ASSESSMENT REPORT

describing

VTEM GEOPHYSICAL AND SOIL GEOCHEMICAL SURVEYS

at the

TES PROPERTY
(Tenures 564053, 564228, 564229, 564230, 564231,
564232, 564233, 564234, 564236, 564241, 564242)

NTS 104N/16
Latitude 69°56'N; Longitude 132°15'W

in the

Teslin Lake Area
Northern British Columbia

prepared by

for
STRATEGIC METALS LTD.

by
W.A. Wengzynowski, P.Eng.
January 2008
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<td>Zinc Geochemistry</td>
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INTRODUCTION

The Tes property was originally staked to cover the apparent on-strike extension of a copper showing (Teslin Lake occurrence, MINFILE 104N 135) hosted by Devonian to Mississippian metavolcanic rocks. The setting is similar to the Mor volcanogenic massive sulphide (VMS) occurrence in the Yukon, 22 km to the northeast. Exploration in 2007 was managed by Archer, Cathro & Associates (1981) Limited on behalf of property owner Strategic Metals Ltd.

This report describes airborne geophysical surveys conducted by Geotech Ltd. in September 2007 from a base at the Teslin, Yukon airport. A total of 354 line kilometres were flown. Archer, Cathro & Associates (1981) Limited managed the program and provided some logistical support. The author supervised the program and his Statement of Qualifications appears in Appendix I.

PROPERTY LOCATION, CLAIM STATUS AND ACCESS

The Tes property consists of 11 contiguous mineral tenures totalling 218 cells that are located in north-central British Columbia. The claim block is approximately centred at latitude 69°56'N and longitude 132°15'W on NTS map sheet 104N/16W (Figure 1).

The mineral tenures are registered in the name of Archer, Cathro & Associates (1981) Limited, which holds them in trust for Strategic Metals. The locations of individual claims are shown on Figure 2 while claim registration data are listed below.

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<td>Tes 11</td>
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* expiry dates include 2007 work which was filed for assessment credit but not yet accepted

The property is located 90 km east of the village of Atlin. Access is by boat, float plane or helicopter from Teslin, Yukon located on the Alaska Highway about 40 km to the northwest. In 2007, geophysical crew and survey gear were mobilized and demobilized daily from Teslin. The geophysical survey was conducted with an Astar 350 B3 contracted from TRK Helicopters Ltd. The geochemical sampling crew was ferried by helicopter from the Morley River Lodge, located on the Alaska Highway 20 km to the northeast.
FIGURE 1

PROPERTY LOCATION
TES PROPERTY

YUKON TERRITORY

ALASKA

NORTHWEST

TERRITORIES

FILE: Projects/ 2007/ Tes/ Fig 1

JANUARY 2006
FIGURE 2

ARCHER, CATHRO & ASSOCIATES (1981) LIMITED

CLAIM MAP
TES PROPERTY

STRATEGIC METALS LTD.

UTM Zone 8, NAD 83, 104N/16

FILE: 2009 Tes/Fig.2
DATE: JANUARY 2009

TESLIN LAKE

VTEM survey area

MINFILE occurrence

0 4 km

FILE: 2009 Tes/Fig.2
DATE: JANUARY 2009

664,000 mN

564053

564228

564229

564230

564231

564232

564233

564234

564236

564241

564242

668,000 mN

668,000 mN

668,000 mN
GEOMORPHOLOGY

The Tes property overlies an area of moderate relief east of Teslin Lake (Figure 3). Elevations range from about 700 metres along the shore of Teslin Lake to 1485 m on ridge crests. Upper parts of the property are probably mantled with a thin veneer of frost-heaved felsenmeer and residual soils while lower elevations are covered with an unknown thickness of glacial till and post-glacial lacustrine silts and colluvium (Cook and Pass, 2000).

Treeline occurs at about 1400 m in this area so that the higher elevations are only lightly vegetated with scrub brush and mosses. Lower elevations support a mixture of deciduous and evergreen forest with a thick understorey of willows in poorly drained areas. Permafrost is likely to be discontinuous over most of the property.

