# Assessment Report Blackwater East and Blackwater West Properties British Columbia

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NTS 93F2, 93F3, 93F7

53°10'50"N 124°52'1"W

Mining Zone: Omineca Mining Division

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# 1 SUMMARY

The Blackwater East and West P roperties, are located in central British Columbia. The Blackwater East and West Properties are situa ted on the Nechako Plateau, approximately 1 10 kilometres southwest of Vanderhoof and 160 kilometres west of Quesnel. The claims are located within the Omine ca Mining Division. The Blackwater West Property is centered at 125 ° 2' 41" North and 53° 6' 3" West and includes the claims in the Blackwater West option and the Dave 2 option totalling 6,481 ha. The Blackwater East Property is centered at 124° 43 19" North and 53° 14' 51" West and includes the claims in the Blackwater East option and the Blackwater Northeast Option totalling 8,463.32 ha.

The Blackwater East and West Properties are within the Stikine Terrane, part of the intermontane tectonic belt. The Stikine Terrane itself is composed of Carboniferous to Middle Jurassic island-arc volcanic and sedimentary rocks plus several related plutonic suites. The Blackwater West and Blackwater East Properties itself is principally underlain b y Mesozoic layered rocks; the most widespread being clastic volcan ic and sedimentary rocks of the Jurassic-aged Hazelton Group. These are intruded by plutonic rocks of various ages, such a s the quartz monzonites of the Lower Jurassic 'Topley Intrusive Suite'.

This region is known for its potential to host large porphyry copper, copper/gold and copper/molybdenum deposits some of which having been discovered in the Nech ako plateau, that includes the Blackwater, Chu, Wolf, 3T and the Capoose deposits. Mineral d eposit types present in the region are classified as porphyry and epigenetic characterized by disseminated, vein and breccia hydrothermal systems.

In 2011, RJK Explorations Ltd. undertook an exploration program on t he Blackwater East and West Properties. The program was a multi-phase program that included:; a 1,550 line kilometre ZTEM helicopter EM survey; 22.1 line kilometre s of ground induced polarization on three grids; and a grou nd program that con sisted of 14 5 soil samples and 56 rock samples on the properties. The cost of the exploration program was \$450,133.

In order to evaluate the economic potential of the Blackwater East and West Properties, a drill program is warranted. Currently RJK Explorations Ltd. has developed 9 potential drill targets on the Blackwater East property and 2 potential drill targets on the Blackwater West Property. The expected cost to drill the 9 potential drill targets on the Blackwater East property is \$535,000

# 2 TERMS OF REFERENCE

This report has been written to fulfi II the requirements for filing assessment work under the British Columbia Mineral Tenure Act. It de scribes exploration work undertaken on the Blackwater East and West Properties. This report is not compliant with National Instrument 43-101 and Form 43-101F1, and sho uld not be used as a "Technical Report" under National Instrument 43-101.

The authors understanding of the regional geolo gy and property geology are a direct result of work performed by Diakow, L. J. and Levson V.M., 1997. The geology section of this report is taken directly from Diakow (1997).

In the preparation of this report, the author utilized British Columbia and Federal Government geological maps, geological reports and claim maps. Information was also obtained from British Columbia Government websites such as Mineral Titles Online (<u>www.mtonline.gov.bc.ca</u>), the Map Place (<u>www.em.gov.bc.ca/mining/Geolsurv/MapPlace</u>), as well as the mineral assessment work reports from the Blackwater East and West area that have been historically filed by various companies.

# 3 PROPERTY DESCRIPTION AND LOCATION

The Blackwater East and West Properties, are located in central British Columbia (Figure 1). The Blackwater East and West Pro perties are situated on the Nechako Plateau a pproximately 110 kilometres southwest of Vanderhoof and 160 kilometres west of Quesnel. The claims are located within the Omine ca Mining Division. The Blackwater West Property is centered at 125 ° 2' 41" North and 53° 6' 3" West and includes the claims in the Blackwater West option and the Dave 2 option (see below) totalling 6,481 ha. The Blackwater East is centered at 124° 43' 19" North and 53° 14' 51" West and includes the claims in the Blackwater East option and the Blackwater Northeast Option (see below) totalling 8,463.32 ha.

#### **Blackwater East Option**

On December 3<sup>rd</sup>, 2010 RJK Explorations Ltd. entered into an option to acquire 100% undivided interest in 13 contiguous mineral claims, totalling 5,611 ha claims (Blackwater East property) (see Table 1). To exercise the option on the Blackwater East property, the company must make cash, share and work commitments over a three-year period totalling \$60,000 cash (\$15,000 on signing); 500,000 shares (150,000 on signing); and \$500,000 in work commitments (\$50,000 in year one). The propert y is also subject to a 2 percent net smelter return royalty, of which 1 percent may be purchased from the vendor for \$1 million.

- Upon signing pay \$15,000, issue 150,000 shares;
- By December 1<sup>st</sup>, 2011, pay \$20,000 and issue 150,00 shares and incur \$50,000 of exploration expenses;
- By December 1<sup>st</sup>, 2012 pay \$25,000 issue 200,000 shares, and incur \$200,000 exploration expenses; and
- By December 1<sup>st</sup>, 2013 have incurred an additional \$200,000 exploration expenses

#### **Blackwater West Option**

On December 1 <sup>st</sup>, 2010, RJK Exp lorations Ltd. entered into an option to acquire a 100% undivided interest 18 contiguous mineral claims totalling 8,250.02 ha (Blackwater West Property) (see Table 2). To e xercise the option on the Blac kwater East property, the company must make cash, share and work commitments over a three-year period totalling \$255,000 cash (\$55,000 on signing), 1.2 million shares (500,000 on signing), and \$750,000 in work commitments (\$250,000 in year on e). The property is also subject to a 2 per cent net smelter return royalty, of which 1 percent may be purchased from the vendor for \$1million.

- Upon signing pay \$55,000, issue 500,000 shares;
- By December 1<sup>st</sup>, 2011, pay \$100,000 and issue 300,00 shares and incur \$250,000 of exploration expenses;
- By December 1<sup>st</sup>, 2012 pay \$100,000 issue 400,000 shares and incur \$500,000 exploration expenses; and
- By December 1<sup>st</sup>, 2013 have incurred an additional \$200,000 in exploration expenses.

#### Table 1: Blackwater East Option Claims

TENURE	Area (ha)	
NUMBER		Issue date
694164	464.711	2010/Jan/04
694188	483.829	2010/Jan/04
694203	483.792	2010/Jan/04
694204	484.052	2010/Jan/04
694205	483.79	2010/Jan/04
694206	464.666	2010/Jan/04
694207	387.074	2010/Jan/04
694208	464.4	2010/Jan/04
694209	483.615	2010/Jan/04
694210	464.146	2010/Jan/04
694223	464.103	2010/Jan/04
694224	289.959	2010/Jan/04
694225	193.364	2010/Jan/04

#### Table 2: Blackwater West Option Claims

TENURE NUMBER	Area (ha)	Issue date
694164	485.767	2010/Jan/04
694188	485.561	2010/JAN/04
694203	485.704	2010/JAN/04
694204	485.485	2010/JAN/04
694205	466.259	2010/JAN/04
694206	466.259	2010/JAN/04
694207	466.06	2010/JAN/04
694208	427.11	2010/JAN/04
694209	465.927	2010/JAN/04
694210	485.156	2010/JAN/04
694223	485.154	2010/JAN/04
694224	194.062	2010/JAN/04
694225	485.154	2010/JAN/04
694164	465.877	2010/JAN/04
694188	484.551	2010/JAN/04
694203	484.947	2010/JAN/04
694204	465.368	2010/JAN/04
694205	465.619	2010/JAN/04

#### **Blackwater Northeast Option**

On August 31<sup>st</sup>, 2011 RJK Explorations Ltd. an nounced it had entered into an option with Jess Otto to acquire the Blackwater Northeast property, consisting of three contiguous mineral claims totalling 870.15 ha (see Table 3). RJK Explorations Ltd. must make cash and share payments and complete work commitments over a thre e-year period totalling \$ 57,500 cash (\$7,500 on signing), 1.75 million shares (250,000 on signing), and \$350,000 in work commitments (\$50,000 in year one). The property is also subject to a 3 percent net smelter return royalty, of which 1.5 percent may be purchased from the vendor for \$2-million. The terms are:

- Upon Signing of the agreement paying \$7,500 and issuing 250,000 shares;
- At the end of year 1 pay an addition al \$15,000 and issue 500,000 share and incur exploration expenses of \$50,000 within the first year;
- At the end year 2 pay an addi tional \$35,000 and issue an additional 1,000,000 shares while incurring exploration expenses of \$100,000 by the end of year two; and
- Incur exploration expenses of \$200,000 by the end of year three.

Tenure	Claim	Issue Date	Area (ha)
835434	JONECHAKO1	2010/Oct/08	386.81
835436	JONECHAKO2	2010/Oct/08	193.37
835527	JONECHAKO3	2010/Oct/09	289.97

#### Table 3: Blackwater Northeast Option Claims

#### Dave 2 Option

On January 5<sup>th</sup>, 2011 JRJK Explorations Ltd. into an option agreemen t with Paul Saulnier to acquire an undivided 100 percent interest in the Dave 2 claim consisting of 213.3 0 hectares (see Table 4).

To exercise the option on the Dave 2 claim, t he company must make cash, share and work commitments over a th ree-year period totalling: \$15,000 cash (\$5,00 0 on signing), 300,000 shares (100,000 on signing) and \$300,000 in work commitments (\$50 ,000 in year one). The property is also subject to a 2 perc ent net smelter return royalty, of which 1 percent may be purchased from the vendor for \$1 million.

#### Table 4: Dave 2 Option Claims

Tenure	Claim	Issue Date	Area (ha)
835024	Dave 2	2010/Oct/04	386.81

# 4 ACCESSIBILTY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE & PHYSIOGRAPHY

#### ACCESS

The Blackwater East and West Properties are located in the forested rolling hills of the southern Nechako Plateau of central British Columbia, approximately 120 kilometres so uthwest of Vanderhoof, which is situated on provincial high way 16 and the main railway line to the ocean port at Prince Rupert. Access to the property is by the all season Kluskus-Malaput forest service road, which crosses the southern portion of the property. Secondary logging roads provid e access to other parts of the property. Elevations on the Blackwater East and We st Properties range from 1100 to 1739 metres. Outcrop exposure is roughly less than 5% at higher elevations but glacial deposits mask the bedrock at lower elevations. Recent pine beetle infestations have severely damaged the forests in the area resulting in increased activity aimed at timber salvage and economic diversification for the region.

An extensive veneer of glacial debris covers the project area with bedrock exposures being rare and generally restricted to higher elevations. However, clear-cut logging has be en recently conducted on several blocks within the claim boundary and a combination of this with the road cuts has resulted in new exposures.

#### CLIMATE

Brief warm summers and long cold winters characterize the region's climate. The a rea receives on average 30 cm of precipitation per annum and temperatures range from a minimum of -40°C in winter to a maximum of 32°C in summer. Snowfall can attain 2 metres at higher elevations. The exploration period is between mid–June and late–October. Year round diamond drilling i s possible given a suitable supply of water and a winterized camp.

Vegetation in the project area is ba Isam fir and white spruce with lodge pole pine. At higher elevations vegetation is less dense and dominated by subalpine fir and whitebark pine.

#### **INFRASTRUCTURE & LOCAL RESOURCES**

Local accommodation is available at the logging camps of Canfor Co rporation. These camps are located along the Kluskus forest service road at the 142.5 km marker (Malaput Camp) and at the 102 km marker (Kluskus Camp). Local accommodation is also available at some ranches and tourist camps in the area. Lab our, contractors, fuel a nd other supplies are available at Vanderhoof, which has a population of 4,000 a nd is located on the CN railroad and a pave d highway. Prince George, located 100 kilometres east of Vanderhoof, has several daily flights t o Vancouver and other points. The nearest available grid electrical power is 19 kilometres north at Kenney Dam.



