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#### ASSESSMENT REPORT

describing

#### **VTEM AND MAGNETIC SURVEYS**

at the

#### **HIDDEN PROPERTY**

NTS 105F/6 Latitude 61°26'N; Longitude 133°22'W

in the

Whitehorse Mining District Yukon Territory

prepared by

Archer, Cathro & Associates (1981) Limited

for

#### STRATEGIC METALS LTD.

by

W. Douglas Eaton, B.Sc. Geology April 2008

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#### **INTRODUCTION**

The Hidden property consists of 12 mineral claims owned 100% by Strategic Metals Ltd. The claims were staked in 2001 to protect tungsten mineralization, soil geochemical anomalies and scheelite panning targets discovered by a previous owner.

On September 8, 2007, helicopter-borne magnetic and versatile time domain electromagnetic (VTEM) surveys were flown across the property by Geotech Ltd of Aurora, Ontario. The author supervised the surveys and his Statement of Qualifications appears in Appendix I.

### PROPERTY LOCATION, CLAIM DATA AND ACCESS

The Hidden property is located approximately 120 km northeast of Whitehorse in southern Yukon Territory. It is on NTS map sheet 105F/6 at latitude 61°26'N and longitude 133°22'W, as shown on Figure 1.

The property consists of the Hid 1-12 mineral claims registered with the Whitehorse Mining Recorder in the name of Archer, Cathro & Associates (1981) Limited, which holds them in trust for Strategic Metals. Claim data are listed below, while the locations of individual claims are shown on Figure 2.

Claim Name	Grant Number	Expiry Date*
Hid 1-12	YC19262-YC19273	March 7, 2016

\* Expiry date includes 2007 work that has been filed for assessment credit but not yet accepted.

The claims lie 15 km due west of the South Canol Road, a gravel road maintained on a seasonal basis by the Government of Yukon. A bulldozer trail extends from the road to a point 8 km east of the Hidden property.

Access for the 2007 geophysical surveys was by helicopter from the Whitehorse Airport, about 120 km southwest of the property. Intraday refueling was done from a gravel pit on the South Canol Road.

## **HISTORY**

The Hidden area was first staked in 1978 by Cub Joint Venture (Union Carbide Canada Limited, Cassiar Asbestos Corporation Limited and Highland-Crow Resources Ltd., a Teck Corp affiliate). The staking was prompted by discovery of tungsten mineralization during follow up prospecting of earlier Union Carbide stream sediment anomalies.

Exploration work in 1978 included grid soil panning and geochemical sampling, ground magnetic and electromagnetic surveys, preliminary mapping and two hand trenches (Abbott and Cathro, 1978). In 1979, the claim block was expanded and eight diamond drill holes totalling





915 m were completed. Later that year geological mapping, additional panning and soil geochemical sampling were performed (Abbott and Cathro, 1979).

In 1981 Cub JV conducted a proton magnetometer survey over the core of the approximately coincident, panning and geochemical anomalies. It also performed petrographic studies (Main and Cathro, 1981).

The final work program by Cub JV was done in 1984. It consisted of three hand trenches in areas of high panning values, localized ultraviolet night lamping surveys and collection of scheelite bearing soil to compare panning results to assay values (Main, 1984).

The Hid claims were staked by Strategic Metals in June 2001 to cover the core of the old work area, including all of the diamond drill holes, the main showing (Discovery Showing) and most of the panning anomaly, as shown on Figure 3. Strategic Metals conducted a few mandays of prospecting in 2003 (Eaton, 2003).

### **GEOMORPHOLOGY**

The Hidden property is located within the Pelly Mountains. It is drained by creeks within the watershed of the Big Salmon River, a major tributary of the Yukon River. The claims cover rugged subalpine and alpine terrain on the flanks of a prominent, unnamed mountain ("the Peak"). Local elevations range from about 1200 m alongside a west flowing creek on the northwestern edge of the property to 1853 m atop the Peak.

Tree line is at about 1500 m. Vegetation ranges from thick stands of black spruce near the creek, through stunted spruce, poplar and buckbrush near tree line, to grassy hillsides and open talus slopes at higher elevations.

## **GEOLOGY**

The property lies southwest of the Tintina Fault within a complex package of rocks where components of Cassiar Platform, Yukon-Tanana Terrane and Slide Mountain Terrane are dismembered and juxtaposed by thrust and high angle faults (Figure 4). Stratigraphic units underlying the property are thought to belong to Cassiar Platform. The main deformation event occurred in Late Paleozoic and early Mesozoic times. Granitic stocks and batholiths are common in the area. They were emplaced during Mid-Cretaceous times (110 - 100 Ma.) and are assigned to the Cassiar Plutonic Suite (Mortensen et al, 2000). The property lies immediately south of the Nisutlin Batholith.

Geology in the immediate vicinity of the Hidden property is shown on Figures 3 and 5. Property mapping was mostly in 1979 done on behalf of Cub JV.

Local stratigraphy ranges from Ordovician to Mississippian in age. The section is at least 1300 m thick and has been subdivided into six map units, as described in the following paragraphs and as illustrated on Figure 6.





Modified	after	Mortensen	and Jilson	(1985),	Mortensen	(1992)	an
Johnston	and	Mortensen	(1994).				

PROJECT: HIDDEN FILE: S:/PROJECTS/2007/HIDDEN DATE: APRIL 2008





The oldest rocks belong to unit **OSc** which consists of at least 100 m of massive dolomite. These dolomites are characteristically white with black bands. They are only exposed in drill core and on a few outcrops near the Discovery Showing.

The dolomite is overlain by unit **OSsl** comprising about 200 m of recessively weathering, black, graphitic calcareous slate with minor fetid limestone. The Discovery Showing may be hosted by fetid grey limestone near the top of this unit. The contact between this unit and the overlying rocks is gradational.

Unit **OSDqc** is composed of about 500 m of grey-green silty shale interbedded with black graphitic shale and distinctive, thinly laminated silty limestone. These rocks undergo marked lateral facies changes and some lithologies are similar to those within other units.

Unit **OSs** gradationally overlies unit OSDqc. It consists of about 100 m of recessively rusty weathering, black non-calcareous slate. A monograph found in slate on the southeast side of the Peak is probably Silurian in age.

Unit **Sd** is massive, light grey sandy dolomite that is interbedded with lenses of massive grey quartzite. This unit is about 300 m thick. These dolomites are difficult to distinguish from those comprising unit OSc.

The youngest sedimentary rocks in the immediate vicinity of the Hidden property are black, graphitic non-calcareous, siliceous slate belonging to unit **uDMs**. These rocks are separated from the other units by a major fault and are believed to belong to a separate stratigraphic package. The exposed section of this unit is at least 300 m thick.

Unit **Kqm** comprises porphyritic granodiorite and quartz monzonite of the Cassiar Plutonic Suite. These rocks are part of the Nisutlin Batholith, the southern margin of which underlies the northeastern corner of the property. The contact is sharp and dips sharply southwest.

Unit **KTfp** forms two north trending, steeply dipping dykes that cut stratigraphy at a high angle in the central part of the claim block. The dykes are up to 10 m wide and consist of dark brown, feldspar porphyry containing vesicles and calcite filled amygdules. These rocks belong to a suite of subvolcanic dykes and associated flows of Upper Cretaceous or Tertiary age. A small isolated exposure of quartz-biotite-feldspar porphyry located about 800 m due south of the Peak is of uncertain affinity and could be unit Kqm or KTfp (it is shown on the maps as Kqm).

At regional scale, the sedimentary rocks form a gently to moderately southwest dipping sequence. However at property scale, they are mildly deformed by open, upright, northwest trending folds with amplitudes ranging up to 100 m. A penetrative cleavage dips southwesterly, subparallel to bedding in fine grained clastic rocks, but there is no evidence that it is accompanied by large scale folds.

The dominant structural elements on the property are north trending normal faults, but similarities between some rock types and limited bedrock exposures makes recognition of these structures difficult. The largest displacement occurs along the westernmost fault where more

than 1000 m of normal offset is inferred. Some movement on the faults appears to postdate emplacement of the batholith as evidenced by offsets on the margin of the Nisutlin Batholith and the presence of airphoto lineaments that can be traced from the wallrocks into the batholith. The younger porphyry dykes strike parallel to the faults suggesting that the two may be related.

#### **GEOCHEMISTRY**

In the late 1970s, Cub JV conducted systematic soil sampling along the southern margin of the Nisutlin Batholith. The sampling was done on a grid that was 6 km long and up to 2 km wide. In most areas, samples were taken at 50 m intervals on lines spaced 200 m apart. Over much of what is now the Hid claims, line spacing was tightened to 100 m and in the vicinity of the Discovery Showing, sample density was further tightened to 25 m intervals on lines spaced 50 m apart. All of the samples were geochemically analyzed for tungsten, copper, molybdenum and lead at Chemex Labs Ltd. in North Vancouver. Molybdenum values were low across the entire area with only a few scattered values exceeding 10 ppm. Tungsten, copper and lead show greater contrast. For each of these elements the highest values are clustered in the area covered by the Hid claims. The area between the Peak and the Discovery Showing contains the greatest concentration of strongly anomalous tungsten (>400 ppm), copper (>100 ppm) and lead (>25 ppm) values. Of the four metals, tungsten is by far the most enriched relative to regional backgrounds. Unfortunately the technique used for most of the tungsten analyses had an upper limit of 400 ppm and samples containing more than that amount were not reanalyzed to establish absolute values. Thus, many samples were reported as >400 ppm. Soil geochemical results are not shown on maps attached to this report, because soil panning results discussed in the following section identify essentially the same areas of interest. Earlier assessment reports include maps illustrating individual values for each metal (Abbott and Cathro, 1978 and 1979).

Soil panning surveys were also conducted in the late 1970s over an area much larger than the current claim block. Sample spacing varies from 50 m intervals on lines spaced 100 to 200 m apart in low priority areas to 25 m intervals on lines spaced 50 m apart in anomalous areas. Sampling was done along pace- and compass-controlled lines between cut baselines. Each sample comprised about 2.5 kg of soil and/or talus fines, which were panned to a concentrate and lamped with an ultraviolet light so that the scheelite grains could be counted. The main area of anomalous response is shown on Figure 3.

