ASSESSMENT REPORT TITLE PAGE AND SUMMARY

TITLE OF REPORT: ASSESSMENT REPORT ON A MAGNETOTELLURIC GEOPHYSICAL SURVEY CONDUCTED IN THE ORION AREA (MINFILE: 104B-671)
OF THE MACKIE PROPERTY, CENTERED AT 422,500 E - 6,246,000 N, SKEENA MINING DIVISION, BRITISH COLUMBIA

TOTAL COST: $132,822.32

AUTHOR(S): BRUCE COATES, B.Sc. P. Geo.
SIGNATURE(S):

NOTICE OF WORK PERMIT NUMBER(S)/DATE(S): 5569866 /2015-SEP-11, 5580051 / 2015-NOV-28
STATEMENT OF WORK EVENT NUMBER(S)/DATE(S): 5633912 /August 12 to 20, 2016

YEAR OF WORK: 2016

PROPERTY NAME: Mackie

CLAIM NAME(S) (on which work was done): Whats Up, High Hopes, Doc, Tuo, Grace NW, Grace N, Grace SE, Grace S, Golden Grace 2, Storm, Storm 2, Storm3, Sheelagh, Hutter, Riley, Sheelagh 2, FM#1 and Mackie Eskay
Latitude 130° 15’ 15” North
Longitude 56° 21’ 08” West
UTM 6246000 North, 422500 East Zone 09

COMMODITIES SOUGHT: gold, silver, copper, lead and zinc

MINERAL INVENTORY MINFILE NUMBER(S),IF KNOWN: Minfile report 104B 033

MINING DIVISION: Skeena
NTS / BCGS: BCGS Map 104B030 NTS 104B08
LATITUDE: 130 ° 15 ’ 15 "
LONGITUDE: 56 ° 21 ’ 08 " (at centre of work)
UTM Zone: 09 EASTING: 422500 NORTHING: 6246000

OWNER(S): Tudor Gold Corp. and portions under option from Richard H. Mill and John C. Bot.

MAILING ADDRESS: Tudor Gold Corp.
Suite 900, 1021 West Hastings Street Vancouver, BC, Canada V6E 0C3

OPERATOR(S) [who paid for the work]: Tudor Gold Corp.

MAILING ADDRESS:
As above

REPORT KEYWORDS (lithology, age, stratigraphy, structure, alteration, mineralization, size and attitude. **Do not use abbreviations or codes**)
Geophysics

REFERENCES TO PREVIOUS ASSESSMENT WORK AND ASSESSMENT REPORT NUMBERS:
35763, 30058, 24965 and 26256

TYPE OF WORK IN THIS REPORT	EXTENT OF WORK (in metric units)	ON WHICH CLAIMS	PROJECT COSTS APPORTIONED (incl. support)
GEOLOGICAL (scale, area)			
Ground, mapping			
Photo interpretation			
GEOPHYSICAL (line-kilometres)			
Ground			
Magnetic			
Electromagnetic	44 MT Stations	Whats Up, High Hopes, Doc, Tuo, Grace NW, Grace N, Grace SE, Grace S, Golden Grace 2, Storm, Storm 2, Storm3, Sheelagh, Hutter, Riley, Sheelagh 2, FM#1 and Mackie Eskay	$132,822.32
Induced Polarization			
Radiometric			
Seismic			
Other			
Airborne			
GEOCHEMICAL (number of samples analysed for …)			
Soil			
Silt			
Rock			
Other			
DRILLING (total metres, number of holes, size, storage location)			
Core			
Non-core			
RELATED TECHNICAL			
Sampling / Assaying			
Petrographic			
Mineralographic			
Metallurgic			
PROSPECTING (scale/area)			
PREPATORY / PHYSICAL			
Line/grid (km)			
Topo/Photogrammetric (scale, area)			
Legal Surveys (scale, area)			
Road, local access (km)/trail			
Trench (number/metres)			
Underground development (metres)			
Other			
		TOTAL COST	$132,822.32

ASSESSMENT REPORT

ON A MAGNETOTELLURIC GEOPHYSICAL

SURVEY CONDUCTED IN THE ORION AREA (MINFILE: 104B-671)

OF THE MACKIE PROPERTY

CENTERED AT 422,500 E - 6,246,000 N,

SKEENA MINING DIVISION

BRITISH COLUMBIA

FOR: TUDOR GOLD (TSX.V- TUD)

Suite 900, 1021 West Hastings St.

Vancouver, BC, Canada V6E 0C3

BY: BRUCE COATES, B.Sc. P. Geo.

WORK PERFORMED: August 13th - 20th, 2016

REPORT DATE: April 18th, 2017

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

LIST OF TABLES

LIST OF APPENDICES

SUMMARY

Tudor Gold Corp (TSX.TUD) emerged in the early summer of 2016 and quickly became one of the largest holders of mineral exploration rights in BC's Golden Triangle. In a Press Release dated April 19th, 2016 Kaizen Capital Corp announced a Qualifying Transaction to acquire the rights to the Mackie Property (Mackie East, Mackie West and Doc Properties) from the private company Tudor Holdings, and changed from a Capital Pool to a Tier II Mining company. A NI 43-101 report by Jim Hutter on the Qualifying Property dated November 30th, 2016 was also submitted as an assessment report to the Mineral Titles Office of the BC Ministry of Mines and Energy.

On May 11th, 2016 Kaizen announced a name change to Tudor Gold Corp (Tudor), as well as additional agreements to option the mineral rights to the Treaty Creek, Electrum and Eskay North properties. On May 24th, 2016 another Press Release, now by Tudor, announced an option agreement to acquire the mineral rights to a further three properties (Fairweather, Delta and High North), and on June 2nd, 2016 an option on the Orion property was added to the list. The original Mackie Property (Mackie East, Mackie West and Doc), plus the Fairweather, Delta, High North and Orion Properties, each with their own option agreements, form a contiguous block of claims which straddle the Frank Mackie Glacier, and this larger block is referred to as the "Mackie Property" in this report.

During the period August 13th - 20th, 2016 a Magnetotelluric Survey was carried out on the Orion portion of the Mackie Property. Quantec Geophysics personnel were housed in Stewart and flown to the property by helicopter each day for the collection of data from 44 MT sites. Kevin Killin of Simcoe Geophysics (17 Violet Ave, Keswick, Ontario, L4P 0C6) coordinated the program and reviewed the data daily during collection. All of the results and Mr. Killin's recommendations are contained in a report attached here as Appendix I.

Quoting Mr. Killin's recommendations (page 29):

"The area needs to be visited by a Tudor geologist and mapping the central ridge as well as the eastern and western slopes will help to open up ideas. The ice sheet is receding and more provable ground is opening up. An airborne survey over the property would be recommended prior to drilling. As deep exploration is the focus, a simple magnetic airborne survey would be recommended. EM data has not proven to be a target producing method in this area, although it does give extra data. The magnetic data would help to confirm structure and would enable Tudor to discriminate targets in conjunction with geology and the MT data."

ASSESSMENT REPORT ON A MAGNETOTELLURIC GEOPHYSICAL

SURVEY CONDUCTED IN THE ORION AREA (MINFILE: 104B-671)

OF THE MACKIE PROPERTY

CENTERED AT 422,500 E - 6,246,000 N,

SKEENA MINING DIVISION, BRITISH COLUMBIA

Introduction

During the period August 13th - 20th, 2016 a Magnetotelluric Survey was carried out on the Orion portion of Tudor Gold's Mackie Property. Quantec Geophysics personnel were housed in Stewart and flown to the property by helicopter each day for the collection of data from 44 MT sites. Kevin Killin of Simcoe Geophysics (17 Violet Ave, Keswick, Ontario, L4P 0C6) coordinated the program and reviewed the data daily during collection. All of the results and Mr. Killin's recommendations are contained in a report attached to this as Appendix I.

Location, Access, Physiography, Climate, Infrastructure and Physiography

Location of the Mackie Property (the property) is ~50 km north-northwest of Stewart and 900 km northwest of Vancouver in the Golden Triangle of northwestern British Columbia (Figure 1). This large property extends approximately 16km in an east-west direction from west of the South Unuk River to the Bowser River headwaters in the east. It abuts the historic Corey and DOC properties in the east, and the currently active Seabridge Gold KSM property and Pretivm Resources' Brucejack Project to the north.

Access to the property can only be gained by helicopter from Stewart, though the north end of the old Granduc Mine road near the Tide Lake airstrip can be used as a staging point. At the west edge of the property, on the west side of the South Unuk River, two old cabins at the DOC property dating from 1986 were refurbished just prior to the Geophysical Program to provide backup accommodation in the event of inclement weather. For future work on the middle and eastern side of the property it will be most cost effective for safety and logistics, to locate a camp at the end of the Granduc road until the exploration work gains focus.

The property lies within the Intermontane Physiographic Belt, and straddles the highlands between the South Unuk and Bowser River drainages. Topography varies from extremely rugged on mountain sides to moderate in valley bottoms. Elevation ranges from 2600 meters at Unuk Peak to 220 meters along the Unuk River valley bottom. Alpine glaciation is evidenced by U-shaped valleys with steep walls – often cliffs - and wider valley bottoms - often with braided rivers. Approximately 20% of the property is covered by glacier ice. Tree line is at about 1,200 meters elevation below which the forest cover consists of mature hemlock spruce and fir typical of temperate rain forests. The undergrowth at lower elevations consists of often thick stands of fern, huckleberry, salmonberry and devils club. Slide alder is abundant in steep areas prone to avalanche. Alpine areas host a healthy cover of heather, black spruce, juniper and mountain ash. Climate at the property is typical of northwestern BC with cool wet summers and moderate wet winters. Snowfall is abundant with depths reaching 2-3 meters in the valleys and 10-15 meters at higher elevations. At lower elevations the ground is covered with snow from early December till early April, while at higher elevations snow cover extends from mid-October till early June.

The Orion area refers to several Nunataks within the Frank Mackie Glacier, and the MT survey covered a portion of the Mackie Claims that is covered by approximately 90% glacial ice.

Property Tenure

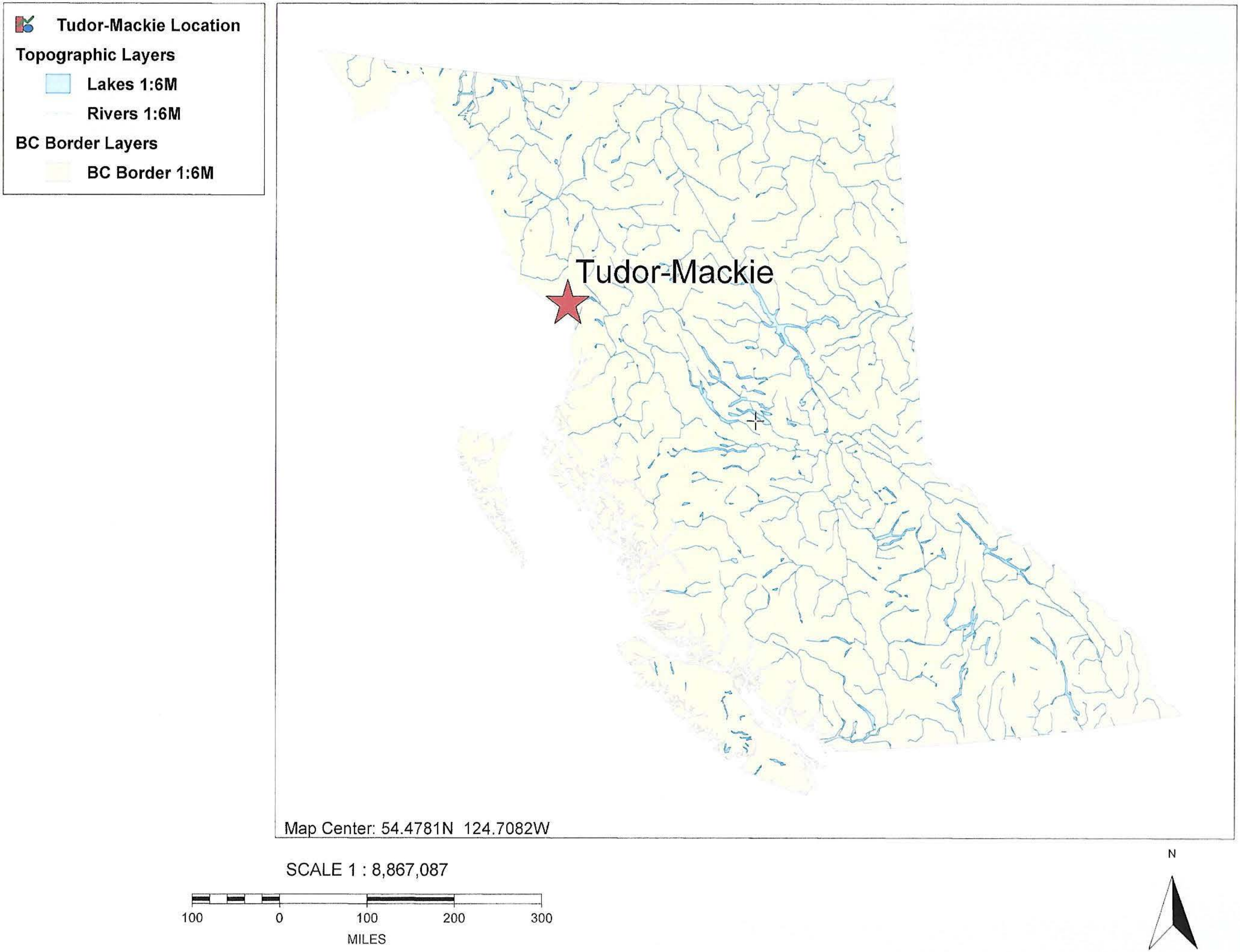
Tudor Gold's extensive Mackie Property includes 48 claims totaling 18,454 hectares (Table 1, Figure 2). Tudor has a number of different option agreements on various portions of the overall property (all of which allow Tudor to earn a 100% interest subject to certain conditions) and ownership has been transferred to Tudor within the BC Government Mineral Titles office so that the condition of continuity for assessment is satisfied. All claims are located in the Skeena Mining Division on Map Sheet 104/B08, and expiry dates include the work reported on here. Six Crown Grants underlying the DOC Claims are still active. The MT work did not require a permit, however more substantial work such as drilling or trenching *would* require a permit from the Ministry of Energy and Mines.

History

The earliest exploration in the area began in the late 1800's when H. W. Ketchum staked claims near the junction of the Unuk River and Sulphurets Creek in 1898. The Unuk River Mining and Dredging Company acquired the property in 1900 and drove two adits on the Cumberland Claim. At about the same time the Globe Claims were staked on the DOC property and two veins were explored by 4 trenches and 2 adits, a small stamp mill was constructed, and 45 tons of high grade ore was stockpiled.

In 1980, Du Pont of Canada Exploration Limited and F&B Explorations Ltd. conducted regional heavy mineral stream sediment sampling and reconnaissance geological mapping in the Mount Madge, Sulphurets Creek and Unuk River areas and also evaluated the Globe claims at DOC. In 1986 Catear Resources Ltd. staked eight claims (Corey 1-8) in the Mount Madge area and discovered the C-I0 Zone, a large, structurally controlled alteration zone containing gold and silver. In 1987 and 1988 Bighorn Development Corp did widespread stream sediment, soil and rock geochemical surveys on the Corey Claims and drilling and trenching on the Cumberland prospect. In 1987 Western Canadian Mining Corp. drilled the Kerr prospect, a large north south trending sheared gossan and alteration zone, which lies along the eastern boundary of the Corey Property. This drilling and subsequent work by Placer Dome through to 1992 resulted in the delineation of the Kerr porphyry Cu/Au deposit, currently owned and further enlarged and deepened by Seabridge Gold Inc as KSM.

