

**Ministry of Energy, Mines & Petroleum Resources**  
Mining & Minerals Division  
BC Geological Survey

**Assessment Report  
Title Page and Summary**

**TYPE OF REPORT [type of survey(s)]:** Geological Geophysical

**TOTAL COST:** \$ 9,522.40

**AUTHOR(S):** Laurence Sookochoff, PEng

**SIGNATURE(S):** Digitally signed by Laurence Sookochoff  
Date: 2016.11.27 21:53:31 -08'00'

**NOTICE OF WORK PERMIT NUMBER(S)/DATE(S):** \_\_\_\_\_

**YEAR OF WORK:** 2016

**STATEMENT OF WORK - CASH PAYMENTS EVENT NUMBER(S)/DATE(S):** 5606680 June 13, 2016

**PROPERTY NAME:** Toni

**CLAIM NAME(S) (on which the work was done):** 1044603

**COMMODITIES SOUGHT:** Copper Gold

**MINERAL INVENTORY MINFILE NUMBER(S), IF KNOWN:** 092HNE292

**MINING DIVISION:** Nicola, Similkameen

**NTS/BCGS:** 092H.090 092H.098 092H.099 092H.100

**LATITUDE:** 49 ° 53 ' 38 " **LONGITUDE:** 120 ° 09 ' 48 " (at centre of work)

**OWNER(S):**

1) Victory Resources Corporation

2) \_\_\_\_\_

**MAILING ADDRESS:**

132366 Cliffstone Court

**OPERATOR(S) [who paid for the work]:**

1) Victory Resources Corporation

2) \_\_\_\_\_

Lake Country BC V4V 2R1

**MAILING ADDRESS:**

132366 Cliffstone Court

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**PROPERTY GEOLOGY KEYWORDS (lithology, age, stratigraphy, structure, alteration, mineralization, size and attitude):**

Jurassic, Pennask Batholith, Granodiorites, Triassic, Nicola Group, Eastern Volcanic Facies, Volcanics, Sediments, Basalts,

Eocene, Princeton Group, Andesites, Cross-structures

**REFERENCES TO PREVIOUS ASSESSMENT WORK AND ASSESSMENT REPORT NUMBERS:** 01658, 32030, 34043, 34170, 34420, 34574, 34881, 34881, 35155, 35156, 35501, 35862, 35932, 35932, 35993

TYPE OF WORK IN THIS REPORT	EXTENT OF WORK (IN METRIC UNITS)	ON WHICH CLAIMS	PROJECT COSTS APPORTIONED (incl. support)
<b>GEOLOGICAL (scale, area)</b>			
Ground, mapping			
Photo interpretation	249 hectares	1044603	\$ 6,000.00
<b>GEOPHYSICAL (line-kilometres)</b>			
Ground			
Magnetic	2.4	1044603	3,522.40
Electromagnetic			
Induced Polarization			
Radiometric			
Seismic			
Other			
Airborne			
<b>GEOCHEMICAL (number of samples analysed for...)</b>			
Soil			
Silt			
Rock			
Other			
<b>DRILLING (total metres; number of holes, size)</b>			
Core			
Non-core			
<b>RELATED TECHNICAL</b>			
Sampling/assaying			
Petrographic			
Mineralographic			
Metallurgic			
<b>PROSPECTING (scale, area)</b>			
<b>PREPARATORY / PHYSICAL</b>			
Line/grid (kilometres)			
Topographic/Photogrammetric (scale, area)			
Legal surveys (scale, area)			
Road, local access (kilometres)/trail			
Trench (metres)			
Underground dev. (metres)			
Other			
<b>TOTAL COST:</b>			<b>\$ 9,522.40</b>

**VICTORY RESOURCES CORPORATION**

*(Owner & Operator)*

**GEOLOGICAL & GEOPHYSICAL**

**ASSESSMENT REPORT**

*(Event 5579431)*

*Work done between June 6, 2016 and June 12, 2016*

*on*

**Tenure 1044603**

*of the 15 claim*

**Toni 1044603 Claim Group**

*Nicola/Similkameen Mining Divisions*

BCGS Map 092H.090/098/.099/.100

Centre of Work

**5,530,705N 703,732E**

*Author & Consultant*

**Laurence Sookochoff, PEng**

*Sookochoff Consultants Inc.*

*Submitted*

**November 27, 2016**

**BC Geological Survey  
Assessment Report  
36297**

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## SUMMARY

The 15 claim 6,571 hectare Toni 1044603 Claim Group ("Property") is located in south-central British Columbia, 217 kilometres northeast of Vancouver, 11 kilometres west of the formerly productive copper-molybdenum porphyry Brenda mine, and 69 kilometres north of the productive Copper Mountain copper-gold porphyry mine. All these properties are located within the prolific "porphyry copper belt" of British Columbia and the geology of the properties as to intrusives and volcanics is comparable.

At Copper Mountain, the Ingerbelle mineral zone is one of five productive mineral zones that exhibit cross-structural mineral controls where up to four structures merge to a cross-structure at the centre of the open-pit (*Figure 14*). The major Copper Mountain Fault appears as the primary development to other structures; all of which relate to primary mineral controls

At the Elk (*Minfile 092HNE058*) structural controls to the eight generally northerly aligned gold in soil anomalous zones (*Figure 15*) are indicated to be controlled by the major northerly ELK/Siwash fault and by a transverse easterly to northeasterly fault set. One of the anomalous zones was developed to an economic mineral deposit (*Figure 15a*) from which from past production (1992-1995) reportedly recovered 1,518,777 grams (48,830 ounces) of gold and 1,903,000 grams (61,183 ounces) of silver was recovered. Recent additional exploration and development at the former mine-site reportedly delineated an additional gold resource of 301,000 ounces of gold in a measured and indicated category and 263,000 ounces of gold in an inferred category.