#### Figure 1: Regional Location Map of the Blackwater West and Blackwater East Properties



# Blackwater East and West Properties

March 2012

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# 5 EXPLORATION HISTORY

In the late 1960's Rio Tinto Canadian Exploration Ltd. carried out stream and lake sedime nt sampling surveys throughout the Nechako Plateau.

The BC Geological Survey undertook a regional lake-sediment sampling program throughout portions of the 093F map sheet in 1993 and subsequently analys ed the samples for 35 elements including; Gold, Arsenic, Barium, Bromine, Cerium, Cesium, Chro mium, Cobalt, Europium, Hafnium, Iron, Lanhinum, Lutetium, Molybdenum, Neodymium, Rubidium, Simarium, Scandium, Sodium, Tantalum, Terbium, Thorium, Tungsten, Uranium, Ytterbium, bismuth , Cadmium, Copper, Iron, lead, Manganese, Mercury, Nickel, Silver , Vanadium, and Zinc

There is no direct evidence in the public domain that there has been any mineral exploration undertaken on what are currently the Blackwater East and West Properties for the work undertaken by RJK Explorations Ltd.

# 6 GEOLOGICAL SETTING AND MINERALIZATION

## 6.1 Regional Geology

After Diakow 1997

The property is situated along the eastern margin of the Stikine Terran e, west of the structural contact with the Cache Creek Terrane and immediately south of the Skeena Arch. Strata of the Stikine Terrane in central and east-central British Columbia comprise superposed island and continental margin arc assemblages and epicontinental sedimentary sequences.

Island arc volcanism and associated sedimentat ion in central Stikine Terrane spans Lat e Triassic to Middle Jurassic time. Elsewhere in Stikinia, remnants of Early De vonian to Permian arc volcanic rocks are known (Monger, 1977). The oldest strata exposed in east-central Stikinia are fossiliferous Upper Triassic sed iments, sporadically exposed in the Smithers (Tipper and Richards, 1976b; MacIntyre et al., 1996) that closely resemble flows of the Stuhini Group, crop out near fine-grained marine sediments containing the Carnian to early Norian bivalve Halobia in the Fulton Lake map area. The se rocks are possibly coextensive with fossil-b earing Upper Triassic marine sediments mapped along the western margin of the Stikine Terrane in the Whitesail Lake (van der Heyden, 1982) and Terrace (Mihalynuk, 1987) map areas, where they crop out in close proximity to Lo wer Permian carbonates (van der Heyden, 1982). Early and Middle Jurassic rocks of the Hazelton Group stratigrap hically overlie the Stuhini Group p throughout much of Stikinia. The H azelton Group is a lithologically varied island ar c succession composed of subaerial and submarine volcanics lo cally inter-layered with marin e sediments (Tipper and Richards, 1976a).

Island arc volcanism commenced in Middle Jurassic time, broadly coincident with a protracted event of terrane accretion and the subsequent overlap of older arc strata by widespread Upper Jurassic and Lower and mid-Cretaceous flysch and molasse deposits. Terrane accretion began possibly as early as Bajocian time, resulting in structural ju xtaposition of oceanic Cache Creek Terrane onto Stikinia, and led to early development of the Bowser Basin and shale deposited in a starved marine environment (Ricketts and Evenchick, 1991; Tipper and Richards, 1976a). Overlying coarser elastic rocks, consisting largely of conglomerate shed from the uplifted Cache Creek Terrane, record fluvatile tr ansport and progradation of de Itaic deposits along the

periphery of the basin. The Skeena Arch became an uplift ed area and sediment source for northerly flowing drainages into the southern part of the Bowser Basin from mid-Oxfordian to earliest Early Cretaceo us times. During parts of the Early and Late Cretaceous, sediments sourced from the northeast and east record initial deposition of non-marine and shallow marine sediments of the Su stut and Skeena groups. In south and south-central Stikinia, contemporaneous deposits of san dstone, siltstone and conglomerate are wide spread and suggest that a number of smaller sedimentary basins may have been connected (e.g., Nazko Basin - Hunt, 1992).

Regional contractional deformatio n, documented in widely separated areas of the Stikine Terrane in the Taseko-Pemberton (Garver, 1995), and the Spatsizi (Evenchick, 1991; Evenchick and McNicoll, 1993) map areas was a middle and Late Cretaceous event. This orogenic event coincides with the transition from se dimentary deposition to continental margin arc volcanism. Definitive evidence of Cretaceous contractional deformation in the intervening region of central Stikinia, particularly in the Nechako River map area, has not yet been recognized. However, a domain of cleaved rocks with local zones of myl onite in the Nechako Range may be the record of this event.

Continent margin arc vol canism began in south and central Stikine Terrane in Late Cretaceous time and continued episodically into the Eocene with eruption of the Kasalka, Ootsa Lake and Endako groups. The Upper Cretaceous Kasalka Group unconformably overlies t he Skeena Group. The Kasalka Group records construction of isolated volcanic centres as the magmatic front apparently migrated from the Coast Belt eastward across the Stikine Terrane over a period of nearly 30 million years, ending in latest Cretaceous time. Robust continental arc magmatism was re-established during Middle and late Eocene time with eruption of the Ootsa Lake and Endako groups. This volcanism app ears to be closely linked to regional crustal transtension in central British Columbia, manifest in up-welling of high- grade metamorphic rocks in core complexes (Ewing, 1980) and major strike-slip faults, su ch as the Tatla Lake Metamorphic Complex adjacent to the Yalakom fault in the Anahim Lake map area (Friedman and Armstrong, 1988).

Transitional basalts that have formed flat-lying lava fields, mainly in southern Stikinia, dominate both the Miocene and younger vol canism forming part of the Chilcotin Group. The Chilcotin Group is interpreted to have erupted in a back- arc setting, east of the Pemberton-Garibaldi arc (Souther, 1991, Bevier, 1983a,b). Shield volcanoes, com prising the Anahim Belt, are lo cally perched on the plateau-forming Chilcotin lavas. They consist of distinctive peralkaline volcanoes erupted between 8.7 and 1.1 Ma above a mantle hotspot (Bevier et al., 1979; Souther, 1986; Souther and Souther, 1994).

# 7 LOCAL AND PROPERTY GEOLOGY

#### After Diakow 1997

The Blackwater East and West Properties is primarily covered by Quaternary cove r with minor examples of the Naglico Formation and Oosta Lake Group rock, which are described below.

# 7.1 Naglico Formation

Augite-phyric mafic flows, lesser tuffs, and scarce intervolcanic marine sediments dominate the Naglico Formation.

Within the internal lithol ogic variability in rocks of the Naglico formation, no single section is representative, however, certain lithological features persist over bro ad areas. The primary lithologies include dark green and so metimes maroon, massive weathered flows of basalt and andesite. Augite phenocrysts are a diagnostic feature of these flows, commonly comprising 1 to 3 volume percent as vi treous prisms averaging between 1 and 2 millimetres long (in rare instances, 5 to 15 millimetres in length). Despite partial to complete replacement of augite by chlorite, epidote, carbonate and opaque granules, they generally retain their prismatic habit. Plagioclase is the primary constituent in all flows that include a numb er of textural v arieties such as sparsely porphyritic, fine-grained crowded plagioclase porphyry to coarse-grained porphyry. Plagioclase is slender, less than 2 millimetres long, in amounts up to 35 v olume percent in the crowded varieties.

Dense aphanitic basalts are commonly interlayered with the more voluminous porphyritic flow varieties. They are lava flows wit h fine gran ular aphanitic textures that sometimes display millimetre-thick resistant laminae protruding from smooth weathered surfaces. Thin sections of these rocks reveal olivine and augite grains occupying interstices between plagioc lase microlites. A representative suite, comprised of both pyroxene-bearing and aphanitic lavas, has a compositional range of basalt to basaltic andesite. Major and trace elements indicate they ar e subalkaline with a low-potassium tholeiitic to calcalkaline trend of island arc affinity.

Generally, sedimentary rocks tend to comprise thin recessive beds that rarely crop out and are commonly found as angular sedimentary debris churned up in roadcuts and logging cutblocks, near more diagnostic lithologies of the Naglico formation. The main feature of these intervolcanicsediments is their immaturity, char acterized by the high proportion of angular plagioclase and volcanic-lithic detritus. The dominant lithologies include feldspathic sandstone and siltstone, tuffaceous argillite, locally pro minent volcanic conglomerate and scarce limestone. Fossils are nearly always present, varying in a bundance from a few ind eterminate belemnites and bivalves to zones containing a rich and varied fauna. A solitary sonninid ammonite extracted from limestone suggests a probable early Bajocian age for the Naglico formation underlying much of the Entiako Spur (Collection GSC C-143394; H.W. Tipper, Report 72-1994-HWT).

# 7.2 Ootsa Lake Group

The Ootsavolcanic field in map are a is against older basement of the Nechako uplift. South of the fault,Ootsa Lake volcanic strata form outliers that cap high-standing Jurassic rocks along the Fawnie Range and Entiako Spur.

Ootsa Lake strata unconformably o verlie Upper Cretaceous volcanics and have an estimated minimum composite thickness of 450 metres. The lowermost unit consists of dark grey, massive and amygdaloidal andesite flows with amygdules infi lled by silica, calcite and epidote. These flows are minor members, within a gradationally overlying bladed-feldspar porphyritic andesite

#### Blackwater East and West Properties

section that is locally up to 100 metres thick. Typically these rocks a re dark grey-green and contain diagnostic plagioclase laths between 5 and 15 millimetres long (20-40% by volume) and pyroxene (5-10% by volume). These units generally appear beneath an upper, conformable section of felsic rocks made up of volumetrically minor dacit e flows and more prevalent rhyolite flows and tuffs. The dacitic rocks, which commonly weather to flaggy porcellaneous fragments, are light green or grey and contain t abular feldspar phenocrysts 2 to 3 millimetres long (5-10% by volume) and slender hornblende phenocrysts 1 to 3 millimetres long. Rhyolitic rocks occupy the stratigraphic top of the Eocene sequence north of the Natalkuz fault. The flows are typically chalky white and pink coloured and display a variety of textures that includes porp hvritic and thinly laminated flows, massive flows and flo w breccias, and rare interlayered pitchstones. Spherulites are common in rocks that have undergone varying degrees of devitrification. Phenocrysts up to 3 millimetres in diameter comprise up to 20% of the rhyolite flows and include, in order of ab undance, plagioclase, potassium feldspar, guart z (<3%) and biotite (1-2%). Air-fall tuffs, sometimes inter -layered with the rhyolite flows, co nsist of white and light green, massive to well bedded ash, crystal, crystal-lapilli and lapilli-block tuffs. A section of graded crystal-lapilli tuffs more than 200 metres thick crops out along the north side of Natalkuz Lake.

The tuffs contain a phenocryst assemblage of feldspar, quartz and biotite. Lithic fragments are fine-grained, subangular to angular and predominantly felsic volcanic rocks. Carbonized wood fragments and rare upright tree trunks observed in the rhyolitic tuff unit attest to subaeria I deposition. A massive aphanitic rhyolite, with conspicuo us parallel joints, is exposed in the canyon walls along the Entiako River near its confluence with the Nechako Reservoir.

