a fixed position over the equator. The corrected position has a published accuracy of less than 3 metres.

Survey co-ordinates are set up prior to the survey and the information is fed into the airborne navigation system. The co-ordinate system employed in the survey design was Nad83. The real-time differentially-corrected GPS positional data was recorded in geodetic coordinates (latitude and longitude using WGS84) at 0.2 s intervals.

### **3.7. AIRBORNE GAMMA RAY SPECTROMETER (AGRS) SYSTEM**

The Aeroquest AGRS system consists of an RSX-5 sensor pack, registration number, which is installed on the floor of the helicopter cabin and an acquisition system designed and manufactured by Radiation Solutions Inc. (RSI).



The system has 4 downward looking Nal crystals (16.75 L) used as the main sensors and 1 upward looking crystal (4.18 L) for monitoring non-geologic sources. The system features automatic peak detection and real-time calibration to ensure spectrum stability and a high quality final product. The full spectrum is recorded (256 or 512 channels) to allow for subsequent noise reduction processing such as NASVD. The data are processed to produce the standard IAGA ROI channels – Total Count, Potassium, Uranium and Thorium. The dose rate, potassium percentage, equivalent uranium and thorium concentrations are also derived and ratios of these concentrations are computed to enhance the interpretation of the survey results.

# 4. PERSONNEL

The following Aeroquest personnel were involved in the project:

- Operations Manager: Troy Will
- Field Data Processor: Khorram Khan
- Field Operator: Brent Lushaka
- Map Preparation and Reporting: Sean Plener and Andrea Ngui

The survey pilot, Chad Goddyn and Ted Slavin, and AMEs, Dale Mayell and Randy Ford, were employed directly by the helicopter operator – Hi-Wood Helicopters, Okotoks, AB.

# 5. DELIVERABLES

### 5.1. HARDCOPY DELIVERABLES

The report includes one set of 1:20,000 scale maps. Four geophysical map products for each block are presented as outlined below.

- Total Magnetic Intensity (TMI) Gradient Enhanced with line contours.
- Measured Vertical Gradients (MVG) with line contours
- TH and TC radiometric grids with contours

The coordinate/projection system for the maps is Nad83. For reference, the latitude and longitude in WGS84 are also noted on the maps.

All the maps show flight path trace and contain topographic base data. Survey specifications are displayed in the margin of the maps.

### **5.2. DIGITAL DELIVERABLES**

### 5.2.1. Final Database of Survey Data (.GDB)

The geophysical profile data is archived digitally in Geosoft GDB binary database format. A description of the contents of the individual channels in the database can be found in Appendix 2. A copy of this digital data is archived at the Aeroquest head office in Mississauga, ON, Canada.



# 5.2.2. Geosoft Grid files (.GRD)

Levelled grid products used to generate the geophysical map images. Heli-TAG products. Naming convention follow:

Montoro\_Tacheeda\_Parameter.grd where Parameter is listed below

- Total Magnetic Intensity (TMI)
- Measured Vertical Gradient (MVG)
- Measured Transverse Gradient (MTG)
- Measured Longitudinal Gradient (MLG)
- Gradient Enhanced TMI (TMI\_ENHANCED)
- Digital Terrain Model (DTM)
- Total Counts (TC\_cps)
- Potassium (K\_cps)
- Uranium (U\_cps)
- Thorium (Th\_cps)

## 5.2.3. Digital Versions of Final Maps (.map .kmz)

Map files in Geosoft .map, Adobe PDF format and Google Earth kmz.

### 5.2.4. Free Viewing Software

- Geosoft Oasis Montaj Viewing Software
- Adobe Acrobat Reader
- Google Earth

# 6. DATA PROCESSING AND PRESENTATION

All in-field and post-field data processing was carried out using Aeroquest proprietary data processing software and Geosoft Oasis Montaj software. Maps were generated using 36-inch wide Hewlett Packard thermal inkjet plotters.

### 6.1. BASE MAP

The geophysical maps accompanying this report are based on positioning in the NAD83 datum. The survey geodetic GPS positions have been projected using Universal Transverse Mercator projection Zone 10N. A summary of the map datum and projection specifications is given following:

- Ellipse: GRS 1980
- Ellipse Major Axis: 6378137 Inverse Flattening: 298.25722
- Datum: North American 1983
- Map Projection: Universal Transverse Mercator
- False Easting, Northing: 500000ft, 0ft

For reference, the latitude and longitude in WGS84 are also noted on the maps.