The anomaly, as defined by greater than 200 grain of scheelite per pan, is 1900 m long and between 500 and 1000 m wide. The Discovery Showing is located in the northern part of the anomaly and is marked by an isolated sample that yielded > 10,000 grains per pan. A much larger area of very anomalous response begins about 100 m uphill to the south of the Discovery Showing. This strongly anomalous, core area is about 1000 m long and 300 m wide and is defined by more than 2000 grains per pan. Within this core, there are several clusters of samples that contained >10,000 grains per pan. The core area is situated at and above timberline where outcrop is relatively common and soil cover is usually about 1 m thick. Although downslope dispersion has likely expanded the anomaly in northerly and westerly directions, most of the scheelite appears to be locally derived.

The core area approximately coincides with an extensive stockwork system of scheelite bearing veinlets hosted by silicified wallrocks. Many of the highest panning values occur along high angle faults and dykes that have narrow skarn zones developed adjacent to them. These faults form broad recessive linears that are mostly blanketed with talus from adjacent wallrocks.

The panning anomalies within the core area have not been systematically followed up but limited work done in 1981 and 1984 yielded encouraging results. Several sites where high concentrations of scheelite grains had been reported were revisited and resampled in 1984. The soil samples from these sites were sent unprocessed to the ALS Chemex Laboratory where it was assayed for tungsten oxide. The following table compares panning results to assay results.

1979 PANNING	1984 SOIL
Value (scheelite grains)	Assay (%WO <sub>3</sub> )
16,600	0.067
1,500	0.056
22,000	0.090
20,000	0.073
17,000	0.180
9,000	0.298
5,000	0.032

Table I - Panning Results vs. Assay Values

No large skarns have been found within the core area and no systematic work has been done to evaluate potential associated with stockwork veinlets. None of the targets within core of the panning anomaly has been drill tested.

#### **MINERALIZATION**

The only partially delineated mineralization on the property is the Discovery Showing. This scheelite occurrence is hosted by skarn, likely developed in unit OSsl dark grey, fetid limestone. It consists of an area of felsenmeer 40 m long and 30 m wide, which contains mineralized skarn blocks that are typically 0.3 to 1 m in diameter but include slabs up to 1 m thick and 5 m across. The mineralized blocks were originally interpreted as frost heaved outcrop; however, trenching showed that they are rotated and form a discontinuous layer overlying soil and unmineralized talus.

The mineralized blocks are coated with a thick layer of brown limonite on weathered surfaces. Inside they consist of massive to weakly banded, dark to medium green, fine grained, siliceous skarn. In a few specimens, reddish brown garnets 1 to 2 mm across occur as random disseminations. Up to 5% pyrrhotite is disseminated throughout most of the skarn blocks. Chalcopyrite is a minor component. Scheelite forms subhedral grains ranging from 1 to 5 mm across. It is usually fairly evenly disseminated throughout the skarn, but it is occasionally segregated into poorly defined bands. Thin sections show that the skarn is composed of angular to subhedral grains of scheelite, diopside and minor garnet in a quartz groundmass with irregular interstitial sulphide blebs. Two semi-quantitative spectrographic analyses done in 1978 on this type of skarn indicate that in addition to iron, copper and tungsten the skarns are enriched in beryllium (700 and 1000 ppm) and bismuth (150 and 300 ppm). Two additional specimens of this material were collected and analyzed in 2003. Those samples were not tested with an ultraviolet lamp in the field and therefore are considered to be relatively representative of typical pyrrhotite bearing skarn. They returned 1.57 and 3.70% WO<sub>3</sub>, 188.5 and 597 ppm beryllium, 79.6 and 167 ppm bismuth and 12 and 24 ppb gold. No beryllium minerals were identified in the specimens (Eaton, 2003).

A second type of mineralized rock, which was given the field name altered skarn, forms a minor part of the float at the Discovery Showing. It occurs as both concordant and discordant bands up to several centimetres wide within diopside-garnet-quartz skarn. In hand specimens it is soft, crumbly and intensely fractured. White laths of pyroxene up to 1 cm long give the rock an igneous appearance but thin sections show that the rock is a skarn in which scheelite and pyroxene again occur in a quartz groundmass. The altered skarn typically exhibits strong limonite stains on all weathered surfaces.

Surface samples of mineralized skarn reportedly averaged 1.2% WO<sub>3</sub> across the area of the float showing. Soil geochemical results suggest the mineralization could extend 200 m further to the west but this is contradicted by the geology map prepared by Cub JV, which shows a major fault about 50 m west of the showing.

Three holes (1, 2 and 3) were drilled at different dip angles from one setup located uphill from the Discovery Showing to test the apparent host stratigraphy downdip from the mineralized float. Another hole (5) was drilled downhill back toward the first three holes to scissor beneath the showing. Figure 6 illustrates three possible interpretations of the results.

Holes 1, 2 and 3 intersected black limestone and weakly developed siliceous diopside skarn containing only traces of scheelite. Bedding angles in the holes suggest that the stratigraphy is nearly horizontal. Therefore, assuming the mineralization is stratigraphically controlled, it has limited lateral extent (Interpretation A) or it is derived from a source located uphill from the drill holes (Interpretation B). Hole 5 intersected a fault zone that assayed 0.95% WO<sub>3</sub> across 2.13 m. Rocks within and adjacent to the fault are described as veined and brecciated skarn, and this is the only skarn logged in that hole. Thus, there is a third possible explanation that accounts for both the observed surface mineralization and drill results. The skarn mineralization could be developed in a narrow band within and along the margins of a vein fault (Interpretation C). Assuming this interpretation is correct, the fault would likely strike northeasterly and dip about 60° to the north. It would extend updip from the intersection in hole 5 to a point immediately above the Discovery Showing float train but downhill from the collars of holes 1, 2 and 3. Descriptions of the mineralized fault and skarn intersected in hole 5 are quite sketchy. However, the altered skarn float has characteristics that would be expected from rocks adjacent to a fault. Mineralogical variations between the skarn observed in the drill hole and the majority of the mineralized float boulders may be due to differing wallrock chemistry.

Prospecting elsewhere on the property during the early 1980s located several other areas where mineralized skarn is developed along faults and adjacent to porphyry dykes, or where widely spaced scheelite bearing quartz veinlets form a broad stockwork zone.

Most of the outcropping skarns are weak and are not accompanied by strong soil geochemical or panning anomalies. The exposed skarns usually grade less than 0.2% WO<sub>3</sub> and contain little or no magnetite or sulphide mineralization. However, magnetic surveys done in 1981 across the core of the panning anomaly identified several areas of high magnetic susceptibility along faults and dykes, perhaps indicating that buried, pyrrhotite rich skarns are present. Hand trenching in 1984 confirmed tungsten bearing skarns are more widespread than is suggested by surface prospecting. All three trenches that were dug exposed mineralized bedrock or float grading between 0.3 and 2.8% WO<sub>3</sub>.

The stockwork zone, which covers an area about 850 by 350 m, largely coincides with the high grade core of the panning anomaly. Mapping and petrographic studies done in 1981 indicate that the entire area exhibits pervasive calc-silicate alteration. The quartz-scheelite veins and veinlets typically have bleached envelopes two to five times their width. Diopside is a ubiquitous vein component, which implies a high temperature of emplacement. Reportedly there are two to three mineralized fractures per metre over large areas. This type of mineralization has not been systematically sampled to establish its average grade.

#### 2007 GEOPHYSICAL SURVEYS

The 2007 geophysical surveys were contracted to Geotech Ltd. of Aurora, Ontario and were performed with an Astar B3 helicopter operated by TRK Helicopters (BC) Ltd. of Langley, British Columbia. The surveys covered a 3000 m by 1000 m, area centered on the Hid claims, and consisted of magnetic and versatile time domain electromagnetics (VTEM). Appendix II contains reports by Geotech, which described equipment and procedures that were used during the surveys plus interpretation of the results. Figure 7 illustrates picked electromagnetic (EM) anomalies while Figure 8 shows the EM anomalies along with interpreted magnetic data. CD's containing the survey data are also attached to this report.

The surveys were flown at a constant speed of 80 km/hr and at an average ground clearance of 140 m. Traverse lines were spaced 100 m apart and were orientated at  $126^{\circ}$  or  $306^{\circ}$ . The tie lines were flown 1000 m apart at  $036^{\circ}$ .

The VTEM survey outlined two sets of shallowly dipping conductors that are tentatively interpreted as sulphide-bearing skarn zones (Figure 8).

The northern conductor is moderately conductive and responds as a thick, shallowly southeast dipping plate. The conductor is about 750 m long and is enigmatic because it appears to extend without break across a major fault that juxtaposes limestone and shale. It is located 300 to 500 m from the intrusive contact.

The southern conductor is also moderately conductive. It is interpreted as a thick shallowly northwest dipping plate. This conductor appears to be hosted by a limestone unit and its trace parallels a nearby, folded contact. The conductor is about 500 m long and is located on the eastern edge of the core area of the panning anomaly.







The magnetic survey produced total magnetic field values ranging from 57620 nT to 57670 nT, which is characterized as quiet behavior (Figure 9). The Discovery Showing is not marked by anomalous response; however magnetic highs, which are offset to the south (downdip) from VTEM conductors, are centred about 350 m to the east and west of the Discovery Showing. These anomalies are in areas of poor exposure and are not explained. Other magnetic highs, which lie southeast of the Discovery Zone, approximately coincide with the core area of the panning anomaly and the area of stockwork veining.

#### **DISCUSSION AND CONCLUSIONS**

The Hidden property has a favourable geological setting for tungsten mineralization and exhibits widespread panning and soil geochemical anomalies that have not been adequately explained. The recently completed geophysical surveys produced magnetic highs in the vicinity of VTEM conductors and within undrilled portions of the panning anomaly. Most of the conductors lie within favourable strata and could represent sulphide-bearing skarn horizons. However, the absence of strong magnetic support for these conductors likely means that a Cantung-type skarn deposit (Mathieson and Clark, 1984) is a poor exploration model.

