

## **Ministry of Energy, Mines & Petroleum Resources**Mining & Minerals Division

Mining & Minerals Division BC Geological Survey



TYPE OF REPORT [type of survey(s)]: Geological Geophysical TOTAL COST: \$ 9,228.40

AUTHOR(S): Laurence Sookochoff, PEng	s	SIGNATURE(S):	Digitally signed by Laur <u>Date: 2017.05.18 08:15:</u>	
NOTICE OF WORK PERMIT NUMBER(S)/DATE(S):				YEAR OF WORK: 201
STATEMENT OF WORK - CASH PAYMENTS EVENT NUMBER(S)/DATE(S):	5606764	November 2	3, 2016	
PROPERTY NAME: Tom Cat				
CLAIM NAME(S) (on which the work was done): 1047659				
соммодітієs sought: Copper Gold				
MINERAL INVENTORY MINFILE NUMBER(S), IF KNOWN: 092HNE056 /	/ 166 / 177	' / 249 / 256 <i>/</i>	257 / 258 / 259	
MINING DIVISION: Nicola	NTS/E	scgs: 092H.	087 /.088 /.097 /.	.098
	<b>°</b> 39	' 19 "	(at centre of wor	k)
DWNER(S):  Sierra Iron Ore Corporation	2)			
MAILING ADDRESS: 132366 Cliffstone Court				
Lake Country BC V4V 2R1				
OPERATOR(S) [who paid for the work]:  Sierra Iron Ore Corporation	2)			
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PROPERTY GEOLOGY KEYWORDS (lithology, age, stratigraphy, structure, Triassic, Nicola Group, Central Volcanic Facies, Andesite, Chal				, Hematite, Structural
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REFERENCES TO PREVIOUS ASSESSMENT WORK AND ASSESSMENT RE	EPORT NUM	BERS: 0101	6, 01059, 0407,	05908, 06302, 06761,

TYPE OF WORK IN THIS REPORT	EXTENT OF WORK (IN METRIC UNITS)	ON WHICH CLAIMS	PROJECT COSTS APPORTIONED (incl. support)
GEOLOGICAL (scale, area)			
Ground, mapping			
Photo interpretation			\$ 6,000.00
GEOPHYSICAL (line-kilometres)			
Ground			
Magnetic		-	3,228.40
Electromagnetic			
Induced Polarization			
Radiometric			
Seismic			
Other			
Airborne			
GEOCHEMICAL (number of samples analysed for)			
Soil		-	
		-	
Rock			
Other		-	
DRILLING (total metres; number of holes, size)			
Core			
Non-core			
RELATED TECHNICAL			
Sampling/assaying			
Petrographic			
Mineralographic			
Metallurgic			
PROSPECTING (scale, area)			
PREPARATORY / PHYSICAL			
Line/grid (kilometres)			
Topographic/Photogrammetric (scale, area)			
Legal surveys (scale, area)			
Road, local access (kilometres)/	trail		
Trench (metres)			
Underground dev. (metres)			
Other			
		TOTAL COST:	\$ 9,228.40
		10172 3001.	7 3,223.10

## SIERRA IRON ORE CORPORATION

(Owner & Operator)

## **GEOLOGICAL & GEOPHYSICAL**

## ASSESSMENT REPORT

(Event 5626764)

Work done on

**Tenure 1047659** 

BC Geological Survey Assessment Report 36521

of the seven claim

## Toni 1047659 Claim Group

(Work done from November 5, 2016 to November 18, 2016)

Nicola Mining Division

BCGS Map 092H.087/.088/.097/.098

Centre of Work

5,534,100N, 668,250E

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Submitted

May 18, 2017

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#### **SUMMARY**

The seven claim, 2,726 hectare Toni 1047659 Claim Group, is located in south-central British Columbia 192 kilometres northeast of Vancouver and within nine kilometres of the of the Ketchan Lake North property (MINFILE 092HNE115) property where a 265.5 metre thick zone of copper-gold mineralization which included a 78 metre interval grading 0.50% copper and 0.15 grams per tonne gold from drill results were recently reported (Kaizen, 2016).

At the Ketchan property, the Summers Creek regional structure was indicated to control the emplacement of the diorite stock and the branching fault splays which may have provided the mineral controls to the significant mineral zones on which Aulis (1991) reports that, "Present drillhole spacing within the IP anomaly suggests the possibility of a porphyry copper-gold deposit of significant size (> 80 million tons)".

At Ketchan, the highest copper grades occur in the deepest part of the intersection with the best grades of copper and gold generally associated with the margins of magnetic highs (*Kaizen*, 2015). It is also reported that brecciated areas generally contain stronger overall alteration, mainly chlorite with increased concentrations of magnetite. The strongest areas of brecciated, magnetite-rich rock observed in most of the 2005 drill holes, generally contained the highest concentrations of pyrite/chalcopyrite

At the Big Kidd prospect(*Minfile 092HNE074*), located within a dioritic stock, and within two kilometres of Tenure 1047659, the 300 metre wide breccia pipe may be an indication of a cross-structural mineral controls proximal to a regional structure. A reported drill-hole intersection of 0.75 grams per tonne gold and 0.2 per cent copper over 71 metres is one of many drill holes that explore the breccia pipe.

As indicated by the BC government supported MapPlace geological maps, the Toni 1047659 Claim Group is underlain by andesites of the upper Triassic Nicola Group Central Volcanic Facies (*uTrNC*.

A northerly trending branch of the regional Kentucky-Alleyne Fault System is adjacent to the northeast corner of Tenure 1047659.

The two cross-structures in the structural analysis of Tenure 1047659 were likely in part influenced by the regional Kentucky-Alleyne Fault system with one branch fault adjacent to the northeast corner of Tenure 1047659. A cross-structure is commonly the prime mineral controlling feature of a mineral zone with the maximum brecciation and depth intensiveness providing the most favourable feeder zone to any hydrothermal fluids sourced from a potentially mineral laden reservoir.

The significance of a cross-structure is shown at the five Copper Mountain mineral deposits where cross-structures appear central to the ore-bodies (*Figure 12*).

The two adjacent anomalous mag LO's revealed by the magnetometer survey, may indicate a central breccia zone (mag LO) extending from the surface volcanics to a concealed mineralized stock, with the peripheral mag HI's indicating the margins of magnetic highs where the best grades of mineralization are located, as at the Ketchan property.

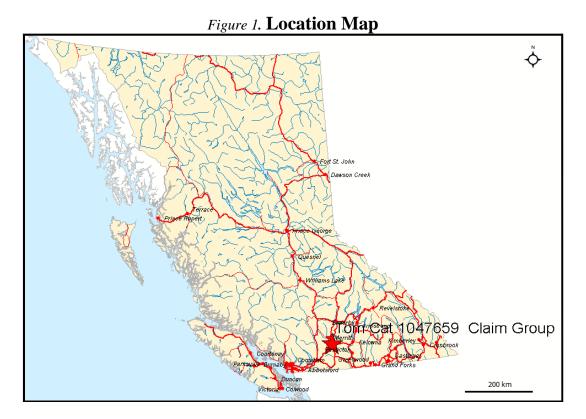
Thus the cross-structural areas should be explored to determine the cause of the magnetometer anomalies If this interpretation is within parameters indicative of a potential mineralized porphyry resource, then standard exploration procedures would be applied to follow-up exploration.

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## INTRODUCTION

From November 5, 2016 to November 18, 2016 a structural analysis and a localized magnetometer survey were completed on Tenure 1047659 of the Toni 1047659 claim group (Property). The purpose of the program was to delineate potential structures and correlative magnetic responses which may be integral in indicating near surface indications and/or geological controls, to a potential mineral resource.

Information for this report was obtained from sources as cited under Selected References.



## PROPERTY DESCRIPTION AND LOCATION

## **Description**

The Property is comprised of seven contiguous claims covering an area of 2726.2909 hectares. Particulars are as follows:

Table I: Tenures of Toni 1047659 Claim Group

Tenure Number	<u>Type</u>	<u>Claim Name</u>	Good Until	Area (ha)
<u>516703</u>	Mineral		20170715	582.976
<u>516708</u>	Mineral		20170715	374.651
<u>535845</u>	Mineral	CASPER WEST	20170715	520.39
1040739	Mineral		20171227	249.6533
<u>1044811</u>	Mineral		20170715	416.2669
<u>1047656</u>	Mineral		20171105	249.6229
<u>1047659</u>	Mineral		20171105	332.7308

<sup>\*</sup>Upon the approval of the assessment work filing of Event Number 5626764.