At Tenure 1044603, the one cross-structure delineated is not only significant as mineral controls to a potential mineral resource but the location of the cross-structure reveals some comparative geological and geophysical attributes to the Copper Mountain and the Elk properties such as major structures, geology, and the location of cross-structures and/or porphyry mineralization along the margins of strong magnetometer anomalies.

As indicated by the BC government supported MapPlace geological map, the Toni 1044603 Claim Group is predominantly underlain in the north by the Pennask Batholith and in the southeast by a localized capping of Eocene volcanic rocks which cap a succession of Upper Triassic Nicola Group sedimentary rocks which in turn cap Nicola Group volcanic rocks. Along the southwest fringes of the Property the Pennask Batholith is in northeasterly contact with the Nicola volcanics.

The results of the localized magnetometer survey within Tenure 1044603 possibly provided additional substance to a potential mineral resource at depth. Assuming that the variable sedimentary rock capping has not modified the magnetometer readings from the underlying rock formations, the one relative magnetometer anomalous high zone may indicate polymetallic veins associated with porphyry mineralization and the anomalous magnetometer low zone may indicate an unidentified cross-structural zone.

Thus, these anomalous magnetic areas are a priority in the exploration for surficial geological indicators of a potential concealed mineral resource. These geological indicators may be revealed as pathfinder minerals, minerals and/or alteration products that would be subject to interpretation as economic mineral indicators to follow-up exploration.

## INTRODUCTION

From June 6, 2016 to June 12, 2016 a structural analysis and a localized magnetometer survey were completed on Tenure 1044603 of the 15 claim Toni 1044603 claim group ("Property"). The purpose of the program was to delineate potential structures and correlative magnetic responses which may be integral in geological controls to potentially economic mineral zones that may occur on Tenure 1044603 or on other claims of the Property.

Information for this report was obtained from sources as cited under Selected References and from work the author has performed on the Toni Property since 2006.

*Figure 1. Location Map*



## PROPERTY LOCATION & DESCRIPTION

### Location

The Property is located within BCGS Maps 092H.090/.098/.099/.100 of the Nicola and Similkameen Mining Divisions, 217 kilometres northeast of Vancouver, 11 kilometres west of the formerly productive copper-molybdenum porphyry Brenda mine, and 69 kilometres north of the productive Copper Mountain copper-gold porphyry mine. All these properties are located within the prolific "porphyry copper belt" of British Columbia and the geology of both properties as to intrusives and volcanics is comparable.

### Description

The Property is comprised of 15 contiguous claims covering an area of 6571.097 hectares.

Property Location & Description (cont'd)

Figure 2. Claim Location  
(Base Map from MapPlace & Google)