Figure 3: Oblique view of the Tes geophysical survey area.
EXPLORATION HISTORY

There is no record of previous exploration on in the Tes claims area although BC Ministry of Energy and Petroleum Resources geologists noted that mineralized outcrops along the shore of Teslin Lake had been sampled previous to their field survey in 1997 (Mihalynuk et al, 1998).

GEOLOGICAL SETTING

The region lies within the Middle Paleozoic Big Salmon Complex, a series of metamorphosed and polyphase deformed mafic to felsic volcanic rocks, quartz-rich clastic sedimentary rocks, and intrusive rocks of diorite, tonalite and leucogranite composition. Metamorphosed felsic tuff, crystalline limestone and chert-exhalite sequences, although volumetrically minor, form conspicuous mappable units (Mihalynuk et al, 2000). Big Salmon Complex is correlated with the Middle Devonian to Lower Mississippian age Lower and Middle Units of Yukon-Tanana Terrane, which contain significant VMS mineralization in the Finlayson Mountains region of east-central Yukon. The Big Salmon Complex rocks have been intruded by Jurassic and Cretaceous granitoids and they are overlain by Pleistocene to Recent basalt of the Tuya Formation. The Big Salmon Complex rocks are bounded on the southwest by the Teslin Fault Zone, which in the area of the Tes claims lies along the linear depression occupied by Teslin Lake.

Geology of the Tes property is shown on Figure 4. Descriptions of rock units that follow are taken from a report of regional mapping by Mihalynuk et al, 1998.

Oldest lithologies are resistant, dark green to black weathering basalt and intermediate to mafic tuff (DMab). Well bedded, bright green, aphanitic lapilli tuff is probably the most common lithology. Units mapped as basalt flows could be mafic sills.

Interbedded mafic to felsic tuffaceous rocks interlayered with pyritic quartz-muscovite schists (DMf) overlie the mafic to intermediate volcanic unit in restricted areas. This unit is shown by the BC Geological Survey (Mihalynuk et al, 1998) to be a continuous unit across the Tes property with the thickest section in the northwest corner of the property.

On a regional basis, the mafic to felsic volcanic units are overlain by a distinctive 25 to 60 m thick, white to pink weathering, thin bedded to laminated and contorted chert horizon known as the "crinkle chert". The chert is interbedded with lesser argillite and minor very fine tuff (?). It contains anomalous muscovite, manganese (piedmontite), iron (hematite and magnetite) and barium contents and it is thought to represent a regional scale volcanic exhalite (Mihalynuk and Peter, 2001) analogous to cherty iron formation associated with VMS mineralization in the Finlayson Mountains of the Yukon (Nelson, 1997). The crinkle chert has not been mapped on the Tes property, however Mihalynuk et al, 2000 note that felsic volcanics on the southern limb of the syncline are locally very siliceous and might be a volcanic-crinkle chert hybrid.

The volcanic-exhalite succession is capped by a regionally extensive buff weathering calcareous and dolomitic marble unit (Mm) with thin layers of quartzite (Roots et al, 2000). The marble
unit is overlain by heterolithic schist, argillaceous quartzite, mafic and felsic tuff and limestone (Mqt). 

No geological mapping was carried out on the Tes property in 2007. Based on an interpretation of regional mapping, the rocks on the Tes claim are folded into a steep sided, upright syncline. They are in fault contact with similar rocks along the northeast side of the property.

**MINERALIZATION**

Mihalynuk et al (1998) describe an exposure of mineralized felsic volcanic rocks on the Tes property along the shore of Teslin Lake (Figure 4) as follows:

Along the eastern shore of northern Teslin Lake, 2 km south of the Yukon border, a series of mafic to felsic tuffaceous rocks, quartz-sericite schists and siltstones are exposed along a kilometre-long section of lakeshore. All are phyllic to schistose and relict textures are rare. Several zones display widespread pyrite and traces of chalcopyrite. For example, at the south end of the outcrop belt a 20 m thickness of locally strongly pyritic felsic metatuff is sandwiched between mafic metatuff. The gossanous layers are up to 30 cm thick and typically contain 10% or more pyrite. Chalcopyrite occurs as sparse cm-sized clots and irregular stringers. Analysis of a single grab sample yielded 2.2% Cu and 28 ppm Ag.