The presence of widespread scheelite bearing veins and narrow skarn zones along steeply dipping faults and dykes suggests that the main controls on mineralization are probably structural. That said, the presence or absence of carbonate minerals in the wallrocks may also be a significant factor in localizing mineralization. Proximity of stockwork zones to feldspar porphyry dykes may indicate the presence of a buried felsic pluton, which could in turn indicate that the stockwork zone is part of large porphyry-style system.

A useful model for the Hidden property could be the Logtung tungsten-molybdenum deposit, located 180 km to the southeast in the same belt of intrusions. This deposit contains 240 million tonnes grading 0.10% WO<sub>3</sub> and 0.047% MoS<sub>2</sub> (Largo, 2007). It is centred on a small Cretaceous-Tertiary dyke swarm. Recent compilation of old exploration data from Logtung identified general zoning away from molybdenum in the core toward tungsten on the fringes. This work also showed that recessively weathering, steeply dipping, sheeted veins that cut the stockwork zone host much higher than deposit average grade mineralization and comprise a greater proportion of total mineralization than previously thought. Beryllium and bismuth minerals are often present in the veins, especially in the more distal part of that system. Skarn zones host only a small percentage of mineralization at Logtung but where intersected often grade between 0.3 and 1% WO<sub>3</sub> (Wengznowski, 2004). Their relationship to the steeply dipping veins is uncertain.

Future tungsten exploration at the Hidden property should evaluate stockwork, vein and faultrelated skarn potential. This should include night lamping, hand trenching, detailed prospecting and diamond drilling. The old drill core, especially hole 5, should be re-logged. New holes should be drilled: 1) beneath and along strike from the Discovery Zone; 2) to test the conductors that are interpreted as skarn zones; and 3) to evaluate bulk tonnage potential of the stockwork zone and associated core area of the panning anomaly. The work should be done with a helicopter portable unitized drill capable of testing to at least 300 m below surface.



Respectfully submitted,

ARCHER, CATHRO & ASSOCIATES (1981) LIMITED

W. Douglas Eaton, B.Sc. Geology

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APPENDIX I

STATEMENT OF QUALIFICATIONS

#### STATEMENT OF QUALIFICATIONS

I, W. Douglas Eaton, geologist, with business addresses in Whitehorse, Yukon Territory and Vancouver, British Columbia and residential address in North Vancouver, British Columbia, hereby certify that:

- 1. I graduated from the University of British Columbia in 1980 with a B.Sc. majoring in Geological Sciences.
- 2. From 1971 to present, I have been actively engaged in mineral exploration in British Columbia and Yukon Territory and on June 1, 1981, became a partner in Archer, Cathro & Associates (1981) Limited.
- 3. I have personally participated in or supervised the field work reported herein and have interpreted all data resulting from this work.

W. Douglas Eaton, B.Sc. Geology

## **APPENDIX II**

## GEOPHYSICAL REPORTS BY GEOTECH LTD., INCLUDING CD'S WITH DIGITAL DATA

# REPORT ON A HELICOPTER-BORNE TIME DOMAIN ELECTROMAGNETIC GEOPHYSICAL INTERPRETATION

# HIDDEN PROPERTY

Yukon Territory, Canada

# For Strategic Metals Ltd.

## By

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Survey flown in September 2007

Project 7067 March, 2008

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## REPORT ON A HELICOPTER-BORNE TIME DOMAIN ELECTROMAGNETIC INTERPRETATION

## HIDDEN Property, Yukon Territory, Canada

# 1. INTRODUCTION

In September 2007, a helicopter-borne electromagnetic survey was carried out by Geotech Ltd. for Strategic Metals Ltd. over the HIDDEN Property located in Yukon Territory, Canada.

This report includes the results of the geophysical interpretation, over this Property. The Property is located at approximately 120 km north-east from Whitehorse, in the Yukon Territory. The geographic coordinates of the block extents are: longitudes, 133° 23'48" W and 133° 20'35" W, and latitudes, 61° 25'13" N and 61° 26'33" N. The surveyed area is 3 km<sup>2</sup>, and the total line kilometers flown are 37 km (Fig. 1).

The survey was conducted using Geotech Ltd VTEM system. Principal geophysical sensors included a versatile time domain electromagnetic system and a high resolution cesium magnetometer. Ancillary equipment included a GPS navigation system and a radar altimeter.

Data processing and map compilation, including generation of final digital data products were achieved at the office of Geotech Ltd in Aurora, Ontario.

The present report describes the results of the geophysical interpretation of this Property.





Fig. 1 Location map of the HIDDEN Property on the satellite image.



# 2. SURVEY DESCRIPTION

In September 2007, Geotech Ltd. carried out a helicopter-borne geophysical survey over the HIDDEN property located in Yukon. Geotech Ltd. utilized a Versatile Time Domain Electromagnetic System to measure the electromagnetic induction field (B-field) and the vertical component of its time derivative (dB/dt). The electromagnetic measurements were made at the off-time mode. The concentric in-loop system was towed at a distance of 42 m from the helicopter. The VTEM Transmitter uses a trapezoid waveform shape with 7.2 ms duration operating at a base frequency of 30Hz. The dipole moment was approximately 425 000 NIA. The half-waveform was 16.7 ms.

A towed cesium and high resolution magnetometer was used to measure the Earth's magnetic field intensity. Data positioning and navigation were assured by a Novatel WAA GPS with accuracy less then 3 m.

A Terra TRA radar altimeter was used to measure the terrain clearance. The helicopter was flying at a constant speed of 80 km/h and an average ground clearance of 140 m. The traverse lines direction was N 54° W and the tie lines direction was N 36° E. The distance between the traverse lines and the tie lines was 100 m and 1000 m, respectively. A more detailed description of the survey parameters is provided in the logistics/processing report.



# 3. GEOLOGICAL CONSIDERATIONS

# 3.1 Topography

The terrain is mountainous and very rugged with alternating valleys and streams. The absolute altitudes range from 1100 m to 1800 m approximately. Due to the terrain roughness of this region, it was difficult to keep a constant ground clearance while surveying this area.



Fig.2 Topographic relief map of the HIDDEN Property with flight path.



# 3.2 Regional geological context

The Yukon Territory is situated in the northern part of the large geologic (and physiographic) belt known as the Cordillera. It is composed of relatively young mountain belts that range from Alaska to Mexico. The Yukon Territory is composed of a diverse type of rocks recording more than a billion years of geological history. Most of them have been affected by folding, faulting, metamorphism and uplift during various tectono-metamorphic events over at least the last 190 million years. This deformation has resulted in a complex arrangement of rock units and the mountainous terrain that has shaped today's geology. Geologically, Yukon is divided into two main components which are largely separated by the Tintina Trench. Formations northeast of the Tintina Fault consist of a thick, older sequence of sedimentary rocks which was deposited upon a stable geological basement. Rocks southwest of the Tintina Trench are composed of a younger, complex mosaic of igneous and metamorphic, representing numerous accreted terranes (Fig. 3).



Fig.3. The major tectonic elements of Yukon superimposed on the satellite image. The figure indicates that the territory is composed of two dominant rock packages separated by the Tintina Fault: thick packages of sediments (northeast) and accreted Terranes (Southwest). The star indicates the location of the HIDDEN property.

# 3.3 Geological context of the HIDDEN Property

Stratigraphic units underlying the property belong to Cassiar Platform and range from Ordovician to Mississippian in age. The section is at least 1300 m thick and has been subdivided into six map units.

The oldest rocks belong to unit **OSc** which consists of at least 100 m of massive white with black bands dolomite.

The dolomite is overlain by unit **OSsl** comprising about 200 m of recessively weathering, black, graphitic calcareous slate with minor fetid limestone. The Discovery Showing may be hosted by fetid grey limestone near the top of this unit. The contact between this unit and the overlying rocks is gradational.

Unit **OSDqc** is composed of about 500 m of grey-green silty shale inter-bedded with black graphitic shale and distinctive, thinly laminated silty limestone.

Unit **OSs** gradationally overlies unit OSDqc. It consists of about 100 m of recessively rusty weathering, black non-calcareous slate. A monograph found in slate on the southeast side of the Peak is probably Silurian in age.

Unit **Sd** is a massive, light grey sandy dolomite that is inter-bedded with lenses of massive grey quartzite. This unit is about 300 m thick. These dolomites are difficult to distinguish from those comprising unit OSc.

The youngest sedimentary rocks in the immediate vicinity of the Hidden property are black, graphitic non-calcareous, siliceous slate belonging to unit **uDMs**. These rocks are separated from the other units by a major fault and are believed to belong to a separate stratigraphic package. The exposed section of this unit is at least 300 m thick.

Unit **Kqm** comprises porphyritic granodiorite and quartz monzonite of the 100 - 110 Ma Cassiar Plutonic Suite. These rocks occur within the Nisutlin Batholith, the southern margin of which underlies the northeastern corner of the property. The contact is sharp and dips sharply southwest. Unit **KTfp** forms two north trending, steeply dipping dykes that cut stratigraphy at a high angle in the central part of the claim block. These rocks belong to a suite of subvolcanic dykes and associated flows of Upper Cretaceous or Tertiary age.

The dominant structural elements on the property are north trending normal faults but similarities between some rock types makes recognition of these structures difficult without very detailed stratigraphic and structural mapping. Faulting is most intensely developed near the Discovery Showing where displacement of 1000 m or more has been measured.

## 3.4 Mineralization

The only well tested mineralization on the property is the Discovery Showing. This scheelite occurrence is hosted by skarn likely developed in unit OSsl dark grey, fetid limestone. It consists of mineralized skarn blocks that are typically 0.3 to 1 m across but range up to 5 m. The mineralized blocks are coated with a thick layer of brown limonite on weathered surfaces. Inside they consist of massive to weakly banded, dark to medium green, fine grained, siliceous skarn. In a few specimens, reddish brown garnets 1 to 2 mm across occur as random disseminations. Up to 5% pyrrhotite is disseminated throughout most of the skarn blocks. Chalcopyrite is a minor component. Scheelite forms subhedral grains ranging from 1 to 5 mm across and is usually fairly evenly disseminated throughout the skarn although it is occasionally segregated into poorly defined bands. Samples returned anomalous concentrations of W, Be, Bi, and Au.