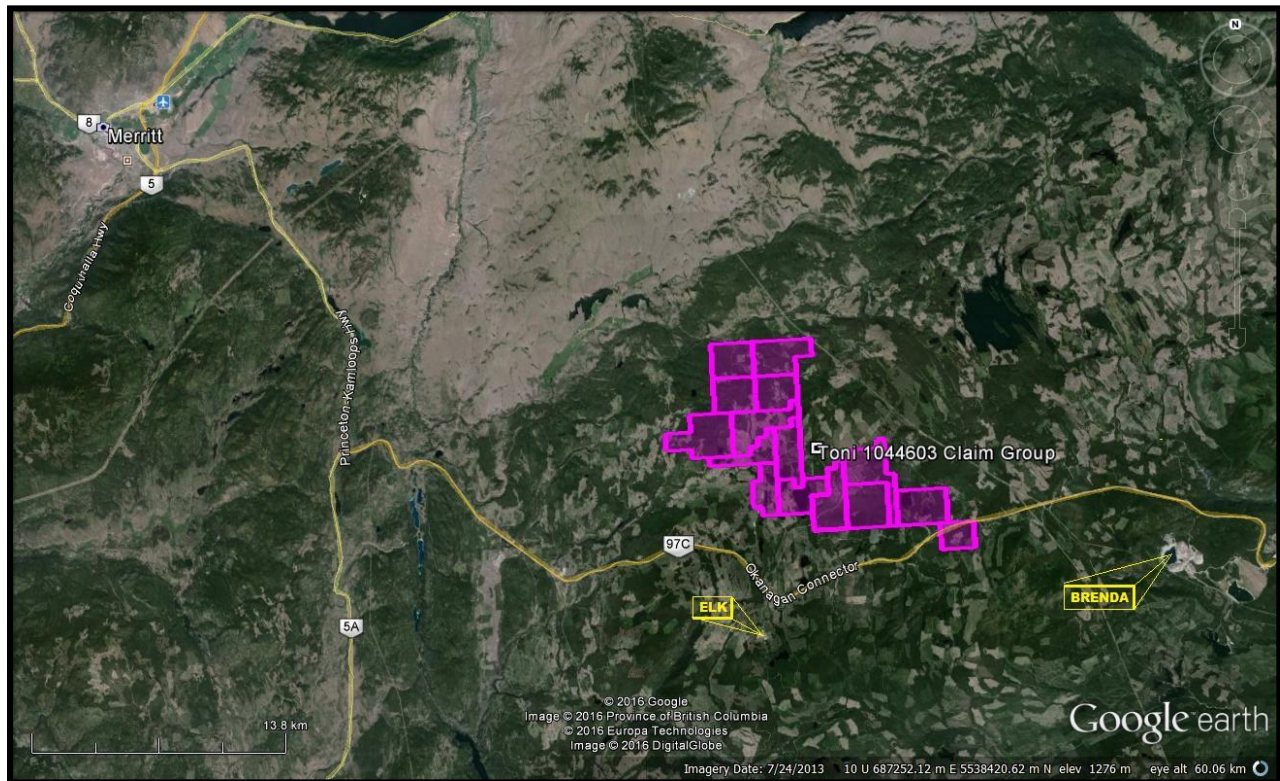
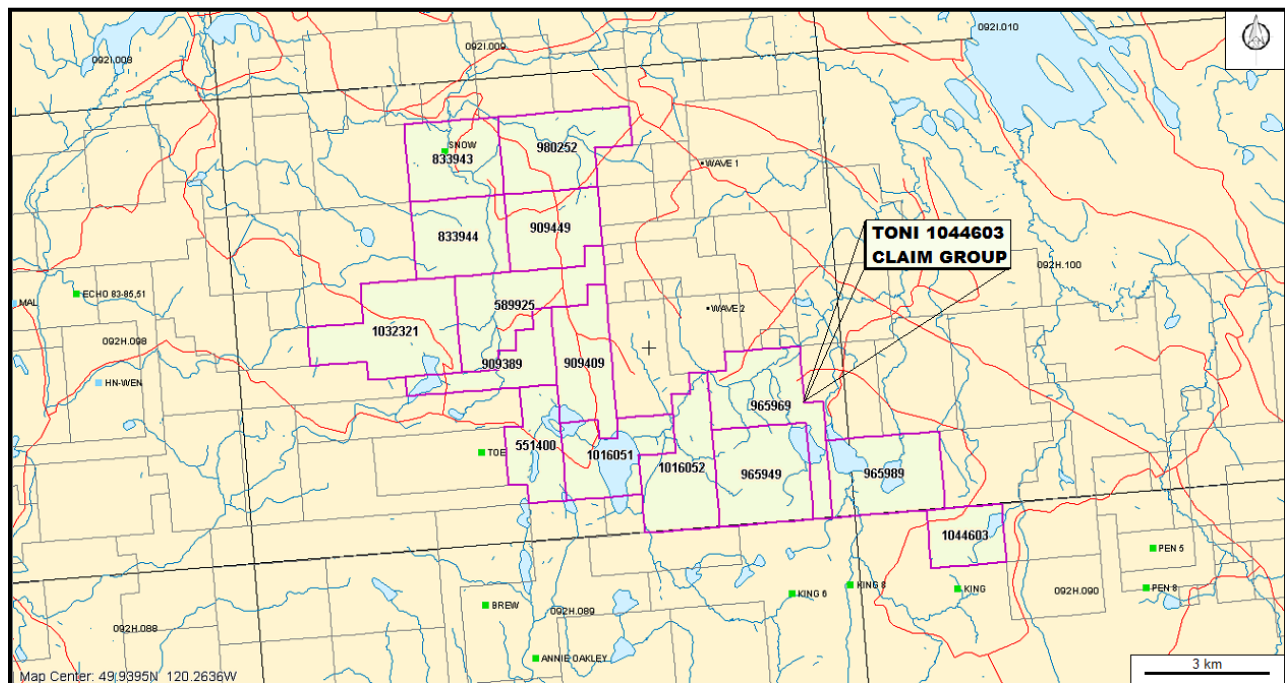


Figure 3. Claim Map  
(Base Map from MapPlace)





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

**Table I. Tenures of the Toni 1044603 Claim Group**  
(from MapPlace)

<u>Tenure Number</u>	<u>Type</u>	<u>Claim Name</u>	<u>Good Until</u>	<u>Area (ha)</u>
<a href="#">551400</a>	Mineral	MINY	20160615	312.041
<a href="#">589925</a>	Mineral	TONI 24	20161012	519.7367
<a href="#">833943</a>	Mineral	SNOW	20160615	415.5088
<a href="#">833944</a>	Mineral	SNOW 1	20160615	415.6536
<a href="#">909389</a>	Mineral	TONI 101	20161012	291.1295
<a href="#">909409</a>	Mineral	TONI102	20161012	415.9075
<a href="#">909449</a>	Mineral		20160615	394.8686
<a href="#">965949</a>	Mineral	TOE120	20160908	520.1682
<a href="#">965969</a>	Mineral	TOE121	20160908	520.0168
<a href="#">965989</a>	Mineral	TOE122	20160913	499.3795
<a href="#">980252</a>	Mineral	V4150	20160615	498.6036
<a href="#">1016051</a>	Mineral	TONI11613	20160615	395.2778
<a href="#">1016052</a>	Mineral	TONI11613A	20160908	478.5305
<a href="#">1032321</a>	Mineral		20160615	644.5177
<a href="#">1044603</a>	Mineral		20170606	249.7572

\*Upon the approval of the assessment work filing, Event Number 5606680

## **ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE & PHYSIOGRAPHY**

### **Access**

Access to the Property is southward from Merritt via Highway 5A/97C for 26 kilometres to the Aspen Grove junction thence eastward via Highway 97C or the Okanagan Connector for 39 kilometres to the western boundary of Tenure 1044603. A network of logging roads provide access routes to many areas within Tenure 1044603.