Stratigraphy in the Mount Davidson outlier consists of two lithologically distinct rhyolit e flow and pyroclastic members that bound an intervening andesite flow member. The lower rhyolite bears a close lithologic resemblance to rocks forming the top of the Eocene sequence n orth of the Natalkuz fault. It consists of off-white, mauve and pale green flows, interflow breccia, and scarce lapilli tuff. Typically these rhyolitic rocks have thinly laminated and aphyric textures, however, some are sparsely porphyritic and contain pla gioclase, quartz and biotite phenocrysts. Fine laminae in the flows are commonly overgrown in part by spherulites, which coalesce and form discontinuous layers that obscure t he primary textures. Scarce lithoph ysae are also present. The middle andesite member is mainly composed of massive flows, with lesser flow breccia and some laharic deposits that conformably overl ie rhyolitic rocks. The flows contain slender plagioclase phenocrysts up to 6 millimetres long and sometimes rounded amygdules, filled with chlorite and opalescent and crystalline sili ca, set in a dark green groundmass. The lithologic similarity of these rocks to those of the Naglico formation and Nechako volcanics make s separating the successions difficult. In general, Eocene andesites in t he area are relatively unaltered and vitreous pyroxene, although present, is more abundant in the Jurassic rocks. The upper rhyolite member consists of pyroclastic flows and related tuffs that thicken locally to 250 metres within a small volcanic subsidence structure centred on Mount Davidson. The rocks thin outward from the main area of subsidence, with the farthest outcrops north of Top Lake and south of Tsacha Mountain forming isolated exposures that rest directly on Jurassic rocks. The main lithology is massive, blocky weathered, uniformly welded ash-flow tuff that forms resistant benches, some do minated by co oling features resembling columnal joints. The ash-flows typically contain up to 35% broken crystals, usually less than 3 millimetres in diameter, and lithic fragments within a gr ey indurated matrix. Q uartz is very diagnostic (3-10%), commonly occurring as clear euhedra between 1 and 4 millimetres in diameter. The lithic fragments are mainly porphyritic lapi lli and few er blocks of andesitic composition. Thin discontinuous volcaniclastic-epiclastic deposits locally cap the upper r hyolitic member along the Mount

Davidson ridge. These deposits are only a few to 10 metres thick and consist of p oorly sorted blocks and lapilli beds, and less common mudstone and siltstone interbeds. The fragments are subangular to subrou nded and consist of coarse-grained plagioclase and p yroxene that resemble andesitic flows characteristic of the Naglico formation. Quartz and some biotite grains are found with plagioclase in the matrix of the coarse deposit and some of the finer graine d beds. These remnants are interpreted as post-subsidence fill, derived in part from high-standing Jurassic rocks and deposited with thin lacustrine mudstone and siltston e over locally subsided ash-flow tuff.

# 8 DEPOSIT TYPES

The Interior Plateau contains a number of present an d past-producing mines, including Blackdome, Gibraltar, Endako and Equity Silver, all of which lay outside the current project area. Lane and Schroeter car ried out a survey of mineral occurrences in the northern part of the Interior Plateau in order to document characteristics and to establish local geologic setting and controls. These data are integrated in a conceptual model, repeated below in both graphical and table form (see table 5 and table 6).



Figure 3: Regional Geology of the Blackwater East and West Properties Area

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Blackwater East and West Properties

March 2012



<del>|</del>8

#### VOLCANIC AND SEDIMENTARY ROCKS

#### LATE QUATERNARY

Fluvial/glaciofluvial sand and gravel, lacustrine/glaciolacustrine sediments, and organic deposits: geochemical signature generally regional and difficult to trace to source; includes floodplain, terrace, delta, alluvial fan, outwash, esker, kame, peat bog, swamp and marsh deposits. *Note: See 1:50 000 scale Open File maps for internal subdivisions of this unit.* 



Morainal diamicton: dominantly basal tills; some glacially-derived debris flow deposits; geochemical signature generally local and traceable; diamicton massive or crudely stratified, dense, unsorted to very poorly sorted; matrix sandy to silty clay; clasts up to boulder size; flutings and crag-and-tail features common; deposits thin (<1 m thick) on steep upper slopes and thicker on lower slopes.

12a Resedimented glacial debris: sandy diamicton, gravel and sand; dominantly glacial debris flow deposits with interbedded and/or overlying sands and gravels; common along meltwater channels and within areas of hummocky topography.

12b Thin till and colluvial deposits: unsorted or very poorly sorted diamicton with abundant angular clasts of local bedrock; occurs mainly as veneers less than 1 metre thick over bedrock in upland areas; locally includes thicker colluvial fan and talus deposits at the base of steep slopes.

#### **NEOGENE - MIOCENE TO PLIOCENE**

#### CHILCOTIN GROUP



Rare friable black mudstone and sandstone; may contain plant debris.

massive to vesicular, typically aphanitic or olivine phyric.

Olivine basalt lava flows: weather brown, crudely layered and columnar jointed,

#### MIDDLE EOCENE

#### OOTSA LAKE GROUP



Andesitic lava flows and volcaniclastic rocks: dark green to maroon, coarsely porphyritic flows and tuff breccia; minor interbedded ash-tuff; rare block tuff and laminated black siltstone on the summit of Mount Davidson.



Rhyolitic ash-flow tuff: grey green, unwelded to weakly welded, crystal fragments (25-30%) characterized by resorbed and prismatic quartz (5-15%, avg. 2mm diameter), plagioclase, potassium feldspar (2-7%) and rare sericitized biotite, lithic fragments (5-20%) typically of lapilli size consist of cognate quartz phyric rhyolite, flow banded and aphanitic rhyolite, and porphyritic andesite; the groundmass when stained indicates weak to moderate potassium feldspar; minor block-lapilli tuff; rare bedded sections of quartz-bearing sandstone derived from the underlying ashflows.



Dacitic lava flows: light grey, flaggy weathering, sparse plagioclase, quartz and biotite phenocrysts.

9d

9e

Andesitic lava flows: maroon and dark green, typically porphyritic with 20-30% slender plagioclase up to 5 millimetres and sparse pyroxene phenocrysts, minor amygdaloidal flows with quartz, epidote and chlorite amygdules; Subunit 9di is a local andesitic flow member that contains plagioclase laths up to 1.2 cm, resembling Unit 10a.

Rhyolitic lava flows (ca. 49.2 ±1 to 49.9±1.7 Ma): mauve, cream, light green or grey, aphanitic to sparsely porphyritic, flow laminated textures predominate but are commonly overprinted by solitary and coalescing spherulites, porphyritic flows contain plagioclase, up to 5% quartz and traces of rare sericitized biotite; autobrecciated flows. Basal conglomerate, dominated by homblende-biotite quartz monzonite cobbles and boulders; occurs in a creek exposure at the Wolf mineral prospect, east of Entiako Lake.

9et Fine ash to lapilli tuff dominated by rhyolitic fragments, locally up to 15% quartz phenocrysts; well bedded, minor lacustrine tuffaceous sandstone and siltstone interbeds may contain plant fragments.

#### LOWER AND MIDDLE JURASSIC

HAZELTON GROUP

NAGLICO FORMATION (BAJOCIAN)

Similar to Unit 4a except conglomeratic layers are minor or absent. In the central and southern Nechako Range, the proportion of conglomerate decreases and sandstones interlayered with black siltstone and mudstone increases. The chert-bearing succession thins dramatically to the west across the Chedakuz Creek valley towards the northern Fawnie Range, where conglomerate layers comprise discontinuous thin interbeds within drab olive green sandstones and siltstones that contain abundant plagioclase and lesser pyroxene grains. Mudstones may contain recessive limy concretions. Bivalves and ammonites are moderately abundant.

#### LOWER AND MIDDLE JURASSIC

#### HAZELTON GROUP

NAGLICO FORMATION (BAJOCIAN)

3a

4b

Basalt and andesitic lava flows: dark green and maroon, characterized by vitreous pyroxene phenocrysts (trace to 15%), textural varieties include dense aphanitic flows, crowded plagioclase (~30-40% equant subhedral plagioclase ≤3 mm in diameter) to coarse grained porphyries (plagioclase to 6 mm), and amygdaloidal porphyry; minor flow breccia; rare hyaloclastite. Epidote, quartz, calcite and hematite are widespread as clots and in veinlets. This unit is lithologically similar, to, and therefore easily confused with pyroxene-phyric rocks of Unit 5.



Lapilli tuff, ash tuff and crystal-ash tuff, rare accretionary lapilli tuff: maroon and light green; minute (generally ≤1.5 mm) broken quartz grains are diagnostic but scarce (1-2%); faint to distinctly layered fine grained interbeds, local internal grading; similar bedded tuffs recur upsection in Unit 5 in the northern Fawnie Range.

#### Symbols

tratigraphic contact (approximate)
ntrusive contact (approximate)
ligh angle fault (assumed)
'hrust fault (assumed)
edding, flow layering
oliation
ossil locality [macrofossil (F), palynology (Fp); GSC location number] (F) C143834
ge determination site [method Ar-Ar (A), K-Ar (K), U-Pb (U); age in m.y. (Ma)] (A) K 174Ma
ubscripts (separate analyzed): b-biotite, h-homblende, t-titanite, wr- whole rock, z-zircon
e flow direction
luting
ill geochemistry site
ake sediment geochemistry site
/INFILE occurrence
fajor all weather logging road, secondary road, trail

# <u>6</u> **Blackwater West and** Blackwater East Properties Property Geology Legend

2012

Blackwater East and West Properties

#### Table 5: Characteristic Features of Mineral Occurrences in the Interior Plateau

Characteristic Features of Mineral Occurrences in the Interior Plateau (Lane and Schroeter, 1997)								
	Deposit Type							
Occurrence	Minfile	Metallic Minerals	Gangue Minerals	Style of Mineralization	Alteration	Age of Mineralization	Hostrock Group: lithologies	
Epithermal A	u-Ag		·					
Baez (Oboy)	093C 015	py, aspy	K-fld, ser, qtz, calc, chl	fine-grained disseminations in, and peripheral, to veinlets and breccias	potassic, phyllic, silicic, argillic	Eocene	Ootsa Lake: rhyolitic flows, breccias	
Bob	093B 054	py, aspy, sb	qtz, K-fld, clay, chl, calc	disseminations in altered horizons	silicic, argillic, potassic, propylitic	Eocene	Skeena: sandstone, conglomerate, siltstone and argillite cut by gfp dikes	
Clisbako	093C 016	py, marc, aspy	qtz, chal	fine-grained wisps and disseminations in stockwork and breccia zones	silicic	Eocene	Ootsa Lake: rhyolite flows, tuffs, breccias; andesite flows and breccias	
Holy Cross	093F 029	ру	qtz, ba	sparsely disseminated in intensely silicified zones	silicic, argillic, hematitic	Eocene	Ootsa Lake: rhyolite dome complexes	
Loon	093F 061	ру	qtz, chal	disseminated, drusy in-fillings in stockwork and breccia zones	silicic	Eocene	Ootsa Lake: felsic and intermediate flows, tuffs and breccias	
Trout	093F 044	py, Au, el	qtz, ad	rhythmically banded quartz- adularia veins and silica-flooded zones	silicic	Eocene	Kasalka(?): polymictic conglomerate and andesitic breccia	
Uduk Lake	093F 057	ру	qtz, chal	fine- and coarse-grained disseminations in stockwork and breccia zones	silicic, argillic	Eocene	Ootsa Lake: rhyolite flows, tuffs and breccias	
Wolf	093F 045	Au, Ag, el, py, cpy	qtz, calc, chal	disseminations in banded and bladed veinlets; microscopic inclusions of Au in py	silicic, argillic	Eocene	Ootsa Lake: rhyolite and high-level intrusions	
Yellow Moose	093F 058	sb, aspy, py, marc, cnb, Au	qtz, chal	fine-grained disseminations and blebs in stockworks and breccias	silicic, argillic	Eocene	Ootsa Lake: rhyolite tuffs, breccias, sandstone	
Tsacha	093F 055	py, cpy, agl, Au, gln, el, sief	qtz, calc, chal, amih, hem	fine-grained disseminations, colloform banded and bladed veins	silicic, argillic, phyllic	pre-Late Cretaceous	Hazelton: rhyolite flows, ash-flow tuffs	
Fawn	093F 043	py, aspy, pyg	qtz, chal, ba, dol, calc, ser	disseminated in silica-flooded breccia and stockwork zones	silicic, argillic	Jurassic (?)	Hazelton: andesitic flows; limy ash, lapilli and block tuffs	
Malaput	n/a	py, sph, gln	qtz, ser, calc	weakly developed stockworks in broad alteration zone	silicic, argillic	Jurassic (?)	Hazelton: felsic tuffs and/or flows	