Tudor-Mackie Location Map



Tudor-Mackie Claim Map

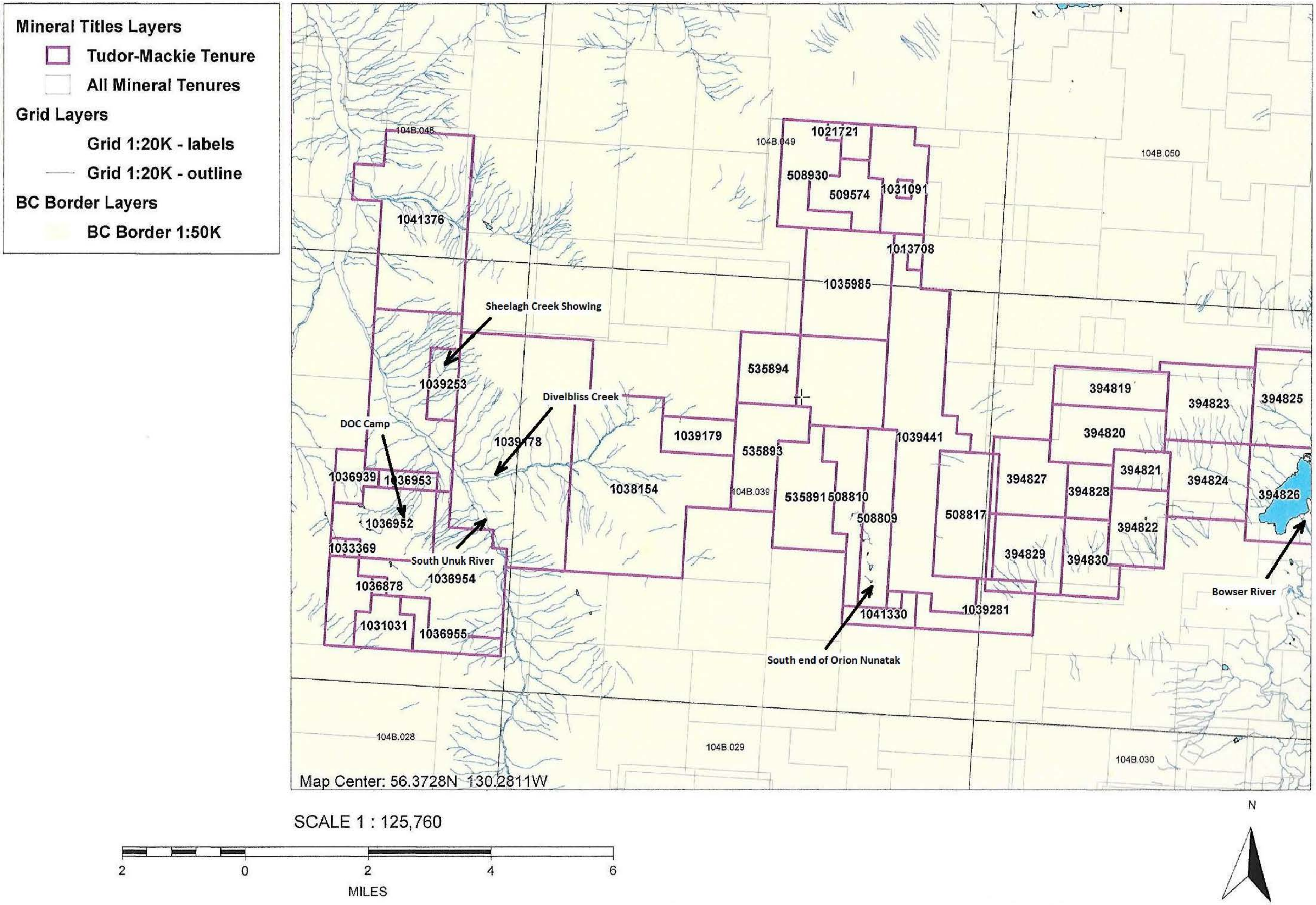


Table 1. Tudor Gold Claims: Mackie Block*

Tenure #	Name	Recorded Date	Good To Date	New Good To Date	Area (ha)	Property
394819	Delta 1	July 2 2002	Dec 11 2022		300.00	Delta
394820	Delta 2	July 2 2002	Dec 11 2022		450.00	Delta
394821	Delta 4	July 2 2002	Dec 11 2022		150.00	Delta
394823	Delta 6	July 2 2002	Dec 11 2022		500.00	Delta
394824	Delta 8	July 2 2002	Dec 11 2022		500.00	Delta
394825	Delta 7	July 2 2002	Dec 11 2022		500.00	Delta
394826	Delta 9	July 2 2002	Dec 11 2022		500.00	Delta
1035987	Deltaex 1	Mar 11 2005	July 15 2023		304.61	Delta
1035991	Extension 1	June 29 2006	July 15 2023		232.93	Delta
1035993		June 29 2006	July 15 2022		35.83	Delta Fill-in
394822	Delta 5	July 2 2002	Dec 11 2022		300.00	Fairweather
394827	Delta 10	July 2 2002	Dec 11 2023		400.00	Fairweather
394828	Delta 11	July 2 2002	Dec 11 2022		300.00	Fairweather
394829	Delta 12	July 2 2002	Dec 11 2023		400.00	Fairweather
394830	Delta 13	July 2 2002	Dec 11 2023		300.00	Fairweather
508817		Mar 11 2005	July 15 2022		502.05	Fairweather
1035983	High 6	Mar 23 2005	July 15 2023		339.99	High North
1035985	High 8	Mar 11 2005	Aug 15 2023		644.62	High North
508930	High W	Mar 14 2005	July 15 2022		357.89	High North
509574	High C3	Mar 23 2005	July 15 2022		250.55	High North
1013708		Oct 13 2012	Oct 13 2023		53.71	High North Fill-in
1021721	Whats Up	Aug 16 2013	Aug 16 2016	Dec 30 2019	17.89	High North Fill-in
1029297	High Hopes	June 30 2014	June 30 2017	Dec 30 2019	71.56	High North Fill-in
1031091	Tuo	Sep 22 2014	Sep 22 2016	Dec 30 2019	17.90	High North Fill-in
1039281	Hutter	Oct 13 2015	Oct 9 2016	Dec 30 2018	304.98	Mackie East
1039441	Riley	Oct 20 2015	Apr 27 2017	Dec 30 2018	1272.47	Mackie East
1038154	Storm	Aug 23 2015	Oct 8 2018	Dec 30 2019	1488.17	Mackie West
1039178	Storm2	Oct 8 2015	Oct 8 2016	Dec 30 2018	1792.55	Mackie West
1039179	Storm3	Oct 8 2015	Oct 8 2016	Dec 30 2018	179.23	Mackie West
1039253	Sheelagh	Oct 12 2015	Oct 10 2016	Dec 30 2019	143.36	Mackie West
1040402	Sheelagh 2	Dec 5 2015	Dec 5 2018	Dec 30 2018	842.29	Mackie West
1041376	Mackie Eskay	Jan 18 2016	Jan 18 2017	Dec 30 2019	1145.72	Mackie West
1031031		Sep 18 2014	Mar 1 2017	Dec 30 2019	179.46	Doc
1033369		Jan 14 2015	Mar 1 2017	Dec 30 2019	17.94	Doc Fill-in
1036878		June 29 2015	Mar 1 2017	Dec 30 2019	17.94	Doc Fill-in
1036939	Grace NW	June 29 2015	Mar 1 2017	Dec 30 2019	125.51	Doc
1036952	Golden Grace 2	June 29 2015	Mar 1 2017	Dec 30 2019	430.45	Doc
1036953	Grace N	June 29 2015	Mar 1 2017	Dec 30 2019	71.72	Doc Fill-in
1036954	Grace SE	June 29 2015	Mar 1 2017	Dec 30 2019	699.69	Doc
1036955	Grace S	June 29 2015	Mar 1 2017	Dec 30 2019	161.52	Doc
1040709	Doc3	Dec 25 2015	Dec 25 2016		17.94	Doc Fill-in
1040710		Dec 25 2015	Dec 23 2016		215.32	Doc
508809		Mar 11 2005	Aug 15 2022		358.62	Orion
508810		Mar 11 2005	Aug 15 2022		322.72	Orion
535891	ER3	June 18 2006	Aug 15 2022		448.24	Orion
535893	RIFFY1	June 18 2006	July 15 2023		394.35	Orion
535894	RIFFY2	June 18 2006	July 15 2023		286.65	Orion
1041330	FM#1	Jan 16 2016	Jan 16 2017	Dec 30 2020	107.65	Orion
					18,454.02	Total Area (ha):

During the same time frame (1986 -1988) Magna Ventures/ Sliver Princess and later Echo Bay Mines spent about 4 M$ at the DOC property doing drilling (4,839 m), underground development (641 m) and a host of trenching (Assessment Report 26256).

In the mid-1990's detailed geological work in the western portion of the Corey property established the presence of a section of Salmon River Formation rhyolite, breccia, mudstone and basalt correlative with and remarkably similar to that at Eskay Creek. As attention switched back to the HSOV, TV, Bench and Battlement Zones and the Cumberland Showing, property wide exploration was renewed, and this lead to several additional discoveries including Sheelagh Creek, CB, TM and G.F.J. Showings.

In the Orion area, as described by Crimonese (2007):

"Due to the remote location and high alpine setting, work in the Orion property area has been relatively minor and more recent. In 1987-1988 the Hat claims of Jantri Resources, covering much the same ground as the present day Orion claims, saw limited prospecting, sampling and geological mapping. This work resulted in the discovery of a stockwork zone called the "No. 13" measuring about 30m by 13m, within which the best vein ran 0.915 opt gold over 1.6m. Almost all of the Hat claims were subsequently allowed to expire".

In 1994 Teuton Resources Corp. acquired the key showings as the Orion 9-11 and Weasle claims. Prospecting, rock geochemical sampling and trenching were carried out on the property identifying a number of new mineral occurrences the most important of which was the Cat-in-the-Hat showing. Trenching of the latter returned an interval grading 0.074 opt gold and 1.36% arsenic across 13 meters in an outcrop of brecciated rhyolite. Further to the south, small quartz carbonate veins were sampled carrying silver values up to 71 opt.

In 2007 Teuton conducted a drill program testing the Cat-in-the Hat showing with 5 diamond drill holes (930.6 m). The drill had an extremely hard time penetrating the Rhyolite and Andesite Tuffs and Breccia. Although anomalous gold and arsenic values were returned, especially near surface, grades like those in the trench were not found.

Regional Geology (Figure 7.1)

The sections on Geology below borrow heavily from Hutter (2015). The property lies within the 'Golden Triangle', a major metallogenic province that extends from the Stewart area in the south, to the Sulphurets and McKay Lake areas in the north, and to the Snippaker Creek area in the northwest. This richly mineralized region contains a diverse suite of deposits that range from mesothermal precious metal deposits such as the Snip, to porphyry-style copper-gold deposits such as Kerr-Sulphurets-Mitchell, to transitional epithermal porphyry-related stockwork deposits such as Brucejack-Valley of the Kings, to the Eskay Creek deposit, with affinities to both epithermal and volcanogenic-style mineralization.

The claims are located along the western margin of the Intermontane Belt, close to the eastern limit of the Coast Plutonic Complex. The area is underlain by Mesozoic volcanic, volcaniclastic and sedimentary rocks that form part of a north-northwesterly trending belt extending from Stewart in the south to the Iskut River in the north. These rocks were deposited in an island arc setting along the western flank of Stikine terrane. They are bounded to the east by the Bowser Basin, comprising an onlap assemblage of Middle to Upper Jurassic sedimentary rocks.

The oldest rocks in Stikinia are Devonian to Mississippian arc-related volcanic and plutonic bodies and accompanying sedimentary strata of the upper Paleozoic Stikine assemblage. These are unconformably overlain by Triassic arc and marine sedimentary strata of the Stuhini Group. Above a Late Triassic-Early Jurassic unconformity, the Hazelton Group and its intrusive sources (latest Triassic to Middle Jurassic) represent the final stage of island arc magmatism and related events. Unconformably above the Hazelton Group, the Bowser Lake Group (Middle Jurassic to Lower Cretaceous) is a northeasterly-sourced, southwestward-younging, clastic overlap sequence derived from the collision of the intermontane terranes and the edge of ancestral North America.

The Hazelton Group can be divided into two distinct intervals separated by an unconformity in most places. The lower Hazelton Group is dominated by arc-related volcanic rocks, whereas the upper Hazelton Group contains mainly fine-grained clastic rocks, and within the Eskay Rift, bimodal rift-related volcanic rocks. Basal units (Jack Formation) of the Hazelton Group are generally coarse, immature, locally derived conglomerates and volcanic breccias, suggesting deposition within a terrain with significant relief. The considerable thickness of these deposits suggests that syn-depositional uplifting of source rocks acted to maintain that relief. The Jack Formation is overlain by the Betty Creek Formation, a complex succession of distinctively coloured red and green epiclastic sedimentary rocks interbedded with andesitic to dacitic tuffs and flows.

The upper Hazelton Group consists of mainly post-arc sedimentary and minor volcanic strata except for the Iskut River Formation, the bimodal volcano-sedimentary fill of the Eskay rift in western Stikinia. The Eskay Rift is a down-dropped rift zone preserving rocks of the Middle Jurassic Iskut River Formation of the Hazelton Group. This north-northwest trending rift zone was the host for the Eskay Creek Mine.

Three major intrusive episodes are recognized in the Stewart-Iskut River area: Late Triassic plutonism (the Stikine Plutonic suite) is thought to be subvolcanic with respect to mafic to intermediate volcanic rocks of the Stuhini Group with which it is spatially and lithologically related. Examples of this episode include gneissic quartz diorite (the Bucke Glacier stock) and meta-diorite to meta-gabbro stocks in the south-western part of the Doc Property. Early Jurassic plutonism (Texas Creek plutonic suite) is characterized by calc-alkaline plutons of granodioritic to quartz monzo-dioritic composition that are crosscut by alkali-feldspar phyric andesite dykes ("Premier porphyries"). These rocks have close spatial and temporal links with volcanic rocks of the Lower Jurassic volcanic rocks of the Hazelton Group and are particularly important with respect to the localization of precious metal lodes (Alldrick, 1989). Monzogranite, quartz monzonite and

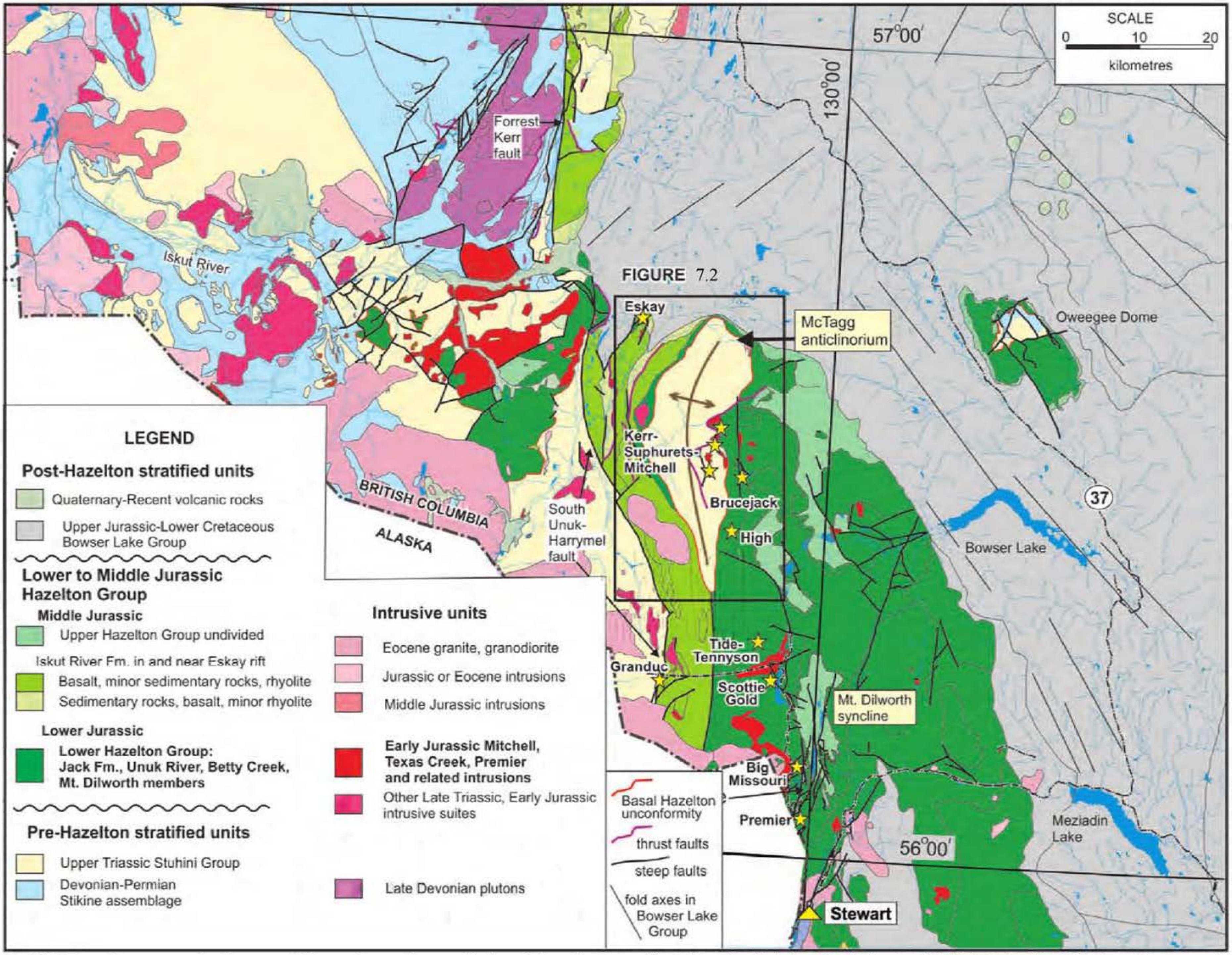


Fig.7.1 Treaty-Stewart trend and western Iskut region geology and mineral deposits, generalized from the digital geological map of British Columbia 2005 from Massey et al. (2005). After Nelson and Kyba (2014) granodiorite of Eocene age outcrop extensively within the Coast Plutonic Complex and its satellitic stocks and dykes.

In terms of mineralization, the most important structural features of the area are the Middle Jurassic Eskay Rift, the Triassic-Jurrassic unconformity, the McTagg anticlinorium and the Sulphurets Fault (Nelson and Kyba, 2014).

Property Geology (Figure 7.2, with legend on following page)

Geology on the west side of the Mackie Property in the area of the DOC camp is within a few kilometers of the eastern limit of the Coast Plutonic Complex. The volcano-sedimentary rocks there are characterized by schist and gneiss of upper greenschist to lower amphibolite grade metamorphism assigned to the Upper Triassic Stuhini Group. Moving eastward, the South Unuk / Harrymel Fault, which is the western boundary of the Eskay Rift zone, passes diagonally through the claim block east of the Sheelagh Creek showing. Lower greenshist facies rocks in this domain cutting through the Corey Property are Hazleton Group and correlative to those in the Eskay Creek area to the north. Within this the Lee Brant Stock, an outlier of Eocene Granitic rock, occupies the headwaters of Divelbliss Creek.

Further still to the east the picture is less clear, with the transition obscured by the Frank Mackie Glacier. At the Orion Nunatak the rocks have been mapped as Stuhini - either emerging from beneath the Hazelton Rocks on the west limb of the McTagg Anticlinorium, and/or thrust over top of the Hazleton Rocks along the Sulphurets Thrust Fault. Rocks at the southern end of the Orion Nunatak where the author was prospecting earlier in the summer certainly “looked” like Stuhini gneisses and schists of lower amphibolite facies. Further north however, in the area of the Cat-In-The-Hat Showing, the descriptions of Rhyolite dome complexes, high sulphidation epithermal vein stockwork, native Sulphur and acid sulphate “hot springs” rocks are very reminiscent of those in the Treaty Creek area (Edward Kruchkowski pers. Comm.), which are not just Hazleton, but upper Hazleton in age. Figure 7.1 and figure 7.2 show conflicting ages for rocks in the Orion Nunatak.

Basal Hazelton strata of the Jack Formation are exposed near the McTagg anticlinorium. The McTagg anticlinorium, a broad fold zone with associated faulting, is a dominant feature through the center of the claims. The eastern margin of the McTagg anticlinorium is a likely location for a basin-bounding fault in the immediate footwall of the Sulphurets thrust fault at its eastern boundary. This fault was a precursor to the thrust fault and was likely a conduit for the KSM porphyry and associated hydrothermal fluids. Seabridge Gold's KSM property is located just to the north of the claims. KSM is a series of gold-copper porphyry deposits: from north to south being the Iron Cap, Mitchell, Sulphurets and Kerr. Below the Kerr deposit Seabridge has outlined a significant tonnage of ore (the "Deep Kerr") that may be amenable to bulk underground mining. These four deposits form a broad arc trending towards the center of the claims and in particular the Orion area.

Jumping across the Frank Mackie Glacier again, the rock exposures in the eastern part of the claims are mapped as belonging to the Jack Formation. This formation, composed mainly of sandstones to

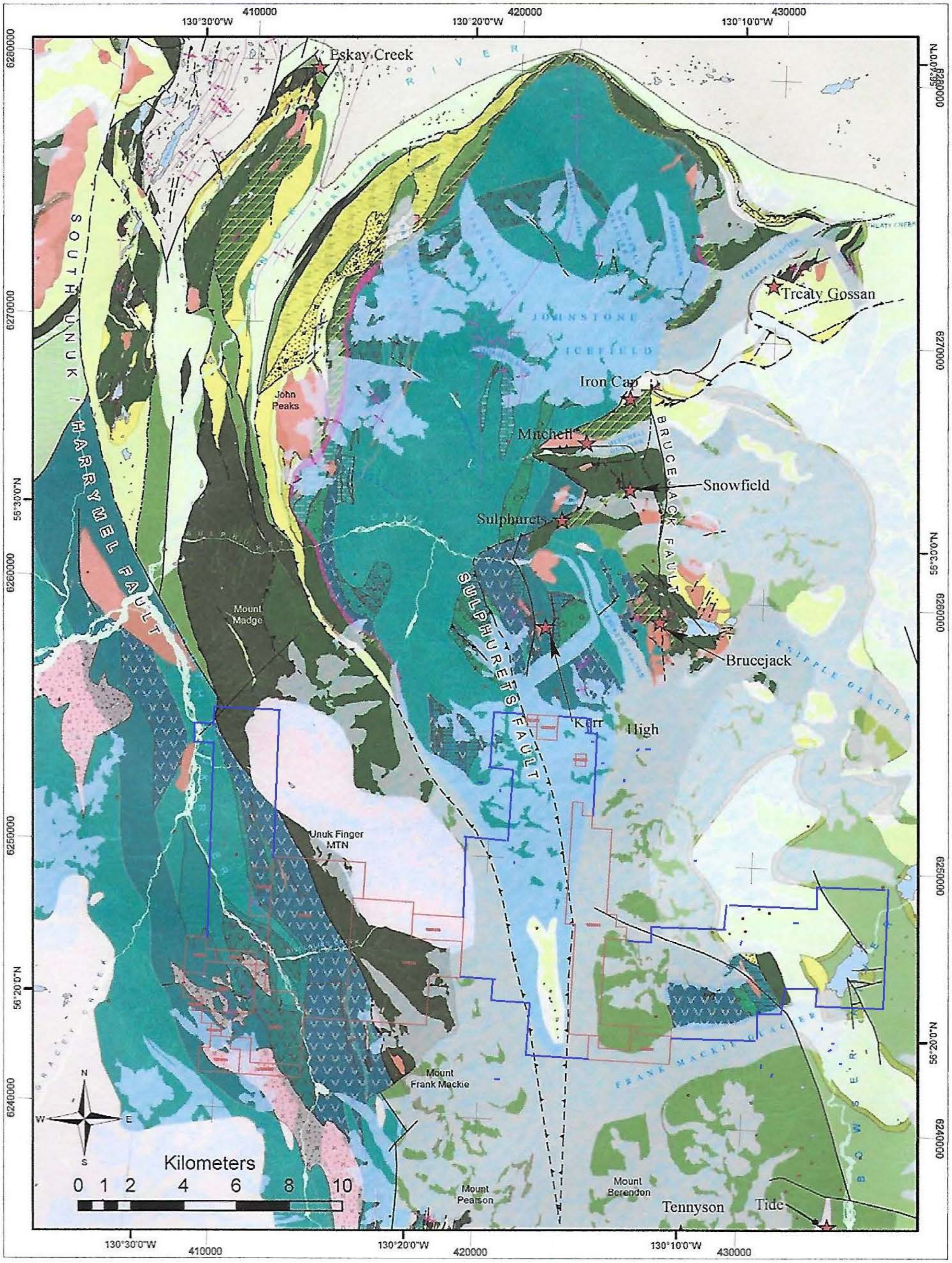


Fig. 7.2 Mackie Property local geology.
After Nelson and Kyba (2014)

Legend

Stratified Rocks

Quaternary
- Edziza volcanic rocks

Cretaceous - Upper Jurassic
- Bowser Lake Group undivided

JURASSIC

Hazelton Group

- Volcanic and sedimentary rocks undivided

Volcanic Rocks

- Volcanic rocks undivided
- Felsic Volcanics undivided
- Coherent rhyolite, autoclastic breccia
- Variably welded felsic lapilli tuff
- Epiclastic felsic breccia and crystal tuff
- Andesitic- basaltic volcanic rocks
- Subareal calc-alkalic andesite and dacite flows, pyroclastic and epiclastics and lapilli tuff
- Pillow lavas, pillow breccias, interbedded mudstone and mafic volcanic rocks

Sedimentary rocks

- Sedimentary rocks undivided
- Limestone
- Calcareous sandstone
- Turbiditic mudstone - siltstone
- Intercalated sedimentary rocks
- **Jack Formation** Sandstone, siltstone, mudstone, wacke, tuff; Intermediate grey-green, beige and maroon, very fine to coarse grained, thin to thickly bedded, arkosic arenites, lesser quartz, graded in part, minor fossils.
- **Basal Jack Formation** Polymictic conglomerate with well rounded clasts of mainly (70%) felsic to intermediate intrusive rocks. Intrusive clasts are generally plagioclase-hornblende-phyric and crowded plagioclase porhyries with tonalitic to granodicritic compositions. Common intraclasts of black argillite (10%). Minor clasts of white polycrystalline quartz (10%), andesite (5%), siltstone + tuff (3%), gossanous quartz-sericite-pyrite replaced clasts (1%) and carbonate (1%). Quartz-rich arkoses and pebbly arkoses. Isolated basal carbonaceous mudrocks.