### **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 three hours distant by road and less than one hour by air from Kamloops.

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**Accessibility, Climate, Local Resources, Infrastructure & Physiography (cont'd)****Physiography**

The topography of Tenure 1044603 is of gently sloped, forested with clear-cut areas. Elevations range from 1,613 metres in the northwest corner to 1,722 metres in the southeast corner.

**HISTORY: PROPERTY AREA**

The history on some of the more selected significant reported *MINFILE* mineral properties peripheral to the Toni 1044603 Claim Group is reported as follows. The distance is relative to the Toni 1044603 Claim Group.

**SIMILCO (COPPER MOUNTAIN) producer (Alkalic porphyry Cu-Au)**

MINFILE 092HSE001

Sixty nine kilometres south

*Development by Granby Consolidated Mining, Smelting and Power Company Ltd. during the 1950's and by Newmont Mining Corporation of Canada during 1968-69, outlined two areas of economic grade mineralization centred on Pit 1 and Pit 2. Most of the ore from the Copper Mountain mine came from glory hole and underground mining, but also included production from several open pits mined from 1952 to 1957. The mine closed in 1957. From 1959 through 1962 the mine was leased and small amounts of ore shipped.*

*In 1977-1978 the Ingerbelle mine (092HSE004) and Copper Mountain mine consolidated operations (the Ingerbelle open pit and mill are across the Similkameen River, west of the Copper Mountain mine). Production from the Ingerbelle orebody commenced in 1972 and mining in the Ingerbelle pit was completed in August 1981. With the installation of an ore conveyor across the Similkameen River canyon, the delivery of Copper Mountain ore from Pit 2 to the Ingerbelle mill began on a limited scale in October 1980, but full production was not implemented until September 1981 after the Ingerbelle orebody was depleted. The mining operation is currently called the Similco mine.*

*Giroux & Holbek (2009) provide a historical summary of the Copper Mountain mine as follows*

*The Copper Mountain area has a long history of exploration and production, beginning with initial exploration in the late 1890's. Successful production was attained in 1923, mostly as an underground mine and continued with minor shut-downs through to 1957 and is referred to as the underground phase. Open pit mining began in 1968 and continued, intermittently through to late 1996 and is termed the open pit phase. An exploration drilling program was carried out in 1997 and thereafter the property was dormant until Copper Mountain Mining Corp resumed exploration in January, 2007.*

**MAL** prospect (Cu skarn; Fe skarn; Au skarn)

MINFILE 092HNE002

Seven kilometres west

*Initial work consisted of diamond drilling and trenching in the early 1960s on the main showing (Malachite 1 2 and Chalcocite 1-2 claims), on which the occurrence is centred. This is located on access road number 5116, 1 kilometre south of Quilchena Creek, 11.5 kilometres east-northeast of the community of Aspen Grove. A second showing, smaller and less significant but with the same characteristics, is located 1 kilometre to the southwest (Malachite 7, 092HNE269).*

**History: Property Area (cont'd)****BRENDA** past producer (Porphyry Cu +/- Mo +/- Au)

MINFILE 092HNE047

Eleven kilometres east

*The Brenda mine began production in early 1970 with measured geological (proven) reserves of 160,556,700 tonnes grading 0.183 per cent copper and 0.049 per cent molybdenum at a cutoff of 0.3 per cent copper equivalent [eCu = % Cu + (3.45 x % Mo)]. The mine officially closed June 8, 1990.*

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

MINFILE 092HNE058

Four kilometres west

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

*Map 41-1989). The volcanics may be affected by low grade propylitic and chloritic alteration. Less than 1 kilometre to the north of the occurrence is the east-striking contact of the Early Jurassic Pennask batholith, a large intrusion of medium-grained granodiorite to quartz diorite.*

*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 volcanoclastic 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).*

Sookochoff (2011) reports that recent exploration work at the HN-WEN by Victory Resources resulted in the delineation of the Adit 1 east-west trending quartz vein within the 90 metre wide northwesterly striking shear zone. The significance of the Adit 1 vein is that it occurs within the Nicola volcanics 50 metres north of the W96-1 drill hole where a mineral hosting quartz vein was intersected from which assays averaging 16.578 gm/t Au, 18.185 gm/t Ag, and 0.75% Cu over 6.55 metres of core or 3.81 metres of 28.43 g/t Au and 0.98% Cu.

**ELK** past producer (Intrusion-related Au pyrrhotite veins; Polymetallic veins Ag-Pb-Zn +/-Au; Au-quartz veins)

MINFILE 092HNE096

Six kilometres south

*From 1992 and 1995 (inclusive), 16,570 tonnes of ore were mined and milled and 1,518,777 grams (48,830 ounces) of gold and 1,903,000 grams (61,183 ounces) of silver recovered.*

*In 1996, Fairfield shipped all remaining stockpiles, estimated to contain 2700 tonnes and grading greater than 12 grams per tonne (Information Circular 1997-1, page 21). A total of 994 metres of ramp access and three development levels exist underground.*

*Reverse circulation drilling, underground diamond drilling, reclamation, road construction, water sampling and aerial photography were also undertaken during this period. Surface and underground diamond drill programs were carried out in the Siwash Mine area from 1994 to 1996 to define the resource. Exploration surface drilling was also carried out during the 1995 and 1996 field seasons to test trench targets between the Siwash mine site and the South Showing area 2.5 kilometres to the south. Limited prospecting and environmental monitoring was undertaken from 1997 to 1999.*