## Tom Cat 1047659 Claim Group

# Figure 2. Claim Location (from MapPlace & Google)

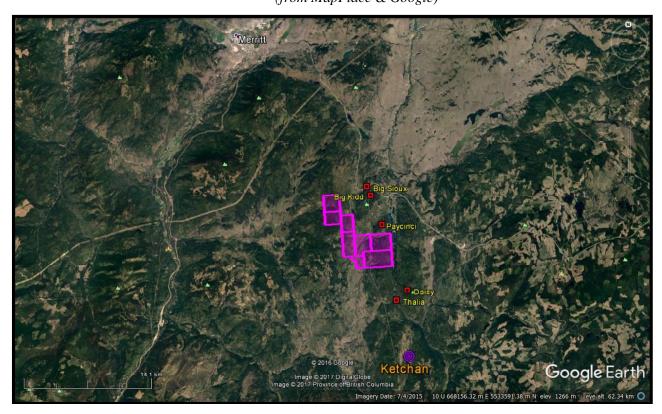
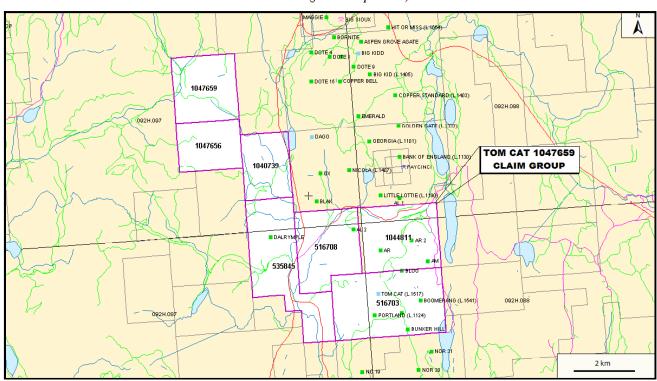


Figure 3. Claim Map (from MapPlace)



**Property Description and Location** (cont'd)

#### Location

The Property is located within BCGS Map 092H.078/.088/.097/.098 of the Nicola Mining Division, 192 kilometres northeast of Vancouver, 25 kilometres south-southeast of Merritt, and 10 kilometres north of the Ketchan property.

# ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE & PHYSIOGRAPHY

#### Access

Access to the Property is southward from Merritt via Highway 5A/97C or the Princeton/Kamloops Highway for 26 kilometres to the Aspen Grove junction thence southward from via Highway 5A for three kilometres to the northern boundary of Tenure 1040739 of the Toni 1047659 Claim Group.

#### Climate

The region is situated within the dry belt of British Columbia with rainfall between 25 and 30 cm per year. Temperatures during the summer months could reach a high of 35° and average 25°C with the winter temperatures reaching a low of -10° and averaging 8°. On the Property snow cover on the ground could be from December to April and would not hamper a year-round exploration program.

#### **Local Resources and Infrastructure**

Merritt, and/or Kamloops, historic mining centres, could be a source of experienced and reliable exploration and mining personnel and a supply for most mining related equipment. Kamloops is serviced daily by commercial airline and is a hub for road and rail transportation. Vancouver, a port city on the southwest corner of, and the largest city in the Province of British Columbia, is four hours by road and less than one hour by air from Kamloops.

## **Physiography**

Tenure 1047659 covers a, moderately sloped forested area. Elevations range from of 1,169 metres in a river valley at the southeast corner to 1,336 along the northwest border.

#### **WATER and POWER**

Sufficient water for all phases of the exploration program should be available from lakes and creeks which are located within the confines or peripheral to Tenure 1047659. A 138KV power line traverses the western portion of the Property.

#### **HISTORY: PROPERTY AREA**

The history on some MINFILE reported mineral anomalies, showings, prospects, and past producers in the Toni 1047659 Claim Group area is reported as follows. The distance is relative to the Toni 1047659 Claim Group.

## **HN-WEN** prospect (Volcanic redbed Cu)

MINFILE 092HNE058

Eleven kilometres east-northeast

Adits and trenches were initially cut around 1900; later work included diamond drilling and trenching in the 1960s and 1970s.

History: Property Area (cont'd)

## **GOLDEN SOVEREIGN** prospect (Volcanic redbed Cu)

MINFILE 092HNE072

Four kilometres east

The Golden Sovereign prospect is centred 900 metres east of the south end of Tule Lake and 4.5 kilometres northeast of Aspen Grove.

The prospect was periodically explored between 1900 and 1913. Nine tonnes of ore grading 5.0 per cent copper were mined in 1916, likely from the high-grade shear zone on the Golden Sovereign claim (Lot 1528). Snowflake Mining Company Ltd. examined the occurrence in 1981.

## **BIG SIOUX** past producer (Volcanic redbed Cu; Alkalic porphyry Cu-Au)

MINFILE 092HNE073

Four kilometres east-northeast

This deposit was one of the first showings to be explored in the Aspen Grove copper camp. It was staked in 1899, and investigated periodically by H.H. Schmidt up to 1914. One shaft, 10 metres deep, an adit, 46 metres long, and numerous pits and trenches were excavated during this time. Forty-four tonnes of ore were shipped in 1918 grading 9.78 per cent copper and 67.9 grams per tonne silver. David Minerals Ltd., Amax Exploration Inc. and Norranco Mining and Refining completed soil and rock geochemical and geophysical surveys over the deposit between 1968 and 1978.

The occurrence was restaked in 1989 after copper mineralization was exposed in a road cut along the north side of the recently completed Coquihalla Highway (Phase 3 - Okanagan Connector). The deposit was subsequently mapped and sampled by Amex Exploration Services Ltd. in 1990, Northair Mines Ltd. in 1991 and Placer Dome Inc. in 1992. Christopher James Gold Corp. drilled the area, including the Big Kidd (092HNE074) in 1997

## **BIG KIDD** prospect (Volcanic redbed Cu; alkalic porphyry Cu-Au)

MINFILE 092HNE074

Four kilometres east

The Fairweather Hills region is underlain by the Central volcanic facies of the Upper Triassic Nicola Group, comprising intermediate, feldspar and feldspar augite porphyritic ash flows, and associated alkaline intrusions.

The intrusions vary from diorite to monzonite in composition and are thought to be comagmatic with the Nicola Group, ranging in age from Late Triassic to Early Jurassic.

Locally, the area is underlain by red and green laharic breccias, augite andesite porphyry and minor sediments of the Nicola Group (Central belt, Bulletin 69). The units generally strike north-northwest and dip east. This sequence is broken up into a series of tilted fault blocks trending north.

A vertical or subvertical breccia pipe, nearly circular in outline and about 300 metres wide, is developed in a body of fine- grained diorite, which may in part be recrystallized volcanics. The pipe consists of angular to subrounded clasts of volcanics, fine- grained diorite (microdiorite) and pinkish grey monzonite and syenomonzonite porphyry in a matrix of altered diorite intrusive material and finely comminuted rock. The fragments are 1 centimetre to several metres in diameter.

History: Property Area (cont'd)

## **PAYCINCI** prospect (Volcanic redbed Cu)

MINFILE 092HNE084

Four kilometres east

The Cincinnatti deposit was first explored by the Bates brothers in the early 1900s. A number of trenches, and one adit 120 metres long, were excavated between 1899 and 1913. Payco Mines Ltd. and Alscope Consolidated Ltd. conducted geological and geophysical surveys, trenching and diamond and percussion drilling between 1963 and 1967. An additional 15 holes totalling 1000 metres were drilled by Gold River Mines and Enterprises Ltd. in 1973 and Sienna Developments Ltd. in 1979.

The deposit was most recently sampled by Pacific Copperfields Ltd. in 1992. In 1998, Christopher James Gold Corp. optioned the property. Reserves are estimated at 1.8 million tonnes grading 1 per cent copper (Tom Schroeter, 1998).

## **KETCHAN LAKE NORTH** *prospect* (Alkalic porphyry Cu-Au)

MINFILE 092HNE115

Four kilometres south

The Ketchan Lake North (previously Log) prospect is 400 metres east of Ketchan (Duke) Lake, 2.25 kilometres southwest of Missezula Lake and 35.5 kilometres north of Princeton.

This prospect was first staked by Plateau Metals Ltd. in 1962, after copper mineralization was uncovered during a logging operation. The company completed a magnetometer survey and drilled three holes, totaling 145 metres, in 1962.