TRIASSIC

Stuhini Group

- Undivided volcanic and sedimentary rocks

Volcanic Rocks

- Intermediate volcanic rocks
- Mafic volcanic rocks
- Andesite boulder conglomerate

Sedimentary Rocks

- Sedimentary rocks undivided
- Limestone and Marble
- Argillite, siltstone turbidites, sandstone and wacke
- Arkosic sandstone, siltstone, mudstone
- Arkosic sandstone, tuffaceous polylithic conglomerate

Intrusive Rocks

Eocene	Coast Plutonic Suite
Early Jurassic	Texas Creek Plutonic Suite
Paleozoic	Stikine Pluitonic Suite

- MINFILE
- significant deposit
- rivers
- lakes
- glaciers

Faults

Type
- defined
- approximate
- inferred

Motion
- normal
- thrust
- strike slip

Structure Lines
- antiform, upright
- synform, overturned
- synform, upright

Table 7.1 Table of Formations.

After Nelson and Kyba (2014)

conglomerates, is the basal formation of the Hazelton Group. The Jack Formation is the favoured host for porphyry and epithermal deposits within the Stewart-Treaty Glacier trend. The contact between Stuhini and Hazelton rocks in this area of the claims may be the Sulphurets Fault, which in this area is obscured by ice.

Mineralization

Mineralization across the Mackie Property is extremely varied (see a partial list of Minfile Occurrences in the reference section) and includes the potential for Beshi Copper; Porphyry Copper +/-Gold, Mesothermal and Epithermal Vein, Disseminated Intrusive Related Gold, Manto and VMS-Eskay type deposits.

2016 Exploration Methodology

Methodology for the 2016 Geophysical program at Orion is documented by Kevin Killin in Appendix I. As he describes: During the period August 13th - 20th, 2016 a Magnetotelluric Survey was carried out on the Orion portion of Tudor Gold's Mackie Property. Quantec Geophysics personnel were housed in Stewart and flown to the property by helicopter each day for the collection of data from 44 sites. This data was reviewed for quality and completeness on a daily basis by Mr. Killin, and then processed by him using the described software to produce the profiles provided in his report.

Conclusions and Recommendations

As I am not a geophysicist, I feel un-qualified to comment on the recommendations and conclusions arising directly from the geophysical data.

Quoting Mr. Killin's recommendations (page 29):

"The area needs to be visited by a Tudor geologist and mapping the central ridge as well as the eastern and western slopes will help to open up ideas. The ice sheet is receding and more provable ground is opening up. An airborne survey over the property would be recommended prior to drilling. As deep exploration is the focus, a simple magnetic airborne survey would be recommended. EM data has not proven to be a target producing method in this area, although it does give extra data. The magnetic data would help to confirm structure and would enable Tudor to discriminate targets in conjunction with geology and the MT data."

References

BC Ministry of Mines Minfile Mineral Showing Reports for:

Cumberland – 104B 011- Polymetallic Vein or VMS, SE of Unuk and Sulphurets junction

Doc, Globe, Grace, Florence - 104B 014, 015, 016, 019 – Quartz veins with Au (+ sig base metals and hemitite), associated with Diorite stocks all cutting Triassic Stuhini andesite tuffs, greywacke and limestone at 110/90 deg

Bliss-104B-039 – Beshi-Cu showing south of Divelbliss Creek (similar to Granduc mine to south)

DC, Duke 1, Divel – 104B 134 - Lead-Silver vein cuts Jurassic Unuk River formation volcanic breccia conglomerate, sandstone siltstone, near the headwaters of Divelbliss Creek

Delta, Delta West, Best Bet – 104B 166 – Polymetallic veins or Manto near feldspar porphyry intrusive 5km north of the Frank Mackie Glacier

Gamma, Fairweather - 104B 168 – Polymetallic stockwork veins in Hazleton volcanic agglomerate, conglomerate, sandstone, between Canoe and Frank Mackie Glaciers

Corey, C-10, Corey 6, Corey South, CB, - 104B 236, 240, 287, 340, 388 – Salmon River Formation and Eskay-type stratigraphy, as well as disseminated Intrusive Related Gold

Sheelagh Creek – 104B 389 – Auriferous quartz vein cuts Stuhini greywacke sandstones

Tribe, Orion, Cat-in-the-Hat - 104B 201, 671, 672 - High Suphidation Epithermal stockwork veins cutting Hazleton Dilworth (?) formation rhyolite flow breccia's and tuffs

Crimonese, D. (2008), Assessment Report # 30058, Assessment Report on Diamond Drilling Work on the Following Claim - Tenure #508810 - Orion Property, Geological Survey Branch, BC MEM

Hutter, J. (2015), Geological and Geochemical Report on the Mackie Property, NI 43-101Qualifying Report for Kaizen Res., and filed as an assessment report with mineral titles BC MEM

Kowalchuk, J. et al (1997), Assessment Report # 24965, Summary Report on the 1996 Exploration on the Corey Property, Geological Survey Branch, BC MEM

Nelson, J. and Kyba, J. (2014), Structural and stratigraphic control of porphyry and related mineralization in the Treaty Glacier – KSM – Brucejack – Stewart trend of western Stikinia, In: Geological Fieldwork 2013, British Columbia MEM, British Columbia Geological Survey Paper 2014-1, pp. 111-140

Robins J. E., (2000), Assessment Report # 26256, Report on the DOC Claims, Skeena Mining Division, British Columbia, Geological Survey Branch, British Columbia Ministry of Energy and Mines

Certificate of Qualifications

I, Bruce F. Coates of the city of Duncan in the province of British Columbia do hereby certify that:

- I am a registered Professional Geoscientist with the Association of Professional Engineers and Geoscientists of the Province of British Columbia with License Number 34247
- I am a consulting geologist of Core Assets Consulting with offices at 3329 Johnston Road, Duncan, BC, V9L 5Z3

I further certify that:

- I am a graduate of the University of British Columbia (1985) with a Bachelor of Science degree in Geology.
- I have worked as a geologist for a total of 30 years since graduation from university, and have been involved in mineral exploration and mining for base and precious metals and uranium throughout western Canada and Russia.
- I am responsible for the presentation of the supporting technical information gathered in this report entitled:

  "ASSESSMENT REPORT ON A MAGNETOTELLURIC GEOPHYSICAL SURVEY CONDUCTED IN THE ORION AREA (MINFILE: 104B-671) OF THE MACKIE PROPERTY, CENTERED AT 422,500 E - 6,246,000 N, SKEENA MINING DIVISION, BRITISH COLUMBIA

- I have no interest, nor do I expect to receive an interest, financial or otherwise, in Tudor Gold Corporation or Teuton Resources

Respectfully Submitted:

B. F. COATES, P. GEO.

PROFESSIONAL PROVINCE OF B. F. COATES # 34247 BRITISH COLUMBIA GEOSCIENTIST

Core Assets Consulting

April 18th, 2017

Affidavit of Expenditures

The following expenditures were submitted to me by Jim Hutter a Professional Geologist registered in the Province of British Columbia. He received them from Aris Morfopoulos, CFO and Secretary for Tudor Gold, who holds a Bachelor of Commerce (Hons.) degree from the University of Manitoba (1975). I have no reason the doubt the authenticity of these expenditures.

Orion 2016 Expenses

Mustang Helicopters	36,243.48
Field Costs (room & board, misc supplies)	3,725.84
Simcoe Geoscience - MT survey	92,853.00
Total:	132,822.32

Total Applied Work Value:	132,822.32

Respectfully submitted,

B. F. COATES, P. GEO.

Core Assets Consulting

April 18th, 2017

Appendix I

Tudor Gold Corp,
Magnetotelluric Geophysical Survey,
Orion Property (Cat in the Hat Showing),
Golden Triangle Area,
Stewart B.C. Canada,

Kevin Killin, HBSc.
Director & Geophysicist,
Simcoe Geoscience Limited,

December 20th, 2016
Project # SGL-16009MT-50

Affordable Intelligent Solutions

SIMCOE GEOSCIENCE
www.SimcoeGeoscience.com

REPORT

Tudor Gold Corp.

Magnetotelluric Geophysical Survey

Orion Property (Cat in the Hat Showing)
Golden Triangle Area, Stewart B.C. Canada

DECEMBER 20TH , 2016 **Project # SGL-16009MT-50**

Simcoe Geoscience Limited
17 Violet Ave., Keswick, Ontario, Canada, L4P 0C6
Phone: +1 (905) 769 1593 / Toll Free: +1 (866) 640 8822
Fax: +1 (905) 535 7422 / info@SimcoeGeoscience.com

CONTENTS

Simcoe Geoscience Limited
17 Violet Ave., Keswick, Ontario, Canada, L4P 0C6
Phone: +1 (905) 769 1593 / Toll Free: +1 (866) 640 8822
Fax: +1 (905) 535 7422 / info@SimcoeGeoscience.com

TABLE OF FIGURES

1 EXECUTIVE SUMMARY

The Orion property is a very interesting exploration challenge. Surrounded by ice, minimal ground mapping can/nor has been performed at this time. The geophysical survey confirms some previous ideas surrounding the prospect, and also raises questions that need some answers. New ideas about the property are talked about and illustrated. All depth profiles (inversions) have been performed and quality controlled, and all other compiled data from outside sources is believed to be true. Simcoe believes that the data truly represent the subsurface. Some data have been edited to ensure an accurate interpretation.

The Orion property is located at the southernmost tip of the Stuhini formation which is part of an anticlinorium located in the rich Golden Triangle. The prospect is contained by the Kyba “Red Line” contact which has been mapped and has proven to be a good exploration area. Many deposits are documented, with Seabridge KSM and Pretium BruceJack to the north. The property spans the contact on both sides, and includes both Stuhini and Hazelton age rocks. These assemblages have proven to be good exploration hosts. The focus of this report is the area surrounding the Cat in the Hat showing, however the Orion property extends past the boundaries of this survey.

The property has been mapped in two directions utilising magnetotellurics. The data are collected and then presented in the best manner for the exploration problem. Two dimensional profiles (2D) can be extracted from the station layout in many ways. Meaningful interpretation requires survey design. On this project there were 44 stations collected. Four profiles were designed in an east west orientation, “across strike” and a profile “parallel to strike” was designed. The ridge data parallel to strike resulted in 2 profiles and provided some excellent information. It is very hard to decide what a strike will be before data acquisition.

The possibility of the Sulfurets fault traversing the Cat in the Hat is a new idea. This could be a good indicator. There could also be a relationship of the axis of the anticlinorium on the property. This could indicate a widening or “smearing” of the rocks under the Cat in The Hat zone. If that were to prove true, the path of the Sulfurets fault or the anticlinorium axis could continue to the south opening up possible prospective ground to the south.

The property needs to have a focused program to prove it’s worth. The area needs to be visited by a Tudor geologist mapping the central ridge as well as the eastern and western slopes will help to open up ideas. The ice sheet is receding and more provable ground is opening up. An airborne survey over the property would be recommended prior to drilling. As deep exploration is the focus, a simple magnetic airborne survey would be recommended. EM data has not proven to be a target producing method in this area, although it does give extra data. The magnetic data would help to confirm structure and would enable Tudor to discriminate targets in conjunction with geology and the MT data. Combining the airborne to cover other claims of interest would also be a benefit.

2 INTRODUCTION

Simcoe Geoscience Limited (Simcoe) was commissioned by Tudor Gold Corp. (Tudor) to design and facilitate a Magnetotelluric (MT) survey on the Orion Property , Skeena Mining Division, B.C., Canada. The 44 sites of MT data were acquired within the period of August 13th 2016 through August 20th 2016 by Quantec Geoscience Limited, and the data were evaluated verified by Simcoe. There were 8 days of work; 6 days of acquisition, 1 day of demobilisation, and 1 weather day. The property was accessed via helicopter. There were 2 crews of 3 men and a processing geophysicist required to acquire and process the data onsite. The data were forwarded on a daily basis for review by Simcoe. Geophysical methods will not map gold directly. Geophysics will help verify and aid in understanding contacts, local and regional geology. When combined with surface mapping, depth sections can provide excellent information for drill targeting.

The Orion property has a showing previously discovered called “The Cat in the Hat”. The showing is located on a ridge between two arms of the receding Frank Mackie Glacier. This showing has geological signatures, gossans, and previous work that on the surface are consistent with other resources that are currently being evaluated or developed in the area. Previous work on the property, including 2 (of five) drill holes in 2007, indicate that the property may have gold mineralisation. Historical trenching on the property has returned values in samples as high as 47.5 grams gold per tonne. (BC Ministry of Mines Assessment Report 23885).

Two important regional features make the Orion Property a favourable exploration area. Jeff Kyba and Joanne Nelson have mapped the area working as Regional Geologists for the B.C. Geological Survey. They have described what is called a prospective geological contact (Kyba line) between the Stuhini-Hazelton groups as follows: “The Stuhini-Hazelton group contact line represents a temporal-stratigraphic horizon when many changes in the Stikine terrane were happening and many mineral deposits were forming. The line work is a useful regional targeting tool for mineral exploration. Nearly all of the significant metal deposits are with 2km of this contact. The exception is Galore Creek which is entirely hosted within the Stuhini Group. However, Regional mappers admit there may be Hazelton Group rocks in the vicinity which have not been recognized.” (Jeff Kyba, Joanne Nelson personal communication 2016). This contact runs through and is believed to curve around the southern boundary of the Orion claims. The ore producing Sulphurets Fault is thought to “terminate” near the eastern boundary of the Orion Property, bordering on the East Mackie claims also owned by Tudor. Geophysical data maps contact(s) on the eastern and western sides of the ridge, and suggests that perhaps the contact and the unmapped Sulphurets in the southern portion of the property continues.

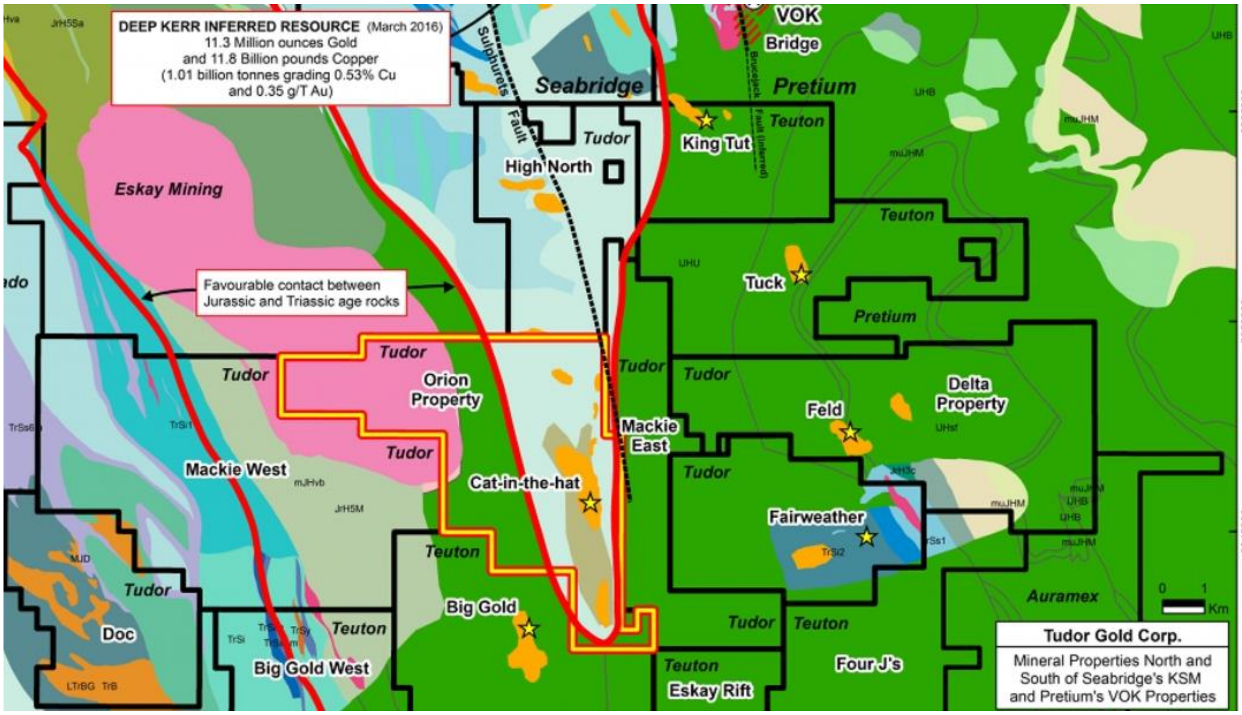


Figure 1 : Orion Property with the Kyba Line , Sulphurets Fault and Surrounding Land Holdings

The Orion property is part of extensive and favourable land holdings by Tudor which can extend the Orion exploration findings to the east, west, and north.

The survey was designed to give a subsurface understanding of the property near the Cat in the Hat showing and to try to verify the Kyba line. The other objective was to define any other property scale structure that could be defined in the absence of any other geophysical data that Simcoe could locate for that area. Two (2) profiles were designed to be on the outcrop in a roughly NNW direction along the ridge. These profiles were expected to define any structure trending in a roughly EW direction and covered the ridge and outcrop as reasonably expected. Four (4) other profiles were designed to be included with the stations taken on the ridge, but to extend across the glacier in the safest manner possible to outcrop on both the West and East sides of the area. These data were expected to help define any structure through the area in a roughly NS direction. The secondary objectives were to define or negate the presence of the Kyba line and to help forward the exploration on not only the Orion property, but the properties held to the east and west. Lastly, the sulphurets fault is thought to "terminate" in the vicinity of the Orion property, and defining a signature could be valuable.

Data from the glacier sites were treated judiciously as sometimes the quality of the electrical data suffers on ice. There is an abundance of magnetic data that are unaffected by the glacier and the Tipper (magnetic) data at all sites were used in the processing, inversion and interpretation products.