The background shading was derived from NASA Shuttle Radar Topography Mission (SRTM) 90 meter resolution DEM data.

### 6.2. FLIGHT PATH & TERRAIN CLEARANCE

The position of the survey helicopter was directed by use of the Global Positioning System (GPS). Positions were updated five times per second (5 Hz) and expressed as WGS84 latitude and longitude calculated from the raw pseudo range derived from the C/A code signal. The instantaneous GPS flight path, after conversion to UTM coordinates, is drawn using linear interpolation between the x/y positions. The terrain clearance was maintained with reference to the radar altimeter. The raw Digital Terrain Model (DTM) was derived by taking the GPS survey elevation and subtracting the radar altimeter terrain clearance values. The calculated topography elevation values are relative and are not tied in to surveyed geodetic heights.

#### 6.3. MAGNETIC GRADIENT DATA

#### 6.3.1. Initial Processing – Total Magnetic Field

Prior to any levelling the magnetic data was subjected to a spike removal filter. Diurnal variation was removed using the base magnetometer data. The data was then simple levelled using tie lines and manually levelled where needed. The resulting data was then micro-levelled using a directional spatial filtering technique. This process removes other very small systematic errors in the data. The data was interpolated onto a grid using a bi-directional gridding algorithm with a cell size of 20m for all Blocks.

#### 6.3.2. Measured Gradients

The three magnetic gradient components were calculated by variable differencing of the four measured total field readings. The baselines distances of the gradient measurements are described in section 3.2.3. Further levelling of the gradient components was then carried out using microlevelling if required. This process minimised the small sources of error discussed above, as well as removed any DC gradient shifts introduced by the absolute accuracy limitations of the caesium sensors. The measured vertical, transverse and longitudinal gradient profiles were interpolated into grids and are included in the digital archive.

#### 6.4. RADIOMETRIC DATA

#### 6.4.1. Equipment and General Adherence to IAEA Standards

Aeroquest Limited adopts the standards for airborne gamma-ray spectrometry (the radiometric method) as laid out in the IAEA Technical Report 323 – Airborne Gamma-Ray Spectrometry Surveying.

#### 6.4.2. Spectral Calibration

When calibrated (with thorium source about once a year) linearity of the each detector is measured and linearity correction coefficients are calculated. When operating in real time (collecting data), the linearity of each detector is mathematically corrected for each measurement. Individual detector tracking (tuning)



and linearity correction provide better fit of the individual spectra that are being summed and therefore a sharper (better resolution) spectrum is obtained.

Crystal	S/N	Cs resolution (%)
1	5502UA	7.14
2	5502UB	8.03
3	5502UC	7.15
4	5502UD	6.90
5	5502DE	7.27

Calibration of the 5 detectors was carried out on April 14<sup>th</sup>, 2011 as follows:

## **Results from Calibration Pad Test**

Calibrations were performed by RSI at their Mississauga facility on April 14<sup>th</sup>, 2011.

Stripping Ratios	Spectrometer Unit	Ideal Values
Th into U(alpha)	0.272	0.250
Th into K (beta)	0.403	0.400
U into K (gamma)	0.773	0.810
U into Th(a )	0.043	0.060

### 6.4.3. Data Quality Assurance and Control

The spectrometer data are referenced to the other ancillary data sets using the RSI data acquisition system. After each flight, preliminary ROI channels are generated and profiles are then plotted from the digital data to check for any missing data, spikes or data corrupted by other noise sources. Where necessary, the data are corrected or flagged for re-flight depending on the severity or duration of the noise.

### 6.4.4. Live-time Correction

Generally, the radiometric data is acquired in units measured in counts per second. The instrumentation may require some time each second to process the incoming data, during this time period no counts are made. This time referred as Dead-time. Alternatively, some systems record the time during which the crystal is actually 'on' in which case the resulting value referred to as the live-time. The data was corrected by using Live-Time channels from the RSI spec pack.

Where:

N = Corrected counts in each second

n = raw recorded counts in each second

It = equipment live time



#### 6.4.5. Filtering to Prepare for Background Corrections

The radar altimeter data are filtered (low pass 5 fiducial) in order to ensure that no noise sources from the altimeter data are introduced to the radiometric data processing. The upward looking data are also filtered to improve the count statistics. In order to establish radon background levels from the upward-looking detector data, temporary heavily filtered (31 points mean filter) downward looking uranium and downward looking thorium data are utilized. The original unfiltered data are, of course, retained.