An additional seven holes, totaling 512 metres, were drilled in 1966 after the property was optioned to Adera Mining Ltd. Various geophysical and geological surveys and 768 metres of trenching were also completed in 1966. A channel sample of hard, well-fractured, silicified diorite, containing evenly disseminated fine crystals of chalcopyrite, yielded 1.36 per cent copper over 3.05 metres (National Mineral Inventory). A section of gossan near the north end of the zone analysed 0.17 per cent copper and 8.23 grams per tonne silver over 29 metres (Assessment Report 977). Hole P3 was drilled in the vicinity and yielded 0.22 per cent copper over 39.6 metres (Assessment Report 977).

The deposit was restaked by Bethlehem Copper Corporation in 1973. The company drilled three percussion holes totaling 322 metres, two diamond drillholes totaling 227 metres and one rotary hole, 218 metres deep, in 1974 and 1975.

Rotary drilling near the centre of the zone intersected disseminated chalcopyrite to a depth of 218 metres (Assessment Report 5824).

Cominco Ltd. completed 1067.3 metres of percussion drilling in 15 holes in 1991. A second hole drilled 695 metres south-southeast of hole P3 assayed 0.379 per cent copper and 0.076 gram per tonne gold over 86.6 metres (Assessment Report 21746).

In 1992, Cominco Ltd. conducted an eight-hole percussion drill program totaling 640 metres. Highlights include drillhole M92-4, which returned 81.4 metres grading 0.2595 per cent copper and 0.124 grams per tonne gold (Assessment Report 22555).

In 2004, William Richard Bergey completed reconnaissance geological mapping on the Aspen Grove property.

In 2005, Copper Belt Resources Ltd. conducted geological mapping and a 10-hole diamond drill program totaling 1210.2 metres.

Sierra Iron Ore Corporation

History: Property Area (cont'd)

## **Ketchan Lake North** prospect (cont'd)

Drillhole K05-07 intersected a 35.8 metre section that assayed 0.54 per cent copper and 0.19 grams per tonne gold (Assessment Report 28484).

In 2006 and 2007, Midland Resources Corp. completed 1416 metres of diamond drilling in seven holes. Highlights include drillhole K-06-11, which returned 36.75 metres grading 0.29 per cent copper and 0.17 grams per tonne gold (Assessment Report 29453).

In 2011, Moag Copper-Gold Resources Inc. completed a mobile metal ion geochemical sampling survey in areas throughout the Aspen Grove property.

In 2013, West Cirque Resources Ltd. acquired the Aspen Grove property, which consists of 37 mineral claims, totaling 5629 hectares, including the Ketchan Lake North prospect, and proceeded to complete an exploration program of geological mapping and rock sampling throughout the property. Twelve samples were taken from trenches and outcrops at the Ketchan Lake North prospect and assayed up to 1.07 per cent copper, 0.458 grams per tonne gold and 52.5 grams per tonne silver (Press Release, West Cirque Resources Ltd., June 11, 2013).

## **HISTORY: PROPERTY**

**TOM CAT** *prospect* (*Volcanic redbed-Cu*; *Subvolcanic-Cu-Ag-Au* (*As-Sb*);

Porphyry Mo (Low F-type)

MINFILE 092HNE056

One kilometre south

The occurrence was initially prospected and trenched by W. Murray between 1906 and 1913. Pyramid Mining Company Ltd. drilled 13 holes totalling 1042 metres in 1965.

**AM** showing (Volcanic redbed Cu)

MINFILE 092HNE166

Within Tenure 1044811

The Am showing is 1.7 kilometres north-northwest of the north end of Bluey Lake and 600 metres west of the south end of Kentucky Lake.

**AR** *showing* (*Volcanic redbed Cu*)

MINFILE 092HNE177

Within Tenure 1044811

The AR showing is 2.6 kilometres northwest of the north end of Bluey Lake and 2.0 kilometres west-northwest of the south end of Kentucky Lake.

## **DALRYMPLE** showing (Volcanic redbed Cu)

MINFILE 092HNE256

Within Tenure 535845

The Dalrymple showing is 2.5 kilometres south-southwest of the south end of Kidd Lake and 2.3 kilometres northeast of the north end of Dodds Lake.

**BLOO** showing (Alkalic porphyry Cu-Au; Volcanic redbed Cu)

MINFILE 092HNE257

Within Tenure 1044811

### Sierra Iron Ore Corporation

Tom Cat 1047659 Claim Group

Event 5626764

The Bloo showing is 1.8 kilometres north-northwest of the north end of Bluey Lake and 1.4 kilometres west-southwest of the south end of Kentucky Lake.

**AR2** showing (Volcanic redbed Cu)

MINFILE 092HNE258

Within Tenure 1044811

The AR 2 showing is 2.4 kilometres north-northwest of the north end of Bluey Lake and 1.25 kilometres northwest of the south end of Kentucky Lake.

**AL2** showing (Volcanic redbed Cu)

MINFILE 092HNE259

Within Tenure 1044811

The AL 2 showing is 1.4 kilometres south-southwest of the south end of Miner Lake and 2.9 kilometres southeast of the south end of Kidd Lake.

## **GEOLOGY: REGIONAL**

The Aspen Grove geological district is located within the regional Quesnel Trough, a 30 to 60, km wide belt of Lower Mesozoic volcanic and related strata enclosed between older rocks and much invaded by batholiths and lesser intrusions (Campbell and Tipper, 1970). The southern part is the well-known Nicola belt, continuing nearly 200 km to its termination at the U.S. border and containing the important copper deposits of the Highland Valley, Craigmont, Copper Mountain, Afton, Brenda, in addition to the historic Hedley gold camp.

The Nicola Group has been divided into western, central, and eastern belts on the basis of lithology and lithogeochemistry and by major fault systems. Variation from calc-alkaline to shoshinitic compositions from west to east has been interpreted to reflect eastward dipping subduction in the Nicola arc.

## **GEOLOGY: PROPERTY AREA**

The geology on some MINFILE reported mineral anomalies, showings, prospects, and past producers peripheral to the Toni 1047659 Claim Group is reported as follows. The distance is relative to the Toni 1047659 Claim Group.

## **HN-WEN** prospect (Volcanic redbed Cu)

MINFILE 092HNE058

Eleven kilometres east-northeast

The HN-WEN occurrence is hosted in the Upper Triassic Nicola Group, which regionally consists of alkalic and calcalkalic volcanics and intrusions of island arc origin, and which is the principal component of the Quesnel Terrane (Geological Survey of Canada Maps 41-1989, 1713A).

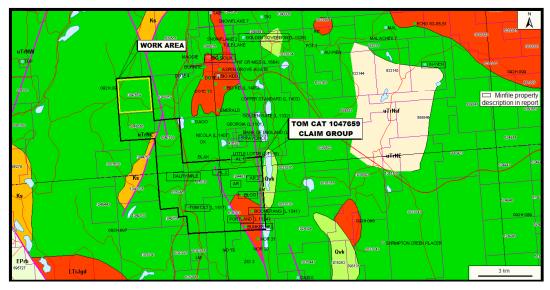
This belt has been of major economic interest because of its potential for porphyry copper-gold mineralization.

The occurrence lies in the northern assemblage of the Eastern belt of the Nicola Group (after Preto, Bulletin 69).

This assemblage mainly consists of well-bedded submarine volcaniclastic rocks and volcanic flows. The main Aspen Grove copper camp lies several kilometres to the west in the Central belt, separated by the north-striking Kentucky-Alleyne fault system (Bulletin 69).

Sierra Iron Ore Corporation Geology: Property Area (cont'd)

Figure 4. Property, Index, Geology, & Minfile



## **GEOLOGY MAP LEGEND**

Pleistocene to Holocene

Qvk

Unnamed alkalic volcanic rocks

Cretaceous

Ka

unnamed, undivided sedimentary rocks

**Upper Triassic: Nicola Group** 

**Eastern Volcanic Facies** 

**uTrNE** 

basaltic volcanic rocks

uTtNsf

mudstone, siltstone, shale, fine clastic

sedimentary rocks

uTrNM1

amphibolite/kyanite lower grade metamorphic rocks

uTrJum

unnamed ultramafic rocks

**Central Volcanic Facies** 

uTrNc

andesitic volcanic rocks

**Late Triassic to Early Jurassic** 

LTrJgd

unnamed granodiorite intrusive rocks

LTrJdr

dioritic to gabbroic intrusive rocks

Geology: Property Area (cont'd)

HN Wen prospect (cont'd)

The area of the occurrence is underlain by augite porphyritic volcanic flows of andesitic to basaltic composition, fragmental rocks including tuff and breccia, and argillites (Assessment Reports 1586, 4230). The argillites are dark grey to black, well bedded, and locally limy. They are somewhat carbonaceous and pyritic. Minor rock types present include feldspar porphyry and locally lenses of diorite. About 2.5 kilometres to the northeast is the contact with the Early Jurassic Pennask batholith, a large intrusion of medium-grained granodiorite to quartz diorite. The contact between the volcanic rocks and the argillites passes through the centre of the mineralized area. The contact is parallel to bedding, striking 130 degrees and dipping 40 degrees southwest, with the volcanic rocks on the northeast side (Assessment Report 4230).