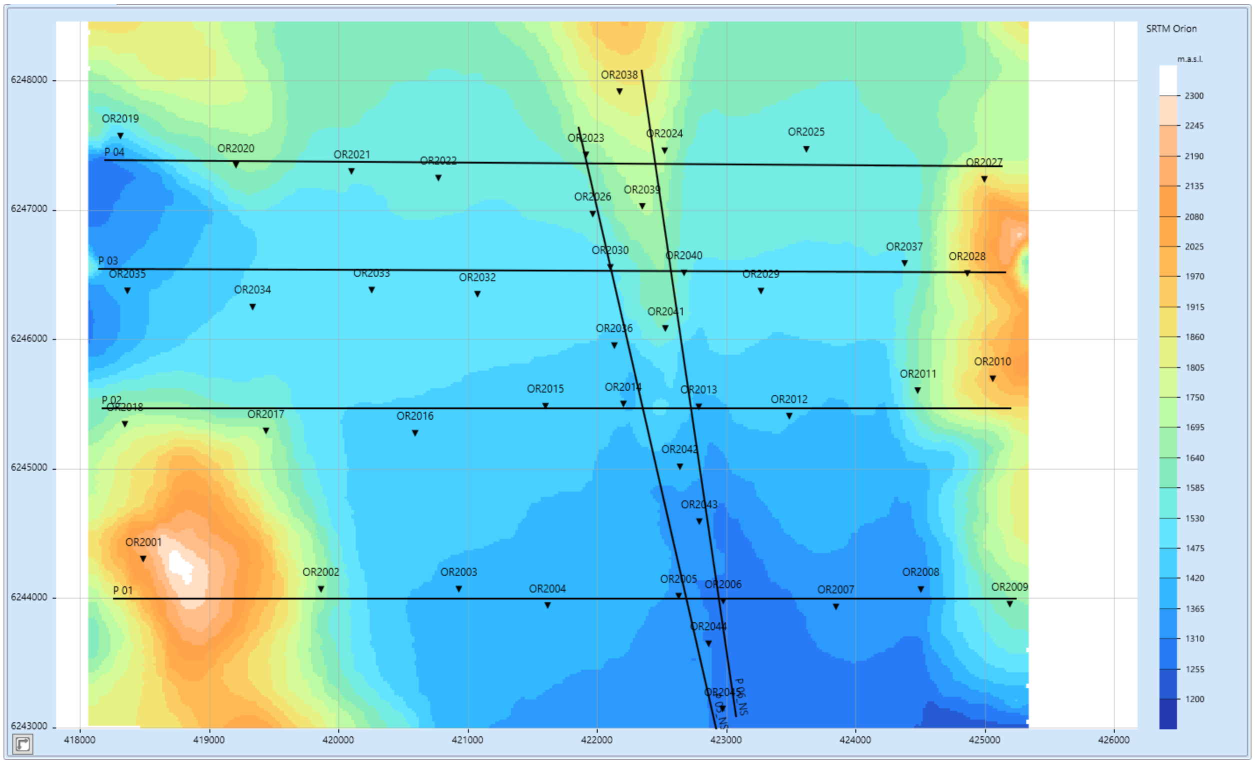


Figure 2 : Orion Property showing the central ridge, MT sites and designed profiles.

3 SURVEY LOCATION, ACCESS AND PHYSIOGRAPHY

The Orion property is located approximately 50km north-northwest of Stewart B.C. and is bounded by other claims currently held by Tudor at Long/Lat: 130°16’07”E, 56°20'51”N. The property can be accessed by helicopter either from Stewart B.C., from staging points on the Granduc Rd, or other access roads north of Stewart. There are no access roads or trails into the property.

The property is mostly covered by glacial ice. As the ice recedes from the Frank Mackie glacier, more outcrops become available for ground exploration. At the time of data acquisition there is a ridge of outcrops along the eastern side of the property which is bounded by two arms of the Frank Mackie Glacier. On each side of the glacier there were areas where the crew could be off the ice. The sites off of the glacier are generally described as “sandy and rocky”, with rock falls in various areas. The terrain is steep and in places unnavigable.

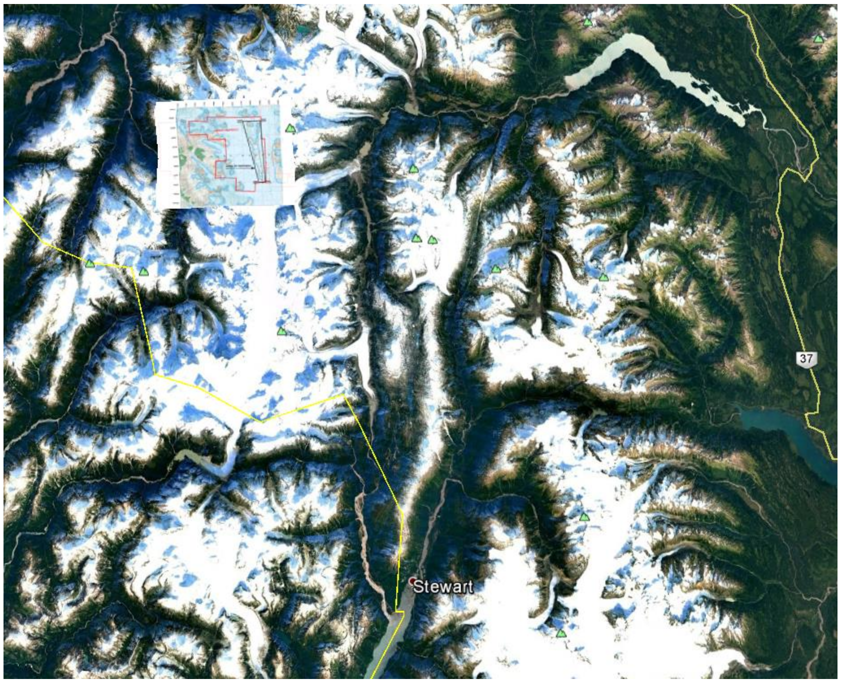


Figure 3 : Orion Location

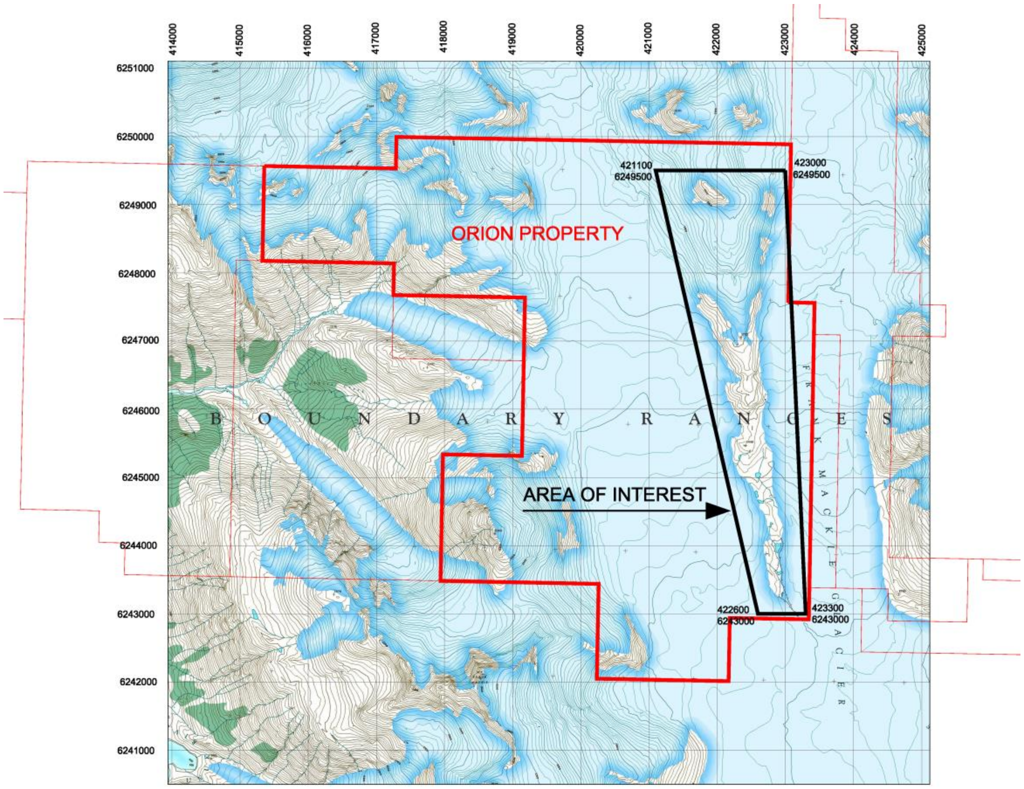


Figure 4 : Orion Property and Area of Interest

4 SURVEY METHODOLOGY SUMMARY

First designed in the 1950's ,the Magnetotelluric (MT) geophysical earth imaging method has been very successful to companies by adding deep exploration data which, aids companies to locate, validate, and expand indicated and confirmed reserves. Magnetotelluric data are collected as a passive electromagnetic method (EM) which uses the earth's independent time varying magnetic and electric fields to explore from the near surface of several tens of meters to great depths, exceeding several kilometres and up to hundreds of kilometres depending on the system frequency selection, sensitivity, acquisition time, subsurface geology and the conditions of the earth's varying magnetic and electric fields. The measurements allow the subsurface electrical conductivity/resistivity to be measured. Electrical wires connected to electrodes, along with magnetic coils to a single data logger. Each wire/electrode and magnetic coil are set in specific directions. The typical setup is shown below.

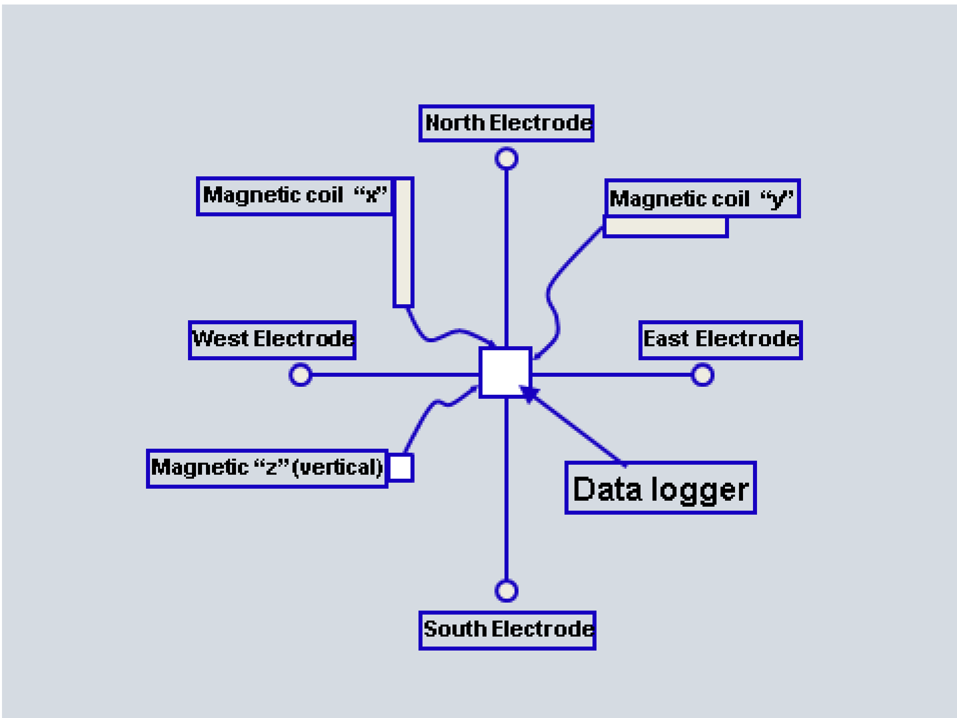


Figure 5 : Typical MT station setup

On this survey the electrodes were set up 100m apart at sites where the crew could access positions consistent with a NS and EW orientation. Typical measurements for mineral exploration are taken over periods of at least 12 hours, and sometimes exceeding 24 hours. Measurements on the property typically exceeded the 12 hour minimum.

The depth of investigation is typically limited by the recording time. If a great depth (say > 2km-3km) is required, the recording period is simply increased to as much as 48hrs in order to get a better signal to noise ratios at the very low frequencies. I shallow depths are required, the data is measured at high frequencies, ant typically not for a long period. Another advantage of the MT method is that large areas can be covered efficiently and effectively in reasonably short periods of time. There are no extremely heavy pieces of equipment (i.e. transmitter) or limitations to the concept of acquiring data in "lines" or "grids". Each station is acquired individually, located as close to the ideal position as safely possible, and is man portable.

Geophysical depth sections are designed after data acquisition to include inversions and imaging of custom profiles of interest showing the inferred electrical conductivity/resistivity of the subsurface. The method is extremely robust overall. Simcoe utilises the best available software analysis and data processing tools (CGG Electromagnetics (Italy) cgg.com Geotools™) in order to extract and present plan maps and sections of the MT information with confidence.

4.1 THEORY

The magnetotelluric method is a passive method measuring the electric $\boldsymbol{E}$ and magnetic $\boldsymbol{B}$ fields in orthogonal directions with the goal of measuring the electromagnetic field at the surface and the subsurface. The reason the sensors are set out in this geometry is because of the relationship between magnetic fields and electric fields. This relationship can be described as "a changing electric field or changing magnetic field changes the other (electric field or magnetic field)". The relationship allows monitoring the changing fields to calculate the corresponding change in the other field, and anomalous responses are due to differences in the magnetic susceptibility and/or the electrical conductivity at different frequencies.

In Magnetotelluric exploration the sources are natural. The solar energy from the sun varies constantly and is not limited to the light spectrum. The solar wind is a constant stream of energy from the sun that depends on factors beyond this report. The energy changes based on solar flares and unexpected events that many explorationists might recognise as a "diurnal variation" where the magnetic variations are very quiet or very active. The solar wind pushes against the "day side" of the earth as it rotates, and causes distortions that vary over the globe with the rotation of the earth. Active solar energy is a source for MT exploration, poor for magnetic data acquisition. The greater the solar energy the better the quality of the MT measurement at that particular time. These are measured as the low frequency component of the MT data.

The second source is lightning generated responses around the world. Most of the lightning energy occurs around the equator, or within the tropics, however there are many lightning prone areas due to where the jet stream is located and local weather related events. There needs to be land for the lightning to form. This discharge of energy (electrical) into the earth modifies the magnetic field, and creates telluric currents. These data are the high frequency / shallower information.

Each source is constantly present worldwide and modifies the subsurface telluric currents. When measuring the orthogonal components of the magnetic and electric field variations at different frequencies it becomes possible to distinguish a conductivity/resistivity model of the subsurface using tensor mathematics from near surface to great depths.

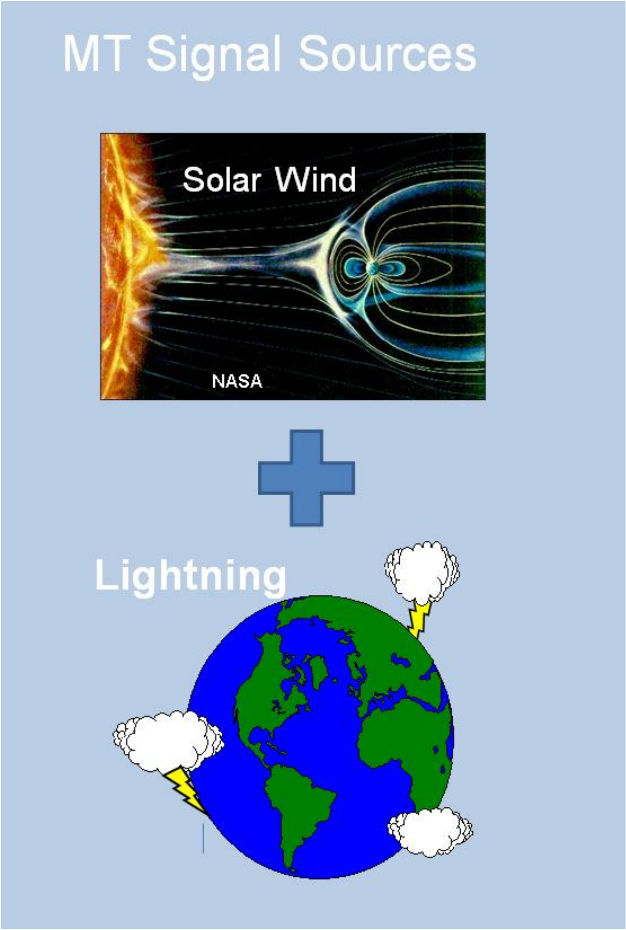


Figure 6 : MT Signal Sources create telluric currents

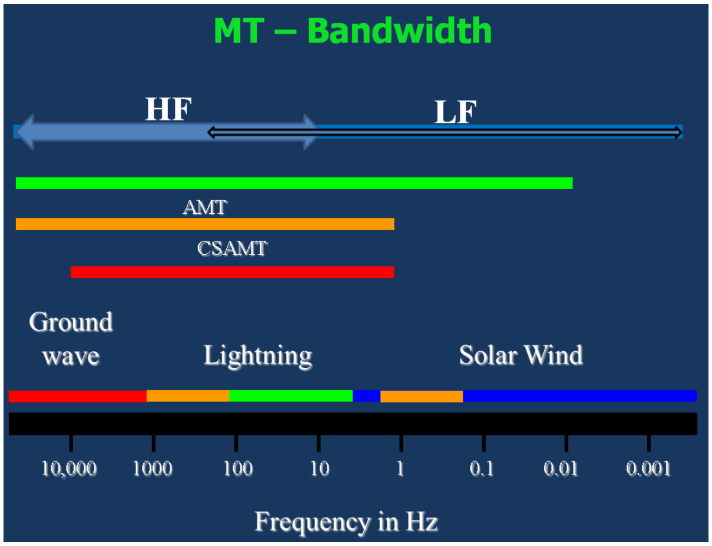


Figure 7 : MT Bandwidth and Sources

4.2 DATA PROCESSING AND INTERPRETATION

The data are treated in several steps to produce an apparent resistivity and phase value for each site, and at many frequencies which relate to the depth of measurement. The data are calibrated to the particular measurement coils , electrical line lengths , and also their geographic orientation. Once all sites are prepared and calibrated, complex mathematics are applied to the data to produce “spectra” and the “impedance tensor” components. These are then analysed and calculations produce the final product, an apparent resistivity and phase value for each site, and each frequency.

These tensor data are analysed for quality by observing different components of the sounding curves at each site. An example site showing some of the important parameters is shown below. Once the components of the tensor have been examined and possibly edited, the data are input into inversion algorithms to produce a subsurface resistivity/depth section.

The MT data contain an abundance of information. These include the subsurface apparent resistivity and phase, the vertical and horizontal magnetic fields (vary from site to site) and the induction vector arrows which can be plotted in order to help locate conductors. The different components (ie the Tipper data or Induction vector data) can point to conductors that are vertically biased, or horizontally biased. With knowledge of a project area the data can be utilized in looking for structure at different depths.

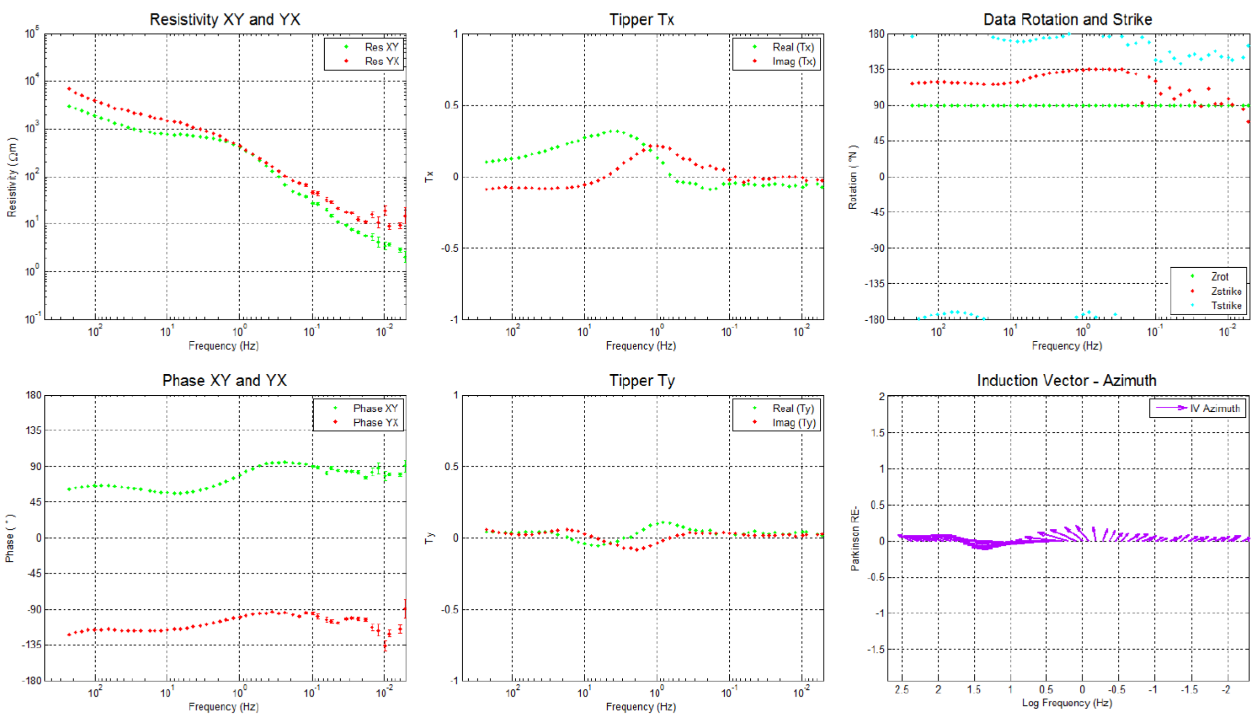


Figure 8 : Typical MT Sounding Curves

When interpreting the MT data a geophysicist will look at different representations of the dataset in order to provide the best explanation of the observed results and the known or assumed geology within a particular area. Some data are reviewed in plan map form, and come directly from the observed data at different frequencies. Knowing that the different frequencies are responding to geology at different depths (higher frequencies are shallower, lower frequencies are deeper), one can get an idea of the varying geological responses with depth. Each property is different and care needs to be taken when estimating the depths from frequencies. A few examples of parameters that are used in a plan map interpretation are the observed apparent resistivity, the induction vector and the tipper magnetic data.