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**History: Property Area (cont'd)****Elk past producer (cont'd)**

*In 1995, Fairfield Minerals with the support from the Explore B.C. Program carried out an extensive program including geochemistry, 13,972 metres of surface and underground diamond drilling in 315 holes and reserve calculations.*

**AU-WEN** prospect (Intrusion related Au pyrrhotite veins; Polymetallic veins Ag-Pb-Zn+/-Au)  
MINFILE 092HNE144  
Nine kilometres west

*The AU occurrence consists of gold-silver-copper mineralization just east of the historical Aspen Grove copper camp, between Merritt and Princeton. Work on this showing dates back to the 1930s when visible gold was discovered in soil.*

*The occurrence is located 1.8 kilometres east-northeast of Pothole Lake, between Quilchena and Pothole creeks, 8 kilometres east-northeast of the community of Aspen Grove. This prospect includes the Au claims and the FLIM and FLAM. The area was prospected in the 1930's for gold (Balon, 1994). McGoran (1979) reported that two prospectors, M. Bresnick and J. Kohler were able to pan colours from test pits although they failed to determine the source of the gold. Harry Nesbitt of Merritt staked the AU claims in 1969 and on his discovery of free gold in trenches prompted an option agreement with New Pyramid Gold Mines who in 1974 conducted further trenching followed by the completion of seven diamond drill holes. No details of the results of the drilling are available.*

*The claims reverted back to Nesbitt who in 1978 sold them to Invex Resources Ltd. A program of soil sampling and trenching by Invex delineated a copper-gold-silver anomaly extending some 700m northwards of the original Nesbitt showing. The combined soil and rock sampling however indicated, that the copper and gold anomalies were more pronounced in the rock sampling where gold values ranged up to 740ppb and copper values to 2,900ppm. McGoran (1979) observed, "the gold mineralization appears to be confined to one or more microdiorite dykes".*

*Invex merged with Imperial Metals Corp. who continued exploring the claims and in 1983 drilled 2 holes near the Nesbitt zone. The drilling returned anomalous gold values ranging up to 650ppb. In 1984, David Heyman optioned the claims from Imperial Metals and after adding the FLIM and FLAM claims optioned the claim group to Algo Resources Ltd. In 1986 Algo conducted IP, magnetometer, soil sampling and geological surveys and the following year drilled nine HQ diamond holes totaling 587 metres. One drill hole, DDH 87-8 obtained the best grade intercept over a near surface 1.5m section that yielded 1.4 gpt Au, 92.89 gpt Ag and 3.58% Cu.*

*Algo relinquished its option and returned the claims to Heyman. Subsequent prospecting by Heyman and J.D. Rowe of Fairfield Minerals Ltd. resulted in the discovery of a 0.75m wide gold-bearing quartz vein north of the Nesbitt zone. Chip sampling of these newly discovered vein yielded gold values of up to 1.402 opt Au.*

*In 1993 Fairfield optioned the ground from Heyman and undertook soil geochemical, geological and geophysical surveys, as well as trenching. A soil grid covered the entire AU claims as well as the FLIM and FLAM claims resulting in a few scattered gold values greater than 50ppb. Fairfield dropped its option and the claims reverted back to Heyman.*

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**History: Property Area (cont'd)****Au-Wen prospect (cont'd)**

*In 1996, George Resources Company Ltd. commenced a program of line cutting and soil sampling covering parts of the AU 1, AU 3, AU 4 and FLAM claims. In addition, trenching and chip sampling of the Hodge Vein and the Nesbitt Zone were carried out.*

*A grid consisting of 25 line kilometers was laid out from which 274 soil samples were collected. None of the soil samples analyzed by ICP yielded a gold value greater than 5ppb while the highest copper value was 77ppm. Carl Verley (1997) observed, "the area sampled was underlain by a blanket of boulder till or outwash". Channel sampling from three trenches cut across the Hodge Vein yielded gold values ranging from 30ppb to 6,600 ppb in the wall rock and greater than 20,000 ppb from the vein. At the Nesbitt zone, two trenches yielded gold ranging from 5 ppb to 1,620 ppb.*

**PEN 5 showing (Polymetallic veins Ag-Pb-Zn+/-Au: Au skarn)**

MINFILE 092HNE300

Three kilometre east

*From 1986 to 1990, Fairfield Minerals Ltd. completed prospecting in the area and subsequently staked the claims in 1990.*

*In 1991, Fairfield Minerals Ltd. conducted soil sampling and prospecting consisting of 2886 soil samples and 35 rock samples.*

*In 1993, Fairfield Minerals Ltd. collected 1156 soil, 11 rock and three stream sediment samples throughout the Pen claims.*

*In 1994, Fairfield Minerals Ltd. executed an exploration program of infill soil sampling, trenching and rock sampling.*

*In 1995, Fairfield Minerals Ltd. completed soil geochemical surveys on the property and later dropped the Pen 5 claim.*

*In 2005, Charles Greig and Bernard Kreft staked the area over the old Pen 5 and 8 claims, which were renamed Puupster and Puupster 2, as part of the North Brenda property.*

*In 2006, Bitterroot Resources Ltd. optioned the North Brenda property from Charles Grieg and Bernard Kreft.*

*In 2009 and 2010, Bitterroot Resources Ltd. completed stream sediment sampling near the Pen 5 showing.*

**PEN 8 showing (Cu skarn, Au skarn)**

MINFILE 092HNE301

Three kilometre east

*The showing was prospected and sampled by Fairfield Minerals Ltd. in 1991.*

**WAVE 1 anomaly (Polymetallic veins Ag-Pb-Zn+/-Au)**

MINFILE 092HNE311

Two kilometres east

**History: Property Area (cont'd)****Wave 1 anomaly (cont'd)**

Between 1986 and 1995, Fairfield Minerals conducted exploration, including a program of wide-spaced grid soil sampling. The Wave 1 and 2 claims were staked to cover areas of mineralized quartz float and coincidental soil and stream anomalies. Recently, the area has been explored by Sookochoff Consultants as a part of the Toni property.