Event 5626764

Geology: Property Area (cont'd)

## GOLDEN SOVEREIGN prospect (Volcanic redbed Cu)

MINFILE 092HNE072

Four kilometres east

A gentle ridge, trending north-northwest and lying between Tule Lake and Quilchena Creek, is underlain by a sequence of green and red volcanic and laharic breccias, with minor thinly-bedded green tuff, of the Upper Triassic Nicola Group (Central belt, Bulletin 69). The units strike northwest and dip 40 to 85 degrees southwest.

## **BIG SIOUX** past producer (Volcanic redbed Cu; Alkalic porphyry Cu-Au)

MINFILE 092HNE073

Four kilometres east-northeast

The Fairweather Hills region is underlain by the Central volcanic facies of the Upper Triassic Nicola Group, comprising intermediate, feldspar and feldspar augite porphyritic pyroclastics and flows, and associated alkaline intrusions. The intrusions vary from diorite to monzonite in composition and are thought to be comagnatic with the Nicola Group, ranging in age from Late Triassic to Early Jurassic.

Locally, the area is underlain by red and green laharic breccias, augite andesite porphyry and minor sediments of the Nicola Group (Central belt, Bulletin 69). The units generally strike north-northwest and dip east. This sequence is broken up into a series of tilted fault blocks trending north. The occurrence is hosted in variably amphibole, augite and feldspar porphyritic basaltic andesite, subjected to extensive fracturing, shearing and faulting. Alteration minerals include abundant epidote, and minor silica and chlorite. Some microdiorite and diorite are also present.

## **BIG KIDD** prospect (Volcanic redbed Cu; alkalic porphyry Cu-Au)

MINFILE 092HNE074

Four kilometres east

Locally, the area is underlain by red and green laharic breccias, augite andesite porphyry and minor sediments of the Nicola Group (Central belt, Bulletin 69). The units generally strike north-northwest and dip east. This sequence is broken up into a series of tilted fault blocks trending north.

A vertical or subvertical breccia pipe, nearly circular in outline and about 300 metres wide, is developed in a body of fine- grained diorite, which may in part be recrystallized volcanics. The pipe consists of angular to subrounded clasts of volcanics, fine- grained diorite (microdiorite) and pinkish grey monzonite and syenomonzonite porphyry in a matrix of altered diorite intrusive material and finely comminuted rock. The fragments are I centimetre to several metres in diameter. Parts of the breccia, especially on the north and east sides of the pipe, show extensive late magmatic and/or hydrothermal alteration and recrystallization. Breccia clasts in these areas have pronounced grey and pinkish grey alteration rims, and the matrix is extensively replaced by epidote, chlorite and calcite.

## PAYCINCI prospect (Volcanic redbed Cu)

MINFILE 092HNE084

Four kilometres east

The deposit is located in the southern portion of an area of hilly upland situated in the centre of the Aspen Grove copper camp, known as the Fairweather Hills.

The Fairweather Hills region is underlain by the Central volcanic facies of the Upper Triassic Nicola Group, comprising intermediate, feldspar and feldspar augite porphyritic pyroclastics and flows, and associated alkaline intrusions.

Geology: Property Area (cont'd)

Paycinci prospect (cont'd)

The intrusions vary from diorite to monzonite in composition and are thought to be comagnatic with the Nicola Group, ranging in age from Late Triassic to Early Jurassic.

Locally, the area is underlain by red and green laharic breccias, augite andesite porphyry and minor sediments of the Nicola Group (Central belt, Bulletin 69). The units generally strike north-northwest and dip east. This sequence is broken up into a series of tilted fault blocks trending north. Hypogene and supergene copper mineralization occurs in green laharic breccia, near the contact with red laharic breccia to the east.

This mineralization consists primarily of disseminated and fracture controlled chalcocite and native copper, accompanied by lesser malachite and azurite, and minor chalcopyrite, bornite, cuprite and pyrite. Drilling indicates chalcopyrite becomes more abundant at depth at the expense of chalcocite. This mineralization is exposed along the crest and east flank of a small northerly trending ridge, over a north-south distance of 400 metres.

**DAISY** prospect (Volcanic redbed-Cu; Subvolcanic-Cu-Ag-Au (As-Sb); Porphyry Mo (Low F-type) MINFILE 092HNE091

Four kilometres south-southeast

This region north of Missezula Lake is underlain by the Eastern volcanic facies of the Upper Triassic Nicola Group, comprising mafic to intermediate, augite and hornblende porphyritic pyroclastics and flows, and associated alkaline intrusions. The intrusions vary from diorite to monzonite in composition and are thought to be comagnatic with the Nicola Group, ranging in age from Late Triassic to Early Jurassic. Much of the copper mineralization and associated alteration frequenting this portion of the Nicola belt can be attributed to the emplacement of such intrusions.

A shear zone 20 to 30 metres wide, striking north-northwest and dipping steeply west, cuts massive green andesite and underlying coarse red volcanic breccia (lahar (?)) of the Nicola Group (Central belt, Bulletin 69).

## **KETCHAN LAKE NORTH** prospect (Alkalic porphyry Cu-Au)

MINFILE 092HNE115

Nine kilometres south

This region southwest of Missezula Lake is underlain by the eastern volcanic facies of the Upper Triassic Nicola Group, comprising mafic to intermediate augite and hornblende porphyritic pyroclastics and flows, and associated alkaline intrusions. The intrusions vary from diorite to monzonite in composition and are thought to be comagnatic with the Nicola Group, ranging in age from Late Triassic to Early Jurassic. Much of the copper mineralization and associated alteration frequenting this portion of the Nicola belt can be attributed to the emplacement of such intrusions.

Locally, the area is underlain by northwest-striking, moderately northeast-dipping andesitic flows, with lesser andesitic lapilli and crystal tuffs and minor lahar deposits of the Nicola Group (Central Belt, Bulletin 69). This sequence is intruded by a west-trending mass of fine to medium-grained diorite (microdiorite), roughly centred about Ketchan Lake, measuring 4000 by 2000 metres.

The diorite commonly contains seams and irregular replacements of orthoclase. Epidote is widespread, and is frequently developed along northwest-striking, northeast-dipping fractures. Disseminations and veinlets of magnetite are also present in this stock.

### **GEOLOGY: PROPERTY**

As indicated by the BC government supported MapPlace geological maps, the Toni 1047659 Claim Group is underlain by andesites of the upper Triassic Nicola Group Central Volcanic Facies (*uTrNC*) with andesites of the Central Volcanic Facies in the west and basalts of the Eastern Volcanic Facies in the east.

A northerly trending branch of the regional Kentucky-Alleyne Fault System is adjacent to the northeast corner of Tenure 1047659.

## TOM CAT prospect (Volcanic redbed-Cu; Subvolcanic-Cu-Ag-Au (As-Sb);

Porphyry Mo (Low F-type)

MINFILE 092HNE056

One kilometre south

This deposit is hosted in green laharic breccia or basaltic flow breccia near the contact with red laharic breccia of the Upper Triassic Nicola Group (Central belt, Bulletin 69).

The unit strikes north-northwest and dips 60 degrees east. Massive basaltic flows outcrop to the northeast. Alteration of the breccia consists of some chloritization of olivine and pyroxene, and sericitization of feldspar.

## **AM** showing (Volcanic redbed Cu)

MINFILE 092HNE166

Within Tenure 1044811

Chalcopyrite, bornite and chalcocite form disseminations and stringers in shear zones within massive green volcanic breccia and lahar deposits of the Upper Triassic Nicola Group (Central belt, Bulletin 69.

## **AR** showing (Volcanic redbed Cu)

MINFILE 092HNE177

Within Tenure 1044811

Two closely-spaced trenches expose chalcopyrite and bornite in green volcanic breccia and lahar deposits of the Upper Triassic Nicola Group (Central belt, Bulletin 69).

## **JOSEE** showing (Alkalic porphyry Cu-Au; Volcanic redbed Cu)

MINFILE 092HNE249

Within Tenure 1053447

Chalcocite occurs in a sequence of massive to crudely layered lahar deposits and volcanic conglomerate of the Upper Triassic Nicola Group (Eastern belt, Bulletin 69).