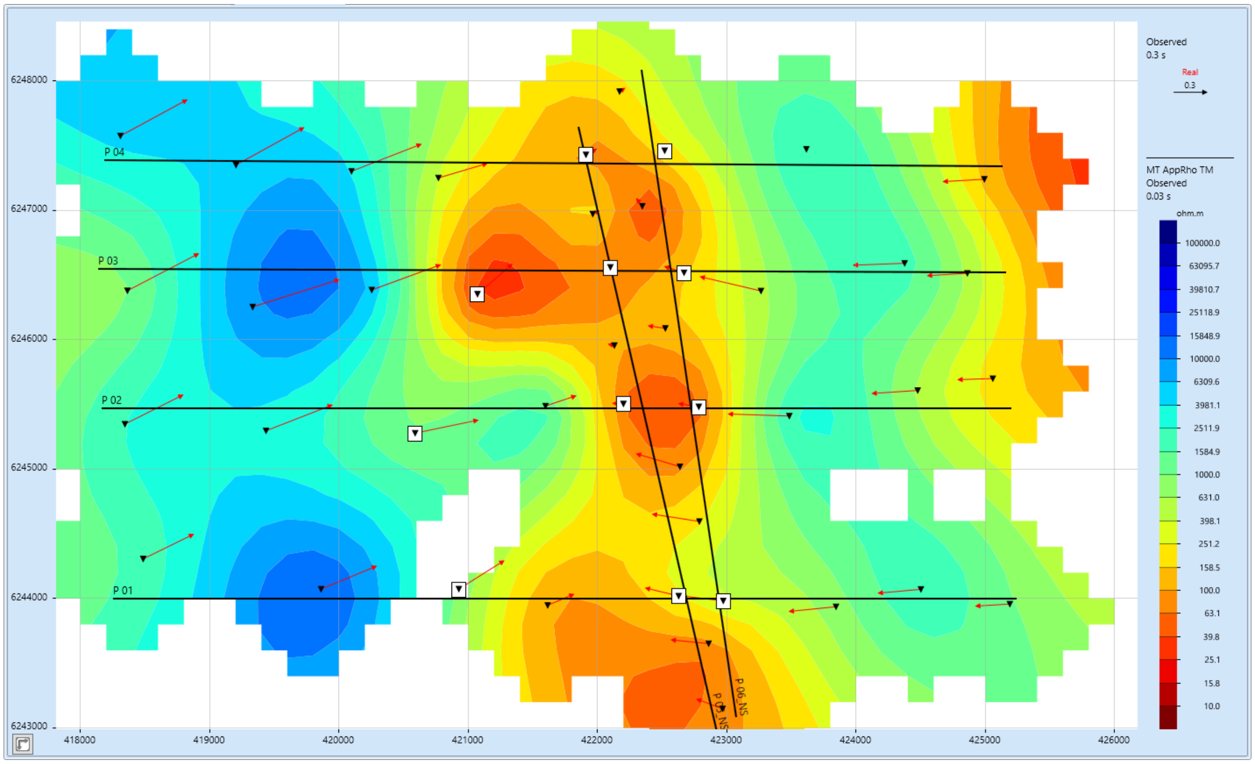


Figure 9 : Example Plan Map showing Induction Arrows and Apparent Resistivity

The observed data are also put into a more complex 2D inversion program which produces depth sections of profiles chosen for presentation. These computations are more complex and as they take into account many parameters for each station, each frequency and adjacent stations, the algorithms give a robust subsurface view. Many different profiles can be constructed over areas of interest depending on the density of the MT data collected. When properly processed and inverted, the 2D inversions sections/profiles should match well (not exactly) at positions where they intersect as the input data on each profile in the vicinity of the intersection may not be the same. These profiles can then be presented in sections and also combined in a 3D space to better understand the subsurface.

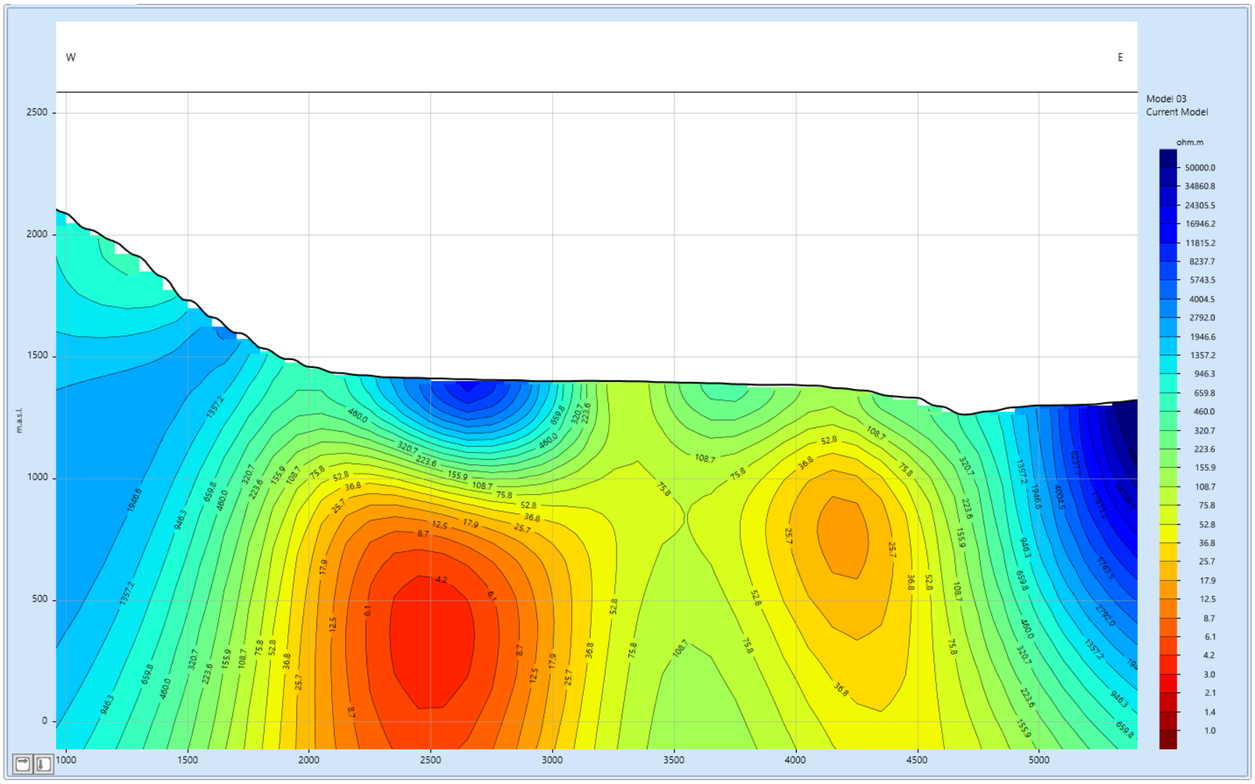


Figure 10 : Example Section showing Apparent Resistivity, Depth, Topography

The sections are displayed taking into consideration appropriate exploration parameters , such as depth, ranges of apparent resistivity values, and any annotations such as interpretive comments or illustrations. Unedited figures are contained in Section 7, Illustrations.

The final step can be to insert all data into a 3D inversion algorithm. These algorithms are very complex and computer time consuming. Some individual inversions can take a month of time on a cluster of computers. This will depend on the number of stations, the frequencies being inverted, and the 3D inversion program being used. Some projects, especially regional assessments are very well suited for the process as the geology can't be resolved using other algorithms. Designing 2D profiles that are over complex geology that is changing strike is very difficult. In these cases a "smooth" 3D model can be computed and be extremely valuable in defining regional 3D responses which can be then be used to focus or refocus exploration objectives on smaller property size areas.

5 RESULTS

The survey results are discussed in two (2) sections. The initial section contains individual interpretations of each section and plan map. Each interpretation may contain references to other sections or plans in order to illustrate continuity or discontinuity which is equally important. The final section of the results combines all significant observations into a geophysical image of the property along with recommendations for future work. Six (6) profiles were designed over the Orion property. Two (2) of the profiles were acquired along the ridge in a roughly NNW orientation covering the Cat in the Hat showing and a further four (4) profiles were collected roughly east-west orientation to provide information across the considered regional strike and to help define any mineralisation around the Kyba line.

5.1 INTERPRETATION

The Orion property features rhyolite and rhyolite breccia with anomalous gold and arsenic. The property might have potential for hosting Eskay Creek-type deposits. The Tudor properties to the east and west of the Orion claims are the Mackie properties which have also been lightly explored and show the potential for mineralisation.

The plan map below should be used for reference in discussing the section data. The historical and known data are provided on a single plan map. Previous work on the property includes drill holes. Each drill hole was collared in an area unbounded by glacial ice and accessible at during the 2007 exploration season. This information is unconfirmed but available in press releases and assessment report 29524. The significant drill holes are OR-2007-01 and Or-2007-02 which were drilled off of the same pad. Each hole assayed gold values and were deemed worthy of more exploration. These holes are not accurately identified to the author at this time, although it is believed that the pad with the mineralisation is located on the “Cat in the Hat” showing illustrated. These holes were not drilled to depth great depth. The surface geology and chemistry (B.C. Assement reports 16479, 19264, 21978) all indicate mineralisation. The findings in this region, as illustrated by properties adjacent to Orion such as Pretivm or Seabridge, are not shallow resources, and require expensive drill hole programs. The Pretivm property seems to have the mineralisation clustered near the Brucejack Fault which is near the Kyba red line and also in on strike with the Sulphurets Fault that continues into the Orion property.

When discussing the profiles on the ridge, or annotations of the ridge on cross profiles it is important to know that these profiles were assumed to be parallel to strike however the sites were chosen in order to get the best possible data where they were not on the glaciers. The data on the EW profiles were intended to give information across strike. The glacier sites have good tipper data and the apparent resistivity data quality depends on the actual site and the electrical contacts. The map below is not accurate on the ice extent. The sites were chosen to be on solid ground as much as possible to get good data quality for the resistivity, all magnetic data are used.

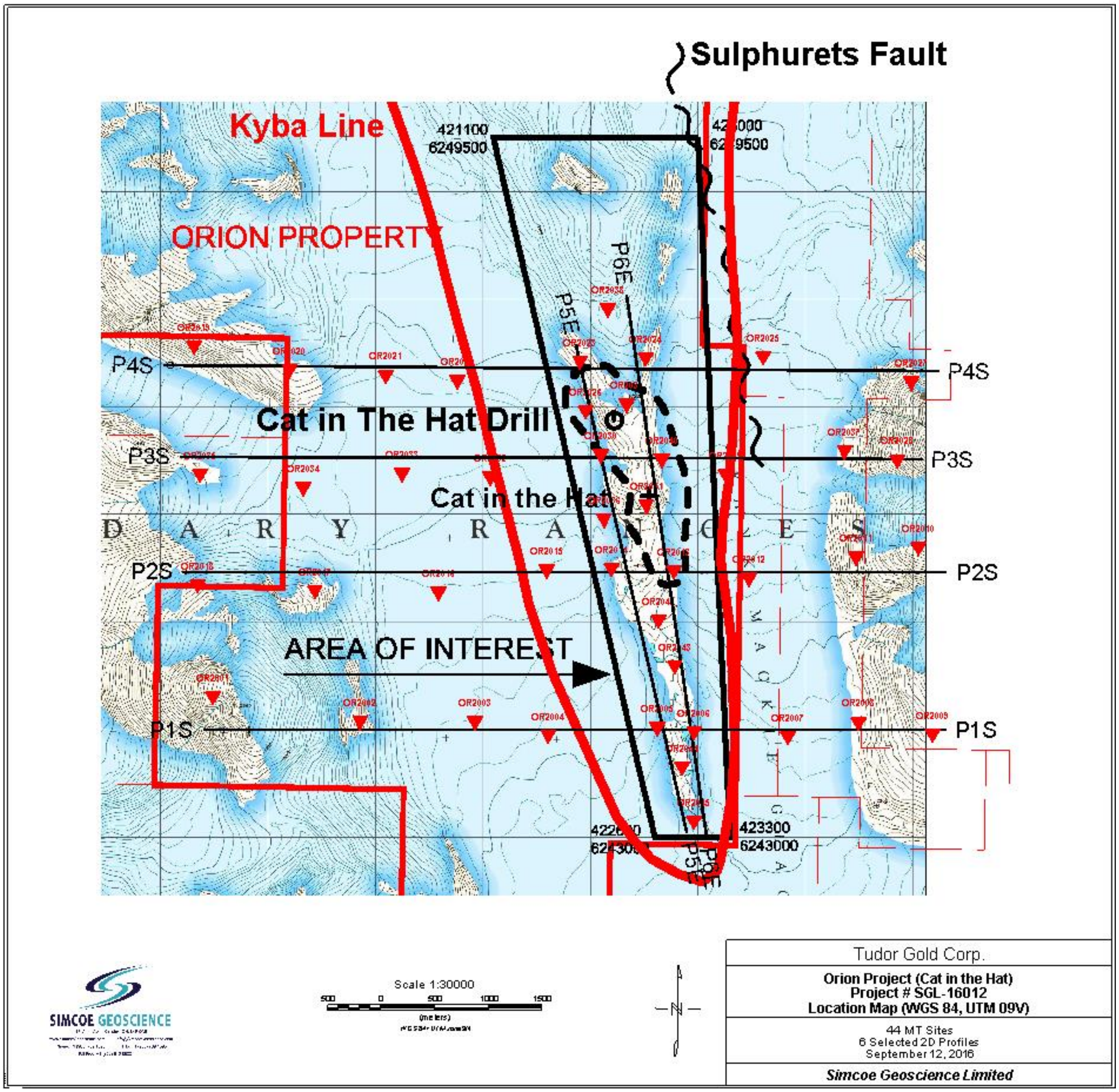


Figure 11 : General and Published Understanding of the Orion Claims

Collection of the MT data is not subject to "lines". These data can also be reprocessed to illustrate profiles in any direction required, as an example a profile from the southeast to the northwest could be designed. It is also very important to understand that the MT data is most reliable with deeper conductors. When viewing the sections it is recommended to ignore approximately the top 150m as these are covered by other methods in general, and the higher frequencies of the MT data can be less reliable.

The Kyba “red line”, or the interpreted contact between the Stuhini-Hazelton groups along with the interpreted position of the Sulphurets Fault are plotted above as taken from regional maps and provided digitally by Jeff Kyba (pers comms 2016).

Each geological assemblage has sedimentary composition. The alteration associated with a meta-sediment can be a schistose or graphitic signature, very highly conductive, whereas pyrite / arsenopyrite / felsic associations with mineralisation would not be considered to be in the range of 10’s of ohm-m.

The Stuhini is composed of mafic flows, sills, and well represented sandstones /siltstones. The Hazelton group contains mafic to felsic rocks, both mafic to volcanic. The distinction that is being used to distinguish the differences is very subtle.. it is the felsic component of Hazelton assemblage , and the sand /siltstone composition , plus the mafic flows in the Stuhini.

The Stuhini is likely to be more conductive overall than the Hazelton. The most important consideration to keep in mind is that alteration or structural deformation will alter responses, more conductive in general.

5.1.1 Depth Section Illustrations

The data show distinct formations on the eastern and western ends of the profile that similar, and a conductive zone in the center of the profile. The conductivities of the regional rocks are considered to be high. The edges of the zones are interpreted to be associated with the Kyba red line, and the contact between the Stuhini and Hazelton groups. The Stuhini group, as an assemblage is being interpreted as being the most conductive in relation to the Hazelton assemblage. The contact has been mapped as closely as possible and full mapping has been impeded by ice cover in the area. There is reason to believe that the highest conductive values on the profiles are not necessarily the best targets. The highest values are considered to be associated with alteration. Each geological assemblage has sedimentary composition. The alteration associated with a meta-sediment can be a schistose or graphitic signature, very highly conductive, whereas pyrite / arsenopyrite / felsic associations with mineralisation would not be considered to be in the range of 10’s of ohm-m.

Space is being intentionally left in order to provide space for notes / comments/ discussion within Tudor at future dates.

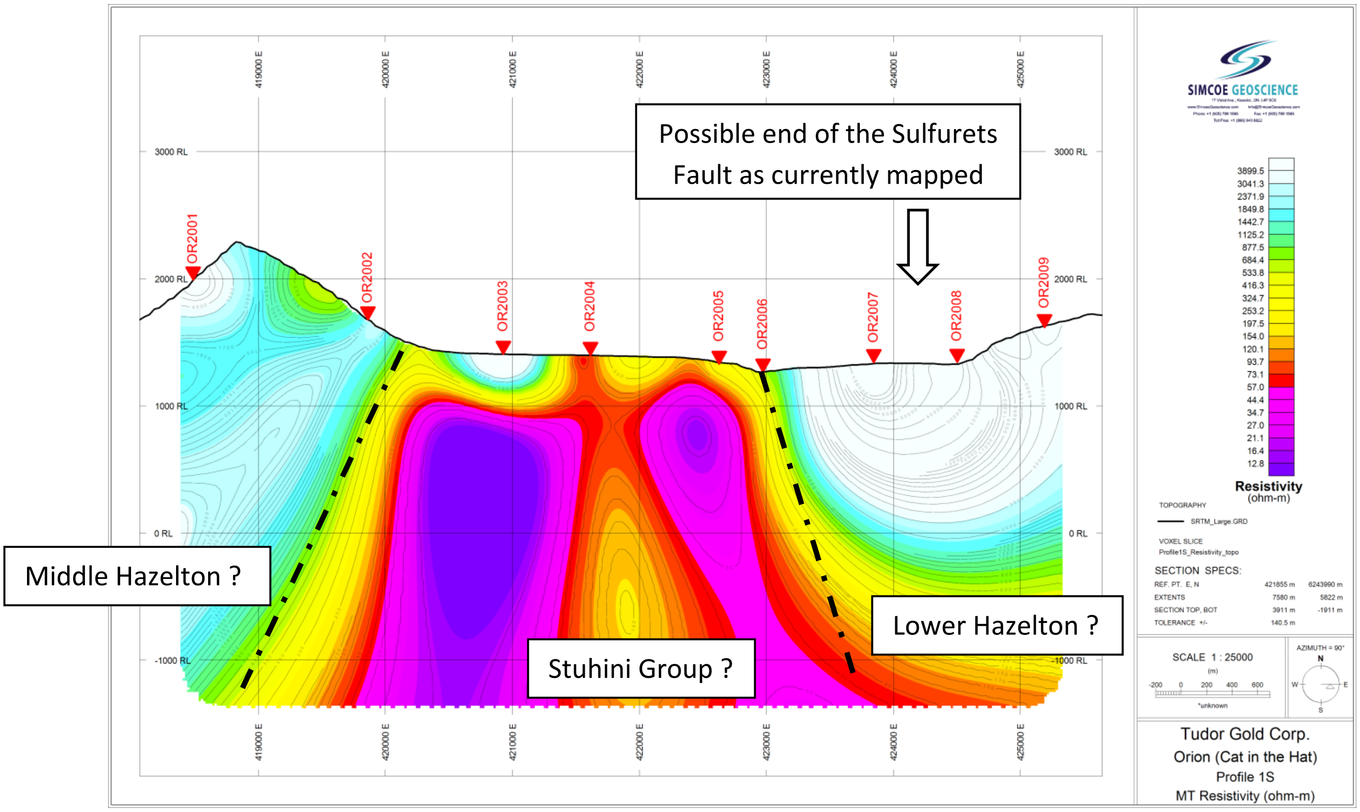


Figure 12 : East-West Profile 1S

The data show a conductivity change from the centre of the profile to the edges on the east and west sides. The glaciers sit under OR2003 and OR2007. The glaciers themselves will show a resistive signature. The data collected from OR2005 and OR2006 are on the “ridge” or land between the glaciers although there is no topographic high mark between these. There are two contacts or discontinuities mapped by the data on this profile. The eastern edge dips steeply to the east. The western edge dips slightly less steeply to the west. The geology seems to be more resistive in terms of both weathering and geophysical conductivity surrounding the ridge. The geophysics can be related to the regional geology as mapped at the surface showing the contacts between the Hazelton and Stuhini Groups. Is it possible that the less conductive zone between OR2005 -04 is indicative of the anticlinorium axis?