This style of mineralization is common in proximity to VMS occurrences in Yukon-Tanana Terrane in the Finlayson region of Yukon Territory.

**SOIL GEOCHEMISTRY**

The Tes property was evaluated with three soil sample lines oriented to cross the stratigraphy. Sample locations are shown on Figure 5 while copper, lead and zinc values are given on Figures 6, 7 and 8, respectively. Coincident weakly anomalous copper (up to 162 ppm), lead (up to 55 ppm) and zinc (up to 100 ppm) occur within or in immediate proximity to the felsic volcanic unit (DMf).

**2007 GEOPHYSICAL SURVEYS**

Geotech Ltd. of Ontario conducted helicopter-borne, Versatile Time Domain Electromagnetic (VTEM) and magnetic surveys over the property and adjacent areas in September 2007. A total of 143 line kilometres was flown. The VTEM system allows for deep penetration while maintaining high special resolution and resistivity discrimination. Principal geophysical sensors included a VTEM system and a high sensitivity cesium magnetometer. Ancillary equipment included a Global Positioning System (GPS) navigational system and a radar altimeter.

The block was flown at 100 m line spacing with two perpendicular tie lines 1000 m apart. Where possible, the helicopter maintained a terrain clearance of 90 m, which translated into an average height of 48 m above the ground for the VTEM system and 70 m for the magnetic sensor. Twenty-four measurement gates were used to record receiver decay in the range from...
Cu (ppm)

- $>100 <162$
- $>50 <100$
- $>0 <50$

SEE REPORT TEXT FOR ROCK UNIT DESCRIPTIONS.
STRATEGIC METALS LTD.

FIGURE 7

ARCHER, CATHRO & ASSOCIATES (1981) LIMITED

LEAD GEOCHEMISTRY

TES PROPERTY

LAD GEOCHEMISTRY

Pb (ppm)

>>20 <55

>10 <20

>0 <10

SEE REPORT TEXT FOR ROCK UNIT DESCRIPTIONS.
STRATEGIC METALS LTD.

FIGURE 8
ARCHER, CATHRO & ASSOCIATES (1981) LIMITED
ZINC GEOCHEMISTRY
TES PROPERTY

Zn (ppm)

≥50 <100
≥20 <50
≥0 <20

FOR ROCK UNIT DESCRIPTIONS.

SEE REPORT TEXT FOR ROCK UNIT DESCRIPTIONS.
120 to 6578 microseconds. A three stage filtering process was used to reject major sferic events and to reduce system noise. The signal to noise ratio was further improved by the application of a low pass linear digital filter. The sensitivity of the magnetic sensor is 0.02 nanoTesla at a sampling interval of 0.1 seconds. Corrections for diurnal variation and tie line levelling were made during data processing.

Survey data and maps from Geotech are included as Appendix II.

Preliminary examination of the data shows that electromagnetic response is highly variable over most of the property. The strongest response is observed in the southwestern corner of the survey area, under Teslin Lake. This probably represents an ultramafic body emplaced along the Teslin Fault Zone, itself expressed as a strong northwest trending EM anomaly that flanks the southwest edge of the magnetic anomaly.

Narrow, elongate, linear magnetic highs occur within the bounds of the felsic volcanic unit along the south limb and nose area of the syncline. These possibly represent magnetite iron formation, common within correlative rocks in mineralized areas of Yukon Tanana Terrane in Yukon. Mihalynuk et al, 2000 note that the felsic volcanic member on the south limb and nose of the syncline could contain appreciable amounts of exhalite material, possibly analogous to the magnetite-rich exhalite common in VMS bearing areas of the Finlayson region.

A number of broad, linear magnetic highs are present within areas underlain by the mafic-intermediate volcanic unit (DMab). These probably represent magnetite bearing mafic sills mapped within this sequence elsewhere in the region by Mihalynuk et al (2000).