#### 6.4.6. Cosmic and Aircraft Background

Cosmic and aircraft background expressions are determined for each spectral window as described in chapter 4 of the IAEA Technical Report 323. The general form of these expressions is N = a + bC, where N is the combined cosmic and aircraft background for each window; a is the aircraft background in the window; C is the cosmic channel count; and b is the cosmic stripping factor for the window.

The expressions are evaluated for each ROI window for each sample and used as a subtractive correction for the data.

#### 6.4.7. Radon Background

Correction of the data for variations in background due to radon is a multi-step process. First, test flights at various elevations over water are carried out in the field to establish the contribution of atmospheric radon to the ROI windows. A least squares analysis of the data from these test flights yields the constants for equations 4.9 to 4.12 (IAEA Report 323). Second, the response of the upward looking detector to radiation from the ground is established. Here a departure from the IAEA Report has been recommended by Grasty and Hovgaard (1996). The expression for the radon component in the downward looking uranium window is given by Ur =( u – a1U – a2T + a2bT – bu)/(au – a1 – a2aT) (see Eq. 4.3 – IAEA 323) where, Ur is the radon background detected in the downward U window; u is the measured count in the upward uranium window; U is the measured count in the downward uranium window; T is the measured count in the downward thorium window; a1, a2, au and aT are proportionality factors; and bu and bT are constants determined experimentally. Using a1 or a2 (see above) in this equation will result in a good estimate of Ur permitting correction of the other ROI windows.

Survey altitude test data will be collected and used to establish atmospheric background and calibrate the upward and downward looking detector systems. Variations in count rates due to soil moisture content and altimeter variations can largely be overcome by a normalization procedure using the thorium count. The procedure correlates the thorium count to the uranium count assuming the contribution to each ROI from the ground is proportional.

#### 6.4.8. Computation of Effective Height above Ground Level

Radar altimeter data are used in adjusting the stripping ratios for altitude and to carry out the height attenuation corrections. They are then converted to effective height (he) at STP by the expression he = (h \* 273.15)/(T + 273.15)\*(P/1013), where h is the observed radar altitude; T is the temperature in degrees C; and P is the barometric pressure in mbars



#### 6.4.9. Compton Stripping Correction

The stripping ratios  $\alpha$ ,  $\beta$ ,  $\gamma$ , a, b and g are determined during tests over calibration pads. The principal ratios a,  $\beta$  and g should be adjusted for temperature, pressure and altitude (above ground) before stripping is carried out. These stripping ratios are used to remove the contribution in each of the three ROI windows from higher energy sources, leaving only the contribution from potassium, uranium and thorium.

#### 6.4.10. Altitude Attenuation Correction

The altitude attenuation correction corrects the data in each of the ROI windows for the effects of altitude. The count rates decrease exponentially with altitude and therefore the counts are corrected to a constant altimeter datum at the nominal survey height of 30m.

#### 6.4.11. Apparent Radioelement Concentrations

The corrected count rate data can be converted to estimate the ground concentrations of each of the three radioelements, potassium, uranium and thorium. The procedure assumes an infinite horizontal slab source geometry with a uniform radioelement concentration. The calculation assumes radioactive equilibrium in the U and Th decay series. Therefore the U and Th concentrations are assigned as equivalent concentrations using the nomenclature eU and eTh.

An estimate of the air absorbed dose rate can be made from the apparent concentrations, K%, eU ppm and eTh ppm using the following formula:

E = 13.08 \* K + 5.43 \* eU + 2.69 \* eTh

where: E is the absorption dose rate in nG/h
K is the concentration of potassium (%)
eU is the equivalent concentration of uranium (ppm)
eTh is the equivalent concentration of thorium (ppm)

A description of how most of the constants were determined can be found in: Exploranium, I.A.E.A. Report, Airborne Gamma-Ray Spectrometer Surveying, Technical Report No. 323, 1991.

### 6.4.12. Computation of Radioelement Ratios

Standard ratioing of the three radioelements (eU/eTh, eU/K and eTh/K) can be carried out and presented in profile or plan map form. In order to ensure statistical confidence in generating these ratios, we generally take the following precautions:

• Reject all data point where the apparent potassium concentration is less than 0.25% as these measurements are likely taken over water.

• Carry out cumulative summing along the survey line of each radioelement, rejecting areas where the summation does not exceed a certain threshold value (usually 10 counts for both numerator and denominator).

• Compute the ratios using the cumulative sums.