A second type of mineralized rock (altered skarn) forms a minor part of the float at the Discovery Showing. Surface samples of mineralized skarn returned anomalous values of W.

Holes were drilled at different dip angles from one setup located above the Discovery Showing. They intersected black limestone and weakly developed siliceous diopside skarn containing only traces of scheelite.

Prospecting elsewhere on the property located several areas of skarn along faults and adjacent to porphyry dykes, and widely spaced scheelite bearing quartz veins forming a broad stockwork zone. Most of the outcropping skarn are weak and are not accompanied by strong soil geochemical or panning anomalies. The exposed skarn usually grades less than 0.2% WO<sub>3</sub> and contains little or no magnetite or sulphides mineralization.





Fig. 4 Simplified Geological map of the HIDDEN Property. Discovery showing is indicated by the red star.

# 4. INTERPRETATION OF THE MAGNETIC DATA

# 4.1 Introduction

Aeromagnetic surveys are routinely used as a powerful tool at different stages in mining exploration and in geological mapping. Because geological formations have different concentrations of magnetic minerals, they exhibit different magnetic signatures in the magnetic field, depending on the susceptibility contrast of rocks and the characteristics of the magnetic field. Thus, observed magnetic field over an area, can provide useful information that can assist the lithological and the structural mapping. It can be used to detect iron-rich mineral deposits, and/or mineral deposits associated with highly magnetic rocks (mafic and ultramafic formations).

# 4.2 Analysis of the Magnetic data

The observed magnetic field over the HIDDEN Property is shown in Figs. 5a-5b. The total magnetic field values are ranging from 57620 nT to 57670 nT approximately, yielding an amplitude difference of 50 nT. The Total magnetic field expresses a quiet behavior over the whole property composed mainly of thick sediments. However, weak magnetic highs are observed in the north-west and east of the block. These magnetic highs are probably related to basement rocks. Some local positive anomalies are observed in the central area. They are probably associated with the mapped NS trending faults with pyrrhotite and /or magnetic contents.

Since the contents of the observed magnetic maps include the response of shallow and deep magnetic sources, it is difficult to analyze the maps containing various wavelength anomalies. Distinguishing shallow features from deeper ones can be performed via several methods of field separation and filtering.

Figure 6 shows the reduced to the pole magnetic field map, upward continued to 100m. The map shows smoother anomalies with reduced intensities. The map shows a NS gradient area related to the mapped NS trending faults. Elsewhere, the RTP field expresses a quiet behavior over the sediments. Figure 7 illustrates the vertical gradient of the TMI. The vertical gradient is used to enhance magnetic signals caused by shallow sources and related to faults, dykes and contacts.

The map highlights some local perturbations in the central area of the block related to NS trending faulting systems. The nature of the observed local anomalies could be associated with disseminated pyrrhotite and / or magnetite controlled by the existing faults. On the other hand, the tilt derivative map illustrated in Fig. 8 yields another example of amplifying signals associated with shallow sources. The tilt derivative known as being the local phase is computed from the vertical and horizontal gradients. The Tilt derivative map provides a better illustration of the perturbation caused by the NS trending faulting system. It also indicates in the NW of the block several NW and NE trending weak liniments probably associated surfacial faults. The vertical gradient and tilt derivative maps are very useful for helping to understand the structural patterns of the area.




Fig. 5a TMI image of the HIDDEN Property.



Fig. 5b Perspective view of the magnetic relief of the HIDDEN Property. The map clearly shows magnetic lows over the eastern area related to non magnetic calcareous shale.





Fig.6 Color shaded relief of reduced to the pole TMI (upward continued to 100m).



Fig.7 Color shaded relief of the vertical gradient of the magnetic field.





Fig. 8 Color shaded relief of the tilt derivative.



### 4.3 Inversion of the magnetic data

Several computer-based techniques can be used to automatically detect magnetic sources and yield estimations of their geometrical and physical parameters. These techniques can be either used to gridded data (3D methods) or to profiles (2D methods). Euler deconvolution is a well established technique, allowing a rapid interpretation of a large amount of magnetic data. This method is mainly aimed to delineate magnetic sources boundaries and to estimate their depths.

Fig. 9 shows the results obtained with the Euler deconvolution inversion using a structural index of 1, a depth tolerance of 10% and a square deconvolution window with a size of  $400 \times 400$  metres. Euler solutions have been plotted on the total gradient (analytic signal) map for a better illustration. The peaks of the total gradient are also used to locate and delineate magnetic sources boundaries. The advantage of the total gradient (analytic signal) is that the location and delineation of magnetic bodies is independent of the magnetization and the inducing magnetic field direction.

The map shows that most of the shallowest Euler solutions (<50 m) are concentrated in the central area and are aligned roughly in the NS direction. The obtained solutions are related to the NS existing faulting system. Relatively deeper solutions (>100 m) are encountered in the northwest and east of the block and are possibly the signature of the basement. Results obtained with the Euler deconvolution confirm the qualitative analysis conducted with the reduced maps and can be efficiently used for the structural mapping of the area.





Fig. 9 Euler deconvolution solutions plotted on the total gradient image.

# 5. INTERPRETATION of the VTEM DATA

## 5.1 Introduction

Transient electromagnetic surveys have proven to be a very efficient tool in mineral exploration by detecting hidden deposits characterized by higher conductivities than the medium in which they are embedded. Because Time domain systems have a much greater depth penetration compared to the Frequency domain systems, these systems are considered as a tool of choice in the mining exploration. The Geotech Helicopter VTEM system, operating in the Time domain, uses concentric-loop geometry with the receiver mounted in the centre of a larger transmitter loop. Both loops are oriented in the vertical plane. This configuration has a number of advantages, as a maximum coupling, sharper anomalies by comparison to airborne fixed wing systems, and the shape of the anomalies in independent of the flight path orientation. Furthermore, the high moment transmitter combined with the lower terrain clearance yields stronger secondary field signals in most conductors when compared to other systems. The actual VTEM systems measure both the electromagnetic induction field B and its time derivative dB/dt. This system specificity has a lot of advantages, as the dB/dt better resolves the shallow conductive sources while the B-field exhibits a better resolution for deep conductors.

# 5.2 VTEM anomalies shape

For concentric-loop geometry systems when both loops are oriented in the Z-axis (VTEM system) thick dipping or horizontal conductors exhibit a characteristic single peak, while steeply dipping and thin conductors manifest a double peak. The minimum indicates the location of the top of the thin conductor, and the major peak indicates the side towards which the conductor is dipping. Synthetic models anomalies were generated for the plate type conductors are provided in the Appendix A to better understand the shape of the VTEM anomalies



## 5.3 Analysis of the EM results

Figures 14 and 15 show the stacked profiles in pseudo-logarithmic scale of the dB/dt and B-field decays, respectively. Both maps indicate the existence of two anomalous zones: W, western, and E, eastern.

The western Zone (W) is composed of moderate and broad decays north-easterly trending. Their shape indicates shallowly dipping (southeasterly) conductive bedrock (Figs. 10 and 11). The eastern zone (E) consists of broad and moderate anomalies trending roughly northeasterly. The observed decays in this zone are anti-symmetric and indicate northwesterly dipping conductive bedrock (Figs. 12 and 13).

The interpretation of the EM profiles was performed using in-house built software for automatically picking the anomalies along the profiles and yielding estimates of the conductance and the decay constant (tau) of isolated anomalies. The picked EM anomalies were posted on the late time EM channel. Figures 16 and 17 illustrate the results of the picked anomalies superimposed on the dB/dt, and B-field late time channel (6.578 ms after the current shut off), respectively.

The anomaly maps show mainly the existence of two bedrocks: W and E located in the west and east of the block respectively.

Bedrock W is northeasterly trending and has moderate conductance values (around 10S). The decay constant values are ranging from 2.5 ms to 5 ms indicating the existence of good conductive bedrock. This bedrock is located near the Discovery showing and is possibly associated with conductive skarnified horizon. The bedrock E is trending in the NE roughly. It is characterized by lesser conductance values (<10S) and decay constants (around 4.5 ms). It is associated with a NW dipping conductive layer. It seems that the eastern and western bedrocks form the flanks of the same horizon; however, this can not be confirmed at this stage.

The interpretation map (Fig. 18) shows the results of the magnetic and electromagnetic analysis superimposed on the total gradient image. The magnetic interpretation suggests the existence in the western area of NW and NE trending cross-cutting faults. It also indicates that the bedrock W is controlled by a NE trending fault associated with deep Euler solutions (>100 m). The eastern bedrock (E) is associated with shallow magnetic sources (<100m) the nature of which could be associated with disseminated pyrrhotite and magnetite.







Fig. 10 EM decays over for the western portion of the line 14020 (zone W). The shape of the decays suggests shallowly dipping conductive bedrock (SE) as indicated by the red arrow.

Fig. 11 EM decays for the western portion of the Line 14040 (zone W) indicating a shallowly dipping conductive conductor (SE) as indicated by the red arrow.



Fig. 12 EM decays over for the eastern portion of the line 14090 (zone E). The shape of the decays suggests shallowly dipping (NW) conductive bedrock as indicated by the red arrow.



Fig. 13 EM decays over for the eastern portion of the line 14101 (zone E). The shape of the decays suggests shallowly dipping (NW) conductive bedrock as indicated by the red arrow.



Fig. 14 EM dB/dt stacked profiles at log-linear scale. Early time decays are in green and late time in red. Anomalous zones: W-western and E-eastern.



Fig. 15 EM B-Field stacked profiles at log-linear scale. Early time decays are in green and late time in red. Anomalous zones: W-western and E-eastern.



Fig. 16 EM picked anomalies plotted on the late time dB/dt channel image (6.578 ms after current shut off). Conductive bedrocks: W and E.



Fig. 17 EM picked anomalies plotted on the late time dB/dt channel image (6.578 ms after current shut off). Conductive bedrocks and E.



Fig. 18 Interpretation map showing the results of the magnetic and electromagnetic data analysis.