**WAVE 2 anomaly (Polymetallic veins Ag-Pb-Zn+/-Au)**

MINFILE 092HNE312

One kilometre north

Between 1986 and 1995, Fairfield Minerals explored the area and completed a program of wide-spaced grid soil sampling. The Wave 1 and 2 claims were staked to cover areas of mineralized quartz float and coincidental soil and stream anomalies. In 1991, samples of mineralized vein float, up to 0.20 metres in diameter, returned up to 25.7 parts per million silver, 1732 parts per million lead and 2107 parts per million zinc (Assessment Report 22864). Recently, the area has been explored by Sookochoff Consultants as a part of the Toni property.

**HISTORY: PROPERTY****SNOW showing (Porphyry Cu +/- Mo +/- Au; Polymetallic veins Ag-Pb-Zn+/-Au)**

MINFILE 092HNE292

Within Tenure 833943

The Pine showing is 500 metres south of Quilchena Creek and 4.8 kilometres north-northeast of the north end of Boot 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 northward from the U.S. border and containing the important copper deposits of the Highland Valley, Craigmont, Copper Mountain, Afton, and 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 lithochemistry and by major fault systems. Variation from calc-alkaline to shoshonitic compositions from west to east has been interpreted to reflect eastward dipping subduction in the Nicola arc.

**GEOLOGY: PROPERTY AREA**

The geology on some of the more selected significant reported *MINFILE* mineral showings, and past producers peripheral to the Property is reported as follows. The distance is relative to the Toni 1044603 Claim Group.

**SIMILCO (COPPER MOUNTAIN) producer (Alkalic porphyry Cu-Au)**

MINFILE 092HSE001

Sixty nine kilometres north

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**Geology: Property Area (cont'd)****Similco (Copper Mountain) producer (cont'd)**

The regional geological setting is characterized by major north-striking high-angle faults which form an ancient, long-lived rift system that extends from the United States border to at least 160 kilometres north. This system was the locus of a long, narrow marine basin in which Nicola Group rocks were deposited during Triassic time, and it then accommodated basins of continental volcanism and sedimentation in Early Tertiary time. The central part of the Nicola basin is marked by an abundance of high-energy, proximal volcanic rocks and contains a large number of coeval, comagmatic, high-level plutons with several associated copper deposits. A group of such plutons, some of which are differentiated, are known as the Copper Mountain Intrusions.

The copper deposits of the Copper Mountain camp occur chiefly in a northwest-trending belt of Upper Triassic Nicola Group rocks, approximately 1100 metres wide and 4300 metres long, that is bounded on the south by the Copper Mountain stock, on the west by a major normal fault system known as the Boundary fault, and on the north by a complex of dioritic to syenitic porphyries and breccias known as the Lost Horse complex. Copper mineralization diminishes markedly to the east, where the Copper Mountain stock and Lost Horse complex diverge sharply.

The Nicola rocks in the vicinity of Copper Mountain are andesitic to basaltic and are composed predominantly of coarse agglomerate, tuff breccia and tuff, with lesser amounts of massive flow units and some lensy layers of volcanic siltstone. These rocks were previously included with the Wolf Creek Formation (Geological Survey of Canada Memoir 171).

The coarse fragmental rocks, which locally contain clasts up to 35 centimetres in diameter, rapidly grade to the southeast and south into massive flows, abundant waterlain tuff and some pillow lava. This distribution of coarse fragmental volcanics, and their spatial association with the porphyry breccia complex and with the copper deposits indicate that one or more Nicola volcanic centres were localized close to the Lost Horse complex. It also indicates the close relationship between copper mineralization and Nicola magmatism in this camp. West of the Boundary fault, the Nicola Group consists of intercalated volcanic and sedimentary rocks that include massive and fragmental andesites, tuff and generally well-bedded calcareous shale, siltstone and sandstone.

The Copper Mountain Intrusions include the Copper Mountain, Smelter Lake and Voigt stocks. These plutons form a continuous alkalic-calcic rock series ranging in composition from pyroxenite to perthosite pegmatite and syenite. The Copper Mountain stock is a concentrically differentiated intrusion, elliptical in plan, and approximately 17 square kilometres in area. Its major axis is 10 kilometres long and strikes 300 degrees. The stock is zoned, with diorite at its outer edge grading through monzonite to syenite and perthosite pegmatite at the core. The two smaller satellites, the Smelter Lake and Voigt stocks, show no differentiation, but are similar in composition to the outer phase of the Copper Mountain stock.

The Lost Horse complex is approximately 4300 metres long and 760 to 2400 metres wide, and consists of porphyries and porphyry breccias which range in composition from diorite to syenite, showing widespread but variable albitization, saussuritization and pink feldspar alteration. These porphyries are not a continuous mass, but are a complex of dykes, sills and irregular bodies. Some phases of the complex are mineralized, but others, such as some major dykes, are clearly post-mineral.