## **DALRYMPLE** showing (Volcanic redbed Cu)

MINFILE 092HNE256

Within Tenure 535845

Quartz-epidote-carbonate veinlets mineralized with chalcopyrite and malachite occur in andesite and dacite of the Upper Triassic Nicola Group (Western belt, Bulletin 69).

## **BLOO** showing (Alkalic porphyry Cu-Au; Volcanic redbed Cu)

MINFILE 092HNE257

Within Tenure 1044811

Chalcopyrite, malachite and hematite occur in fine-grained diorite or dioritized volcanics of the Upper Triassic Nicola Group (Central belt, Bulletin 69).

Geology: Property (cont'd)

**AR2** *showing* (*Volcanic redbed Cu*)

MINFILE 092HNE258 Within Tenure 1044811

An old shaft exposes malachite and chalcocite in volcanic breccia and lahar deposits of the Upper Triassic Nicola Group (Central belt, Bulletin 69).

**AL2** *showing* (*Volcanic redbed Cu*)

MINFILE 092HNE259 Within Tenure 1044811

Copper mineralization occurs in limy siltstone and impure limestone near the contact with green volcanic breccia of the Upper Triassic Nicola Group (Central belt, Bulletin 69).

## MINERALIZATION: PROPERTY AREA

The mineralization on some of the more significant mineral MINFILE mineral anomalies, showings, prospects, and past producers in the Toni 1047659 Claim Group area is reported as follows. The distance is relative to the Toni 1047659 Claim Group.

**HN-WEN** prospect (Volcanic redbed Cu)

MINFILE 092HNE058

Eleven kilometres east-northeast

The mineralization is restricted to the volcanics. It is exposed in 3 adits and at least 8 trenches, and is marked by alteration, mainly epidotization, silicification, carbonatization, moderate chloritization and local pyritization.

Chalcopyrite is the only copper mineral: it is disseminated, or concentrated in quartz and calcite veins and veinlets between 0.3 and 30 centimetres thick, usually about 8 centimetres thick. Pyrite, pyrrhotite and rare specular hematite are also present in the veins. Locally oxidation has produced abundant malachite, azurite and limonite.

The mineralized zone measures 760 by 90 metres and has a depth of about 75 metres. Diamond drilling indicates that it strikes 160 degrees and dips vertically or steeply east, so it is not parallel to the volcanic-sedimentary contact, indicating that the contact is not the controlling factor.

Incidentally, the Echo occurrence (092HNE059) lies on this trend, 2 kilometres to the north-northwest, and the mineralization may also extend south-southeast of the HN-WEN occurrence (Assessment Report 4230).

Some significant copper and silver values have been obtained from the workings and diamond drill core. A 1.5-metre chip sample from Adit Number 1 was assayed at 4.39 per cent copper, 92.6 grams per tonne silver, and 0.7 gram per tonne gold (Assessment Report 4230). A grab sample from here was assayed at 4.84 per cent copper, 46.6 grams per tonne silver and 0.7 gram per tonne gold (Assessment Report 4230). Both samples were from oxidized material and may not be representative of grade throughout the deposit (Assessment Report 4230). A drill core sample (hole HNS 72-1) assayed 1.12 per cent copper and 3.4 grams per tonne silver (Assessment Report 4230).

Pyrite, pyrrhotite, chalcopyrite and arsenopyrite are disseminated sporadically in the tuffaceous rocks and argillite, up to about 1 per cent, and also occur in fractures (Assessment Reports 11241, 16008). Native gold is associated with the sulphides in narrow quartz-filled fractures in these rocks (Assessment Report 16008). Minor malachite occurs in volcanics.

Mineralization: Property Area (cont'd)

## GOLDEN SOVEREIGN prospect (Volcanic redbed Cu)

MINFILE 092HNE072 Four kilometres east

Copper mineralization is confined largely to one horizon of red breccia exposed near the crest of the ridge. The bed strikes 150 degrees, dips 60 degrees southwest, and is about 50 metres wide on surface.

Mineralization consists primarily of disseminated flakes of chalcocite and minor chalcopyrite, occurring in a zone up to 40 metres wide, near the contact with underlying green breccia. The zone is exposed periodically over a strike length of up to 400 metres. Some chalcopyrite is present in the green breccia, where the red and green breccias are faulted against each other.

Pyrite is also reported. A chip sample assayed 0.9 per cent copper, 0.7 gram per tonne gold and 10 grams per tonne silver over 4.6 metres (Minister of Mines Annual Report 1901, page 1180). A second chip sample assayed 0.25 per cent copper over 3.0 metres (Minister of Mines Annual Report 1913, page 222).

A second, possibly parallel zone of mineralization, 50 metres wide, is exposed about 100 metres west of the north end of the previous zone. A bed of impure limestone, 50 metres wide, separates the two zones. Here, the breccia exhibits some greenish yellow epidote, and yellowish white serpentine. The mineralized zone contains veinlets of chalcocite and blebs and nuggets of native copper up to 22 kilograms in size. Abundant chalcocite and native copper are concentrated along one prominent shear zone, 0.15 to 1.0 metres wide, striking 050 degrees and dipping 75 to 90 degrees southeast. Malachite and minor azurite are developed along two intersecting sets of fractures in the vicinity of the shear.

# **BIG SIOUX** past producer (Volcanic redbed Cu; Alkalic porphyry Cu-Au) MINFILE 092HNE073

Four kilometres east-northeast

Copper mineralization is exposed along a 300-metre long roadcut and in various old workings north of the roadcut, in an area 500 metres long and 300 metres wide. Mineralization consists primarily of pyrite and chalcopyrite, as disseminations, blebs, fracture fillings, and in calcite and epidote veins. Pyrite also forms thin bands, comprising up to 25 per cent of the hostrock. Malachite occurs along fractures in many surface exposures. Chalcocite forms fracture fillings in one prominent 1.8-metres wide shear zone, striking 075 degrees and dipping 75 degrees north. Minor bornite is also reported. One chip sample taken along the roadcut assayed 3.27 per cent copper, 14.45 grams per tonne gold and 34.1 grams per tonne silver over 10 metres (Assessment Report 20834, page 5). Channel sampling along a trench analysed 0.223 per cent copper, 0.106 gram per tonne gold and 1.26 grams per tonne silver over 27 metres (Assessment Report 7100, page 11, trench 4). A composite grab sample from the dump of a shaft, excavated in the chalcocite-bearing shear zone, assayed 12.6 per cent copper, 0.7 gram per tonne gold and 82 grams per tonne silver (Minister of Mines Annual Report 1901, page 1181).

## **BIG KIDD** prospect (Volcanic redbed Cu; alkalic porphyry Cu-Au)

MINFILE 092HNE074

Four kilometres east

Mineralization is erratic and consists of abundant magnetite, and pyrite, lesser chalcopyrite, and traces of bornite and chalcocite, as disseminations, lenses, scattered blebs and veinlets.

Mineralization: Property Area (cont'd)

**Big Kidd** prospect (cont'd)

Cuprite and native copper are also reported. This mineralization tends to favour the zones of alteration, but is not proportional to the intensity of alteration.

The sulphides are in part controlled by zones of shearing and fracturing in the northeastern portion of the deposit. Limonite, malachite and azurite are present at or near surface. Pyrite occurs primarily as disseminations up to 5 millimetres in diameter.

The mineral also occurs along fractures in association with chalcopyrite, orthoclase, quartz and/or carbonate. Chalcopyrite tends to be finely disseminated and is usually associated with magnetite, intimately associated with pyrite, and forms pseudomorphs after pyrite. Pyrite-chalcopyrite intergrowths are prevalent along fractures. Bornite is often found in magnetite-chalcopyrite blebs and veinlets, which often display epidote halos.

Copper content is quite variable, and precious metal values are low but anomalous.

Channel sampling of an adit yielded 0.901 per cent copper, 0.141 gram per tonne gold and 13.66 grams per tonne silver over 14 metres (Assessment Report 7100, page 8, adit no. 1) Channel sampling of a trench, 90 to 190 metres west of the adit, yielded 0.237 per cent copper, 0.095 gram per tonne gold and 3.37 gram per tonne silver over 35 metres (Assessment Report 7100, page 9, trench no. 12). Trenching and sampling of the northern margin of the breccia pipe yielded gold values of up to 1.97 grams per tonne over 6 metres (Assessment Report 8743, Figure 3.)