## 5.4 Selected Anomalies

Several individual anomalies extracted from the described above anomalous zones of interest have been selected for modeling by converting the EM decays into CDIs. The anomalies are located on the following lines: L14040, L14050, L14070, L14090, and L14101. The summarized characteristics of the selected anomalies are given in the following table.

Bedrock /Line	An om	Anomaly Type description	Conductor geometry	X- location m	Y- location	Cond uctan	Dip	Dip Azi	Tau mse
	aly ID				m	ce S		mu t	c
W/L14040	А	Anti-symmetric broad Single peak	Thick shallowly dipping plate	586721	6812271	11.0	SE	NE	3.9
W/L14050	А	Anti-symmetric broad Single peak	Thick shallowly dipping plate	586618	6812220	9.9	SE	NE	4.7
W/L14070	В	Anti-symmetric broad Single peak	Thick shallowly dipping plate	586343	6812167	6.5	SE.	NE	5.0
E/L14070	А	Anti-symmetric broad Single peak	Thick shallowly dipping plate	587658	6811241	7.9	NW	NE	3.5
W/L14090	В	Anti-symmetric broad Single peak	Thick shallowly dipping plate	586147	6812072	9.1	SE	NE	3.4
E/L14090	А	Anti-symmetric broad Single peak	Thick shallowly dipping plate	587576	6811053	11.2	NW	NE	4.2
W/L14101	А	Anti-symmetric broad Single peak	Thick shallowly dipping plate	586066	6812010	11.9	SE	NE	4.3
W/L14101	В	Anti-symmetric broad Single peak	Thick shallowly dipping plate	586386	6811786	11.8	-	-	4.6
E/L14101	C	Anti-symmetric Single peak	Thick shallowly dipping plate	587480	6810983	10.8	NW	NE	4.4

Table 1. Summarized results of selected anomalies.

## 5.5 Conductivity Depth Sections

Conductivity depth imaging is considered as one of the important steps in the analysis and interpretation of electromagnetic data. CDI allows providing useful information of the conductivity distribution of the considered cross section. CDIs were performed for the selected lines using the EMflow software (Figs.19a-23b).



Fig. 19a shows the CDI section for the line L14040 (dB/dt data). The section indicates the existence of shallowly dipping (SE) good conductive bedrock. The approximate depth of the layer is <200m. Letter A indicates the location of the anomaly on the map.

LINE 14040(CDI-Exponent:)



Fig. 19b shows the CDI section for the line L14040 (B-Field data). The section indicates the existence of shallowly dipping (SE) good conductive bedrock in the right side of the section. The approximate depth of the layer is <200m. Letter A indicates the location of the anomaly on the map.



Fig. 20a shows the CDI section for the line L14050 (dB/dt data). The section depicts the existence of shallowly dipping conductive layer (<200m). Letter A indicates the location of the anomalies on the map.

LINE 14050(CDI-Exponent:)



Fig. 20b shows the CDI section for the line L14050 (B-Field data). The section depicts the existence of shallowly dipping conductive layer (<200m). Letter A indicates the location of the anomalies on the map.



Fig. 21a shows the CDI section for the line L14070 (dB/dt data). The section suggests the existence of shallowly dipping good conductive layer. The depth to the top of the bedrock is less than 200m in the right side of the section. Letters A and B indicate the location of the anomalies on the map.



Fig. 21b shows the CDI section for the line L14070 (B-Field data). The section suggests the existence of shallowly dipping good conductive layer. The depth to the top of the bedrock is less than 200m in the right side of the section. Letters A and B indicate the location of the anomalies on the map.



Fig. 22a shows the CDI section for the line L14090 (dB/dt data). The section indicates the existence of shallowly dipping good conductive bedrock. The top of the layer is located at shallow depth (<100m) in the right side of the section. A and B indicate the location of the anomalies on the map.



LINE 14090(CDI-Exponent:)

Fig. 22b shows the CDI section for the line L14090 (B-Field data). The section indicates the existence of shallowly dipping good conductive bedrock. The top of the layer is located at shallow depth (<100m) in the right side of the section. A and B indicate the location of the anomalies on the map.



Fig. 23a shows the CDI section for the line L14101 (dB/dt data). The section highlights the existence of shallowly dipping good conductive bedrock in the left and right sides of the section at shallow depths (100-200m). Letters A, B and C indicate the location of the anomalies on the map.





Fig. 23b shows the CDI section for the line L14101 (B-Field data). The section highlights the existence of shallowly dipping good conductive bedrock in the left and right sides of the section at shallow depths (100-200m). Letters A, B and C indicate the location of the anomalies on the map.

# 6. CONCLUSIONS AND RECOMMANDATIONS

The analysis of the magnetic does not reveal any noticeable magnetic activity due to the presence of relatively thick non-magnetic sediments. However, some weakly magnetic structures controlled by NS trending faults are highlighted in the central area. The interpretation also suggests the existence of NE and NW trending cross-cutting faults in the west of the block. The VTEM survey reveals the existence of 2 NE trending shallowly dipping moderate to good conductive bedrocks characterized by relatively moderate conductance and decay constants values. CDI sections showed that the western bedrock is dipping southeasterly, while the eastern bedrock is northwesterly. The western bedrock, the top of which is located at depth less than 200 m, is controlled by a NE trending fault and may be associated with conductive skarnified zone.

The recommendation is to conduct some drilling tests on the potential anomalies to determine the nature of the conductive bedrocks.

Respectfully submitted,

Nasreddine Bournas PhD, PGeo. Geotech Ltd. March, 2008



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#### APPENDIX A

#### VTEM ANOMALY MODELING

#### I. THIN PLATE



Figure A-1: dB/dt response of a shallow vertical thin plate. Depth=100 m, CT=20 S. The EM response is normalized by the dipole moment and the Rx area.



Figure A-3: dB/dt response of a shallow skewed thin plate. Depth=200 m, CT=20 S. The EM response is normalized by the dipole moment and the Rx area.



Figure A-2: B-field response of a shallow vertical thin plate. Depth=100 m, CT=20 S. The EM response is normalized by the dipole moment.



Figure A-4: B-field response of a shallow skewed thin plate. Depth=100 m, CT=20 S.The EM response is normalized by the dipole moment.



Figure A-5: dB/dt response of a deep vertical thin plate. Depth=200 m, CT=20 S. The EM response is normalized by the dipole moment and the Rx area.



Figure A-6: B-Field response of a deep vertical thin plate. Depth=200 m, CT=20 S. The EM response is normalized by the dipole moment.



Figure A-7: dB/dt response of a deep skewed thin plate. Depth=200 m, CT=20 S. The EM response is normalized by the dipole moment and the Rx area.



Figure A-8: B-field response of a deep skewed thin plate. Depth=200 m, CT=20 S. The EM response is normalized by the dipole moment.





Figure A-9: dB/dt response of a shallow horizontal thin plate. Depth=100 m, CT=20 S. The EM response is normalized by the dipole moment and the Rx area.



Figure A-10: B-Field response of a shallow horizontal thin plate. Depth=100 m, CT=20 S. The EM response is normalized by the dipole moment.



Figure A-11: dB/dt response of a deep horizontal thin plate. Depth=200 m, CT=20 S. The EM response is normalized by the dipole moment and the Rx area.



Figure A-12: B-Field response of a deep horizontal thin plate. Depth=200 m, CT=20 S. The EM response is normalized by the dipole moment.

### **II. THICK PLATE**



Figure A-13: dB/dt response of a shallow vertical thick plate. Depth=100 m, C=12 S/m, thickness=20 m. The EM response is normalized by the dipole moment and the Rx area.



Figure A-14: B-Field response of a shallow vertical thick plate. Depth=100 m, C=12 S/m, thickness= 20 m. The EM response is normalized by the dipole moment.



Figure A-15: dB/dt response of a shallow skewed thick plate. Depth=100 m, C=12 S/m, thickness=20 m. The EM response is normalized by the dipole moment and the Rx area.



Figure A-16: B-Field response of a shallow skewed thick plate. Depth=100 m, C=12 S/m, thickness=20 m. The EM response is normalized by the dipole moment.

#### **III. MULTIPLE THIN PLATES**



Figure A-17: dB/dt response of two vertical thin plates. Depth=100 m, CT=20 S. The EM response is normalized by the dipole moment and the Rx area.



Figure A-18: B-Field response of two vertical thin plates. Depth=100 m, CT=20 S. The EM response is normalized by the dipole moment.







Project 7067



Project 7067


# REPORT ON A HELICOPTER-BORNE VERSATILE TIME DOMAIN ELECTROMAGNETIC (VTEM) GEOPHYSICAL SURVEY

Highway Property Yukon / British Columbia, Canada

for Strategic Metals Ltd.

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Survey flown in September 2007

Project 7067 February, 2008

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## REPORT ON A HELICOPTER-BORNE VERSATILE TIME DOMAIN ELECTROMAGNETIC SURVEY

Highway property, Yukon / British Columbia, Canada

## **Executive Summary**

This report describes the Helicopter-borne geophysical survey carried out on behalf of Strategic Metals Ltd. by Geotech Ltd. over one block in Yukon / British Columbia, Canada.

Principal geophysical sensors included a versatile time domain electromagnetic (VTEM) system and a cesium magnetometer. Ancillary equipment included a GPS navigation system and a radar altimeter. A total of 326.44 line-km were flown.

In-field data processing involved quality control and compilation of data collected during the acquisition stage, using the in-field processing centre established in Teslin, Yukon. Preliminary and final data processing, including generation of final digital data products were done at the office of Geotech Ltd. in Aurora, Ontario.

The processed survey results are presented as electromagnetic stacked profiles and total magnetic intensity grid.

Digital data includes all electromagnetic and magnetic products plus positional, altitude and raw data.



## 1. INTRODUCTION

#### 1.1 General Considerations

These services are the result of the Agreement made between Geotech Ltd. and Archer Cathro & Associates to perform a helicopter-borne geophysical survey over one block located in Yukon / British Columbia, Canada.

326.44 line-km of geophysical data were acquired during the survey.

Bill Wengzynowski, acted on behalf of Strategic Metals Ltd. during data acquisition and data processing phases of this project.

The survey block is as shown in Appendix A.