A west-northwest trending chain of strong EM conductors extends along the northeast edge of the survey area. This plots close to the mapped location of a regional scale fault zone. A parallel less conductive, but equally continuous chain of EM conductors is present in the west central part of the survey area in an area mapped as being underlain by the mixed sedimentary-volcanic unit (Mqt). The EM anomaly chain lie close to the axis of the syncline and it may reflect shearing or faulting along the axial plane. Two additional areas of anomalous conductivity are more interesting from an exploration point of view since they lie within the felsic volcanic unit (DMf). The western anomaly is of moderate strength over a length of 500 m. This has been modelled as a southerly dipping, shallow conductor that lies at the top of the felsic unit about 3 km east, along strike of the MINFILE occurrence on the shore of Teslin Lake. A 700 m long chain of conductors lies about 4 km along strike to the east. It is of interest because it appears to lie within the same stratigraphic interval as the other conductors. Assuming that the bedrock has not been overturned, the EM conductors lie stratigraphically above a unit with positive magnetic response, which is perhaps magnetite rich exhalite.

**CONCLUSIONS AND RECOMMENDATIONS**

The Tes claim area is underlain by the Big Salmon Complex, a sequence of layered metamorphic rocks that are correlated with Middle Devonian to Mississippian meta-igneous, volcanic and sedimentary rocks of the Yukon Tanana Terrane. The setting is similar to the Mor volcanogenic massive sulphide (VMS) occurrence in the Yukon, 22 km to the northeast. Stratigraphy on the
Tes property consists of a thick section of mafic and intermediate metavolcanic rocks capped by a relatively thin felsic metavolcanic member and overlain by a mixed volcanic-sedimentary unit. Several areas of anomalous bedrock conductivity occur near the top of the felsic metavolcanic member, immediately overlying a relatively thin magnetically anomalous unit. This geophysical signature is similar to that of VMS occurrences in the Finlayson region of Yukon Tanana. The Tes property should be explored with geological mapping and soil sampling to evaluate the EM geophysical anomalies as possible VMS exploration targets, prior to confirmation by diamond drilling.

Respectfully submitted,

ARCHER, CATHRO AND ASSOCIATES (1981) LIMITED.

W.A. Wengzynowski, P.Eng.
REFERENCES

Cook, S. J. and Pass, H. E.

Mihalynuk, M. G., Nelson, J. and Friedman, R. M.

Mihalynuk, M. G., Nelson, J. L., Roots, C. F., Friedman, R. M. and de Keijzer, M.

Mihalynuk, M. G. and Peter, J. M.

Nelson, J. L.

Roots, C. F., de Keijzer, M, Nelson, J. L. and Mihalynuk, M. G.
APPENDIX I

STATEMENT OF QUALIFICATIONS
STATEMENT OF QUALIFICATIONS

I, William A. Wengzynowski, geological engineer, with business addresses in Vancouver, British Columbia and Whitehorse, Yukon Territory and residential address at 301 Fairway Drive, North Vancouver, British Columbia, V7G 1L4 do hereby certify that:


2. I graduated from the University of British Columbia in 1993 with a B.A.Sc in Geological Engineering, Option I, mineral and fuel exploration.

3. I registered as a Professional Engineer in the Province of British Columbia on December 12, 1998 (Licence Number 24119).

4. From 1983 to present, I have been actively engaged in mineral exploration in the Yukon Territory, Northwest Territories, northern British Columbia and Mexico.

5. I have personally participated in and supervised the fieldwork reported herein.

William A. Wengzynowski, P. Eng.
APPENDIX II

STATEMENT OF COSTS
Statement of costs  
Teslin Lake Project  
**Tes Mineral Tenures** 564053, 564228-564234, 564236, 564241-564242  
September 3, 2008

**Labour (September to October 2007)**

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**Expenses (including management fee)**

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**Total** $93,034.97
APPENDIX III

GEOTECH LTD. VTEM GEOPHYSICAL SURVEY
REPORT ON A HELICOPTER-BORNE
TIME DOMAIN ELECTROMAGNETIC
GEOPHYSICAL INTERPRETATION

TES PROPERTY
Yukon Territory, Canada

For
Strategic Metals Ltd.