## **APPENDIX 1: Survey Boundaries**

The following table presents the International Montoro Recourses Tacheeda Lake survey block boundaries. All geophysical data presented in this report have been windowed to these outlines plus a 100m extension around the block. X and Y positions are in metres (NAD83 UTM Zone 10N).

Montoro Tacheeda Lake		
X	Y	
525402	6066945	
527523	6069067	
528617	6067993	
529665	6067992	
529677	6066137	
531689	6066151	
531680	6065231	
532098	6065227	
532131	6065072	
532638	6065070	
530504	6062897	
529611	6062891	
529153	6062426	
530104	6062431	
530113	6061895	
531313	6061880	
532556	6060422	
530435	6058300	
529883	6058937	
529257	6059647	
528722	6059635	
527312	6058240	
526101	6058233	
526085	6061015	
526442	6061442	
526881	6061867	
526894	6063346	
526474	6063336	
526428	6065952	
525402	6066945	
525402	6066945	



## **APPENDIX 2: DESCRIPTION OF DATABASE FIELDS**

The GDB files are Geosoft binary databases. In the database, the Survey lines and Tie Lines are prefixed with an "L" for "Line" and "T" for "Tie".

## Heli-TAG database:

COLUMN	UNITS	DESCRIPTOR
Х	m	Nad 83 UTM Zone 10
Y	m	Nad 83 UTM Zone 10
Lat_WGS84	Decimal degree	Latitude WGS84
Lon_WGS84	Decimal degree	Longitude WGS84
Date	yyyy/mm/dd	Date
Flight	#	Flight number
Line	#	Line number
Bheight	m	Terrain clearance of gradiometer bird
Basemag	nT	Base station magnetometer readings
DTM	ft	Digital terrain model
Ralt	m	Radar altitude of aircraft
Galt	m	GPS elevation of aircraft (Above Mean Sea Level)
Mag_Nose	nT	Total Magnetic Intensity of Nose Sensor
Mag_Port	nT	Total Magnetic Intensity of Port Sensor
Mag_Starboard	nT	Total Magnetic Intensity of Starboard Sensor
Mag_Tail	nT	Total Magnetic Intensity of Tail Sensor
TMI	nT	Total Field TMI
MTG	nT/m	Measured Transverse Gradient (Cross Track) corrected for flight direction and levelled
MLG	nT/m	Measured Longitudinal Gradient (Along Track) corrected for flight direction and levelled
MVG	nT/m	Measured Vertical Gradient (levelled)
Pitch	degree	Degree of pitch of instrument
Roll	degree	Degree of roll of instrument
Yaw	degree	Degree of yaw of instrument
UTCtime	Hh:mm:ss.ss	UTCtime

#### AGRS database

Column	Units	Description
UTCtime	hh:mm:ss.s	UTCtime
K_raw	Cps	Radiometrics – potassium
Th_raw	Cps	Radiometrics – Thorium
U_raw	Cps	Radiometrics – Uranium
TC_raw	Cps	Radiometrics – Total Counts
UpU_raw	Cps	Radiometrics - Uranium upward looking counts
Flight	#	Flight number
Ralt_s	m	Radar altitude at standard temperature and pressure
K_CPS	Cps	Radiometrics – corrected potassium
Th_CPS	Cps	Radiometrics – corrected Thorium
U_CPS	Cps	Radiometrics – corrected Uranium
TC_CPS	Cps	Radiometrics – corrected Total Counts
eK	%	Radiometrics – potassium (%K)
eTh	ppm	Radiometrics – equivalent Thorium
eU	ppm	Radiometrics – equivalent Uranium
Dose_Rate	uR/hr	Radiometrics – exposure rate
Lat_WGS84	Decimal degree	Latitude WGS84
Long_WGS84	Decimal degree	Longitude WGS84
eThK		Thorium – Potassium Ratio



Job # 11049

Column	Units	Description
eUK		Uranium – Potassium Ratio
eUTh		Uranium – Thorium Ratio
Down_256	counts per second	256 channel spectral data (Downward looking)
Up_256	counts per second	256 channel spectral data (Upward looking)
Х	m	Nad 83 UTM Zone 10
Y	m	Nad 83 UTM zone 10
Temperature	°C	Temperature
Pressure	mbar	Barometic Presuure
Cosmic	Cps	Radiometrics – Cosmic
Line	#	Line numbers
Date	yyyy/mm/dd	Flight date