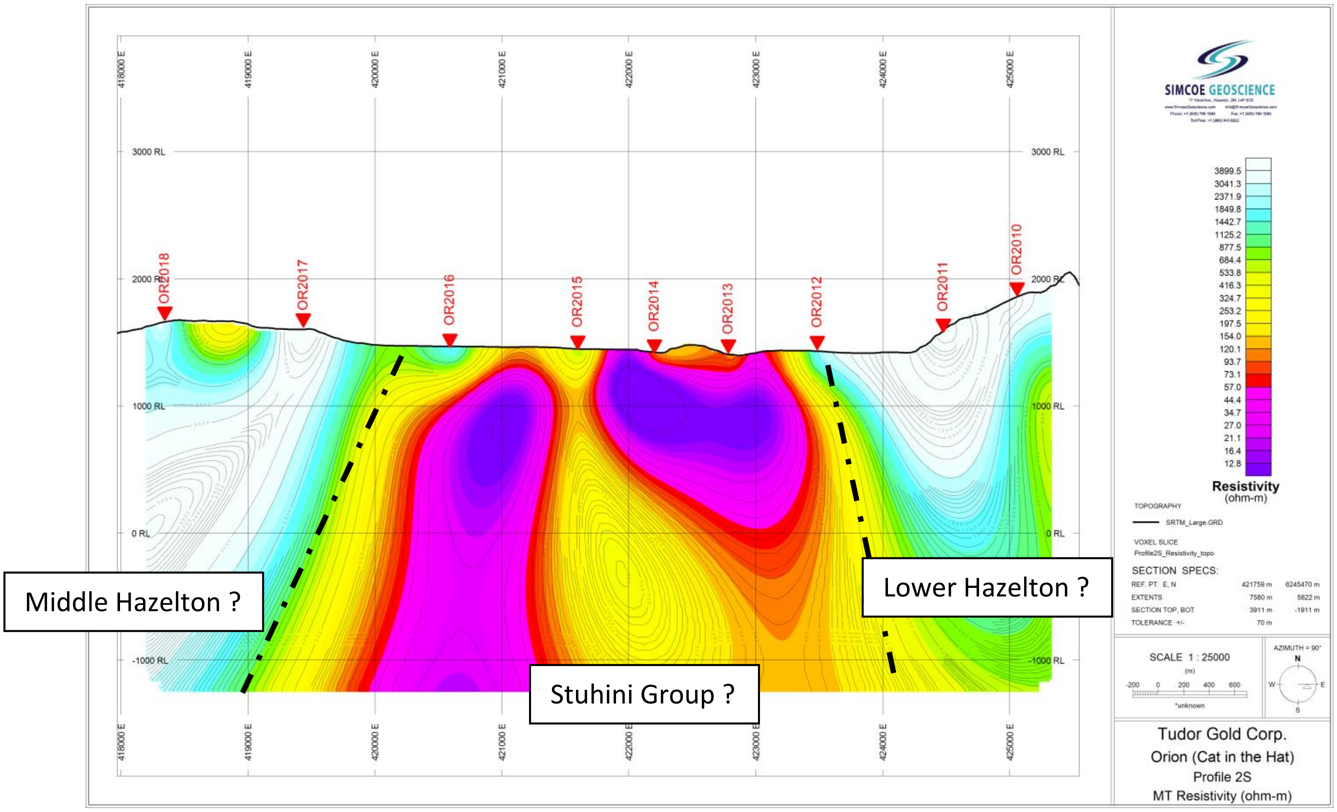


Figure 13 : East-West Profile 2S

Profile 2S passed the southern tip of the Cat in the Hat Gossan and shows continuity of the geophysical signatures from Profile 1S. The interpreted contacts are drawn at the same angles and are supported by the data. The western conductive anomaly seems to have remained continuous and the eastern anomaly has shallowed. The data on the eastern and western sides are similar. The data under station OR2015 is very similar to OR2004. There is some sense of continuity of a less resistive zone progressing to the north within the dataset.

The profile also shows a similar trend as in 1S. The data appear to show a more conductive kind of geology at depth that may progress to the east as indicated from the data on this profile under OR2010. As the data are at the end of the profile the depths may be slightly inaccurate, however the sounding does indicate the conductor exists. As in profile 1S is it possible that the less conductive zone under OR2015 is indicative of the anticlinorium axis?

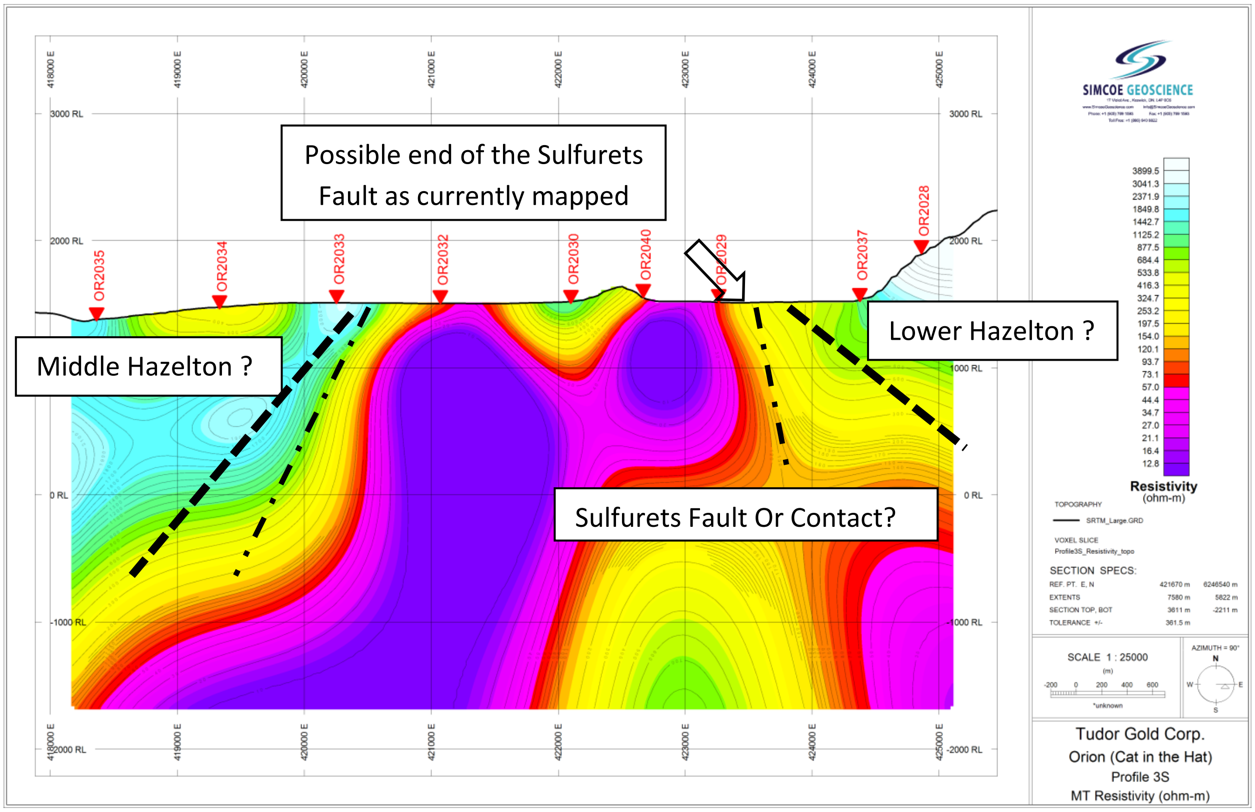


Figure 14 : East-West Profile 3S

Profile 3S passes over the center of the mapped Cat in the Hat gossan and shows some continuity with Profile 2S. The interpreted discontinuity to the west has remained similar. The eastern contact at the surface remains the same while the shapes of the features at depth change. This profile also marks the end of the mapped Sulphurets Fault in the south, terminating somewhere between OR2029 and 0R2037. The interpreted contacts, Kyba line becomes less clear on this profile. Geophysically it could be that the contact on the eastern side of the profile is truncated, possibly pushing the Stuhini to the east at depth.

The broader lines on the outside indicate another possible contact distribution where the Hazelton contact moves into a broader area. The dips of the contacts change from “semi vertical” to much shallower. The profile is anomalous.

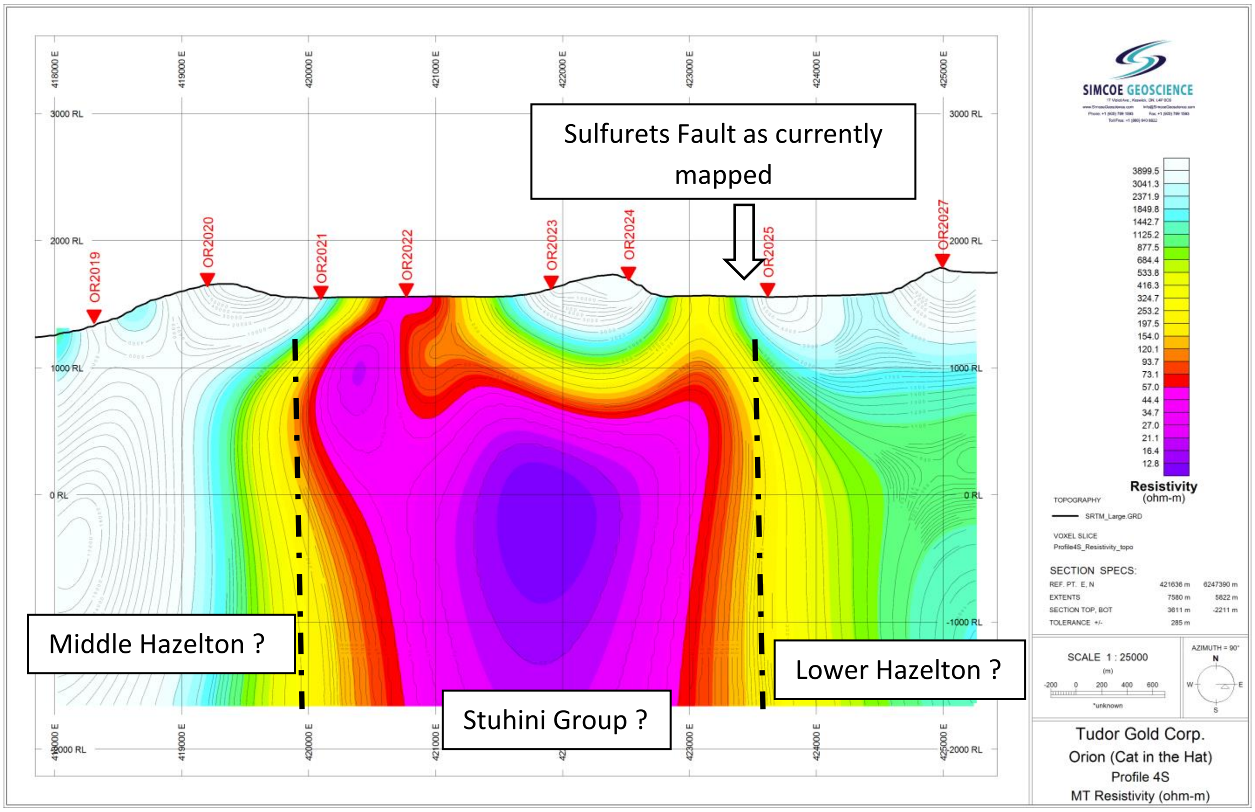


Figure 15 : East-West Profile 4S

This profile is at the north end of the Cat in the Hat showing and essentially reverts back to similar signatures seen on Profiles 1S-2S. There are clear geophysical responses that can be attributed to the Stuhini and Hazelton groups, providing that the assumptions of the conductivities/resistivities of the assemblages are correct, as both assemblages would be deemed very conductive should there be a comparison with other felsic rocks, such as an andesite intrusion or other granitoid .

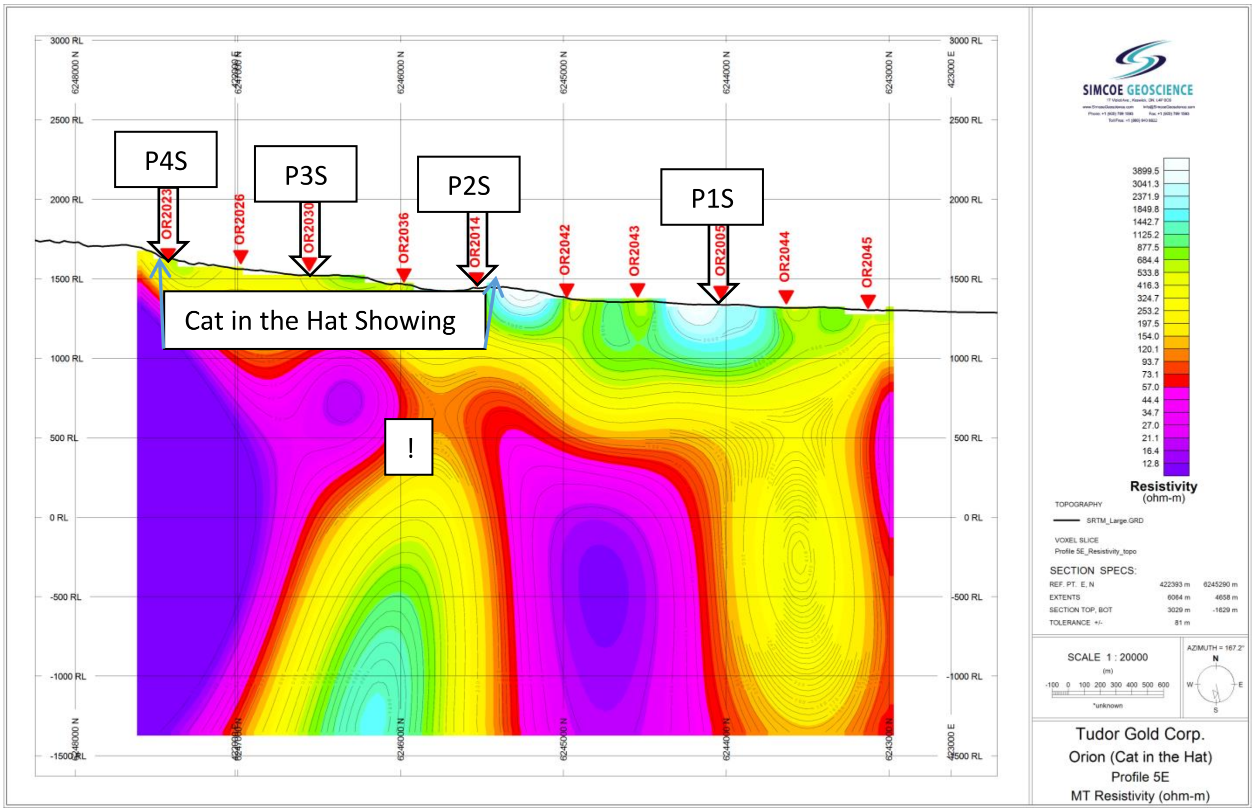


Figure 16 : North - South Profile 5E

The Cat in the Hat showing is illustrated between P4S and P2S. As indicated in the earlier part of the report, the data near surface should be considered with less confidence than the deeper data.

The data along the ridge have good electrical and magnetic data, and have been processed to visualise the data "parallel to strike".

The data show a discontinuity, possibly a fault that is located between P2S and P3S. The discontinuity is below the gossan zone. The data were processed to cross over the gossan zone and the Cat in the Hat showing. The data show a discontinuity (!) beneath the gossan area and OR2036 and it is interpreted to be between profiles P2S and P3S which explains the character difference in the profiles from the southern profiles to the northern profiles.

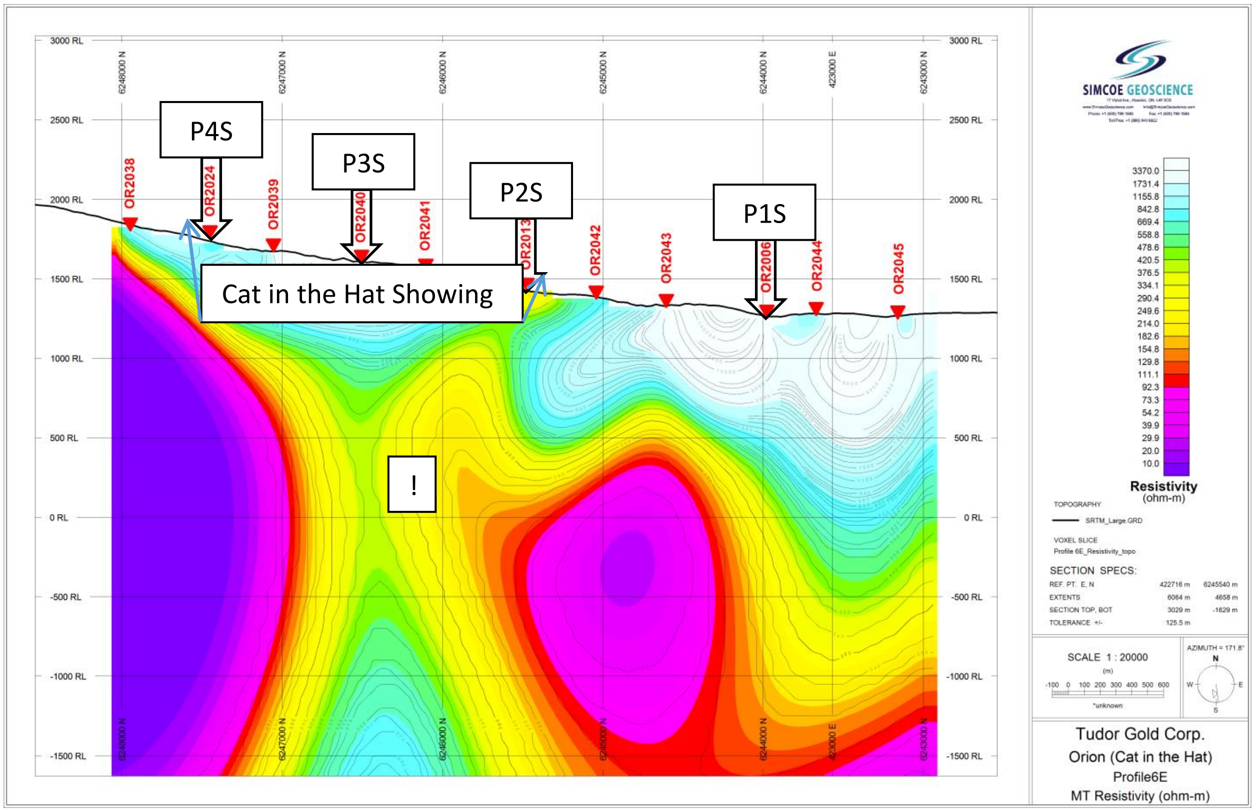


Figure 17 : North-South Profile 6E

This profile is sub parallel to profile 5E, and slightly more to the east. The character in general is similar to P5E and shows the same break/discontinuity under the Cat in the Hat and OR2040 and OR2041. The break is also between the profiles P3S and P2S. Overall the data are very conductive and are thought to be Stuhini.