Occurrence	Minfile	Metallic Minerals	Gangue Minerals	Style of Mineralization	Alteration	Age of Mineralizatio n	Hostrock Group: lithologies
Au-Ag Base Metal							
April	093F 060	sph, gln, py, po, aspy, cpy	qtz, chl, calc	coarse-grained disseminations to semi- massive, crudely banded veins/shears	phyllic, propylitic	Jurassic (?)	Hazelton: tuffaceous/limy siltstones
Ben	093F 059	aspy, py, po, cpy, gln, sph, mo	qtz, bio	semi-massive veins, layered to laminated or foliated	phyllic, potassic	Jurassic (?)	Hazelton: intermediate flows, tuffs
Blackwater- Davidson	093F 037	sph, py, po, gln, aspy, cpy, lei, bou, marc	qtz, ser, bio	disseminated and fracture-controlled; replacements	phyllic, potassic	Late- Cretaceous (?)	Hazelton: felsic and intermediate flows and tuffs; siltstone and argillite
Buck - Xmas Cake	093F 050	sp, py, po, ga, cp	qtz, carb	massive to semi-massive sulphide breccia	argillic	Late- Cretaceous (?)	Hazelton: rhyolite flows, breccias
Buck-Rutt	093F 050	sph, py, po	qtz, ser, chl, clay	disseminated, laminated to layered, stratabound	argillic, phyllic, silicic	Late- Cretaceous (?)	Hazelton: tuffaceous siltstones, argillites
Capoose	093F 040	sph, gln, py, aspy, cpy, tel, po, pyg, el, Au	qtz, gnl, mus	disseminated, replacement and fracture- controlled	phyllic, hornfels	Late- Cretaceous	Hazelton: garnetiferous rhyolite sills, hornfels
Au-Cu (-Fe) Skar	'n						
Fawn 5	093F 053	mag, po, py, cpy, aspy, gln	bio, chal, ep, dp, calc	massive to semi-massive magnetite; disseminated sulphides in metasomatized andesite tuffs	hornfels, calc- silicate; metasomatism	Jurassic	Hazelton: andesitic flows, tuffs, fragmentals
Porphyry Mo-Cu							
CH, C	093F 004	py, cpy, po, mo	qtz, K-fld, bio, mag	disseminated in veinlets and weakly developed stockworks	silicic, hornfels, potassic, propyllitic, phyllic	Eocene (?)	Hazelton: andesite flows, siltstones. Crowded feldspar porphyry, granodiorite and diorite
Paw	093F 052	py, mo, cpy		disseminated and fracture-controlled	silicic	Jurassic	Capoose batholith: diorite to granodiorite
Chu	093F 001	mo, py, po, cpy	qtz, bio	disseminated and fracture-controlled	hornfels, potassic	Jurassic (?)	Hazelton: pyroclastic andesite and siltstone; granodiorite dikes related to the Capoosebatholith(?)
Ned	093F 039	то, ру, сру	qtz	disseminated and fracture-controlled	silicic	Late- Cretaceous (?)	Late Cretaceous(?) quartz monzonite

#### Table 6: Discovery Methods for Selected Prospects in the Interior Plateau Project Area, BC

Discovery Methods for Selected Prospects in the Interior Plateau Project Area, BC (Lane and Schroeter, 1997)							
Property	Deposit Type	Discovered By:	Year	Discovery Method			
April	Mesothermal vein?	Granges Expl. Ab.	1982	Regional geochemical stream sediment sampling: Zn-Ag anomalies followed by prospecting and grid-based soil sampling			
Baez	Epithermal Au	Phelps Dodge	1992	Reconnaissance stream sediment and soil sampling, rock sampling, geophysics, diamond drilling			
Ben	Mesothermal vein	BHP-Utah		Reconnaissance exploration for volca nogenic massive sulphide mineralization in Hazelton Group rocks			
Blackwater -Davidson (Pem)	Porphyry-related Au- Ag	Granges Expl. Ab.	1973	Reconnaissance silt sampli ng: Pb-Zn-Ag stream sedi ment anomalies led to subsequent soil sampling and staking of the Pem claim			
Buck (Range)	Mesothermal vein?	BP Minerals Ltd.	1981	Reconnaissance geochemical sampling and prospecting outlined several base metal - silver anomalies; trenching and rock sampling followed			
Capoose	Porphyry-related Ag- Au	Rio Tinto Canadian Expl. Ltd.	<1969	Reconnaissance stream and lake sediment sampling; follow- up prospecting, soil and rock sampling, trenching and diamond drilling			
СН (С)	Porphyry Cu-Au	Rio Tinto Canadian Expl. Ltd.	<1969	Reconnaissance lake sediment sampling (and interpretation of federal government regional aeromagnetic survey); follow-up IP/Resistivity and magnetometer surveys in conjunction with bedrock mapping over favourable geology of Jurassic Hazelton Group intruded by Chutanli Lake monzonitic stocks			
Chu	Porphyry Cu	ASARCO Inc.	1969	Reconnaissance stream s ediment anomalies led to the discovery of copper and molybdenum mineralization in outcrop			
Clisbako	Epithermal Au	Eighty-Eight Res.	1990	Prospecting and rock sampling; trenching and diamond drilling; biogeochemistry			
Fawn (Gran)	Epithermal Au-Ag	BP Minerals Ltd.	1982	Reconnaissance geochemical sampling and prospecting in an area of favourable garnet alteration, and Pb lake sediment anomaly, outlined a broad base metal-silver anomaly; trenching, geophysics and diamond drilling confirmed orientation and width			
Fawn 5	Skarn Fe, Skarn Cu- Au	BP Minerals Ltd. BC Geological Survey	1983 1993	Reconnaissance mapping and sampling on the margin of the Capoose batholith			
Holy Cross	Epithermal Au	Noranda	1987	Prospecting and rock chip sampling of silica-flooded rhyolite followed by trenching			
Loon	Epithermal Au	Mingold Resources Inc.	1988	Reconnaissance exploration; prospecting; traced mineralized float boulders up-ice to their source			
Ned	Porphyry Mo-Cu	Granges Expl. Ab.	1975	Reconnaissance stream and lake sediment sampling; follow- up soil sampling outlined an area of anomalous Mo-Cu			
Oboy	Epithermal Au	Rio Algom Exploration Inc.	1985	Reconnaissance soil and stream sediment Ag-As anomalies			
Paw	Porphyry Mo-Cu	Perry Grunenberg	1993	Prospecting new logging roads			
Tsacha (Tommy)	Epithermal Au	BC Geological Survey	1993	Regional mapping crew discovered and sampled auriferous epithermal quartz vein and stockwork mineralization			
Trout	Epithermal Au	Kerr Addison Mines Ltd.	1984	Reconnaissance exploration; prospecting, mapping and sampling			
Uduk Lake	Epithermal Au	Amax Exploration	1980	Reconnaissance mapping; soil and rock geochemistry, geophysics and trenching			
Wolf	Epithermal Au	Rio AlgomExpl. Inc.	1983	Anomalous silver lake-sediment anomaly followed by soil and rock sampling, biogeochemistry, geophysics, trenching and diamond drilling			
Yellow Moose	Epithermal Au	Newmont Expl. of Canada Ltd.	1987	reconnaissance prospecting; traced stib nite-bearing float up- ice to bedrock source			



Figure 7: Schematic section showing location of mineral occurrences and spatially and/or genetically-related intrusions (Lane and Schroeter, 1997)

Analogies to mineralization surrounding (e.g., Mount Da vidson, Capoose and Ch u) suggest that any mineralization on the Nechako property may be related to the emp lacement of Cretaceous intrusives into the Jura ssic Hazelton and the Bowser Lake Groups. Sulphide mineralization as exists on the property may likely be associated with phyllic to potassi c or kaolinite alteration of felsic and intermediate volcanic rocks, with secondary quartz. Specific mineralization is anticipated to consist of pyrite, sphalerite, tetra hedrite, and arsenopyrite; gold and silver mineralization zones are not expected to be confined to a particular lithologic unit.

# 9 EXPLORATION

In 2011 RJK Explorations Ltd. undertook an exploration program on the Blackwater East and West Properties. The program was a multi-phase program that included: 1,584.1 line kilometres of Fugro DIGHEM airborne survey flew a 1,550 line kilometre ZTEM helicopter EM su rvey, 22.1 line kilometres of ground induced polarization on three grids, an d a ground program that t consisted of 145 soil samples and 56 rock samples on the properties

# 9.1 Fugro Airborne Surveys DIGHEM

Fugro Airborne Surveys was contracted to fly an airborne electromagnetic and magnetic DIGHEM survey for RJK Explorations Ltd. over the Blackwater East and West Properties. Data acquisition occurred during the period December 19<sup>th</sup>, 2010 to January 11<sup>th</sup>, 2011 (Previously reported). Final survey coverage consisted of 1,584.1 km line-kilometres, including tie lines. Flight lines were flown east-west (090°–270°) with a line separation of 100 m. Tie lines were flown orthogonal to the traverse lines (180°–360°) at intervals of 1,000 m.

An airborne electromagnetic and magnetic DIGHEM survey was conceived and designed by RJK Explorations Ltd. to cover the property and aid in the de sign of the 2011 exploration program. Original objectives of this survey were two-fold:

- provide high resolution electromagnetic and magnetic data for the direct detection and delineation of sulphide-associated gold-silver occurrences; and
- facilitate the mapping of bedrock lithologies and structure that in turn may influence the emplacement or hosting of economic mineralization.

RJK Explorations engaged the services of Condor Consulting of Lakewood Colorado to undertake a detailed analysis of data collected by Fugro (see Appendix B for full Condor report). Condor was commissioned to carry out comprehensive processing, analysis and interpretation of the EM and magnetic data from the DIGHEM survey and to identify new zones of potential gold mineralization that could then be followed up by detailed ground geophysical work, soil sampling, geological mapping and/or by drilling.

Condor Consulting identifed a number of Ta rget Zones based on the recognition of discr ete conductive features and an analysis of the conductivity and magnetic outcomes and concluded

"The Dighem system appears to not have seen below the conductive glacial tills. Potential conductors, due to alteration or graphite alon g structures, were not identified. A deeper penetrating EM system, such as VTEM, would have a better chance of seeing through the surface conductors.

However, the magnetic data was clean and revealed a host of possible structures, seen a s magnetic lows. The lows were sele cted as the important feature in the magnetics, as they may represent magnetite destruction in the otherwise magnetic volcanic rocks.

Not only we re linear magnetic lows observed, but also localized areas that appeared to have undergone alteration. These areas, particularly where supported by the pres ence of structures seen by the magnetic low lineations, are considered targets for mineralization.