The crew was based in Teslin, Yukon for the acquisition phase of the survey, as shown in Section 2 of this report.

The helicopter was based at the Teslin airport for the duration of the survey. Survey flying was completed on September 18<sup>th</sup>, 2007. Preliminary data processing was carried out daily during the acquisition phase of the project. Final data presentation and data archiving was completed in the Aurora office of Geotech Ltd. in February, 2008.

#### 1.2. Survey and System Specifications

The survey block was flown at nominal traverse line spacing of 100 metres, at N45°E / N225°E direction. Tie lines were flown perpendicular to traverse lines.

Where possible, the helicopter maintained a mean terrain clearance of 85 metres, which translated into an average height of 50 metres above ground for the bird-mounted VTEM system and 70 metres for the magnetic sensor.

The survey was flown using an Astar B3 helicopter, registration C-GTFX. The helicopter was operated by TRK helicopters. Details of the survey specifications may be found in Section 2 of this report.



#### 1.3. Data Processing and Final Products

Data compilation and processing were carried out by the application of Geosoft OASIS Montaj and programs proprietary to Geotech Ltd.

A database, grids and maps of final products were presented to Strategic Metals Ltd.

The survey report describes the procedures for data acquisition, processing, final image presentation and the specifications for the digital data set.

#### 1.4. Topographic Relief and cultural features

The survey block is located in Yukon, approximately 35 kilometers SE of the town of Teslin.

Topographically, the survey area exhibits a mountainous terrain, with elevation range from 720 metres to 1310 metres above sea level.



Figure 1. – Projection of flight path on topography

## 2. DATA ACQUISITION

#### 2.1. Survey Area

The survey block (see location map, Appendix A) and general flight specifications are as follows:

Survey block	Line spacing (m)	Area (Km2)	Line- km	Flight direction	Line number
HIGHWAY	100	56.09	284.43	N45E / N225E	L3010 - L3710
	1000		42.00	N135E / N315E	T3910 - T3930

Table 1 - Survey block

Survey block boundaries co-ordinates are provided in Appendix B.

#### 2.2. Survey Operations

Survey operations were based in Teslin, Yukon for the acquisition phase of the survey.

The following table shows the timing of the flying.

Date	Flight #	Flown KM	Block	Crew Location	Comments
14-September-07	95	77.89	HIGHWAY	Teslin, Yukon	Other blocks flown
15-September-07				Teslin, Yukon	No production due to weather
16-September-07	96-98	176.24	HIGHWAY	Teslin, Yukon	Production
17-September-07				Teslin, Yukon	No production due to weather
18-September-07	99	79.17	HIGHWAY	Teslin, Yukon	Other blocks flown

Table 2 - Survey schedule



#### 2.3. Flight Specifications

The nominal EM sensor terrain clearance was 50 m (EM bird height above ground, i.e. helicopter is maintained 85 m above ground) due to rough terrain and helicopter crew safety. Nominal survey speed was 80 km/hour. The data recording rates of the data acquisition was 0.1 second for electromagnetics and magnetometer, 0.2 second for altimeter and GPS. This translates to a geophysical reading about every 2 metres along flight track. Navigation was assisted by a GPS receiver and data acquisition system, which reports GPS co-ordinates as latitude/longitude and directs the pilot over a pre-programmed survey grid.

The operator was responsible for monitoring of the system integrity. He also maintained a detailed flight log during the survey, tracking the times of the flight as well as any unusual geophysical or topographic feature.

On return of the aircrew to the base the survey data was transferred from a compact flash card (PCMCIA) to the data processing computer.



### 2.4. Aircraft and Equipment

#### 2.4.1. Survey Aircraft

An Astar B3 helicopter, registration C-GTFX - owned and operated by TRK Helicopters Ltd. - was used for the survey. Installation of the geophysical and ancillary equipment was carried out by Geotech Ltd.

### 2.4.2. Electromagnetic System

The electromagnetic system was a Geotech Time Domain EM (VTEM) system. The configuration is as indicated in Figure 2 below.



Figure 1 – VTEM configuration

Figure 2 – Sample times

Receiver and transmitter coils are concentric and Z-direction oriented. The receiver decay recording scheme is shown diagrammatically in Figure 3.

Twenty-four measurement gates were used in the range from 120  $\mu s$  to 6578  $\mu s,$  as shown in Table 3.

VTEM Decay Sampling scheme					
Array	( M	(Microseconds)			
Index	Time Gate	Start	End	Width	
10	120	110	131	21	
11	141	131	154	24	
12	167	154	183	29	
13	198	183	216	34	
14	234	216	258	42	
15	281	258	310	53	
16	339	310	373	63	
17	406	373	445	73	
18	484	445	529	84	
19	573	529	628	99	
20	682	628	750	123	
21	818	750	896	146	
22	974	896	1063	167	
23	1151	1063	1261	198	
24	1370	1261	1506	245	
25	1641	1506	1797	292	
26	1953	1797	2130	333	
27	2307	2130	2526	396	
28	2745	2526	3016	490	
29	3286	3016	3599	583	
30	3911	3599	4266	667	
31	4620	4266	5058	792	
32	5495	5058	6037	979	
33	6578	6037	7203	1167	

Table 3 - VTEM decay sampling scheme



Transmitter coil diameter was 26 metres, the number of turns was 4. Transmitter pulse repetition rate was 30 Hz. Peak current was 206.2 Amp. Pulse width was 7.2 ms Duty cycle was 43%. Peak dipole moment was 437,700 NIA.

Receiver coil diameter was 1.2 metre, the number of turns was 100. Receiver effective area was 113.1 m<sup>2</sup> Wave form – trapezoid. Recording sampling rate was 10 samples per second.

The EM bird was towed 42 m below the helicopter.

#### 2.4.3. Airborne magnetometer

The magnetic sensor utilized for the survey was a Geometrics optically pumped cesium vapour magnetic field sensor, mounted in a separated bird, towed 15 metres below the helicopter, as shown on figure 1. The sensitivity of the magnetic sensor is 0.02 nanoTesla (nT) at a sampling interval of 0.1 seconds. The magnetometer sends the measured magnetic field strength as nanoTeslas to the data acquisition system via the RS-232 port.

### 2.4.4. Ancillary Systems

#### 2.4.4.1. Radar Altimeter

A Terra TRA 3000/TRI 40 radar altimeter was used to record terrain clearance. The antenna was mounted beneath the bubble of the helicopter cockpit.

#### 2.4.4.2. GPS Navigation System

The navigation system used was a Geotech PC based navigation system utilizing a NovAtel's WAAS enable OEM4-G2-3151W GPS receiver, Geotech navigate software, a full screen display with controls in front of the pilot to direct the flight and an NovAtel GPS antenna mounted on the helicopter tail. The co-ordinates of the block were set-up prior to the survey and the information was fed into the airborne navigation system.

#### 2.4.4.3. Digital Acquisition System

A Geotech data acquisition system recorded the digital survey data on an internal compact flash card. Data is displayed on an LCD screen as traces to allow the operator to monitor the integrity of the system. The data type and sampling interval as provided in table 4.

DATA TYPE	SAMPLING
TDEM	0.1 sec
Magnetometer	0.1 sec
GPS Position	0.2 sec
RadarAltimeter	0.2 sec

Table 4 - Sampling Rates

#### 2.4.5. Base Station

A combine magnetometer/GPS base station was utilized on this project. A Geometrics Cesium vapour magnetometer was used as a magnetic sensor with a sensitivity of 0.001 nT. The base station was recording the magnetic field together with the GPS time at 1 Hz on a base station computer.

The base station magnetometer sensor was installed 100 metres from the airport in Teslin, away from electric transmission lines and moving ferrous objects such as motor vehicles.

The magnetometer base station's data was backed-up to the data processing computer at the end of each survey day.

## 3. PERSONNEL

The following Geotech Ltd. personnel were involved in the project:

Field

Project Manager:

Harish Kumar

Crew Chief: Operator: Kieth Lavelley Paul Taylor

The survey pilot and the mechanic engineer were employed directly by the helicopter operator – TRK Helicopters Ltd.

Pilot:	Randy Marks
Engineer:	Chris Ward

Office

Data Processing / Reporting: Data Technician:

George Lev Maria Jagodkin

Data acquisition and processing phases were carried out under the supervision of Andrei Bagrianski, Surveys Manager. Overall management of the project was undertaken by Edward Morrison, President, Geotech Ltd.



## 4. DATA PROCESSING AND PRESENTATION

#### 4.1. Flight Path

The flight path, recorded by the acquisition program as WGS 84 latitude/longitude, was converted into the UTM coordinate system in Oasis Montaj.

The flight path was drawn using linear interpolation between x, y positions from the navigation system. Positions are updated every second and expressed as UTM eastings (x) and UTM northings (y).

#### 4.2. Electromagnetic Data

A three stage digital filtering process was used 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 filter used was a 16 point non-linear filter.

The signal to noise ratio was further improved by the application of a low pass linear digital filter. This filter has zero phase shift which prevents any lag or peak displacement from occurring, and it suppresses only variations with a wavelength less than about 1 second or 20 metres. This filter is a symmetrical 1 sec linear filter.

The results are presented as stacked profiles of EM voltages for the time gates, in linear - logarithmic scale for both B-field and dB/dt response.

Generalized modeling results of the VTEM system, written by Geophysicist Roger Barlow, are shown in Appendix C.

Graphical representation of the VTEM output voltage of the receiver coil and the transmitter current is shown in Appendix D.

#### 4.3. Magnetic Data

The processing of the magnetic data involved the correction for diurnal variations by using the digitally recorded ground base station magnetic values. The base station magnetometer data was edited and merged into the Geosoft GDB database on a daily basis. The aeromagnetic data was corrected for diurnal variations by subtracting the observed magnetic base station deviations.

A micro-levelling procedure was applied to remove persistent low-amplitude components of flight-line noise remaining in the data. Where Tie lines were available, Tie line levelling was carried out by adjusting intersection points along the traverse lines.

The corrected magnetic data was interpolated between survey lines using a random point gridding method to yield x-y grid values for a standard grid cell size of approximately 0.1 cm at the mapping scale. The Minimum Curvature algorithm was used to interpolate values onto a rectangular regular spaced grid.