The structures evident in the data will be discussed while visualising in plan view.

5.1.2 Plan Maps

The plan map illustrations correlate the data observed in the depth profiles. The known or assumed geology is presented on the 2 maps for a comparison to the interpreted data.

Each map will show the core Stuhini formation (conductive) as indicated in the profiles, and the Hazelton group (less conductive) surrounding the area.

Conductive areas are darker colours, and resistive are white. Each image has the same colour distribution.

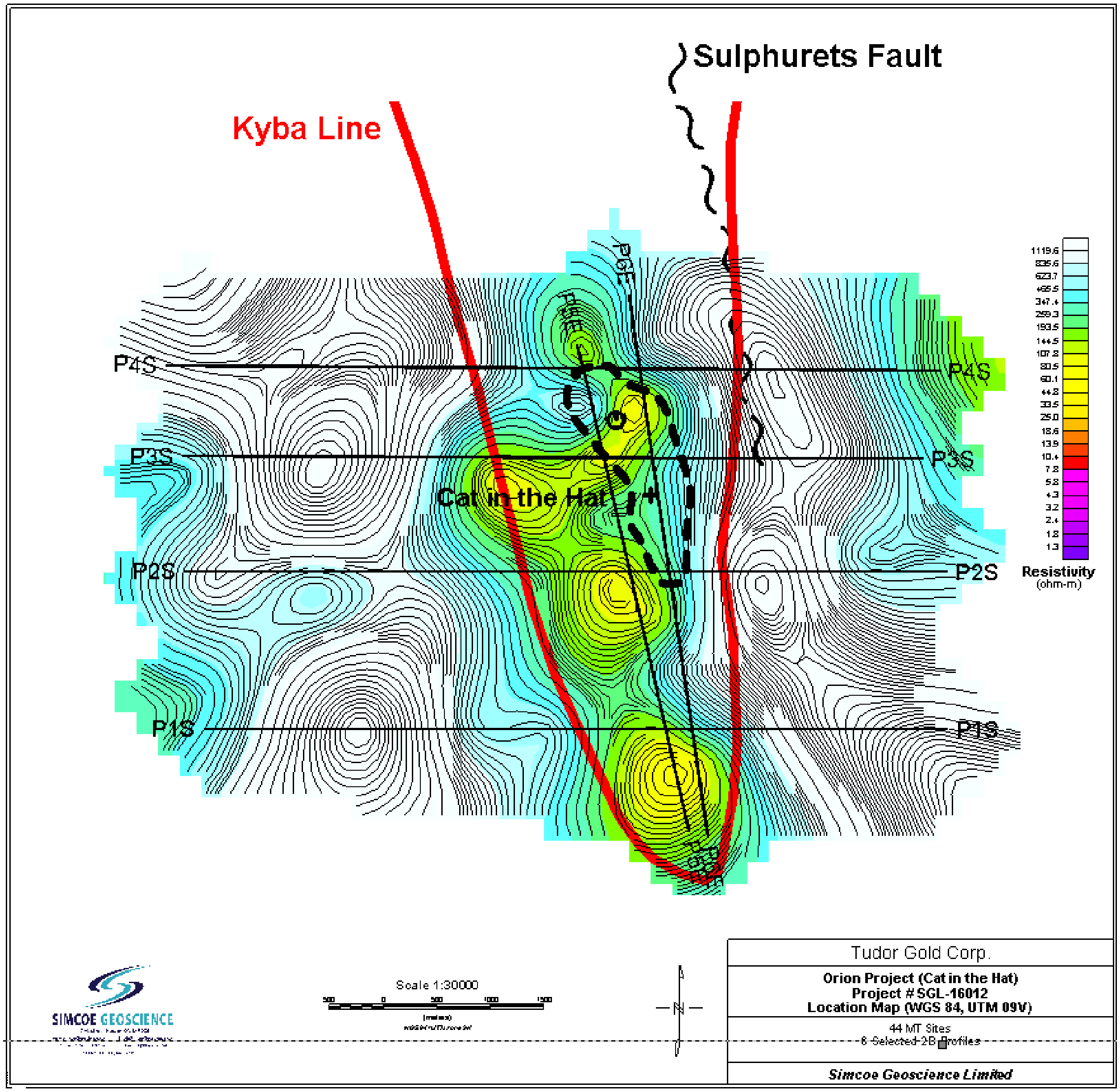


Figure 18 : Plan Map 0m to 150m

The Kyba line seems to be confirmed at the shallow levels, dipping steeply to the east on the eastern side and showing a shallower dip to the west on the western side. Any reinterpretation of the Kyba line would be extremely subjective, it would move the contact(s) slightly but is not important from the exploration view. Of more interest is the discontinuity in the data around the Cat in the Hat showing which indicates some kind of an unknown/ not understood geological cause.

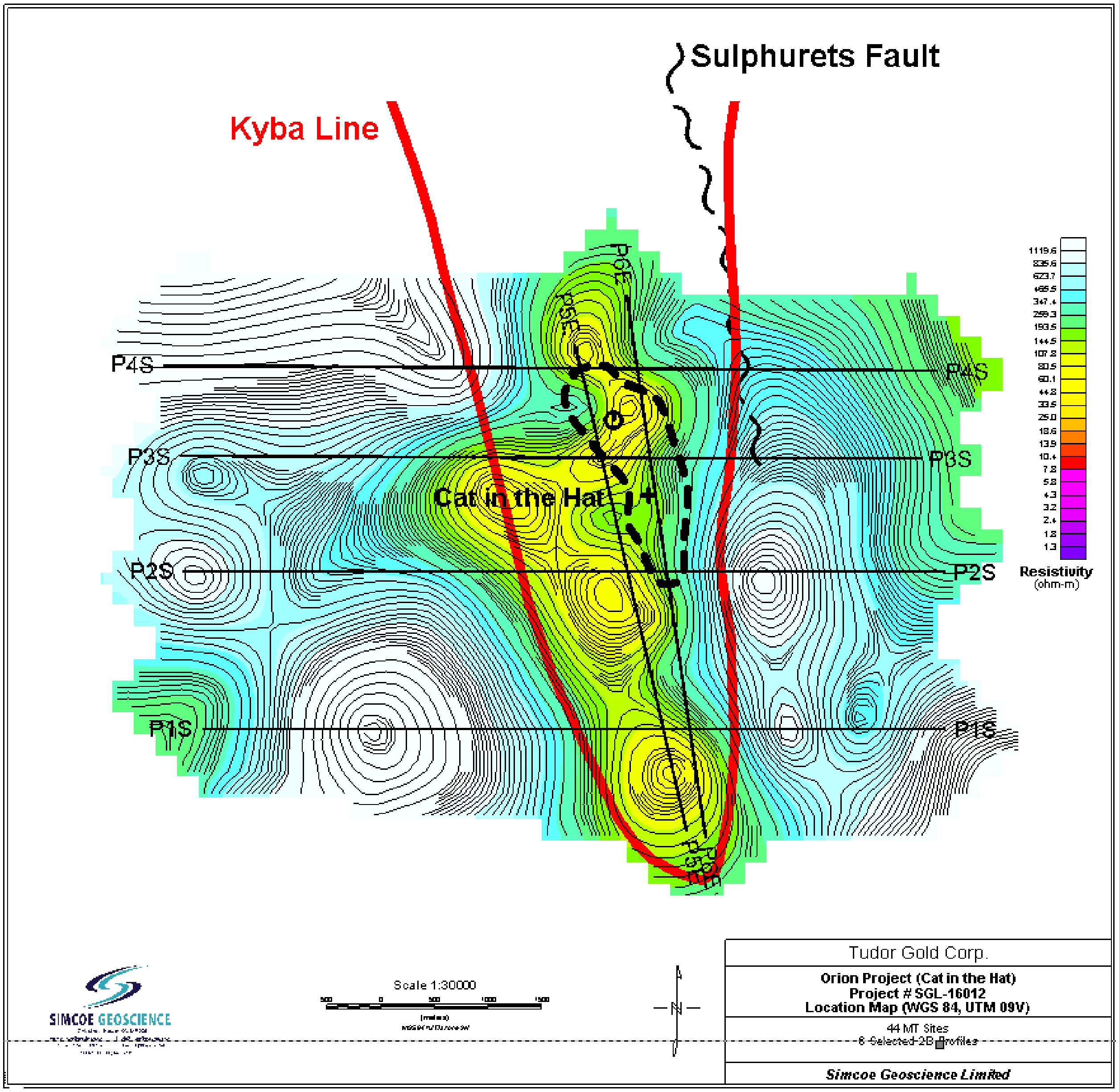


Figure 19 : Plan Map 150m-300m

The discontinuity is verified as we continue to depth, and the structure seems to be pushing some of the conductive rocks to the west.

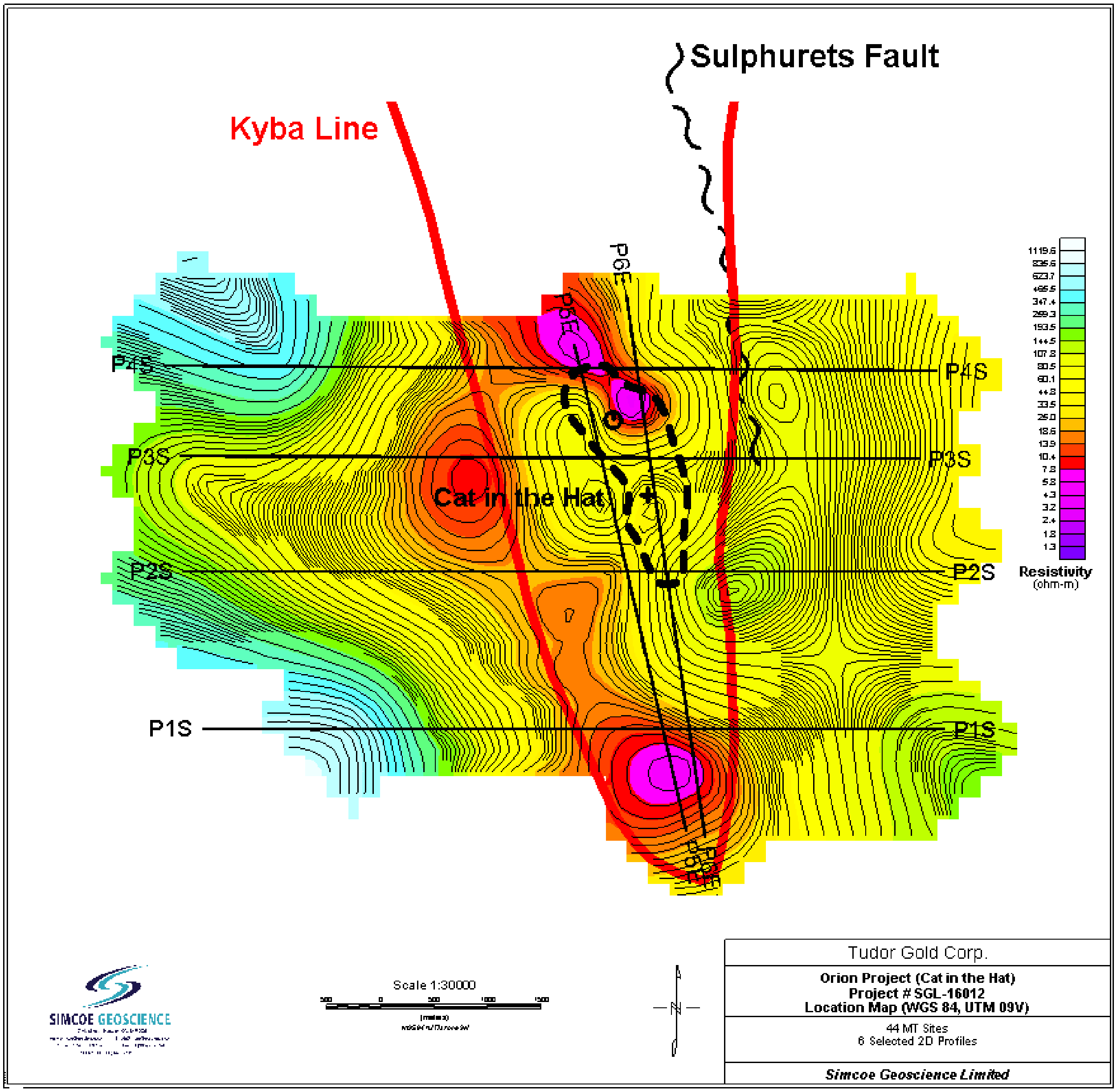


Figure 20 : Plan Map 400m to 750m

When the data at depth are plotted, there is a clear disconnect around the Cat in the Hat. Determining the structure is based solely on the resistivity data, as there are no Magnetic data to correlate and refute or verify the structure. Looking at the plans, one can imagine a NW/SE structure parallel to the showing , or possibly one in an NE/SW direction cutting the Cat in the Hat.

Combining the observations on the plan maps and the depth sections has resulted in the following map of the Orion area.

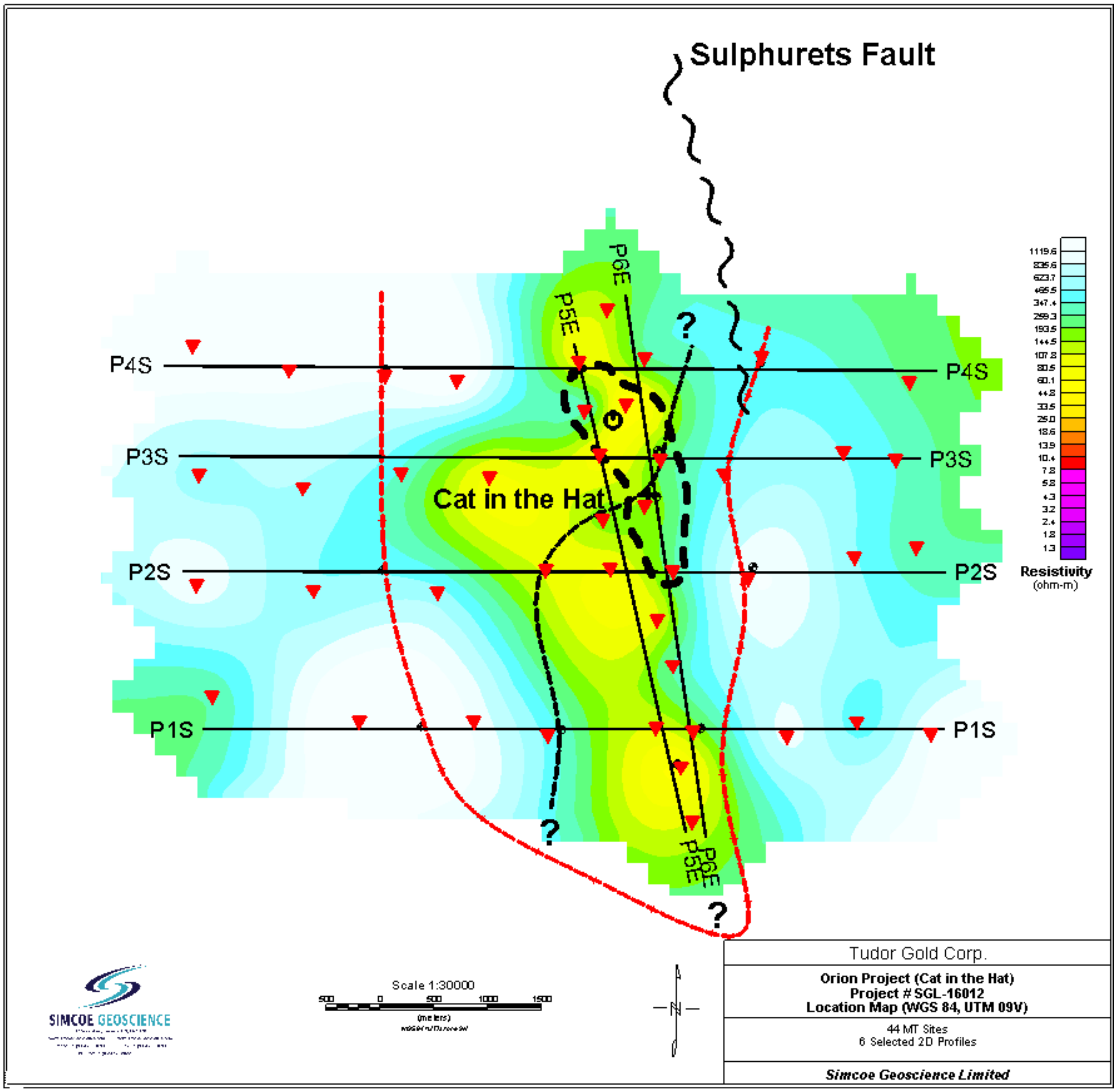


Figure 21 : Plan Map 400m to 750m

The interpreted Kyba contact is mapped in red, and south of profile P1S could be modified judiciously. The contacts on the profiles are drawn looking at the positions beneath the stations and where the contact has been interpreted. The eastern side is virtually unchanged. The western side where there is little information and has been interpolated from previous ground work has changed.

The most significant finding at this time, subject to getting any new data, is that the Sulphurets fault may not terminate where plotted. The fault brings a new credibility to the potential of these claims. This could also be significant for exploration to the south and acquisition of properties.

The discontinuity may also represent the axis of the anticlinorium.

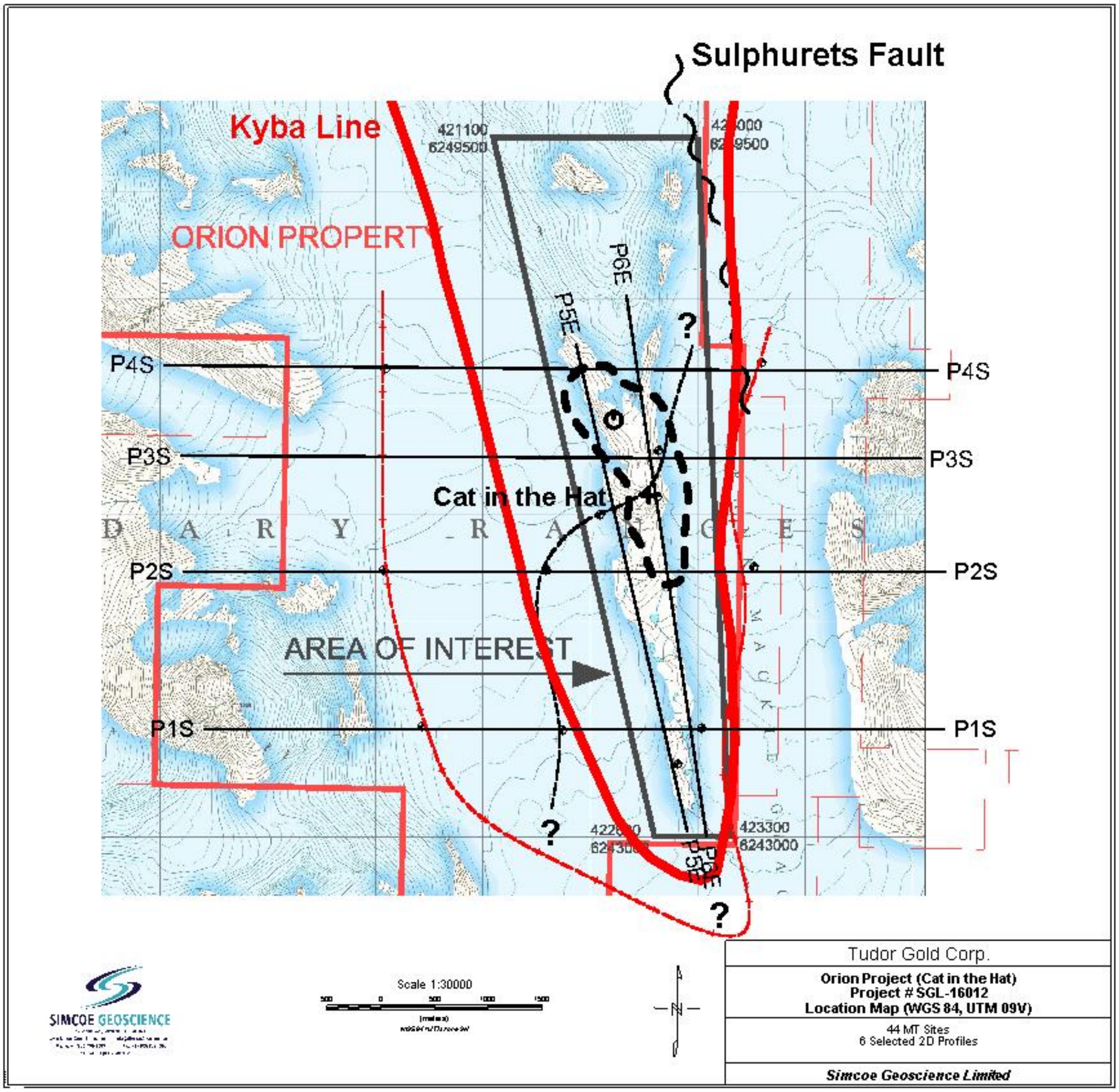


Figure 22 : Combined Interpretation Map

The combined map shows that there could be a continuity of the Sulphurets Fault which has proven to be a locator for mineralisation in properties to the north. The confirmation of the Kyba contact has shown that the showing is of interest (Kyba pers comms 2016) as the proximity is within a 2km range of the contact that companies are finding mineralisation. The possibility of the Sulfurets fault or a spur going through the property is also an excellent indicator.