By
Geotech Limited
245 Industrial Parkway North
L4G 4C4 Aurora, Ontario, Canada
Tel: 1.905.841.5004
Fax: 1.905.841.0611

www.geotech.ca

Email: info@geotech.ca

Survey flown in September 2007

Project 7067
January, 2008
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1. INTRODUCTION

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

This report includes the results of the geophysical interpretation, over this Property. The Property is located at approximately 170 km south-east from Whitehorse, in the Yukon Territory. The geographic coordinates of the block extents are: longitudes, 132° 24'17" W and 132° 08'25" W, and latitudes, 59° 54'34" N and 59° 58'46" N. The surveyed area is 55 km², and the total line kilometers flown are 354 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 TES Property on the satellite image.
2. SURVEY DESCRIPTION

In July and September 2007, Geotech Ltd. carried out a helicopter-borne geophysical survey over the TES 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 was keeping a constant ground clearance of 90 m when the terrain allowed it. The traverse lines direction was NE 17° and the tie lines direction was NW 73°. 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 very rugged with alternating high mountains, valleys and lakes. The absolute altitude ranges from 700 m to 1400 m approximately. Due to the terrain roughness, it was difficult to keep a constant ground clearance while surveying this area.

Fig. 2 Topography of the TES Property with the 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).
3.3 Geological context of the TES Property

The geology of the TES property is a synform containing favorable VMS felsic metavolcanic strata and mafic volcanic rocks around the outer edge. The core units are marble and quartzite. There is only one occurrence mapped in the area and it occurs at the extreme west end of the survey, which is believed to be more likely VMS.

![Figure 4: Simplified geological scheme of the TES Property.](image)

4. INTERPRETATION OF THE MAGNETIC DATA

*Geotech Ltd.* - *Report on an Airborne Geophysical Interpretation for Strategic Metals Ltd. TES Property.*
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 TES Property is shown in Fig. 5. The total magnetic field values are ranging from 57500 to 58300 approximately, yielding an amplitude difference of 800 nT. The TMI map shows a relatively high activity. The strongest anomaly is observed in the south western corner of the area. It seems to be composed of several lineaments trending northwesterly (NW30°). This anomaly coincides with the existing river and is probably caused by hidden mafic rocks. The short wavelength magnetic lineaments observed in the central and eastern parts and trending roughly NW 75° are more likely associated with mafic dykes within the mafic metavolcanics or with magnetic contacts. The observed magnetic field over the central and northwestern area exhibits a quiet character with low values. This area corresponds to non magnetic sedimentary rocks composed mainly of clean quartzite.

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. We can also notice that the short wavelength anomalies have vanished. The map clearly outlines the boundary of the non-magnetic sedimentary rocks and also shows the deep magnetic structure in the southwestern corner of the area.

Figure 7 illustrates the vertical gradient of the TMI. The vertical gradient map shows the enhancement of magnetic signals caused by shallow sources and related to faults, dykes and contacts.

Several magnetic lineaments are clearly identified by the vertical gradient helping to understand the structural geology of the area. The tilt derivative map illustrated in Fig. 8 yields another example of amplifying weak signals generated by shallow sources. The tilt derivative known as being the local phase is computed from the vertical and horizontal gradients. As illustrated in the Tilt derivative
map several shallow magnetic structures can be identified in this area. Most of them are probably associated with faults/contacts or hidden mafic dykes.