#### Blackwater East and West Properties

Based on the criteria above, 20 TZs were identified and listed below. The targets are all magnetic lows, possibly due to alteration. The eranking of the targets is the estimated chance that mineralization exists based on the geophysical data. About half of the target zones are ranked low, reflecting substantial uncertainty. Five targets were ranked mediu m and two were ranked high, TZW-6 and TZE-3. The scarcity of high-ranking targets does not necessarily reflect an absence of mineralization within the survey area, only the geophysical nature of the mineralization, making it difficult to select the most promising targets without additional information.

Figures 8 and 9 show the TZs over the magnetic reduced to pole data with the magnetic lineations. These figures are shown below the following list of TZs. The TZ polygons are meant to show the best area to drill test the target based on the ano maly extent, not the limits of a potential ore body."

Number	Priority	Description
TZW-1	Medium	Strong magnetic low located along a NNE structure on the mapped geology.
TZW-2	Low	Along a NW trending structure as seen in the magnetics.
TZW-3	Low	Along two NW trending structures as seen in the magnetics.
TZW-4	Low	Mild magnetic low trending east-west.
TZW-5	Low	Mild low over to NW trending magnetic lineations.
TZW-6	High	Strong magnetic low, has an amorphous shape. Appears to be at an intersection of NW, NE, and east-west structures as seen in the magneticlineations. Seen on line 10830.
TZW-7	Medium	East-west along a magnetic linear.
TZW-8	Low	Mild magnetic low.
TZW-9	Low	East-west along a magnetic linear.
TZW-10	Medium	NW trending along a magnetic linear. Located within more magnetic material.
TZE-1	Low	Circular magnetic low.
TZE-2	Low	Circular magnetic low.
TZE-3	High	Magnetic low that appears associated with the intersection of a north-south and an east-west structure as see from the magnetic data. Seen onLine 20240.
TZE-4	Low	NW trending magnetic low.
TZE-5	Low	Along a NW trending magnetic linear.
TZE-6	Low	Circular magnetic low.
TZe-7	Medium	Located along a magnetic linear that has a north-south component and aENE component.
TZE-8	Medium	Along a north-south magnetic low that is coincident with a drainage.
TZE-9	Low	Along a north-south magnetic low that is coincident with a drainage.
TZE-10	Low	Very small circular magnetic low.

#### Table 7: Condor Consulting Targets



#### Figure 8: Blackwater East Target Zones over Magnetic Data Reduced to Pole





### 9.2 Helicopter-borne ZTEM Tipper and Aeromagnetic Survey

In July of 2011 RJK Explorations Ltd. engaged the services of Geotech Ltd. to undertake a 1,550 line kilometre ZTEM helicopter EM survey over t he Blackwater East and West Properties (se e Appendix C for full ZTEM report and maps). The ZTEM survey comp rised airborne Tipper AFMAG (audio frequency electromagnetics) measurements at six frequencies in the 30 to 720 Hz band, as well as aeromagnetics using a cae sium magnetometer. The West Block was flown in a north to south (N 0°E azimuth) direction, with a flight line spacing of 150 metres. Tie lines were flown in an east to west (N 90°E azimuth). The East Block was flown in an east to west (N 90°E azimuth). The East Block was flown in a north to south (N 0°E azimuth) (Figures 10 and 11). The ZTEM is useful in mapping geolog y to depth based on lat eral resistivity contrasts, which is of p articular interest, as this can re late to hydrothermal alteration processes associated with gold deposits (Williams, 1987). Geotech undertook and interpretation of the ZTEM data (Appendix C).

#### Blackwater East Block

Three magnetic domain s: ME1, ME2, and ME3 characte rize the Blackwater East survey block. Domains ME1 and ME3 appear regional; whereas ME2 is a circular, localized anomaly high. ME1 runs northerly along eastern side; ME3 is located in the south- and north-western corn ers, respectively. By using both the Reduced-to-pole and the Magnetic Ana lytic Signal maps, various magnetic structural were interpreted that might be responsible for the lateral offset of the magnetic highs and lows (see Figure 10).

In Blackwater East Block, ZTEM features of interest (Anomalies A-E) were identified and computermodeled using 2D inversion with topographic correct ion. The Blackwater East Block has an undifferentiated conductivity (A), suggesting a porous volcanic or sedimentary unit, juxtaposed to more resistive unit, possibly an intrusive or felsite, to the west. The latter is characterized by a central cluster of circular resistive zones (D-E-F) surrounded by more conductive rocks (B-C) – resembling a central, potassic altered volcanic epithermal center and surrounding clay-chlorite altered halo. The Blackwater East block therefore represents an area of exploration interest.

#### Blackwater West Block

As in the other block, the aeromagnetic data was also gridded and is displayed on the topographic maps in Figure 11. Three magnetic domains MW1, MW 2, and MW3 characterize this survey block. Domain MW1 is a major regional magnetic high occupying a great portion of the southwest part of the grid with a SW-NE trend. However, the highest magnetic values have a prefere ntial E-W along southern side of the block. MW2 and MW3 are circular, localized magnetic highs located at the northwest end of the survey. By using both the Reduced-to-pole and the Magnetic Analytic Signa I maps, various magnetic structures were interpreted that might be responsible for t he lateral offset of the magnetic highs and lows (see segmented wavy lines overlaying maps in Figure 11).

Over the Blackwater West Block, ZTEM fe atures were defined (Anomalies H-M) and also successfully modeled using 2D inversion. Two conductive trends (H-I) characterize the block, with the larger one (I) reflecting a major conductive E-W trending unit in the center of the grid. The outer edges of the conductive units also feature interesting circular, resistive zones (J-M). Areas of interest are outlined from the ZTEM survey re sults and locations for potential targets or zones of interest, both resistive (1st priority) and conductive (2nd priority).

Blackwater East and West Properties

Magnetic data proved very useful in both a) identifying potential geological structures and b) defining the final location of these areas or interest, based on favourable resistivity anomalies with associated low magnetic strength, in both the Blackwater East and West blocks. Both blocks feature characteristic high resistivity & lower magnetic anomalies that are in turn flanked/surrounded by magnetic highs, analog ous to the Richfield deposit geophysical target model.

# 9.3 Two Dimensional Induced Polarization Survey

A two-dimensional Induced Polarization (2DIP) survey was conducted by SJ Geophysics Ltd. on the Blackwater East and West project for RJK Explorations Ltd., from September 20<sup>th</sup> to October 13<sup>th</sup>, 2011 (see Appendix D for full report)

The 2011 project consisted of three grids, West1, East1, and East 2. A total of approximately 2.7, 11.4, and 8 line kilometers on the West 1, East 1, and East 2 grids respectively were surve yed (Figure 12). The initial quality control of data collected in the field was performed on site by the field geophysicist, while the final data processing was carried out in the office of S.J.V. Consultants Ltd. in Delta, BC.

#### **Blackwater West**

West 1 grid consist s of three north-south trending line s. The three lines are located to the immediate north of a large quartz monzonitic to monzogranitic intrusive rock unit and underlain by volcaniclastic rocks of t he Hazelton Group, Naglico Formation or Entiako Formation. The West 1 grid is bounded by a north-east trending fault to the southeast and a north-northeast trending fault to the northwest.

On Blackwater West, the 2DIP results on West 1 grid reveal a flat lying layered resistivity pattern in all three short lines. The models for the west most line capture a signature resembling the response from a epithermal system: a small localized chargeability high feature appears in the resistivity contact zone and is accompanied by a resistive cap. This a nomaly is open to the west. All lines show a resistive bottom layer in the models. This layer contains zone s of coincid ent elevated chargeability and decreased resistivity. These anomalies likely reflect facies changes within this layer (Figure 13).

#### **Blackwater East**

The East 1 and 2 grids are situ ated in an area with thick cove rage of quaternary glacial overburden, colluvial and fluvial deposits, which makes geologic mapping difficult (Figure 5). Helicopter-borne magnetometer survey results were used t o assist in understanding the structure control of the IP respon ses. Figure 12 shows the airborne magnetomet er survey result as a RTP (reduced to pole) magnetic total field intensity false color contour plan map, superimposed with 2DIP survey lines. In t he airborne survey are a, western and eastern portions exhibit different magnetic patterns. The eastern portion of the survey area is characterized with a higher magnetic total field intensity background value compared to that of the western portion. The 2DIP lines are situated in the western portion of the airborne survey area where two distinct isolated circular magnetic highs and a few magnetic c low lineaments are evident. Examples of the magnetic low lineaments in the western portion of the airborne survey are a are denoted as bold dashed line s in Figure 14. The circular magnetic highs may imply intrusion occurrence s while the lineaments may shed light on fault/contact structures.

#### East 1 Grid

On Blackwater East, the helicopter-borne magnetometer survey result (surveyed by Geotech Ltd., September 2011) is integrated with the IP results to better interpret the geophysical anomalies. The most prominent chargeability anomalies occur on the East 1 grid where four areas of interest are outlined based on the occurrences of chargeability anomalies accompanied by resistive cap/pl ug and magnetic lineaments. The four geophysical target areas surround a circular magnetic high that is situated in the western portion of the grid (Figure 15).

The most prominent chargeability anomalies occur on the E ast 1 grid where four areas of interest are outlined based on the occurr ences of chargeability anomalies accompani ed by resistive cap/plug and magnetic lineaments. The four geophysical target areas surround a circular magnetic high that is situated in the western portion of the grid (Figure 15). Descriptions of these areas of interest are listed in the following table.

#### Table 8: East 1 Grid IP Targets

Area of Interest	Feature Description
C1-1400	Chargeability anomaly, at edge of circular magnetic high, with a resistive cap.
C2-1400	Chargeability anomaly, at eastern flank of a resistivity plug.
C1-2000	Chargeability anomaly, with a resistive cap.
C1-2900	Chargeability anomaly, associated with magnetic lineaments, partially
	associated with resistivity high.

#### East 2 Grid

The 3D inversion shows on the East 2 Grid the resistivity changes between the western (high) and eastern (low) portions of the grid. The resistivity transition line seems to coincide with the northnorthwest trending magnetic cont act lineament. This may suggest a rock type change across the contact. Two areas of interest (C1-9000 and C1-9300) are identified and marked on Figure 16. The large south western corner chargeability high (C1-9000) is situated immediately n orth of a circular magnetic high and co incides with a large re sistivity high. It is possibly relate d to lith ology or alteration such as silicification. The chargeability anomalies in the eastern edge area (C1-9300) are weak responses and not well defined by the 2D models. However, they appear to follow a n orth-northeast trend and are accompanied by resistive caps. The area seems to be alteration related.

# 9.4 2011 Soil and Prospecting Program

In the summer RJK Explorations Lt d. engaged the services of Minconsult Exploration Services of Coldstream, British Columbia to undertake a gro und exploration program. The program consisted of 145 soil samples on three grids on the Blackwater East property (Figure 16 for grid location and Appendix E for assays and soil maps) and general prospecting and the collection 56 rock samples on the Blackwater East and West Properties (Appendix F for assays and maps). Figure 17 and 18 illustrate the rock sample locations. No significant assays were encountered in the rock samples, however the soils samples gave rise to anomalous gold values. Minconsult Exploration Service did not generate a sampling report on the sampling methods or methodology.

Figure 16 is a summary map for Bla ckwater East Property that illustrates anomalous gold in soils, along with ZTEM resistivity highs and lows, Magnetic highs and lows, IP Chargeability a nd Resistivity highs and any outcrops found during the sampling program.

#### Blackwater East and West Properties

#### Figure 10: Blackwater East ZTEM



#### Figure 11: Blackwater West ZTEM



#### Figure 12: Two Dimensional Induced Polarization Grid Locations









Figure 13: Line 618000: 2D Inversion Models, Resistivity and Chargeability, West 1 Grid.



Figure 14: RTP, Magnetic Total Field Intensity Overlaying 2DIP survey grid.