## **PAYCINCI** prospect (Volcanic redbed Cu)

MINFILE 092HNE084

One kilometre north

Hypogene and supergene copper mineralization occurs in green laharic breccia, near the contact with red laharic breccia to the east. This mineralization consists primarily of disseminated and fracture controlled chalcocite and native copper, accompanied by lesser malachite and azurite, and minor chalcopyrite, bornite, cuprite and pyrite. Drilling indicates chalcopyrite becomes more abundant at depth at the expense of chalcocite. This mineralization is exposed along the crest and east flank of a small northerly trending ridge, over a north-south distance of 400 metres.

Drill indicated reserves are 54,000 tonnes grading 0.876 per cent copper (Assessment Report 7654, page 1). Precious metal values are generally low. Six rock samples analysed 1.1 to 2.4 per cent copper, 0.005 to 0.010 gram per tonne gold and 1.3 to 5.7 grams per tonne silver (Assessment Report 14108, Figure 5, samples 2051 to 2056.

## **DAISY** prospect (Volcanic redbed-Cu; Subvolcanic-Cu-Ag-Au (As-Sb); Porphyry Mo (Low F-type) MINFILE 092HNE091

Four kilometres south-southeast

The shear zone is erratically mineralized with minor bornite and chalcocite smeared along fractures, over a strike length of 350 metres. Malachite and azurite occur frequently along fractures. Hematite and magnetite are also reported. This mineralization is best developed in the andesite. An overlying bed of volcanic sandstone is barren, while only minor amounts of mineralization are found in the breccia.

Two samples taken over 4 metres yielded up to 11 grams per tonne silver, 1.07 per cent copper and trace gold (Assessment Report 12351, page 6).

## Mineralization: Property Area (cont'd)

**Daisy** prospect (cont'd)

An additional chip sample assayed trace gold, 3.4 grams per tonne silver and 0.8 per cent copper over 9.1 metres (Minister of Mines Annual Report 1928, page 222). A sample of sorted ore assayed trace gold, 61.7 grams per tonne silver and 7.8 per cent copper (Minister of Mines Annual Report 1915, page 224).

A second area of copper mineralization occurs 400 metres south-southeast, where copper carbonates and sulphides are developed along fractures.

## **KETCHAN LAKE NORTH** prospect (Alkalic porphyry Cu-Au)

MINFILE 092HNE115

Nine kilometres south

Mineralization is hosted in the diorite and consists of pyrite and chalcopyrite, usually as disseminations, but also as fracture fillings. Rare bornite and chalcocite are also reported.

Seams, patches and blebs of orthoclase, epidote and/or magnetite are sometimes associated with this mineralization. Some malachite is also present in surface exposures. Chlorite, sericite and traces of secondary biotite occur with the sulphides at depth.

Trenching and drilling have intersected copper mineralization in a northwest-trending zone 1400 metres long and up to 600 metres wide, roughly paralleling the northeastern margin of the stock.

## **MINERALIZATION: PROPERTY**

**TOM CAT** prospect (Volcanic redbed-Cu; Subvolcanic-Cu-Ag-Au (As-Sb);

Porphyry Mo (Low F-type)

MINFILE 092HNE056

Within Tenure 1044811

The laharic breccia is erratically mineralized with chalcocite, magnetite, bornite, chalcopyrite, native copper and hematite, as disseminations and fracture coatings. Trenching and diamond drilling has intersected this mineralization over a width of 30 metres and a depth of at least 45 metres.

One drillhole analysed 0.32 per cent copper over 45.7 metres (Minister of Mines Annual Report 1965, page 157, hole 1). Two chip samples assayed 2.4 and 1.6 per cent copper over 2.1 and 3.0 metres respectively (Minister of Mines Annual Report 1913, page 223).

**AM** showing (Volcanic redbed Cu)

MINFILE 092HNE166

Within Tenure 1044811

A chip sample from an old shaft assayed 2.05 per cent copper over 1.6 metres (Assessment Report 6821, page 4).

**AR** showing (Volcanic redbed Cu)

MINFILE 092HNE177

Within Tenure 1044811

Two closely-spaced trenches expose chalcopyrite and bornite in green volcanic breccia and lahar deposits of the Upper Triassic Nicola Group (Central belt, Bulletin 69).

Mineralization: Property (cont'd)

**JOSEE** showing (Alkalic porphyry Cu-Au; Volcanic redbed Cu)

MINFILE 092HNE249 Within Tenure 1053447

Chalcocite occurs in a sequence of massive to crudely layered lahar deposits and volcanic conglomerate of the Upper Triassic Nicola Group (Eastern belt, Bulletin 69).

## **DALRYMPLE** showing (Volcanic redbed Cu)

MINFILE 092HNE256 Within Tenure 535845

A rock sample analysed 0.18 per cent copper and 0.9 gram per tonne silver (Assessment Report 10497, page 6, sample PR-4).

## **BLOO** showing (Alkalic porphyry Cu-Au; Volcanic redbed Cu)

MINFILE 092HNE257

Within Tenure 1044811

A rock sample analysed 0.483 per cent copper and 1.7 grams per tonne silver (Assessment Report 14141, Drawing 5b, sample 2574).

Three rock samples taken in the vicinity of an old shaft in diorite, 250 metres east-northeast, yielded 0.428 to 0.795 per cent copper (Assessment Report 20551, Figure 3).

## **AR 2** showing (Volcanic redbed Cu)

MINFILE 092HNE258

Within Tenure 1044811

An old shaft exposes malachite and chalcocite in volcanic breccia and lahar deposits of the Upper Triassic Nicola Group (Central belt, Bulletin 69).

**AL2** *showing* (*Volcanic redbed Cu*)

MINFILE 092HNE259

Within Tenure 516708

A sample analysed 1.43 per cent copper and 0.001 gram per tonne gold (Assessment Report 20551, Figure 3, Sample Al 90001).

## STRUCTURAL ANALYSIS

## a) Purpose

The purpose of the structural analysis was to delineate any area of relative major fault intersections which location could be the centre of maximum brecciation and be depth intensive to provide the most favourable feeder zone to any convective hydrothermal fluids sourced from a potentially mineral laden reservoir. The fluid constituents and/or the indications thereof should be etched in the surface material; where by means of standard exploratory procedures, the source and location may be identified and a foundation on which to warrant any follow-up exploration.

These surficial indications such as prime minerals, indicator minerals, or alteration patterns, may be an expression of sub-surface mineralization that originated from a potentially developed mineral resource. Thus, a cross-structural location would be the prime area to initially prospect for the surficial indicators which may be revealed as pathfinder minerals, minerals and/or alteration products that would be subject to interpretation as economic mineral indicators.

## Structural Analysis (cont'd)

## b) Method

The structural analysis was performed on an orthophoto of Tenure 1047659 by viewing of the map and marking the lineaments, or indicated structures, thereon. A total of 66 lineaments were marked (*Figure 5*), compiled into a 10 degree class interval, and plotted as a rose diagram as indicated on Figure 6.

#### c) Results

Two cross-structural locations, "A" and "B", were delineated between one indicated major westerly and two northwesterly trending structures. The cross-structures are located within a sequence of andesitic rocks of the Central Volcanic Facies of Nicola Volcanics.

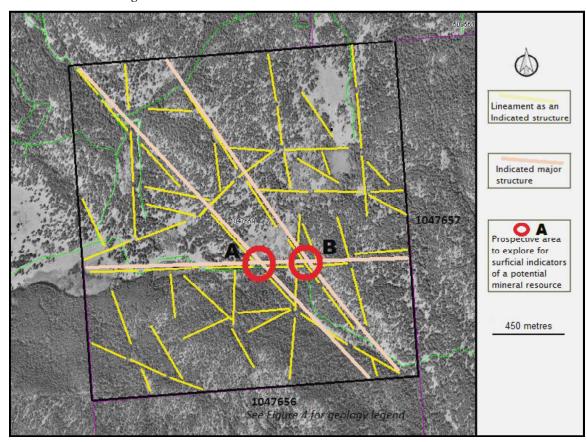
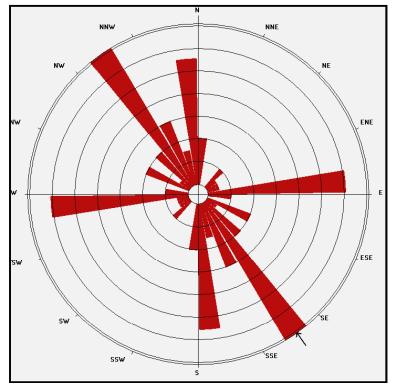