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**Geology: Property Area (cont'd)****Similco (Copper Mountain) producer (cont'd)**

Radiometric age dates on the Lost Horse complex, the Smelter Lake and Voigt stocks, and on sulphide-bearing pegmatite veins indicate that the apparent age of these intrusions and of the associated mineralization is Early Jurassic (Bulletin 59, page 43; Canadian Journal of Earth Sciences, Volume 24, page 2533).

Nicola Group rocks near Copper Mountain exhibit secondary mineral assemblages which are characteristic of greenschist facies, or of albite-epidote hornfels. The volcanic rocks have widespread epidote, chlorite, tremolite-actinolite, sericite, carbonate and locally biotite and prehnite. In the immediate vicinity of the Copper Mountain stock, a narrow aureole of contact metamorphism, generally less than 60 metres wide, overprints the above assemblages and is characterized by a widespread development of granoblastic diopsidic pyroxene, green hornblende, brown to reddish biotite, abundant epidote, intermediate plagioclase and some quartz.

In the narrow belt of Nicola rocks, between the Ingerbelle mine (092HSE004) to the west and Copper Mountain, the alteration differs and, where best developed, involves widespread development of biotite, followed by albite-epidote, with subsequent local potash feldspar and/or scapolite metasomatism in both Nicola rocks and Lost Horse intrusions.

The feldspar and scapolite metasomatism is characterized by intense veining and is controlled by the presence and intensity of fractures and by the proximity of large bodies of Lost Horse intrusive rocks.

The area near Copper Mountain is characterized by brittle deformation which produced a large number of faults and locally, intense fracturing. Very broad, northerly trending folds have been recognized or postulated at widely-spaced localities, but these folds decrease quickly in amplitude and down section. The area is dominated regionally by well-developed, northerly striking, high-angle faults which are best described as forming a rift system. Copper Mountain is dominated by strong easterly and northwesterly faulting. The narrow belt of Nicola rocks between Ingerbelle and Copper Mountain, confined between the Copper Mountain stock and the Lost Horse complex, is highly faulted and fractured, but does not appear appreciably folded.

The strata are mostly flat-lying or very gently dipping where marker beds exist, and the few areas of steep dips can best be explained as blocks tilted by faulting. Faults in this area have been grouped in order of decreasing relative age of their latest movement into: easterly faults (Gully, Pit), "mine breaks", northwest faults (Main), northeast faults (Tremblay, Honeysuckle) and the Boundary fault. Of these, the Boundary fault is part of the regional rift system; the others appear to be local structures, the genesis and history of which are closely related to the evolution of the Copper Mountain Intrusions (Canadian Institute of Mining and Metallurgy Special Volume 15).

Concentric patterns of rock alteration about individual orebodies at Copper Mountain are not evident. Alteration appears to be related mainly to the intrusive bodies and also controlled in distribution by faults and fractures. Biotite is well-developed along the stock contact in the underground mine and appears to be associated with the orebodies, and also forms selvages on bigger veins.

Pale green bleaching of both volcanic and intrusive rocks is best developed at Pit 2, but also occurs and is locally intense at several other localities throughout the camp, such as along the Lost Horse contact, in portions of Pit 1 and in the outer part of the underground mine.



**Geology: Property Area (cont'd)****Similco (Copper Mountain) producer (cont'd)**

*It appears to follow the biotite stage and involves the development of albitic plagioclase and epidote, and the destruction of biotite and disseminated magnetite. Pink potash feldspar developed along fractures in the latest stage of alteration and is often accompanied by pegmatite veins. These "veins", found in most orebodies and elsewhere at Copper Mountain, consist of potash feldspar, biotite, calcite, fluorite, apatite and also some chalcopyrite and bornite. They are usually less than 0.3 metre wide and have formed in part by replacement of the wallrock. Closely-spaced thin pegmatite veins form the northeast sheeted zones of ore fractures. As at the Ingerbelle mine, copper mineralization appears to have occurred during the intermediate and late stages of alteration (Canadian Institute of Mining and Metallurgy Special Volume 15).*

**MAL** prospect (Cu skarn; Fe skarn; Au skarn)

MINFILE 092HNE002

Seven kilometres west

*The Malachite 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 in southern British Columbia (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 or facies of the Nicola Group (after Preto, Bulletin 69). This assemblage mainly consists of well-bedded submarine volcanoclastic rocks and volcanic flows.*

*The area of the Malachite occurrence is underlain by dark green, augite porphyritic andesitic to basaltic volcanics and fragmental rocks, with subordinate black argillite with local limy horizons, and feldspar porphyry (Assessment Reports 449, 1586). Some volcanic flow breccia contains pink trachytic fragments (Assessment Report 9590). Stratified rocks strike north-northwest and dip moderately to steeply west (Geological Survey of Canada Map 41-1989).*