#### Figure 15: 3D Inverted Resistivity and Chargeability Models East 1 Grid





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#### Figure 17: Blackwater West Rocks



#### Figure 18: Blackwater East Rocks



<u>в</u>9

Figure 19 is a summary map for the Blackwater West Property that illustrates the ZTEM resistivity highs and lows, Magnetic highs and lows, IP Ch argeability and Resistivity highs and any outcrops found during the sampling program.

## 10 SAMPLE PREPARATION, ANALYSES AND SECURITY

RJK Explorations Ltd. sent all the 2011 so il and rock to samples to Stewart Group Eco Te ch Laboratory Ltd. of Ka mloops British Columbia an ALS Minerals La boratory (an accredite d lab pursuant to NI 43-101). All sample s underwent 45-element Inductively Coupled Plasma - Mass Spectrometry (ICP-MS) analysis. In addition, samples were submitted to Fire A ssay Fusion for Gold.

ALS Minerals routinely screen te sts and sam ple preparation quality is monitor ed through the insertion of sample preparation duplicates. For every 50 s amples prepared, an additional sp lit is taken from the coarse crushed material to cre ate a pulverizing duplicate. The additional sp lit is processed and analyzed in a similar manner to the other samples in the submission. It should be noted that the precision of the preparation duplicate results is highly dependent on the individu al sample.

ALS Minerals inserts quality control samples (reference materials, blanks and duplicates) on each analytical run, based on the rack sizes associated with the method. The rack size is the number of samples including QC samples included in a batch. The blank is inserted at the beginning, standards are inserted at random intervals, and duplicate s are analysed at the e nd of the b atch. Quality control samples are inserted d based on the following rack sizes specific to the method (Table 9).

Rack Size	Methods	Quality Control Sample Allocation
20	Specialty methods including specific gravity, bulk density, and acid insolubility	2 standards, 1 duplicate, 1 blank
28	Specialty fire assay, assay- grade, umpire and concentrate methods	1 standard, 1 duplicate, 1 blank
39	XRF methods	2 standards, 1 duplicate, 1 blank
40	Regular AAS, ICP- AES and ICP- MS methods	2 standards, 1 duplicate, 1 blank
84	Regular fire assay methods	2 standards, 3 duplicates, 1 blank

#### Table 9: ALS Minerals Quality

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Figure 19: Summary map for Blackwater West Property



# 11 ADJACENT PROPERTIES

The Blackwater West property is southeast of Silver Quest Resource's Capoose Deposit (see Figure 3), Silver Quest Resources ann ounced on January 20 <sup>th</sup>, 2010 a new resources estimate for the Capoose: "The resource estimate at a gold equivalent ("AuEq") cut-off grade of 0.40 grams per tonne ("g/t") is 31.22 million tonnes g rading 0.38 g/t gold and 26.5 g/t silver for 383,823 contained ounces of gold and 26,593,915 contained ounces of sil ver in an In dicated category and 37.23 million tonnes grading 0.37 g/t gold and 24.6 g/t silver for 443,206 contained ounces of gold and 29,517,933 contained ounces of silver in an Inferred category"

The Blackwater East and West Properties are directly east and west (see Figure 3) of the recent Blackwater gold discovery of Richfield Venture s Ltd. (now owned by Ne w Gold), which announced on March 2<sup>nd</sup>, 2011:

"At a base case cut-off grade of 0.40 g/t Au, the estimated global Indicated resource is 53.46 million tonnes at an average grade of 1.06 g/t Au containing 1.83 million ounces gold, with an additional 75.45 m illion tonnes at an ave rage grade of 0.96 g/ t Au containing 2.34 million ounces g old in the Inferred category. The table b elow summarizes the Geosim resource estimates at selected cut-off grades: "

	INDICATED				INFERRED			
CUT-OFF G/T AU	TONNES 000'S	GRADE AU G/T	AG G/T	CONTAINED AU M OZ	TONNES 000'S	GRADE AU G/T	AG G/T	CONTAINE D
0.3	54,136	1.06	5.6	1.84	78,653	0.94	4.0	2.38
0.4	53,460	1.06	5.6	1.83	75,452	0.96	4.0	2.34
0.5	49,914	1.11	5.7	1.78	68,001	1.02	4.2	2.23

Blackwater Deposit - Indicated and Inferred Resource Estimates

The Blackwater West Property is directly nor th of Silver Quest Resources Ltd. 3Ts project(see Figure 3). Silver Quest Resources Ltd. reports on their web site "*The 3Ts Project covers an epith ermal quartz-carbonate vein system within which m ore than 12 individual mineralized veins, rangin g up to 65 0 metres in strike length and up t o 15 metres in true width, have been identified to date. The 3Ts Project is lo cated approximately 120 kilo metres southwest of Vanderhoof and consist s of ten m ineral claims covering approximately 3,164 hectares. A total of 1,645 metres of diamond drilling has been completed in ten holes, with assay results pending.* 

Three of these holes were drilled in the Ted Vein area. The best hole from previous drilling on the Ted Vein intersected 8.88 g/t gold and 393.6 g/t silver across a true width of 15.4 metres. The remaining seven holes were drilled in the area between the Mint Vein and the Ringer Target. Previ ous diamond drill holes on the Mint Vein structure intersected up to 8.08 g/t gold and 80.4 g/t silver across 2.0 metres. Previous results from the Ringer Zone included eig ht samples collected from boulders that returned a n average of 19 g/t gold and 140 g/t silver. Six new mineralized veins, ranging from 4 to 117 centimetres wide, were intersected in the latest seven drill holes."

The Blackwater East property i s directly west of TTM Resources Inc.'s 'Chu Molybdenum' deposit (Figure 3). On May 21, 2 011 TTM Resources an nounced it had " received an updated Resource Estimate from Giroux Consultants Inc., of Vancouver, B.C. The revised estimate was calculated by incorporating the 2009 and 2010 drilling campaigns (13 drill hol es totalling 5,894 m eters) that o ccurred subsequent to the previous resource estimate announced in the Co mpany's Feb 27, 2009 press rele ase, which incorporated all holes drilled to the end of 2008. The Mineral Resource Estimate at the Company's 100% owned Chu Molybdenum project using a 0.04% Mo cut-o ff now stands at: Measured 159 million tonnes at an average grade of 0.061% Mo and 0.035% Cu (214 million lbs. molybdenum, 122.8 million lbs. copper), Indicated 211 million tonnes at an average grade of 0.057% Mo and 0.035% Cu (265.9 million lbs. molybdenum, 163 million lbs. copper), and Inferred 256 million tonnes at an average grade of 0.052% Mo and 0.036% Cu (294.2 million lbs. molybdenum, 203 million lbs. copper). The Measured plus Indicated resource totals 370 m illion tonnes at a grad e of 0.059% Mo and 0.035% Cu (482.2 million lbs. of molybdenum, 286.1 million lbs. copper). The Measured and Indicated resource tonnage has increased by 18% while the contained molybdenum and copper have increased by 16% and 12% respectively over the previous estimate."

## 12 INTERPRETATION AND CONCLUSIONS

In 2010 and 2011, RJK Explorations Ltd. carried out an exploration program o n the Blackwater East and West Properties. The program was a multi-phase program t hat included: 1,584.1 line kilometres of Fugro DIGHEM airborne survey, a 1,550 line kilometre ZTEM helicopter EM survey , 22.1 line kilometres of gr ound induced polarization on three grids, and a ground program that consisted of 145 soil samples and 56 rock samples on the properties.

The DIGHEM survey identified 12 targets are all magnetic lows, possibly due to alteration. Five targets were ranked medium and two were ranked high, TZW-6 and TZE-3.

The Blackwater East Block, ZTEM features of interest (Ano malies A-E) were identified. The Blackwater East Block has an undifferentiated conductivity (A), suggesting a porous volcanic or sedimentary unit, juxtaposed to a more resistive unit, possib ly an intrusive or felsite, to the west. The latter is ch aracterized by a central cluster of circular resist ive zones (D-E-F) surrounded by more conductive rocks (B- C) – resembling a central, potassic altered volcanic epithermal center and surrounding clay-chlorite altered halo.

Over the Bl ackwater West Block, Z TEM features were defined (Anomalies H-M). Two conductive trends (H-I) characterize the block, with the larger one (I) re flecting a major conductive E-W trending unit in the center of the grid. The outer edges of the conductive units also feature interesting circular, resistive zones (J-M). Areas of interest are outlined from the ZTEM surve y results and locations for potential targets or zones of interest, both resistive (1st priority) and conductive (2nd priority).

The most prominent chargeability an omalies occur on the East 1 grid w here four areas of interest are outlin ed based on the occurrences of chargeability anomalies accompanied by resist ive cap/plug and magnetic lineaments. The four geophysical target areas surround a circular magnetic high that is situated in the western portion of the grid.

The 3D inversion shows on the East 2 Grid, the resistivity changes between the western (high) and eastern (low) portions of the grid. The resist ivity transition line seems to coincide with the nort h-northwest trending magnetic contact linea ment. This may suggest a rock type change across the cont act. The large south western corner chargeability high (C1-9000) is sit uated immediately north of a circular magnetic high and coincides with a large resistivity high. It is possibly related to lit hology or alteration such as silicification. The chargeability anomalies in the eastern edge area (C1-9300) are weak. However, they appear to follow a north-northeast trend and are accompanied by resistive caps. The area seems to be alteration related.

# 13 RECOMMENDATIONS

In order to evaluate the economic potential of the Blackwater East and West Properties, a drill program is warranted. Currently, RJK Explorations Ltd. has developed 9 potential drill targets on the Blackwater East property (F igure 16) and 2 potential drill target s on the Blackwater West Property (Figu re 19). The current recommendation is to drill test the Blackwater East property and then evaluate the results.

# 14 PROPOSED PROGRAMS & BUDGET

The following budget covers an initial program of drilling on the Blackwater East Property

Item	No. Of Units	Rate	Total
Bond and Permitting	1	\$10,000	\$10,000
Exploration Planning	10	\$500	\$5,000
Diamond Drilling (9 drill holes)	2000	\$150	\$300,000
Geological Fieldwork (1 geologists)	40	\$600	\$24,000
Core Cutter	40	\$300	\$12,000
Assaying rock samples	300	\$100	\$30,000
Excavator for Drilling	30	\$1,200	\$36,000
Accommodation and Meals (Man days)	140	\$200	\$28,000
Vehicles : 2	40	\$200	\$8,000
ATV Rentals	40	\$100	\$4,000
Supplies and Rentals	Lump Sum	\$10,000	\$10,000
Reports	Lump Sum	\$20,000	\$20,000
	Subtotal	-	\$487,000
	Contingency 10%		\$48,000
TOTAL (CANADIAN DOLLARS)			\$535,000

#### Phase 1: Budget - Blackwater East

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#### CERTIFICATE 16

I, Mike Magrum, P. Eng., do hereby certify as follows:

That I am a consulting geologic engineer geologist, with offices at 609-475 Howe Street Vancouver, B.C.

That I am a graduate of Alaska University, wit h a B.Sc. in Geological Engineering in 1976.

That I am a Practicing Member in good standing of the Northwest Territories and Nunavut Association of Professional Engineers, Geologists and Geophysicists.

That I have been pract icing my profession continuously since 1980 and have been working since 1976.

The information for this report has been ta ken from government an d old geolo gical reports and work undertaken by RJK Explorations Inc

The assessment costs presented in this report are true and accurate t o the best of my knowledge.