Figure 5. Indicated Structures on Tenure 1047659

## Structural Analysis (cont'd)

Figure 6. Rose Diagram from the indicated lineaments



## **STATISTICS**

Axial (non-polar) data No. of Data = 66 Sector angle = 10°

Scale: tick interval = 3% [2.0 data] Maximum = 21.2% [14 data] Mean Resultant dir'n = 145-325

[Approx. 95% Confidence interval = ±22.5°]

(valid only for unimodal data)

Mean Resultant dir'n = 144.7 - 324.7

Circ.Median = not calculated

Circ.Mean Dev.about median = not calculated (Not calculated if too many data, or data are axial (non-polar), and too coarsely grouped

Circ. Variance = 0.22 Circular Std.Dev. = 40.86° Circ. Dispersion = 2.51 Circ.Std Error = 0.195 Circ.Skewness = 3.12 Circ.Kurtosis = -5.39 kappa = 0.78 (von Mises concentration param. estimate)

Resultant length = 23.87 Mean Resultant length = 0.3617

'Mean' Moments: Cbar = 0.1202; Sbar = -0.3412 'Full' trig. sums: SumCos = 7.934; Sbar = -22.516 Mean resultant of doubled angles = 0.3436 Mean direction of doubled angles = 147

(Usage references: Mardia & Jupp, 'Directional Statistics', 1999, Wiley; Fisher, 'Statistical Analysis of Circular Data', 1993, Cambridge University Press) Note: The 95% confidence calculation uses Fisher's (1993) 'large-sample method Structural Analysis (cont'd)

## Figure 7. Cross-Structural location on Tenure 1047659

(Base map from MapPlace and Google Earth)



*Table II.* **Approximate location of cross-structures on Tenure 1047659** (*UTM-Zone 10 NAD 83*)

Area	UTM East	UTM North	Elevation (metres)
Α	668,162	5,534,055	1,214
В	668,416	5,534,047	1,215

## **Magnetometer Survey**

## a) Instrumentation

A Scintrex MF 2 Model magnetometer was used for the magnetometer survey. Diurnal variations were corrected by taking repeated readings at a base point throughout the day. Magnetometer values are total intensity and relative.

#### b) Theory

Only two commonly occurring minerals are strongly magnetic, magnetite and pyrrhotite; magnetic surveys are therefore used to detect the presence of these minerals in varying concentrations. Magnetics is also useful is a reconnaissance tool for mapping geologic lithology and structure since different rock types have different background amounts of magnetite and/or pyrrhotite.

#### c) Survey Procedure

From an initial grid station at 5534000N 668000E four additional base-line stations were established northerly at 50 metre intervals to 5534200N. Magnetometer readings were taken at 25 metre intervals along each of the five grid lines to 668500E. The grid line stations were located with a GPS instrument. Line kilometres of magnetometer survey completed was 2.5. The field data is reported herein in Appendix I.

Magnetometer Survey (cont'd)

Figure 8. Magnetometer Survey Grid (Base map from Google Earth)

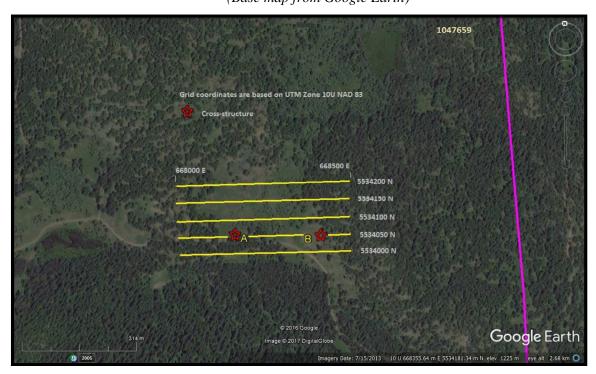
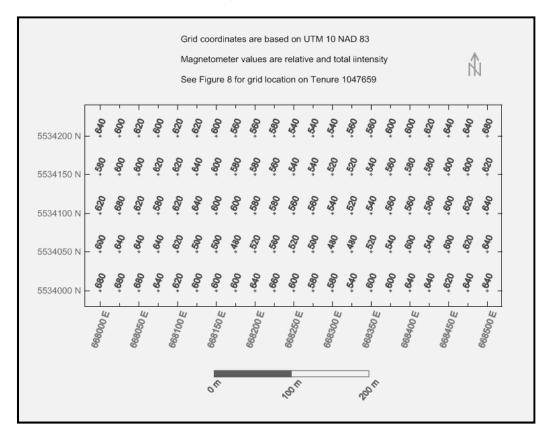


Figure 9 . Magnetometer Survey Data



Magnetometer Survey (cont'd)

#### d) Data Reduction

The field results were initially input to an Exel spreadsheet whereupon a Surfer 31 program was utilized to create the maps exemplified herein as Figures 9, 10, & 11.

#### e) Results

The results of the localized magnetometer survey, which covered a 10 hectare area of the 332 hectare Tenure 1047659 claim and an area of andesitic rocks of the Central Volcanic Facies of the Nicola Volcanics, indicated two central localized anomalous mag LO's which correlate with the one east-west structure as indicated by the structural analysis (*Figure 5*). The anomalies are terminated to the east and to the west by a mag HI zone.

A mag LO indication of the two northwesterly structures was not defined other than an open-ended mag LO trending from the eastern anomaly

The approximate location of cross-structure "A" correlates with the western anomaly, with anomaly "B" to the east of the eastern anomaly and correlating with a one reading sub-anomalous mag LO.

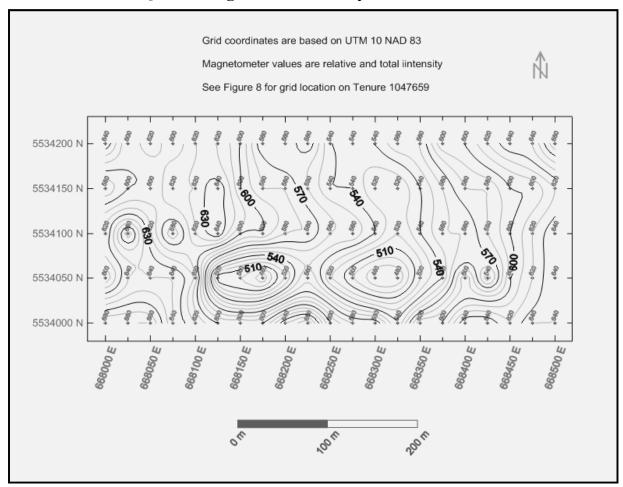


Figure 10. Magnetometer Survey Data Contoured

Magnetometer Survey (cont'd)

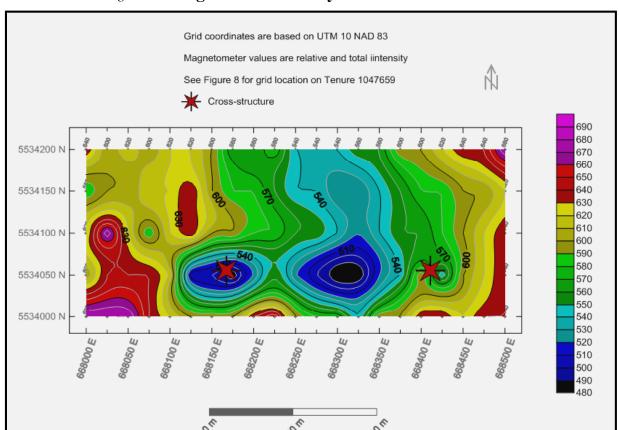


Figure 11. Magnetometer Survey Data Colour Contoured

#### INTERPRETATION & CONCLUSIONS

The trend of the indicated structures making up the two cross-structures within Tenure 1047659 were likely in part influenced by the regional north-northwesterly trending structure of the Kentucky-Alleyne Fault system with one splay structure adjacent to the northeast corner of Tenure 1047659 (*Figure 4*). The east-west structure of the cross-structures may be subsidiary to the major fault system or developed from an alternative directional force. Both structural directions are common to the area as shown by the predominant drainage pattern.

The importance of these cross-structures in this specific area is indicated in the 300 metre wide breccia zone or breccia pipe on the Big Kidd property located four kilometres east of Tenure 1047659 and within one kilometre east of a regional north-northwesterly trending structure. A cross-structure is commonly the prime mineral controlling feature of a mineral zone with the maximum brecciation and depth intensiveness providing the most favourable feeder zone to any hydrothermal fluids sourced from a potentially mineral laden reservoir.