## **APPENDIX 3: RADIOMETRICS PTOCESSING PARAMETERS**

COEFFICIENTS		
	Cosmic Stripping Factor (b)	Aircraft Background Value (a)
тс	1.15	69.03
К	0.06	12.14
U	0.05	1.72
Th	0.07	-0.16
Uup	0.01	0.47


Aircraft Background and Cosmic Stripping Factors


Altitude Attenuation Coefficients


COEFFICIENTS		
Element Attenuation Coeff.		
тс	-0.0315	
К	-0.0389	
U	-0.0500	
Th	-0.0179	


Sensitivity Factors

Sensitivity Factors		
Block	Tacheeda Lake	
STP Height (m)	80.305	
K (cps/%)	41.293	
U (cps/ppm eU)	2.215	
Th (cps/ppm eTh)	1.005	
Dose rate (cps/nG/hr)	6.444	









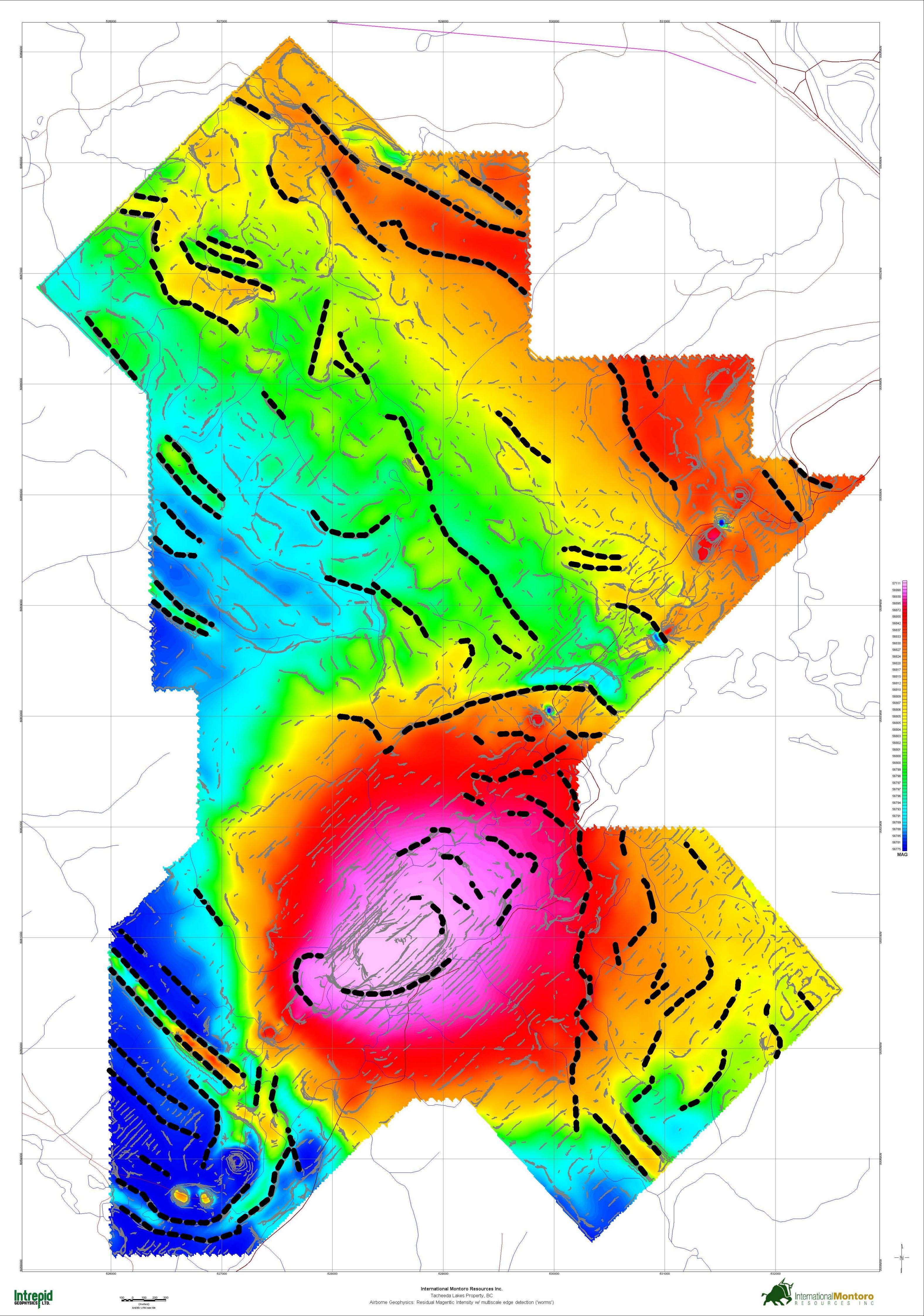
Th

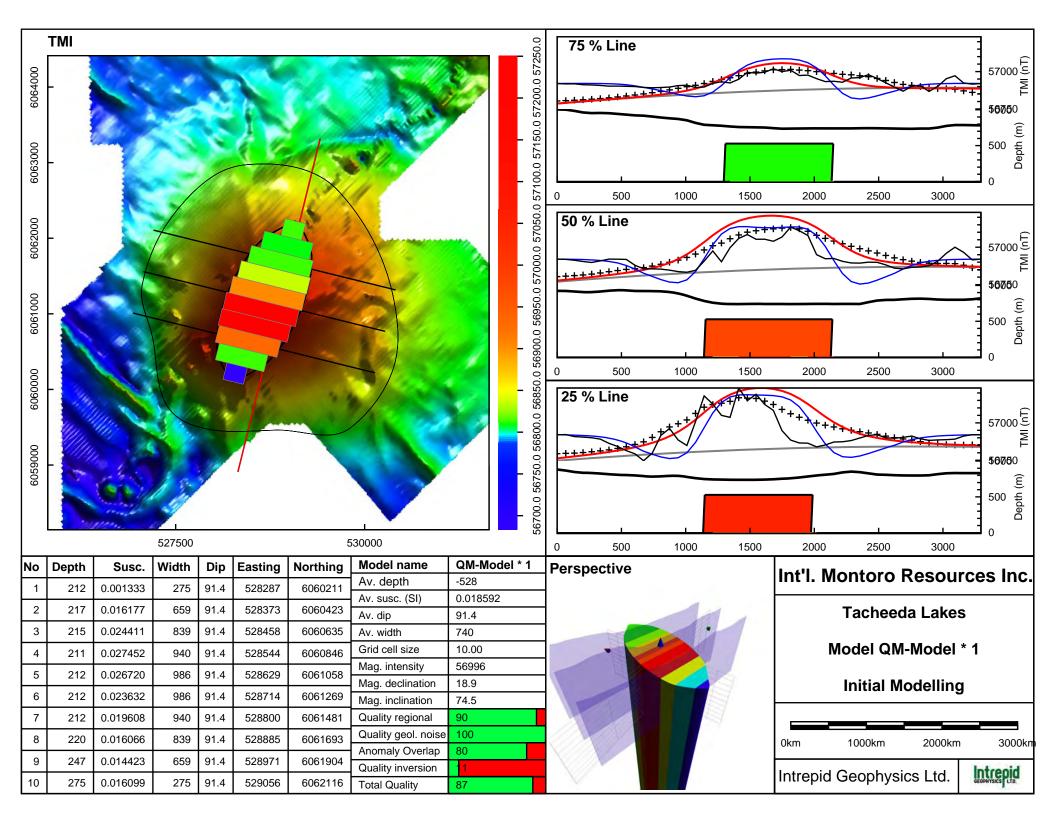
## **APPENDIX 3**

Magnetic Interpretation

Intrepid Geophysics,

Christopher J. Campbell, P. Geo.





# **APPENDIX 4**

Statement of Qualifications

#### **Statement of Qualifications**

I, Neil McCallum, P.Geol. of 156 W. 16<sup>th</sup> Ave, Vancouver, BC, V5Y1Y7

Do hereby certify that:

1) I am author of the Report titled '2011 EXPLORATION AND FIELDWORK ON THE TACHEEDA PROPERTY' dated February 29, 2012, relating to the Tacheeda Property, Central British Columbia.

2) I supervised the work described herein.

3) I have been a registered professional geologist with the Association of Professional Engineers, Geologists and Geophysicists of Alberta since 2009, member # 78767; and a registered geologist with the Association of Professional Engineers, Geologists and Geophysicist of British Columbia since 2011, member #35641.

4) I am a graduate of the University of Alberta, Edmonton, Alberta, with a B.Sc. in geology, 2004.

5) I have practiced in the field of mineral exploration for base-metal, precious metal, uranium, rare metals, industrial mineral and coal deposits since 2004. I have practiced my profession continuously since 2004.

Dated at Vancouver this 29<sup>th</sup> day of February, 2012.

Neil McCallum, B.Sc., P.Geo.