DATED at Vancouver, British Columbia, this 29<sup>th</sup> day of March 2012

hr. Mag

Mike Magrum P.Eng

# Appendix A

### Blackwater East

Geotech-Vtem Survey 950 line km		100,000.00
Condor Consulting Interpration of DIGHEM Survey		\$ 16,750.00
IP Survey Blackwater East 22.1 line Kilometers. (SJ Geophysics)	Sept 20-Oct 12 2011	\$ 60,546.00
Line Cutting Blackwater East (Hendex Exploration Services Ltd)	Aug 15- Sept 12 2011	\$ 22,560.00
Assay of Rock and Soil Samples		\$ 5,560.00
Min Consult to Collect Rock Samples and Soil	May 15 to June 30 2011	\$ 48,811.00
Camp Rental TTM Resources @ \$125 per man day 265 man days	May 15 to Oct 12 2011	\$ 25,650.00
Project Supervison Glen Kasner @ \$600 per day for 65 days	May 15 to Oct 12 2011	\$ 39,000.00
Assessment Report and Map	March 1 March 26 2012	\$ 3,250.00
	Sub-total	\$ 322,127.00
Blackwater West		
Geotech-Vtem Survey 600 line km		\$ 80,500.00
Condor Consulting Interpration of DIGHEM Survey		\$ 16,750.00
Assay of Rock Samples		\$ 3,500.00
Min Consult to Collect Rock Samples	May 15 to June 30 2011	\$ 10,506.00
Camp Rental TTM Resources @ \$125 per man day 60 man days	May 15 to Oct 12 2011	\$ 7,500.00
Project Supervison Glen Kasner @ \$600 per day for 10 days	May 15 to Oct 12 2011	\$ 6,000.00
Assessment Report and Map	March 1 March 26 2012	\$ 3,250.00
	Sub-total	\$ 128,006.00

\$ 450,133.00

# Appendix B

### **REPORT ON PROCESSING AND ANALYSIS**

### OF A DIGHEM EM & MAGNETIC SURVEY

### **BLACKWATER EAST AND WEST PROPERTY**

#### **BRITISH COLUMBIA**

#### FOR

### **RJK EXPLORATIONS LTD.**

### **JUNE 2011**





Condor Consulting, Inc. Lakewood, Colorado USA **REPORT ON PROCESSING AND ANALYSIS** 

OF A DIGHEM EM & MAGNETIC SURVEY

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## 1. SUMMARY

This report covers the processing and analysis completed by Condor Consulting, Inc. (Condor) of a Dighem survey carried out in December 2010 and January 2011 for RJK Explorations Ltd. (RJK), over their Blackwater East and Blackwater West properties, located in central BC.

Condor was commissioned to carry out comprehensive processing, analysis and interpretation of the EM and magnetic data from the DIGHEM survey.

The principal task of this current program of work is to identify new zones of potential gold mineralization that could then be followed up by detailed ground geophysical work, soil sampling, geological mapping and/or by drilling.

The outcome of this work has been to identify a number of Target Zones based on the recognition of discrete conductive features and an analysis of the conductivity and magnetic outcomes.

Follow-up work leading to drilling of the high and medium priority targets is recommended.

## 2. INTRODUCTION

During December 2010 and January 2011, Fugro Airborne Surveys (Fugro) carried out a Dighem AEM and magnetic survey for RJK Explorations Ltd. (RJK) over their Blackwater East and Blackwater West properties in central British Columbia, Canada (Figure 1). Figure 2 shows the two blocks with local drainages.

Condor was contracted by RJK to assess the survey data and identify potential gold mineralization. Condor has completed the assessment of the data.



Figure 1: Location map of Blackwater claims in British Columbia.



Figure 2: Location map of Blackwater claims from Fugro Airbone Surveys (2011).

The West area acquired 948.0 km of flight line data, and 638.8 km acquired for the East area to form a total of 1 586.8 line-km of geophysical data acquired by Fugro. The line spacing for both areas was a nominal 100 m line spacing in an east-west with respect to UTM north. All the lines from the survey were processed and interpreted for this report.

The Fugro logistics report (Fugro Airbone Surveys 2011), (see Appendix B, Archive DVD) provides the specific details of the surveys.

In addition, the client provided background information on the deposits within the vicinity. These materials were prepared by Mr. Derrick Strickland, consultant to RJK.

Glenn Kasner of RJK consulted with Condor to undertake a full assessment of all the DIGHEM survey outcomes. This report, along with the Archive DVD and hardcopies of the target maps, fulfills the Processing and Analysis Quotation, dated March 25, 2011.

## 3. GEOLOGY

## **Geological Background**

The contents of this section are from a report provided by Derrick Strickland: *Nechako area exploration summary* – *second incarnation*. Blackwater/Mount Davidson project (presently held by Richfield Ventures/Silver Quest Resources) is between RJK's two Blackwater claim blocks and the description of its geology is assumed to be a relevant to RJK's blocks.

The Blackwater-Davidson project is located within the Nechako Uplift, a structurally raised block. This uplift provides a window through younger cover rocks to the underlying volcanic and sedimentary rocks of the Jurassic Hazelton and the Bowser Lake Groups. Cretaceous Capoose Batholith granitic rocks intrude these stratified rocks. Eocene volcanic rocks of the Ootsa Lake and Endako Groups locally overlie the older rocks. Younger basalt of the Chilcotin Group forms rare hill caps within the Nechako Uplift.

The geologic setting for the Blackwater-Davidson prospect may be similar to other Au or Ag prospects in the region; mineralization may be related to the emplacement of the Quanchus Intrusions. Sulphide mineralization on the property is associated with phyllic to potassic or kaolinite alteration of felsic and intermediate volcanic rocks, with secondary quartz. Mineralization on the property consists of pyrite, sphalerite, tetrahedrite, and arsenopyrite. Gold and silver mineralization zones were defined from drill core samples and are not confined to a particular lithologic unit. A highly altered kaolinized outcrop occurs in the southwest area of the claims, but contains no sulphide minerals. Drilling intersected sericitized, silicified, clay-altered and brecciated felsic volcanic rocks. Bedding strikes northwest and dips northeast, but faults, marked by crush zones and gouge were intersected in many holes.

Richfield Ventures hole BW 59, Figure 3, located in the Blackwater-Davidson project, indicates gold between 7 m and 368 m. The rocks are strongly silicified and brecciated to the bottom of the hole with disseminated sulphide throughout, particularly pyrite, sphalerite and galena.

Figure 4 shows a section through the Blackwater-Davidson deposit that indicates the mineralization is in structures steeply dipping to the northeast.



Figure 3: IP data for Blackwater project from Richfield Ventures Corp. <u>www.richfieldventures.ca</u>.



Figure 4 :Davidson cross section from www.silverquest.ca

## **Target Models**

There is no known mineralization within the two survey areas that could have been used to evaluate an anticipated geophysical response.

From the experience of the RJK geologists, it is suggested that the ore is resistive due to silica flooding and magnetically low. This, however, would only describe the most common mineralization as observed to date.

The East block has more glacial tills, covering the entire survey area, while the West block has thinner till and uncovered areas. The Dighem survey is unlikely to penetrate conductive tills to any significant extent. Finding resistors under the surface conductors would be unlikely.

It is known that hydrothermal alteration often follows increased porosity along geologic structures. These structures may be visible in the magnetics, and magnetic lows can indicate magnetite destruction associated with hydrothermal alteration.

## 4. PROCESSING, ANALYSIS TECHNIQUES AND PRODUCTS

## Processing

To enhance the data and to assist interpretation, the following processing steps were carried out on the EM and magnetic data.

#### Layered-earth Inversion

The Layered-Earth Inversion (LEI) algorithm, EM1DFM (Farquharson and Oldenburg, 2000), models the EM data with a layered-earth model increasing in thickness from the surface to depth in an approximately logarithmic fashion. There were 27 layers and the first layer was 1 m thick and progressively increased to 26 m thick to a depth of 216 m. For numerical reasons, a 28<sup>th</sup> layer was added to extend the depth to 1000 m. The LEI assigns a conductivity to each layer resulting in a conductivity-depth section (CDS) for each sounding. The units of conductivity are siemens per meter, often converted for convenience to millisiemens per meter (mS/m). The reciprocal of conductivity is resistivity and denoted by the units ohm-m.

#### Depth Imaging

The depth is determined from LEI. This style of inversion works well where the conductivity structure of the earth is primarily sub-horizontal. However, if the conductors are steeply dipping sheets or pods, the depth derived from the LEI can be used only as a rough indicator of the actual depth.

#### Magnetics

Processing was done on the magnetic data using **encom**<sup>•</sup>Pa, (Pitney Bowes Business Insight) software and algorithms, described by Shi and Butt (2004) – this paper is included in Appendix B, archive DVD. The reduction to pole (RTP) was performed using **encom**<sup>•</sup>Pa.

#### Magnetic 3D Modeling

The DIGHEM magnetic data was inverted using the University of British Columbia 3D inversion programs.

The UBC 3D magnetic inversion is a model inversion, producing fuzzy objects in the resulting block model. This can be mitigated to some extent by sharpening techniques and by constraints. However, the model will still contain a large spatial uncertainty, which manifests as indistinct boundaries. Therefore, the physical properties in the model generally underestimate the actual value of the physical property of anomalously strong objects being imaged since the physical property is smeared over a greater volume than the actual object.

### **Analysis Techniques and Issues**

#### **Discrete Features**

Discrete features are considered to be those EM responses which are interpreted to be caused by conductors with limited lateral dimensions. Such features would be caused by vertical to sub vertical conductors, not flay lying conductive horizons.

#### Wide Zones

Wide zones are considered to be those EM responses which are not caused by a local conductor, but instead by a large conductor such as a conductive lithology.

#### **Target Zones**

Target Zones are groupings of conductors (either discrete conductors or wide features from depth imaging) that are deemed to be a geophysically-logical feature. The Target Zones (or TZs) are prioritized based on the degree of correlation of the observed response with the defined target model(s).

## 5. SURVEY RESULTS

## **Data Quality**

Overall, both the magnetic and EM data quality appears to be good. For the West block the sensor height ranged from 26 m to 100 m with an average of 48 m. The East block ranged from 21 m to 69 m with an average of 43 m. Usually the Dighem systems are flown with a 35 m elevation if possible. Whether the increased height is due to trees or topography, it has a detrimental effect on the depth of penetration for the EM signal.

Both the West and East blocks contain numerous cultural features, which from Google Earth appear to be associated with logging. Although the area appears well accessed, there is no significant indication of cultural contamination in either the magnetic or EM data. Within the West block there is an area where the survey lines avoided something, causing a hole in the data set, however, it is not expected to be detrimental to the interpretation.

## **Geophysical Character over the Property**

The regional magnetic data is shown in Figure 5. There is a strong magnetic anomaly in the southern portion of the western block. The east block appears to be positioned along the western edge of a north-south magnetic feature.



Figure 5: Regional magnetic data.

In the CDS, there is little to suggest the Dighem data is seeing below the glacial tills. Most of the conductors appear flat-lying, and appear to be horizons within the tills. Figures 2 to 9 show sections through both blocks. A black line is drawn through the sections at 100 m depth, which is an optimistic depth of penetration for the Dighem system. These sections were selected since they crossed through what appeared to be interesting areas as seen in plan views.

The left side of each figure shows a MultiPlot with the following tracks:

- EM profiles in-phase
- EM profiles quadrature
- LEI derived CDS
- Magnetic profiles
- Mag3D derived susceptibility depth section

• Track map showing regional geology.

The right side of each figure shows an image of the 900 Hz coplanar quadrature data. This image shows the overall conductivity at the lowest frequency used.

There are some small hints of features extending to depth. For instance, West block Line 10680 (Figure 7) has a weak deep conductor at 361800 E, which is coincident with a mag high. This deep conductor is only visible because of the apparent lack of conductivity at shallower depths. Another deep conductor may be present at 363200 E. These are very slight conductors that are poorly resolved and not robust. Both seem to be associated with magnetic highs.