The significance of a cross-structures is also shown at the five Copper Mountain mineral deposits where cross-structures appear central to the ore-bodies (*Figure 12*).

### **Interpretation & Conclusions** (cont'd)

The best comparative geological condition to a potential porphyry mineral resource within the Tenure 1047659 area is at the Ketchan Lake North property (*Minfile 092HNE115*) nine kilometres south where mineralization is hosted by a northwest trending zone paralleling the northwest margin of a diorite stock, The mineralization in usually of disseminations and fracture fillings in the diorite. The zone of copper mineralization trends northwest for 1400 metres and is up to 600 metres wide.

The significance of the brecciation to increased mineralization on the Ketchan property as reported by Thomson (2006) as:

"Brecciated areas generally contain stronger overall alteration, mainly chlorite with increased concentrations of magnetite. The strongest areas of brecciated magnetite-rich rock, observed in most of the 2005 drill holes, generally contained the highest concentrations of pyrite/chalcopyrite." Many of these highly brecciated cross-structures in the andesitic Nicola volcanic area appear in association with intrusive stocks.

Thompson (2006) also reports on the Ketchan that:

"It is speculated that the abundant faulting ... is related to fault splays branching from the relatively proximal, Summers Creek Fault." and that the, "... configuration of the diorite stock also indicates that the major structures played a role in its emplacement resulting in additional structural variants".

Aulis, (1991) also reports on the Ketchan that,

"Present drillhole spacing within the IP anomaly suggests the possibility) of a porphyry copper-gold deposit of significant size (> 80 million tons)".

These larger breccia zones may be hydrothermally enhanced which, in an analysis of mineralogical constituents, should provide surficial clues as to a potential mineral resource at an estimated depth. More informative would be a mineralogical and geological analysis of drill core where an alteration and/or a mineralogical zoning pattern can be established leading to a potential mineral resource. The core from a reported 71 metre drill intersection of 0.75 grams per tonne gold and 0.2 per cent copper at the Big Kidd breccia would make for an interesting analysis for such a zoning pattern.

The magnetic response from mineral zones within the Central Belt, as within the Tenure 1047659, may be indicated to a greater degree by magnetic highs from increased concentrations of magnetite as opposed to magnetic lows from dominant hydrothermal alteration, if the mineralization at the Ketchan property is the norm. Thomson (2006) reports that:

"Possibly, this may be the basis for mineral resources and/or mineral zones to be located along the margins of magnetic highs as demonstrated at Ketchan property where, ... "the best grades of copper and gold are generally associated with the margins of magnetic highs ...".

The two adjacent anomalous mag LO's revealed by the magnetometer survey, may indicate a central breccia zone (mag LO) extending from the surface volcanics to a concealed mineralized stock, with the peripheral mag HI's indicating the margins of magnetic highs where the best grades of mineralization are located, as at the Ketchan property.

Thus the cross-structural areas should be explored to determine the cause of the magnetometer anomalies If this interpretation is within parameters indicative of a potential mineralized porphyry resource, then standard exploration procedures would be applied to follow-up exploration.

Respectfully submitted Sookochoff Consultants Inc.

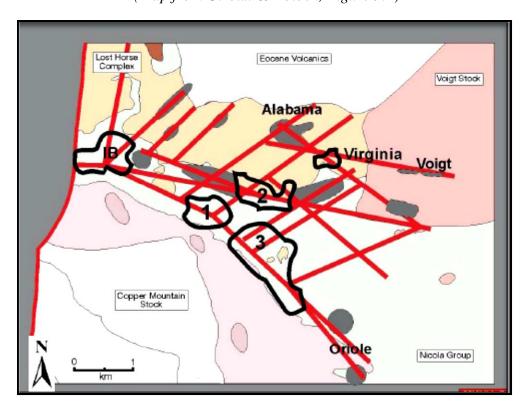


Laurence Sookochoff, PEng

## Figure 12. Geology: Copper Mountain Camp

(Note the mineral controlling feature of the cross-structures.)

(Map from Giroux & Holbek, Figure 9.4)



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092HNE072 - GOLDEN SOVEREIGN
092HNE073 – BIG SIOUX
092HNE074 – BIG KIDD
092HNE084 – PAYCINCI
092HNE257 – BLOO
092HNE258 – AR2
092HNE259 – AL2

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## STATEMENT OF COSTS

Work on Tenure 1047659 was completed from November 5, 2016 to November 18, 2016 to the value as follows:

Structural	Analysis
Str actur ar	111141

Laurence Sookochoff, P Eng. 3 days @ \$ 1,000.00/day	\$ 3,000.00
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## **Magnetometer Survey**

Guy Delorme and Christopher Delorme

November 17-18, 2016		
Four man days @ \$300.00 per day		1,200.00
Truck rental 3 days @ \$75.00	225.00	
Kilometre charge: 160@ \$0.70	112.00	
Fuel	38.40	
Room & board: 4 man days @ \$90.00	360.00	
Mag rental 3 days @ \$80.00	240.00	975.40
		\$5,175.40
Maps		750.00
Report		3,300.00

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\$ 9,225.40

#### **CERTIFICATE**

- I, Laurence Sookochoff, of the City of Vancouver, in the Province of British Columbia, do hereby certify:
- That I am a Consulting Geologist and principal of Sookochoff Consultants Inc. with an address at 120 125A-1030 Denman Street, Vancouver, BC V6G 2M6.
- I, Laurence Sookochoff, further certify that:
- 1) I am a graduate of the University of British Columbia (1966) and hold a B.Sc. degree in Geology.
- 2) I have been practicing my profession for the past fifty years.
- 3) I am registered and in good standing with the Association of Professional Engineers and Geoscientists of British Columbia.
- 4) The information for this report is based on information as itemized in the Selected Reference section of this report and from work the author has performed on the Toni Property since 2006.
- 5) I have no interest in the Property as described herein.

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Laurence Sookochoff, P. Eng.

Sierra Iron Ore Corporation	Tom Cat 1047659 Claim Group	Event 5626764
	Appendix I  Magnetemater Data	
	Magnetometer Data	
Sookochoff Consultants Inc.	April 24, 2017	page 34 of 35

	E5626764 T1047659													
East	North	Mag	East	North	Mag	East	North	Mag	East	North	Mag	East	North	Mag
668000	5534000	680	668000	5534050	600	668000	5534100	620	668000	5534150	580	668000	5534200	640
668025	5534000	680	668025	5534050	640	668025	5534100	680	668025	5534150	600	668025	5534200	600
668050	5534000	680	668050	5534050	640	668050	5534100	620	668050	5534150	600	668050	5534200	620
668075	5534000	640	668075	5534050	640	668075	5534100	580	668075	5534150	620	668075	5534200	600
668100	5534000	620	668100	5534050	620	668100	5534100	620	668100	5534150	620	668100	5534200	620
668125	5534000	600	668125	5534050	500	668125	5534100	640	668125	5534150	640	668125	5534200	620
668150	5534000	600	668150	5534050	500	668150	5534100	600	668150	5534150	600	668150	5534200	600
668175	5534000	600	668175	5534050	480	668175	5534100	600	668175	5534150	580	668175	5534200	560
668200	5534000	640	668200	5534050	520	668200	5534100	580	668200	5534150	580	668200	5534200	560
668225	5534000	660	668225	5534050	560	668225	5534100	580	668225	5534150	560	668225	5534200	580
668250	5534000	600	668250	5534050	520	668250	5534100	560	668250	5534150	540	668250	5534200	540
668275	5534000	580	668275	5534050	500	668275	5534100	560	668275	5534150	540	668275	5534200	540
668300	5534000	580	668300	5534050	480	668300	5534100	540	668300	5534150	520	668300	5534200	540
668325	5534000	540	668325	5534050	480	668325	5534100	520	668325	5534150	520	668325	5534200	560
668350	5534000	600	668350	5534050	520	668350	5534100	540	668350	5534150	540	668350	5534200	560
668375	5534000	600	668375	5534050	540	668375	5534100	560	668375	5534150	560	668375	5534200	600
668400	5534000	640	668400	5534050	600	668400	5534100	560	668400	5534150	580	668400	5534200	600
668425	5534000	640	668425	5534050	540	668425	5534100	580	668425	5534150	580	668425	5534200	620
668450	5534000	620	668450	5534050	600	668450	5534100	600	668450	5534150	600	668450	5534200	640
668475	5534000	640	668475	5534050	620	668475	5534100	620	668475	5534150	600	668475	5534200	640
668500	5534000	640	668500	5534050	640	668500	5534100	640	668500	5534150	620	668500	5534200	680