Fig. 5 TMI image of the TES Property.
Fig. 6 Color shaded relief of reduced to the pole TMI.
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 having a size of 800 x 800 metres. Euler solutions have been plotted on the total gradient (analytic signal) map for better illustration. The picks of the total gradient are used to located and delineate the magnetic sources boundaries. Euler solutions are mostly related to shallow sources (<100 m). The shallowest sources are located in the southern and eastern parts of the map. They are located on the picks of the analytic signal and are trending roughly in the NW direction. The deepest solutions (>200m) are encountered in the southwestern portion of the map. The solutions are trending northwesterly. Results obtained with the Euler deconvolution confirm the qualitative analysis of the reduced maps and can be very useful for the structural understanding and analysis of the area.
Fig. 9 Euler deconvolution solutions plotted on the total gradient image.
5. INTERPRETATION of 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 \( \frac{dB}{dt} \). This system specificity has a lot of advantages, as the \( \frac{dB}{dt} \) 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 channels, respectively. Both maps indicate mainly the existence of 3 anomalous zones (A, B, and C). The comparison of the dB/dt and B-field maps shows that the latter provides a better resolution of the anomalies associated with deep conductors. Zone B, located in the northeastern part of the area contains the strongest anomalies. The observed anomalies in this zone are broad and are trending in the NW30° direction (Fig. 10 and 11). Zone A, situated in the southwestern corner consists of weak and broad anomalies trending in the NW75° direction. The central zone C, consists of several linear and parallel anomalies trending roughly in the NW35° direction. These linear anomalies are likely to be associated with poor conductive bedrock or conductive faults/contacts southerly dipping (Fig. 12 and 13). The mineralization occurrence (Minfile) located on the line 1050 in the northwestern corner of the area is not associated with any noticeable EM anomaly; however this occurrence is located along the direction of a northwesterly trending conductive bedrock.

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 most significant picked anomalies are observed in zone B. The calculated conductance values are ranging between 5 and 15S. The estimated decay constants are ranging from 2.5 ms to 4.0 ms. There is no evident geological indication to explain the nature of this anomalous zone. However, it could be related to conductive shear zone containing conductive graphitic schists. Zone A, located in the southwestern corner is associated with broad anomalies trending in the NW direction. The estimated conductance values are ranging between 5 and 10S. The estimated decay constants are between 2.5 and 3.6 ms. The nature of this anomaly could be associated with a deep and wide conductive layer. The picked anomalies detected in the western area A are characterized by lower values of the conductance (<5S) and the decay constant (<3ms), however the observed anomalies are located near a mineralization occurrence and this fact can make them potential for a possible mineralization.

Figure 18 illustrates the EM picked anomalies posted on the shaded relief of the analytic signal. The map shows that the detected EM anomalies are well controlled by the magnetic lineaments. In the central area some anomalies are in very good correlation with the magnetic data suggesting a possible metallic nature of the conductive bedrock.

The interpretation map (Fig. 19) shows the results of the magnetic and electromagnetic analysis superimposed on the total gradient image. The magnetic interpretation suggests the existence of several faults trending in the NW and in NE directions. It also indicates the possible existence of magnetic dykes (mafic nature) trending roughly in the NW direction. In the central area, the detected EM anomalies are associated with magnetic anomalies suggesting a possible metallic nature.
Fig. 10 EM decays over for the northern portion of the line 1510 showing the existence of broad anomaly. Anomalous Zone B.

Fig. 11 EM decays over for the northern portion of the line 1670 showing the existence of broad anomalies. Anomalous Zone B. The red arrow indicates the dipping direction.

Fig. 12 EM decays for the central portion of the Line 1130 (Zone C) showing broad anti-symmetric anomalies related to southerly dipping conductors.

Fig. 13 EM decays for the central portion of the Line 1250 showing the existence of anti-symmetric anomaly (Zone C in the map) and indicating southerly dipping conductor.
Fig. 14 Stacked EM dB/dt profiles at log-linear scale. Early time decays are in green and late time in red.
Fig. 15 Stacked EM B-Field profiles at log-linear scale. Early time decays are in green and late time in red.
Fig. 16 EM picked anomalies plotted on the late time dB/dt channel image (6.578 ms after current shut off).
Fig. 17 EM picked anomalies plotted on the late time B-Field channel image (6.578 ms after current shut off).
Fig. 18 Late time B-Field channel image superimposed on the shaded relief of the magnetic total gradient. The map clearly shows that the conductive bedrocks are structurally controlled by magnetic structures trending roughly in the NW direction.
Fig. 19 Interpretation map showing the results of the magnetic and electromagnetic data analysis. The map clearly shows that the deepest sources are located in the southwestern part of the area.
5.4 Selected Anomalies

Several individual potential 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: L1130, L1250, L1570, and L1670. The summarized characteristics of the selected anomalies are given in the following table:

<table>
<thead>
<tr>
<th>Anomalou s zone/Line</th>
<th>Anomaly ID</th>
<th>Anomaly Type description</th>
<th>Conductor geometry</th>
<th>X- location m</th>
<th>Y- location m</th>
<th>Conduct ance S</th>
<th>Dip</th>
<th>Dip Azimuth</th>
<th>Tau mae c</th>
</tr>
</thead>
<tbody>
<tr>
<td>C/L1130</td>
<td>B</td>
<td>One anti-symmetric peak</td>
<td>Thin shallowly dipping plate</td>
<td>648117</td>
<td>6650706</td>
<td>5.9 S</td>
<td>NW</td>
<td>3.3</td>
<td></td>
</tr>
<tr>
<td>C/L1130</td>
<td>A</td>
<td>One broad anti-symmetric peak</td>
<td>Thin shallowly dipping plate</td>
<td>648340</td>
<td>6651560</td>
<td>5.0 S</td>
<td>NW</td>
<td>2.3</td>
<td></td>
</tr>
<tr>
<td>C/L1130 C/T1920</td>
<td>C</td>
<td>One anti-symmetric peak</td>
<td>Thin shallowly dipping plate</td>
<td>647886</td>
<td>6649845</td>
<td>6.4 S</td>
<td>EW</td>
<td>3.0</td>
<td></td>
</tr>
<tr>
<td>C/L1250</td>
<td>A</td>
<td>One broad anti-symmetric peak</td>
<td>Thin shallowly dipping plate</td>
<td>650164</td>
<td>6649070</td>
<td>6.1 S</td>
<td>EW</td>
<td>2.7</td>
<td></td>
</tr>
<tr>
<td>B/L1570</td>
<td>C</td>
<td>One anti-symmetric peak</td>
<td>Thin shallowly dipping plate</td>
<td>656742</td>
<td>6648912</td>
<td>14.5 S</td>
<td>EW</td>
<td>2.9</td>
<td></td>
</tr>
<tr>
<td>B/L1670</td>
<td>D</td>
<td>One broad anti-symmetric peak</td>
<td>Thin shallowly dipping plate</td>
<td>658467</td>
<td>6647610</td>
<td>7.7 S</td>
<td>EW</td>
<td>2.9</td>
<td></td>
</tr>
</tbody>
</table>

Table 1. Summarized results of the 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. CDI were performed for the selected lines using the EMflow software. As shown from the obtained results (Figs. 20-23) the detected conductive bedrocks are southerly dipping.
Fig. 20a shows the CDI section for the line L1050 containing the Minfile occurrence in the right most side of the line. The section indicates the presence of a conductor at an approximate depth of 300 m. Horizontal conductive bedrock is indicated in the central and southern parts of the section.
Fig. 21 shows the CDI section for the line L1130. The section indicates the existence of 3 conductive bedrocks at various depths in the right part. Horizontal conductive bedrock is indicated in the central and southern parts of the section. The letters A, B and C indicate the location of the Picked anomalies.
Fig. 22 shows the CDI section for the line L1570. The section highlights the existence of southerly dipping good conductive bedrock. Letter C indicates the location of the picked anomaly.
Fig. 23 shows the CDI section for the line 1670. The section reveals the existence of southerly dipping good conductive bedrock. Letter D indicates the location of the picked anomaly.
6. CONCLUSIONS AND RECOMMENDATIONS

The analysis of the magnetic map of the TES property revealed the existence of high magnetic activity with the presence of several magnetic lineaments related to shallow (<100m) and deep (>200m) structures. The Euler deconvolution inversion method has confirmed the existence of dyke like structures trending roughly in the NW direction. The magnetic interpretation using different reduced maps suggests also the presence of several faults trending in the NW and NE directions. The VTEM survey reveals the existence of 3 anomalous zones (A, B, and C) of interest and composed of southerly dipping conductors. Zone C, which is composed of linear conductors trending in the NW may be regarded with attention, since these bedrocks are situated close to a known mineralization occurrence. Furthermore, a good correlation of the conductive bedrocks with the magnetic data was observed and particularly in the central area of the surveyed block. The recommendation is to conduct some drilling tests on the selected potential anomalies to detect a possible mineralization.

Respectfully submitted,

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7. REFERENCES


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-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-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-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.