The survey area shows an average magnetic activity. Maximum values of 59051 nT are observed in the NE quadrant of the block. Average of 5775 nT is detected in the survey area.



## 5. DELIVERABLES

#### 5.1. Survey Report

The survey report describes the data acquisition, processing, and final presentation of the survey results.

The survey report is provided in two paper copies and digitally in PDF format.

#### 5.2. Maps

Final maps were produced at a scale of 1:25,000. The coordinate/projection system used was the WGS84, UTM zone 8N. All maps show the flight path trace and topographic data. Latitude and longitude are also noted on maps.

The following maps are presented on paper,

- dB/dt profiles, Time Gates 0.234 6.578 ms in linear logarithmic scale
- B-field profiles, Time Gates 0.234 6.578 ms in linear logarithmic scale
- Total Magnetic intensity contours and colour image

#### 5.3. Digital Data

Two copies of DVDs were prepared.

There are two (2) main directories,

- **Data** contains a database, grids and maps, as described below.
- **Report** contains a copy of the report and appendices in PDF format.
- 7067highway\_fp.kmz containing flightpath of the HIGHWAY property. A free version of Google Earth software can be downloaded from, <u>http://earth.google.com/download-earth.html</u>



• Database in Geosoft GDB format, containing the following channels:

X:	X positional data (metres – WGS84, utm zone 8 north)
Y:	Y positional data (metres – WGS84, utm zone 8 north)
Z:	GPS antenna elevation (metres - ASL)
Radar:	Helicopter terrain clearance from radar altimeter (metres - AGL)
Radarb:	EM Loop terrain clearance from radar altimeter (metres - AGL)
DEM:	Digital elevation model (metres)
Gtime1:	GPS time (seconds of the day)
Mag1:	Raw Total Magnetic field data (nT)
Basemag:	Magnetic diurnal variation data (nT)
Mag2:	Total Magnetic field diurnal variation corrected data (nT)
Mag3:	Leveled Total Magnetic field data (nT)
SF[10]:	dB/dt 120 microsecond time channel (pV/A/m <sup>4</sup> )
SF[11]:	dB/dt 141 microsecond time channel (pV/A/m <sup>4</sup> )
SF[12]:	dB/dt 167 microsecond time channel (pV/A/m <sup>4</sup> )
SF[13]:	dB/dt 198 microsecond time channel (pV/A/m <sup>4</sup> )
SF[14]:	dB/dt 234 microsecond time channel (pV/A/m <sup>4</sup> )
SF[15]:	dB/dt 281 microsecond time channel (pV/A/m <sup>4</sup> )
SF[16]:	dB/dt 339 microsecond time channel $(pV/A/m^4)$
SF[17]:	dB/dt 406 microsecond time channel (pV/A/m <sup>4</sup> )
SF[18]:	dB/dt 484 microsecond time channel (pV/A/m <sup>4</sup> )
SF[19]:	dB/dt 573 microsecond time channel $(pV/A/m^4)$
SF[20]:	dB/dt 682 microsecond time channel (pV/A/m <sup>4</sup> )
SF[21]:	dB/dt 818 microsecond time channel (pV/A/m <sup>4</sup> )
SF[22]:	dB/dt 974 microsecond time channel (pV/A/m <sup>4</sup> )
SF[23]:	dB/dt 1151 microsecond time channel $(pV/A/m^4)$
SF[24]:	dB/dt 1370 microsecond time channel $(pV/A/m^4)$
SF[25]:	$dB/dt \ 1641 \ microsecond \ time \ channel \ (pV/A/m^4)$
SF[26]:	dB/dt 1953 microsecond time channel $(pV/A/m^4)$
SF[27]:	dB/dt 2307 microsecond time channel $(pV/A/m^4)$
SF[28]:	dB/dt 2745 microsecond time channel (pV/A/m <sup>4</sup> )
SF[29]:	dB/dt 3286 microsecond time channel (pV/A/m <sup>4</sup> )
SF[30]:	dB/dt 3911 microsecond time channel $(pV/A/m^4)$
SF[31]:	dB/dt 4620 microsecond time channel (pV/A/m <sup>4</sup> )
SF[32]:	dB/dt 5495 microsecond time channel (pV/A/m <sup>4</sup> )
SF[33]:	dB/dt 6578 microsecond time channel $(pV/A/m^4)$
BF[10]:	B-field 120 microsecond time channel $(pV*ms)/(A*m_{\star}^4)$
BF[11]:	B-field 141 microsecond time channel $(pV*ms)/(A*m^4)$
BF[12]:	B-field 167 microsecond time channel $(pV*ms)/(A*m^4)$
BF[13]:	B-field 198 microsecond time channel $(pV*ms)/(A*m^4)$
BF[14]:	B-field 234 microsecond time channel ( $pV*ms$ )/( $A*m^4$ )



BF[15]:	B-field 281 microsecond time channel $(pV*ms)/(A*m^4)$
BF[16]:	B-field 339 microsecond time channel $(pV*ms)/(A*m^4)$
BF[17]:	B-field 406 microsecond time channel $(pV*ms)/(A*m^4)$
BF[18]:	B-field 484 microsecond time channel $(pV*ms)/(A*m^4)$
BF[19]:	B-field 573 microsecond time channel $(pV*ms)/(A*m^4)$
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BF[21]:	B-field 818 microsecond time channel $(pV*ms)/(A*m^4)$
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BF[29]:	B-field 3286 microsecond time channel (pV*ms)/(A*m <sup>4</sup> )
BF[30]:	B-field 3911 microsecond time channel $(pV*ms)/(A*m^4)$
BF[31]:	B-field 4620 microsecond time channel $(pV*ms)/(A*m^4)$
BF[32]:	B-field 5495 microsecond time channel $(pV*ms)/(A*m^4)$
BF[33]:	B-field 6578 microsecond time channel $(pV*ms)/(A*m^4)$
PLM:	Power line monitor

Electromagnetic B-field and dB/dt data is found in array channel format between indexes 10 - 33, as described above.



• Database 7067highway\_wform.gdb in Geosoft GDB format, containing the following channels:

Time:	Sampling rate interval, 10.416 microseconds
Volt:	output voltage of the receiver coil (volt)

• Grids in Geosoft GRD format, as follow,

Highway_magfin:	Total magnetic intensity (nT)
Highway_DEM:	Digital elevation model (m)

A Geosoft .GRD file has a .GI metadata file associated with it, containing grid projection information. Grid cell size of 10 metres was used.

• Maps at 1:25,000 scale in Geosoft MAP format, as follow,

Highway_Magfin:	Total magnetic intensity contours and colour image
Highway_dBdt:	VTEM dB/dt profiles, Time Gates 0.234 – 6.578 ms
	in linear - logarithmic scale
Highway_EMLP:	VTEM B-field profiles, Time Gates 0.234 - 6.578 ms
	in linear - logarithmic scale

• A *readme.txt* file describing the content of digital data, as described above.

## 6. CONCLUSIONS

A helicopter-borne versatile time domain electromagnetic (VTEM) geophysical survey has been completed over the Highway property, located in Yukon, Canada.

The total area coverage is  $56.09 \text{ km}^2$ . Total survey line coverage is 326.44 line kilometres. The principal sensors included a Time Domain EM system and a magnetometer. Results have been presented as stacked profiles and contour colour images at a scale of 1:25,000.

Final data processing at the office of Geotech Ltd. in Aurora, Ontario was carried out under the supervision of Andrei Bagrianski, Surveys Manager.

A number of EM anomaly groupings were identified. Ground follow-up of those anomalies should be carried out if favourably supported by other geoscientific data.

Respectfully submitted,

George Lev Geotech Ltd. February, 2008



#### APPENDIX A

#### SURVEY BLOCK LOCATION MAP





### **APPENDIX B**

#### SURVEY BLOCK COORDINATES (WGS 84, UTM zone 8 north)

#### Highway property

HIGHWAY	
Easting	Northing
654926	6662177
664816	6652267
661981	6649437
652090	6659347



#### **APPENDIX C**

## MODELING VTEM DATA



#### MODELING VTEM DATA

#### Introduction

The VTEM system is based on a concentric or central loop design, whereby, the receiver is positioned at the centre of a 26.1 meters diameter transmitter loop that produces a dipole moment up to 625,000 NIA at peak current. The wave form is a bi-polar, modified square wave with a turn-on and turn-off at each end. With a base frequency of 30 Hz, the duration of each pulse is approximately 7.5 milliseconds followed by an off time where no primary field is present.

During turn-on and turn-off, a time varying field is produced (dB/dt) and an electro-motive force (emf) is created as a finite impulse response. A current ring around the transmitter loop moves outward and downward as time progresses. When conductive rocks and mineralization are encountered, a secondary field is created by mutual induction and measured by the receiver at the centre of the transmitter loop.

Measurements are made during the off-time, when only the secondary field (representing the conductive targets encountered in the ground) is present.

Late in 2006, Geotech Ltd. incorporated a B-Field measurement in the VTEM system. The B-Field measurements have the advantage of containing more spectral energy at low spectral frequencies than the dB/dt measurements; hence, greater amplitudes and accuracies when encountering targets with higher conductances (> 500 Siemens). The converse is true at higher spectral frequencies where dB/dt measurements are best applied. The B-field is most widely used in nickel exploration where a small percentage of targets are extremely conductive (> 2500 Siemens) and less resolvable or invisible (below the noise threshold) using dB/dt measurements.

Efficient modeling of the results can be carried out on regularly shaped geometries, thus yielding close approximations to the parameters of the measured targets. The following is a description of a series of common models made for the purpose of promoting a general understanding of the measured results.

#### Variation of Plate Depth

Geometries represented by plates of different strike length, depth extent, dip, plunge and depth below surface can be varied with characteristic parameters like conductance of the target, conductance of the host and conductivity/thickness and thickness of the overburden layer.