5.2 CONCLUSIONS AND RECOMMENDATIONS

The Orion property is a very interesting exploration challenge. Surrounded by ice, minimal ground mapping can/nor has been performed at this time. The geophysical survey confirms some previous ideas surrounding the prospect, and also raises questions that need some answers. New ideas about the property are talked about and illustrated. All depth profiles (inversions) have been performed and quality controlled, and all other compiled data from outside sources is believed to be true. Simcoe believes that the data truly represent the subsurface. Some data have been edited to ensure an accurate interpretation.

The Orion property is mapped at the southernmost tip of the Stuhini formation which is part of an anticlinorium located in the rich Golden Triangle. The prospect is contained by the Kyba "Red Line" contact which has been mapped and has proven to be a good exploration area. Many deposits are documented, with Seabridge KSM and Pretium BruceJack to the north. The property spans the contact on both sides, and includes both Stuhini and Hazelton age rocks. These assemblages have proven to be good exploration hosts. The focus of this report is the area surrounding the Cat in the Hat formation, however the Orion property extends past the boundaries of this survey.

The property has been mapped in two directions utilising magnetotellurics. The data are collected and then presented in the best manner for the exploration problem. Two dimensional profiles (2D) can be extracted from the station layout in many ways. Meaningful interpretation requires survey design. On this project there were 44 stations collected. Four profiles were designed in an east west orientation, "across strike" and a profile "parallel to strike" was designed . The ridge data parallel to strike resulted in 2 profiles and provided some excellent information. It is very hard to decide what a strike will be before data acquisition.

The possibility of the Sulfurets fault traversing the Cat in the Hat is a new idea. This could be a good indicator. There could also be a relationship of the axis of the anticlinorium on the property. This could indicate a widening or "smearing" of the rocks under the Cat in The Hat zone. If that were to prove true, the path of the Sulfurets fault or the anticlinorium axis could continue to the south opening up possible prospective ground to the south.

The property needs to have a focused program to prove it's worth. The area needs to be visited by a Tudor geologist and mapping the central ridge as well as the eastern and western slopes will help to open up ideas. The ice sheet is receding and more provable ground is opening up. An airborne survey over the property would be recommended prior to drilling. As deep exploration is the focus, a simple magnetic airborne survey would be recommended. EM data has not proven to be a target producing method in this area, although it does give extra data. The magnetic data would help to confirm structure and would enable Tudor to discriminate targets in conjunction with geology and the MT data.

5.3 REFERENCES

Many of the contributions and references in this report were verbal. I have conversed with many people including Joanne Nelson and Jeff Kyba of the BC Geological group, Jim Hutter, Ray Marks, Bruce Coates and others of Tudor. Dino Crimonese of Teuton Resources deserves mention. I have used references from previously submitted reports, and have ensured that I did not plagiarise or misquote anyone to the best of my knowledge. Simcoe has been provided with digital data, and have incorporated these data into maps. Where geolocation is provided, we have asked for, and been assured of proper datums, zones, latitudes and longitudes. Simcoe has no reason to believe that any data presented are not correct.

Simcoe thanks the following contributors.

Nelson J, Kyba J (2103) Structural and stratigraphic controls of porphyry and related mineralisation in the Treaty Glacier-KSM-Brucejack-Stewart Trend of western Stikinia. B.C. Ministry of Mines and Fieldwork 2013.

B.C. Geological Branch Assessment Report #29524

B.C. Geological Branch Assessment Report #29412

B.C. Geological Branch Assessment Report #24397

B.C. Geological Branch Assessment Report #23885

6 CERTIFICATE OF QUALIFICATIONS

I, Kevin Killin, P.Geo., declare that

I am Director and Geophysicist with residence in Whitby, Ontario and I am presently employed in this capacity with Simcoe Geoscience Limited., Keswick, Ontario, Canada;

I hold the following academic qualifications: Honours Bachelor of Science Degree (HB.Sc.), Geological Geophysics From the University of Western Ontario in London Ontario;

I have continued to upgrade my education in courses related to geophysical applications.

I am a registered geoscientist since 2004, with license to practice in the Province of Ontario, (APGO License # 0823).

I have practiced my profession continuously since 1986 in Canada, Britain , Africa, Europe, United States, South America, Iran.

I am the Professional Geophysicist responsible for this project.

I was in charge of Quality Control and Assurance of the acquired data; I have analyzed the data and authored the report, and can attest that these accurately and faithfully reflect the data acquired on site;

The statements made in this report represent my professional opinion in consideration of the information available to me at the time of writing this report.

Whitby, Ontario

[Signed and sealed]

Kevin Killin , HBSc.

Director & Geophysicist

Simcoe Geoscience Limited

7 APPENDICES

7.1 ORION REPORT ILLUSTRATIONS

A separate PDF file is included as an external reference to this report containing all images in this report and is titled "Orion Report Illustrations".

7.2 COMPANY PROFILE

Simcoe Geoscience Limited
17 Violet Ave., Keswick
Ontario, Canada
L4P 0C6
Phone: 1 905 769 1593
Toll Free: 1 866 640 8822
Fax: 1 905 535 7422
Email: info@simcoegeoscience.com
Website: www.simcoegeoscience.com

Simcoe Geoscience Limited is a Toronto based company that provides ground geophysical surveys and consulting services to the environmental, engineering and exploration industries. Management has a combined "50 plus" years of industry related experience and our dynamic team of geoscientists and consultants are able to offer solutions for all of your geoscientific challenges. Simcoe has a strong business interest in designing and executing accurate, affordable and streamlined geoscience solutions. We have world class computing power and unparalleled modeling experience which allows us to provide high quality products in an efficient manner.

Vision

Simcoe Geoscience Limited is committed to providing premier quality services in a safe, timely and cost effective manner to its clients. We strive to be the partner of choice for technology and innovation.

Mission

The mission of Simcoe Geoscience Limited is to provide realistic, affordable and simplified solutions to aid in efficiency and reduce risks for any geoscience related projects.

Objectives

Simcoe Geoscience Limited is focused on becoming an established leader in the acquisition, data processing and interpretation of all geophysical data by providing organizations with the best quality data and products to the end user on time.

Why Simcoe Geoscience

In today's highly competitive market, Simcoe Geoscience is offering innovative, affordable, streamlined solutions to mining, environmental, engineering and energy industries globally to optimize their needs using proven technologies and consulting services.

Consultants and Geoscientists

We have a dynamic team of experienced consultants and geoscientists who are committed to bringing unsurpassed resolution to the complex sub-surface environments using the latest technologies.

Tailor-Made Solutions

Combining world-class expertise with innovative technologies, we deliver custom solutions that help optimize exploration and investment. We use our knowledge to identify the most effective technology according to customers' requirements.

Proven Technologies

We apply our world-class computing power, unparalleled inversion/modelling algorithms and unique imaging flow to turn your legacy data into high-quality, three-dimensional sub-surface maps quickly and cost effectively.

Loyal Clientele

With Simcoe Geoscience, you benefit from objective and impartial advice, technical proficiency, a passion for innovation, and true collaboration.

Safety and Security

Simcoe Geoscience is committed to delivering products and services with safe operations and preserving the environment while applying our HSE policy.

Health, Safety and Environment

Simcoe Geoscience Limited is committed to protecting the health and safety of everybody who plays a part in our operations. Simcoe Geoscience is committed to delivering products and services while preserving the environment by applying our HSE policy.

Mission

To meet our commitment, Simcoe Geoscience will:

- Demonstrate visible and active leadership that engages management and employees to manage health, safety and environmental (HSE) performance as a line responsibility with clear authorities and accountabilities.
- Ensure that all employees understand that safe operation is a condition of employment, and that they are each responsible for their own safety and the safety of those around them.
- Maintain "stop work policies" that establish the responsibility and authority for all employees to stop work they believe to be unsafe.
- Manage all projects, products and processes through their life-cycles in a way that protects safety and health and minimizes impacts on the environment.
- Provide employees with the capabilities, knowledge and resources necessary to instill personal ownership and motivation to achieve HSE excellence.
- Comply with applicable regulations and laws.
- Work with clients to develop regulations and standards that improve the safety and health of people and the environment.
- Maintain a secure work environment to protect ourselves and the Company's assets from risks of injury, property loss or damage resulting from hostile acts.

Our Expectations

Through implementation of this policy, Simcoe Geoscience seeks to earn the public's trust and to be recognized as a leader in HSE performance.

Scope of Services

Simcoe Geoscience specializes in conducting ground geophysical surveys to complement environmental, geotechnical engineering and exploration projects. Geophysical surveys are deployed to provide information about physical properties of the subsurface which could only otherwise be obtained through intrusive inspection or excavation. Geophysical investigations can provide substantial cost savings when compared to traditional blind site investigations as the risks of unknown site issues are vastly reduced. Our clients include environmental agencies, engineering consultancies, municipalities and property developers. Please contact us for a custom solution.

Exploration

- Shallow & Deep Exploration Techniques
- Base Metal Exploration
- Precious Metal Exploration
- Diamond Exploration
- Overburden Studies
- Mine Extension Studies
- Tailings Pond/Waste Pile Thickness

Environmental & Geotechnical

- Shallow Geophysics
- Buried Utilities
- Groundwater Mapping
- Bedrock Topography Studies
- Decommissioning Studies
- Waste Pile Thickness
- Subsurface Voids
- Contaminant Plume Delineation
- Containment Structure Evaluation
- Abandoned Mine Workings

Consulting

- Experience
- Client Cooperation & Communication
- Custom Solutions
- Project Integration & Interpretation
- Project Design & Pre-Survey Modelling
- QA/QC for all Geophysical Programs
- Software & Computing Resources
- Compilation & Visualization
- 2D & 3D Inversion

Technologies and Applications

- **Electromagnetic**

Electromagnetic method is a geophysical technique based on physical principles of the inducing and detecting electrical current flow within geological strata. A primary alternating electric current of known frequency and magnitude is passed through a sending coil creating a primary magnetic field in the space surrounding the coil, including underground. The eddy currents generated in the ground in turn induce a secondary current in underground conductors which results in an alternating secondary magnetic field, that is sensed by the receiving coil. The secondary field is distinguished from the primary field by a phase lag. The ratio of the magnitudes of the primary and secondary currents is proportional to the terrain conductivity.

The readings are commonly expressed in the conductivity units of mS/m. The depth of penetration is governed by the coil separation and orientation. The EM method should not be confused with the electrical resistivity method. The difference between the two techniques is in the way that the electrical currents are forced to flow in the subsurface. In the electromagnetic method, currents are induced in the subsurface without any direct contact with the ground surface.

EM surveys are categorized as frequency domain and time domain. Frequency domain instruments measure the amplitude and phase of the induced electromagnetic field while time domain instruments measure the decay time of the induced field. The applications of this method include:

- Contaminant mapping
- Permafrost identification
- Soil characterization
- Groundwater investigation
- Identify karst bedrock features
- Predict areas prone to slope failure
- Underground storage tank (UST) detection
- Identify small ferrous and non-ferrous metallic
- Map soil salinity and salt water intrusion
- Delineate landfill and trench boundaries
- Detect location and orientation of faults
- Map lateral and vertical distribution of soil type
- Defining the lateral extent of potential aggregate resources

- **Electrical Resistivity & IP**

The purpose of electrical surveys is to determine the subsurface resistivity distribution by making measurements on the ground surface. From these measurements, the true resistivity of the subsurface can be estimated. The ground resistivity is related to various geological parameters such as the mineral and fluid content, porosity and degree of water saturation in the rock. Electrical resistivity surveys have been used for many decades in hydrogeological, mining and geotechnical investigations. More recently, it has been used for environmental surveys.

Induced Polarization (IP) method is closely related to the resistivity method. IP method requires measuring instruments that are more sensitive than the normal resistivity method, as well has significantly higher currents. IP surveys are common in mineral exploration and this method is also able to detect conductive minerals of very low concentrations that might otherwise be missed by resistivity or EM surveys. IP method uses alternating currents (in the frequency domain) of much higher frequencies than standard resistivity surveys. Electromagnetic coupling is a serious problem and to minimize the EM coupling, the dipole-dipole (or pole-dipole) array is commonly used.

The common applications of these methods are to:

- Investigate groundwater sources
- Characterize soil and rock types
- Delineate subsurface contaminants
- Map bedrock topography
- Investigate the thickness of peat
- Determine the existence of subsurface voids
- Identify buried utilities and infrastructure
- Investigate archeological sites
- Image geological structures, fracture and fault
- Delineate potential aggregate resources
- Complement electrical grounding studies at new and existing pipeline and electrical transmission facilities

- **Ground Penetrating Radar (GPR)**

Ground penetrating radar (GPR) provides a high resolution, cross-sectional image of the shallow subsurface. A short pulse of electromagnetic energy is radiated downward. When this pulse strikes an interface between layers of material with different electrical properties, part of the wave reflects back, and the remaining energy continues to the next interface. Depth measurements to interfaces are determined from travel time of the reflected pulse and the velocity of the radar signal.

The Ground Penetrating Radar (GPR) method relies on contrasts in the dielectric constant between materials. The methods have been used extensively to:

- Map water table and bedrock topography
- Map stratigraphic layers
- Evaluate mine and quarry rock
- Image geological structures, fracture and fault
- Map the location and burial depth of drums, underground storage tanks, and utilities
- Identify buried utilities and infrastructure
- Delineate disposal pits, trenches, and landfill boundaries
- Locate voids and washouts along pipelines, under roadways, parking lots, and building floors
- Investigate the thickness of peat
- Determine the existence of subsurface voids
- Investigate archaeological sites and cemeteries
- Screen proposed borehole locations for subsurface interference
- Delineate inorganic and organic free-phase contamination plumes

- **Seismic**

Seismic survey, method of investigating subsurface structure, particularly as related to exploration for oil & gas, mineral deposits and geotechnical studies. The technique is based on determinations of the time interval that elapses between the initiation of a seismic wave at a selected shot point and the arrival of reflected or refracted impulses at geophones. Seismic waves are generated using various sources such as hammer, drop weight and dynamite, depending on the survey configuration. Upon arrival at the geophone, the amplitude and timing of waves are recorded to give a seismogram. Reflection and Refraction are the most commonly used seismic techniques. Multichannel Analysis of Surface Waves (MASW) is relatively new addition to the seismic methods and evaluates ground stiffness in 1-D, 2-D, and 3-D formats for various types of geotechnical engineering projects.

Seismic methods determine geological structure and rock velocities by either refracting or reflecting waves off boundaries between rock units with different seismic velocities or impedance, the common applications include:

- General geologic structure
- Mapping of bedrock depth and topography
- Overburden thickness
- Water table depth
- Faults and mapping of weak zones
- Rock velocities and quality
- Geologic layering
- Landfill investigations
- Rock rippability and quality
- Engineering properties: bulk or shear moduli

Simcoe Geoscience Limited
17 Violet Ave., Keswick, Ontario, Canada, L4P 0C6
Phone: +1 (905) 769 1593 / Toll Free: +1 (866) 640 8822
Fax: +1 (905) 535 7422 / info@SimcoeGeoscience.com

- **Magnetic & Gravity**

Magnetic surveys measure small, localized variations in the Earth's magnetic field. The magnetic properties of naturally occurring materials such as magnetic ore bodies and basic igneous rocks allow them to be identified and mapped by magnetic surveys. Strong local magnetic fields or anomalies are also produced by buried steel objects. A broad range of applications of ground magnetic surveys are:

- Accurately mapping archaeological features
- Mapping basic igneous intrusive rocks & faults
- Evaluating the size and shape of ore bodies
- Identify geologic bedrock features such as mafic dikes or geologic contacts
- Delineate areas of ferromagnetic
- Finding buried steel tanks and waste drums
- Detecting iron and steel obstructions
- Locating unmarked mineshafts
- Locate underground storage tanks (USTs)
- Locate buried drums
- Delineate landfill perimeter
- Identify locations of historic structures

Gravity surveys measure the changes of rock density by looking at changes in gravity caused by geological structures. State-of-the-art gravity meters can sense differences in the acceleration (pull) of gravity to one part in one billion. Measurements taken at the Earth’s surface express the acceleration of gravity of the total mass of the Earth but because of their high sensitivity the instruments can detect mass variations in the crustal geology. The amplitude of the variation from the high to the low of the gravity gradient zone is a function of the displacement on the fault. In addition to providing insights to fault problems, gravity methodology applies to any geologic problem involving mass variations. The common applications of gravity survey are:

- Mineral Exploration - massive sulphides, porphyry's structure
- Diamond Exploration - Kimberlitic pipes
- Coal Exploration - basin structure, grabens, large faults
- Petroleum - frontier basin mapping, diapirs
- Locating void(s) in Karst Topography
- Engineering, tunneling, footings

- **Borehole Logging**

Borehole logging is the practice of making a detailed record (a well log) of the geologic formations penetrated by a borehole. The geophysical logs are the physical measurements made by instruments lowered into the hole. Logging tools measure the natural gamma ray, electrical, acoustic, stimulated radioactive responses, electromagnetic, nuclear magnetic resonance, pressure and other properties of the subsurface and their contained fluids. Well logging is performed in boreholes drilled for:

- Mineral Exploration
- Environmental and Geotechnical Studies
- Groundwater Exploration
- Geothermal Exploration
- Oil and Gas Exploration

Instruments

Shallow Investigations Ground Conductivity Meters (Geonics)

- EM31-MK2
- EM34-3
- EM38-MK2

Metal Detectors (Geonics)

- EM61-MK2A
- EM61S
- EM61HH-MK2A

Deeper Investigations Time Domain EM Systems

- ABEM WalkTEM
- GDD NordicEM24

Resistivity/Induced Polarization Systems

- ABEM Terrameter LS
- GDD IP Transmitter & Receiver

Ground Penetrating Radar Systems

- StructureScan™ Mini HR
- UtilityScan® DF & UtilityScan®
- RoadScan™ 30
- BridgeScan™
- RTA Mala System

Seismic Solutions

- ABEM Terraloc Pro

Ground Magnetic Systems

- Overhauser magnetometer system
- Optically pumped Potassium magnetometer and gradiometer systems
- Proton magnetometer system

Ground Gravity Systems

- LaCoste & Romberg Model G Aliod1000
- LaCoste & Romberg Model G Land meter

Borehole Logging Systems

- TDEM (BH43-3 Geonics with PROTEM system)
- Electrical Resistivity
- Natural Gamma
- Spectral Gamma
- Induced Polarization
- Caliper/Mechanical

Memberships and Affiliations

- Prospectors and Developers Association (PDAC)
- Management are active members of the Professional Geoscientists of Ontario (APGO)
- Certificate of Authorization - Professional Geoscientists of Ontario (APGO)
- Ground Geophysical Survey Safety Association (GGSSA)
- Environmental and Engineering Geophysical Society (SAGEEP)