West block Line 11090 (Figure 10) went through the center of a large conductor seen in plan view. This large conductor appears to be another flat-lying conductor in tills, only deeper and stronger.

All the lines have been examined and there are not many places where there is any indication of conductors that are not in the tills, and they are all weak with lots of uncertainty.



Report on DIGHEM Survey for Blackwater Projects (British Columbia)

Figure 6: West block, line 10490.



Figure 7: West block, line 10680.


Figure 8: West block, line 10760.



Figure 9: West block, line 10900.



Figure 10: West block, line 11090.



Figure 11: East block, line 20240.



Figure 12: East block, line 20860.



Figure 13: East block, line 20910.

The Wide Zones were selected from the LEI and are shown in Figures 14 and 15 over the known geology for the two survey blocks.

The Wide Zones for West block indicate only partial coverage of the area by the conductive tills. This is also seen in the mapped geology. The selected wide zones do correspond with the mapped geology, in that the wide zones do not occur where there is mapped surface geology. This suggests that the conductors seen in the Dighem data are within the tills.

For the East block, the bulk of the area is apparently covered by till. Only one area on the west side did not show the wide horizontal conductors, although there is no indication of outcrop in the mapped geology.

There is some correlation between topography and the computed ground conductance. Figures 16 and 17 show the conductance for the 0 to 100 m depth interval with topographic contours. It may be expected that the glacial tills may be deeper and possibly more conductive over flat areas. This appears to be the case for the northern portion of the west block, however it is not apparent in other areas. Two topographic highs in the east block do appear more resistive, indicating less water-saturated tills.



Figure 14: Wide Zones (orange lines) for West block conductivity as seen from the LEIs.



Figure 15: Wide Zones for East block conductivity as seen from the LEIs.



Figure 16: Conductance for the 0 to 100 m depth interval from the LEIs.



Figure 17: Conductance for the 0 to 100 m depth interval from the LEIs.

## 6. MAGNETIC DATA

The magnetic data appears to be more useful than the electromagnetic data. From the geologic description of the nearby Mount Davidson area, it appears that volcanic material is most likely present and that the mineralization is associated with alteration, which can destroy the magnetite. Thus magnetic lows, which appear to be due to hydrothermal alteration, could be an indicator of mineralization.

Figures 18 and 19 show the reduced to pole magnetic data for the two Blackwater areas. On the images are linears and polygons indicating lows, which may be due to hydrothermal activity.

Figures 20 and 21 show the vertical gradient of the magnetic data for the two blocks.



Figure 18: Magnetics for West area, reduced to pole. Black lines show magnetic lows.



Figure 19: Magnetics for East area, reduced to pole. Black lines show magnetic lows.



Figure 20: Magnetics for West area, reduced to pole, vertical gradient. Black lines show magnetic lows.



Figure 21: Magnetics for East area, reduced to pole, vertical gradient. Black lines show magnetic lows.

## 7. DISCUSSION AND TARGET ZONES

The Dighem system appears to not have seen below the conductive glacial tills. Potential conductors, due to alteration or graphite along structures, were not identified. A deeper penetrating EM system, such as VTEM, would have a better chance of seeing through the surface conductors.

However, the magnetic data was clean and revealed a host of possible structures, seen as magnetic lows. The lows were selected as the important feature in the magnetics, as they may represent magnetite destruction in the otherwise magnetic volcanic rocks.

Not only were linear magnetic lows observed, but also localized areas that appeared to have undergone alteration. These areas, particularly where supported by the presence of structures seen by the magnetic low lineations, are considered targets for mineralization.

Based on the criteria above, 20 TZs were identified and listed below. The targets are all magnetic lows, possibly due to alteration. The ranking of the targets is the estimated chance that mineralization exists based on the geophysical data. About half of the target zones are ranked low, reflecting substantial uncertainty. Five targets were ranked medium and two were ranked high, TZW-6 and TZE-3. The scarcity of high ranking targets does not necessarily reflect an absence of mineralization within the survey area, only the geophysical nature of the mineralization, making it difficult to select the most promising targets without additional information.

Figures 22 and 23 show the TZs over the magnetic reduced to pole data with the magnetic lineations. These figures are shown below the following list of TZs. The TZ polygons are meant to show the best area to drill test the target based on the anomaly extent, not the limits of a potential ore body.

Although targets can be selected from the Dighem magnetic data, it is important that they be further investigated with ground IP/resistivity or geochemistry before drilling.

Number	Priority	Description
TZW-1	Medium	Strong magnetic low located along a NNE structure on the mapped geol-
		ogy.
TZW-2	Low	Along a NW trending structure as seen in the magnetics.
TZW-3	Low	Along two NW trending structures as seen in the magnetics.
TZW-4	Low	Mild magnetic low trending east-west.
TZW-5	Low	Mild low over to NW trending magnetic lineations.
TZW-6	High	Strong magnetic low, has an amorphous shape. Appears to be at an
		intersection of NW, NE, and east-west structures as seen in the magnetic
		lineations. Seen on line 10830.
TZW-7	Medium	East-west along a magnetic linear.
TZW-8	Low	Mild magnetic low.
TZW-9	Low	East-west along a magnetic linear.
TZW-10	Medium	NW trending along a magnetic linear. Located within more magnetic ma-
		terial.
TZE-1	Low	Circular magnetic low.
TZE-2	Low	Circular magnetic low.
TZE-3	High	Magnetic low that appears associated with the intersection of a north-
		south and an east-west structure as see from the magnetic data. Seen on
		Line 20240.
TZE-4	Low	NW trending magnetic low.
TZE-5	Low	Along a NW trending magnetic linear.
TZE-6	Low	Circular magnetic low.
TZe-7	Medium	Located along a magnetic linear that has a north-south component and a
		ENE component.
TZE-8	Medium	Along a north-south magnetic low that is coincident with a drainage.
TZE-9	Low	Along a north-south magnetic low that is coincident with a drainage.
<b>TZE-10</b>	Low	Very small circular magnetic low.

#### Table 5-1 Target Zones



Figure 22: West block Target Zones over image of magnetic data, reduced to pole.



Figure 23: East block Target Zones over image of magnetic data, reduced to pole.

#### **Priority Target Zones**

Two TZs within the survey blocks have been identified as high-priority: TZW-6 and TZE-3. Although only two TZ is selected as high ranking, the other target zones also indicate plausible targets. The distinction between the low, medium and high ranked targets is subjective and cannot be considered inflexible.

As mentioned above, additional ground geophysics or geochemistry could be used to further refine the target zone ranking.

### 8. Products

Table 6-1 lists the maps and products that are provided. Other products can be prepared from the existing dataset required.

All maps are created using the following datum and projection parameters:

Ellipsoid: NAD83 Datum: NAD83 Projection: UTM (Zone: 10N):

#### Table 6-1 Survey Products

TargetMaps @ 1:20 000 (1 hard copy each)

Each map includes picked anomalies, magnetic and conductivity lineations, deposit locations, concessions, Target Zones, and drill collars.

- Reduced to Pole TMI (RTP)
- 1<sup>st</sup> Vertical Gradient of RTP magnetics
- Tilt angle of RTP (commonly referred to as the phase of the analytic signal)
- Magnetic susceptibility model 200 m depth slice
- EM-Z (co-planar) 900 Hz in-phase
- EM-Z (co-planar) 900 Hz quadrature
- DTM (from Dighem Survey)

<u>MultiPlots</u>™ @ 1:20 000 (PDF)

Mini-Plates<sup>™</sup>: RTP, tilt angle of RTP, coplanar in-phase 900 Hz, coplanar quadrature 900 Hz and Topography.

Each MultiPlot<sup>™</sup> show the following:

- Profiles Dighem EM Component Profiles Channels
- Profiles RTP, tilt angle of RTP, 1<sup>st</sup> Vertical Derivative of RTP
- Conductivity depth section LEI (mS/m) + bird height
- Susceptibility-depth section from magnetic 3D inversion (~0 to 0.1 SI units) + bird height
- TrackMap: Geology with magnetic lineations from lows (disruptions), TZs and flight path

#### Processing and Analysis Report (1 hard copy)

Additional Products - Appendix B (on archive DVD, 1 copy)

- Digital XYZ archive in Geosoft format
- Digital grid archives in Geosoft format
- Susceptibility 3D Model in UBC format
- Density 3D Model in UBC format
- Profile Analyst session file (to create MultiPlots™)
- PDFs of TargetMaps and MultiPlots™
- Processing and Analysis Report in PDF format
- Profile Analyst V11 (free viewer)
- Fugro Report: Fugro Airbone Surveys, (2011)

## 9. CONCLUSIONS AND RECOMMENDATIONS

This report provides a description of the processing, analysis and outcomes of a 2010-2011 Dighem EM and magnetic survey performed for RJK Explorations Ltd. over the company's Blackwater properties in central British Columbia.

The EM data appears to have by and large failed in penetrating the glacial till. Anomalies seen within the data can be attributed to conductors within the till.

The magnetic data appears to be useful in identifying potential zones of magnetite destruction, possibly from hydrothermal alteration, and could indicate mineraization.

Based on EM, magnetic and radiometric data, two high priority Target Zone has been identified (designated TZW-6 and TZE-3), which shows conductivity anomalies that are in good structural context with known mineralization.

Although alteration may be identified, alteration alone does not indicate mineralization. Ground follow up of Target Zones is recommended to better delineate targets prior to drilling.

Helicopter time-domain EM, such as Geotech's VTEM, Fugro's HeliTEM or Aeroquest's AeroTEM, can be used to help resolve deep bedrock conductors. If it was not believed strong basement conductors are present, then the Geotech ZTEM system which can map zones of high resistivity better than conventional EM systems would be a suitable system to apply. Whatever systems were considered, calibration over the Richfield deposit would be of value.

Respectfully submitted,

Scott J Thomas

Scott J. Thomas Senior Geophysicist Condor Consulting, Inc. June 7, 2011

#### 10. **REFERENCES**

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- Fugro Airbone Surveys (2011): Logistics and interpretation report, airborne magnetic & EM survey, RJK Blackwater East & West claims, Vanderhoof area, British Columbia, February 2011.
- Shi, Z. and Butt, G. (2004): New enhancement filters for geological mapping. ASEG 17<sup>th</sup> Geophysical Conference and Exhibition, Sydney 2004. Extended abstract.

#### 11. AUTHOR'S CERTIFICATION

I Hereby Certify that at the writing of this report "Report on Dighem AEM and magnetic data, Blackwater East and West property, British Columbia, for RJK Explorations Ltd." dated May 2011:

I have resided at 3952 Yank Way, Arvada Colorado, USA, since August 2007;

I am employed as an exploration geophysicist by Condor Consulting, Inc.;

I have graduated from Northern Arizona University with the degree of Bachelor of Science in Geology/Geophysics, and have obtained an MS and PhD (with honours) from the University of Arizona in 1995;

I have been actively involved in the field of mineral exploration since 1996 as a full time exploration geophysicist for base metals, concentrating on gold and copper exploration;

I have been performing mineral exploration activities for the account of **Condor Consulting Inc.** since August 2007;

I have no direct interest, nor do I expect to receive such interest in the Blackwater East and West properties and I do not have any stock in **RJK Explorations Ltd.** or any other company named in this report.

Dated this 5<sup>th</sup> day of May, 2011.

Lakewood, Colorado.

(homas

Scott Thomas Exploration Geophysicist

## 12. APPENDICES

# **APPENDIX A - BACKGROUND INFORMATION ON EM PROCESSING**

### **APPENDIX B - ARCHIVE DVD**

Contact the BCGSB if you wish line data 269 pages 773MB