Diagrammatic models for a vertical plate are shown in figures A and G at two different depths, all other parameters remaining constant. With this transmitter-receiver geometry, the classic **M** shaped response is generated. Figure A shows a plate where the top is near surface. Here, amplitudes of the duel peaks are higher and symmetrical with the zero centre positioned directly above the plate. Most important is the separation distance of the peaks. This distance is small when the plate is near surface and widens with a linear relationship as the plate (depth to top) increases. Figure G shows a much deeper plate where the separation distance of the peaks is much wider and the amplitudes of the channels have decreased.



#### Variation of Plate Dip

As the plate dips and departs from the vertical position, the peaks become asymmetrical. Figure B shows a near surface plate dipping 80°. Note that the direction of dip is toward the high shoulder of the response and the top of the plate remains under the centre minimum.

As the dip increases, the aspect ratio (Min/Max) decreases and this aspect ratio can be used as an empirical guide to dip angles from near 90° to about 30°. The method is not sensitive enough where dips are less than about 30°. Figure E shows a plate dipping 45° and, at this angle, the minimum shoulder starts to vanish. In Figure D, a flat lying plate is shown, relatively near surface. Note that the twin peak anomaly has been replaced by a symmetrical shape with large, bell shaped, channel amplitudes which decay relative to the conductance of the plate.

Figure H shows a special case where two plates are positioned to represent a synclinal structure. Note that the main characteristic to remember is the centre amplitudes are higher (approximately double) compared to the high shoulder of a single plate. This model is very representative of tightly folded formations where the conductors where once flat lying.

#### Variation of Prism Depth

Finally, with prism models, another algorithm is required to represent current on the plate. A plate model is considered to be infinitely thin with respect to thickness and incapable of representing the current in the thickness dimension. A prism model is constructed to deal with this problem, thereby, representing the thickness of the body more accurately.

Figures C, F and I show the same prism at increasing depths. Aside from an expected decrease in amplitude, the side lobes of the anomaly show a widening with deeper prism depths of the bell shaped early time channels.















I





Appendix C Generalized modeling results of the VTEM system Page 3 of 6

#### **General Modeling Concepts**

A set of models has been produced for the Geotech VTEM® system with explanation notes (see models A to I above). The reader is encouraged to review these models, so as to get a general understanding of the responses as they apply to survey results. While these models do not begin to cover all possibilities, they give a general perspective on the simple and most commonly encountered anomalies.

When producing these models, a few key points were observed and are worth noting as follows:

- For near vertical and vertical plate models, the top of the conductor is always located directly under the centre low point between the two shoulders in the classic **M** shaped response.
- As the plate is positioned at an increasing depth to the top, the shoulders of the **M** shaped response, have a greater separation distance.
- When faced with choosing between a flat lying plate and a prism model to represent the target (broad response) some ambiguity is present and caution should be exercised.
- With the concentric loop system and Z-component receiver coil, virtually all types of conductors and most geometries are most always well coupled and a response is generated (see model H). Only concentric loop systems can map this type of target.

The modelling program used to generate the responses was prepared by PetRos Eikon Inc. and is one of a very few that can model a wide range of targets in a conductive half space.

#### **General Interpretation Principals**

#### Magnetics

The total magnetic intensity responses reflect major changes in the magnetite and/or other magnetic minerals content in the underlying rocks and unconsolidated overburden. Precambrian rocks have often been subjected to intense heat and pressure during structural and metamorphic events in their history. Original signatures imprinted on these rocks at the time of formation have, it most cases, been modified, resulting in low magnetic susceptibility values.

The amplitude of magnetic anomalies, relative to the regional background, helps to assist in identifying specific magnetic and non-magnetic rock units (and conductors) related to, for example, mafic flows, mafic to ultramafic intrusives, felsic intrusives, felsic volcanics and/or sediments etc. Obviously, several geological sources can produce the same magnetic response. These ambiguities can be reduced considerably if basic geological information on the area is available to the geophysical interpreter.



In addition to simple amplitude variations, the shape of the response expressed in the wave length and the symmetry or asymmetry, is used to estimate the depth, geometric parameters and magnetization of the anomaly. For example, long narrow magnetic linears usually reflect mafic flows or intrusive dyke features. Large areas with complex magnetic patterns may be produced by intrusive bodies with significant magnetization, flat lying magnetic sills or sedimentary iron formation. Local isolated circular magnetic patterns often represent plug-like igneous intrusives such as kimberlites, pegmatites or volcanic vent areas.

Because the total magnetic intensity (TMI) responses may represent two or more closely spaced bodies within a response, the second derivative of the TMI response may be helpful for distinguishing these complexities. The second derivative is most useful in mapping near surface linears and other subtle magnetic structures that are partially masked by nearby higher amplitude magnetic features. The broad zones of higher magnetic amplitude, however, are severely attenuated in the vertical derivative results. These higher amplitude zones reflect rock units having strong magnetic susceptibility signatures. For this reason, both the TMI and the second derivative maps should be evaluated together.

Theoretically, the second derivative, zero contour or colour delineates the contacts or limits of large sources with near vertical dip and shallow depth to the top. The vertical gradient map also aids in determining contact zones between rocks with a susceptibility contrast, however, different, more complicated rules of thumb apply.

#### **Concentric Loop EM Systems**

Concentric systems with horizontal transmitter and receiver antennae produce much larger responses for flat lying conductors as contrasted with vertical plate-like conductors. The amount of current developing on the flat upper surface of targets having a substantial area in this dimension, are the direct result of the effective coupling angle, between the primary magnetic field and the flat surface area. One therefore, must not compare the amplitude/conductance of responses generated from flat lying bodies with those derived from near vertical plates; their ratios will be quite different for similar conductances.

Determining dip angle is very accurate for plates with dip angles greater than 30°. For angles less than 30° to 0°, the sensitivity is low and dips can not be distinguished accurately in the presence of normal survey noise levels.

A plate like body that has near vertical position will display a two shoulder, classic **M** shaped response with a distinctive separation distance between peaks for a given depth to top.

It is sometimes difficult to distinguish between responses associated with the edge effects of flat lying conductors and poorly conductive bedrock conductors. Poorly conductive bedrock conductors having low dip angles will also exhibit responses that may be interpreted as surfacial overburden conductors. In some situations, the conductive response has line to line continuity and some magnetic correlation providing possible evidence that the response is related to an actual bedrock source.



The EM interpretation process used, places considerable emphasis on determining an understanding of the general conductive patterns in the area of interest. Each area has different characteristics and these can effectively guide the detailed process used.

The first stage is to determine which time gates are most descriptive of the overall conductance patterns. Maps of the time gates that represent the range of responses can be very informative.

Next, stacking the relevant channels as profiles on the flight path together with the second vertical derivative of the TMI is very helpful in revealing correlations between the EM and Magnetics.

Next, key lines can be profiled as single lines to emphasize specific characteristics of a conductor or the relationship of one conductor to another on the same line. Resistivity Depth sections can be constructed to show the relationship of conductive overburden or conductive bedrock with the conductive anomaly.





**APPENDIX D** 

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#### **APPENDIX E**

#### **GEOPHYSICAL MAP**





Project 7067

Yukon / British Columbia, Canada Flown and processed by Geotech Ltd. 245 Industrial Parkway North., Aurora, Ontario, Canada L4G 4C4 www.geotech.ca

February, 2008



Project 7067

February, 2008



Project 7067





Survey Specifications: Dates Flown: September 14-18, 2007 Survey Base: Teslin, YT Aircraft: Astar B3 helicopter, Registration C-GTFX Nominal Flight Line Spacing: 100 metres Nominal Flight Line Directions: N45°E/N225°E Nominal Tie Line Spacing: 1000 metres Nominal Tie Line Directions: N135°E/N315°E Nominal Tie Line Directions: N135°E/N315°E Nominal helicopter terrain clearance 85 metres EM Loop is towed 42 metres under helicopter Magnetic sensor is 15 metres under helicopter

## Instruments:

Geotech Time Domain Electromagnetic System (VTEM) with concentric Rx/Tx geometry Transmitter Loop Diameter 26 m, Base Frequency 30 Hz Dipole Moment 437,700 NIA Transmitter Wave Form: Trapezoid, Pulse Width 7.22 ms Geometrics Optically-pumped, High Sensitivity Cesium Magnetometer Magnetometer Resolution 0.02 nT at 10 samples/sec



(Linear between +/-0.4 pV/A/m^4 logarithmic above 0.4 pV/A/m^4) 0.234 ms 0.281 ms 0.339 ms 0.406 ms 0.484 ms 0.573 ms 0.682 ms 0.818 ms 0.974 ms 1.151 ms 1.370 ms 1.641 ms 1.953 ms 2.307 ms 2.745 ms 3.286 ms 3.911 ms 4.620 ms 5.495 ms 6.578 ms Boundary Yukon - BC Roads Lakes, Rivers Swamps Topographic contours

Profiles scale 1 mm = 0.1 pV/A/m^4

Scale 1:25000 500 750 (meters) WGS 84 / UTM zone 8N Strategic Metals Ltd. Block HIGHWAY Yukon, Canada Geotech VTEM System dB/dt Profiles Time Gates 0.234 - 6.578 ms Flown and processed by Geotech Ltd. 245 Industrial Parkway North, Aurora, Ontario, Canada L4G 4C4 www.geotech.ca

February, 2008

#### ARCHER, CATHRO & ASSOCIATES (1981) LIMITED 1016 - 510 West Hastings Street Vancouver, B.C. V6B 1L8

Telephone: 604-688-2568

## AFFIDAVIT



I, Joan Mariacher, of Vancouver, B.C. make oath and say:

That to the best of my knowledge the attached Statement of

Expenditures for exploration work on Hid 1-12

mineral claims on Claim Sheet 105F/6 is accurate.

nnne Joan Mariacher

Sworn before me at Vancouver, B.C.

this 3rd day of December, 2007.

Notary Public. Yukon Territory
Statement of Expenditures Hid 1-12 Mineral Claims November 27, 2007

4

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Contract VTEM Survey

Geotech Ltd.

\$\$,566.25



BILL TO:

Vancouver, BC Canada V6B (L8

Archer, Cathro & Associates (1981) Limite

1016-510 West Hastings Street

Geotech Ltd.

30 Industrial Parkway South, Aurora ON L4G 3W2

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