**BRENDA** past producer (Porphyry Cu +/- Mo +/- Au)

MINFILE 092HNE047

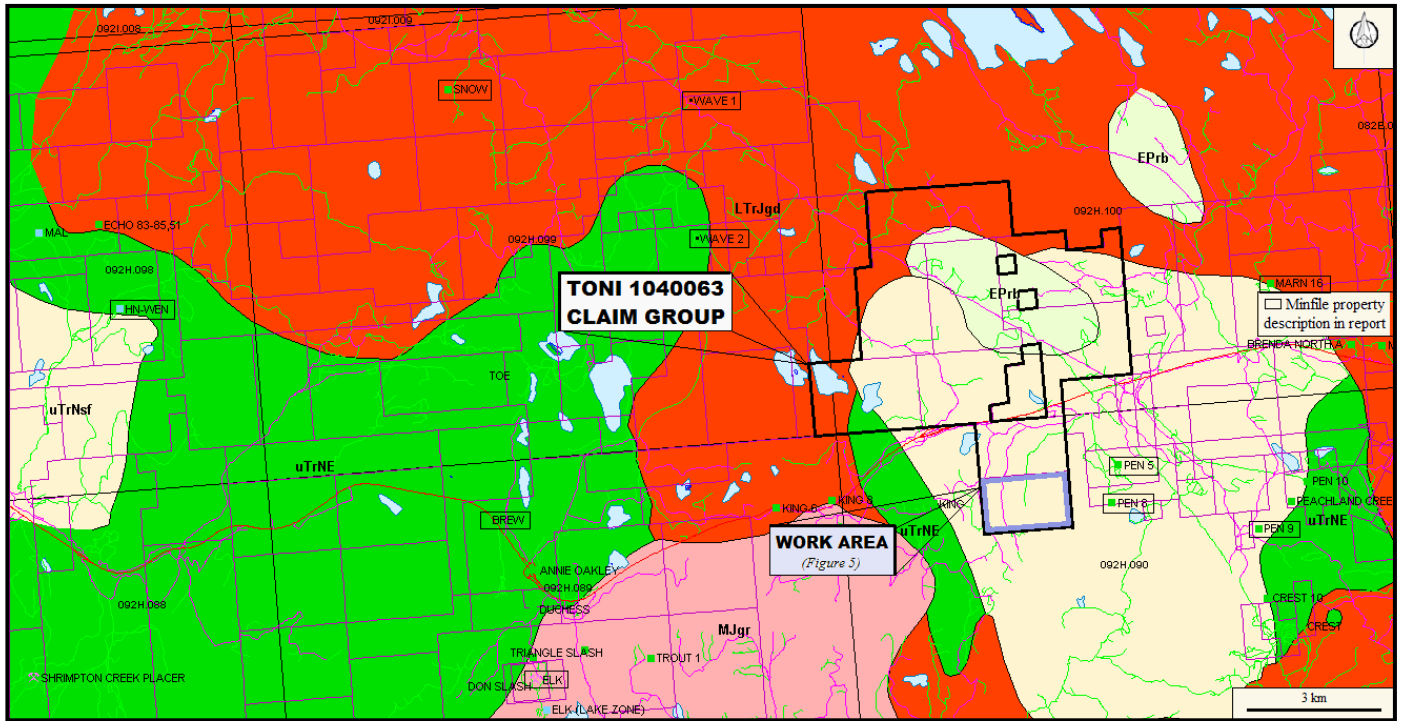
Eleven kilometres east

*The Pennask Mountain area is mainly underlain by a roof pendant comprising westerly younging, Upper Triassic sedimentary and volcanoclastic rocks of the Nicola Group.*

*These are intruded and enclosed to the north, east and south by plutonic rocks of the Early Jurassic Pennask batholith and Middle Jurassic Osprey Lake batholith. Both the Nicola rocks and the Pennask batholith are unconformably overlain by Tertiary sediments and volcanics of the Princeton Group.*

*The Brenda copper-molybdenum deposit is within the "Brenda stock", a composite quartz diorite/granodiorite body which forms part of the Pennask batholith. Several ages and compositions of pre and post-ore dikes cut the stock. The deposit is approximately 390 metres from the contact with Nicola Group rocks to the west. Nicola Group tuffs, volcanic breccias and flows adjacent to the Brenda stock have been altered to "schistose hornfels". This hornfels, which is as wide as 450 metres, is characterized by the development of bands and aligned lenses of felted brown to black biotite. Chistosity generally strikes roughly parallel to the intrusive contact and dips west at 30 to 70 degrees.*

Figure 4. Geology, Claims, Index, & Minfile  
(Base Map from MapPlace)



**GEOLOGY MAP LEGEND**

**Pleistocene to Holocene**

Qvk  
 Unnamed alkalic  
 volcanic rocks

**Eocene**

EPrb: **Princeton Group**  
 andesitic volcanic rocks

**Upper Triassic: Nicola Group**

**Eastern Volcanic Facies**  
 uTrNE  
 basaltic volcanic rocks  
 uTtNsf  
 mudstone, siltstone, shale, fine  
 clastic sedimentary rocks

uTrNMI  
 basaltic volcanic rocks

uTrJum  
 unnamed ultramafic rocks

**Late Triassic to Early Jurassic**

LTrJgd  
 unnamed granodiorite intrusive  
 rocks  
 LTrJdr  
 dioritic to gabbroic intrusive  
 rocks

**Geology: Property Area (cont'd)****Brenda past producer (cont'd)**

*The schistose hornfels grades westerly into recognizable west-dipping volcanic rocks which in turn are overlain by greywacke, argillite and shales. The Brenda stock is a composite, zoned quartz diorite to granodiorite body which can be divided into two units. Unit 1 is of quartz diorite composition and contains abundant mafic minerals (hornblende > biotite) and angular quartz grains, whereas unit 2 is porphyritic granodiorite and contains fewer mafic minerals (biotite > hornblende), well-defined biotite phenocrysts and subhedral quartz grains.*

*The contact between units 1 and 2 is generally gradational, but locally sharp. At sharp contacts, unit 2 is chilled against unit 1.*

*Dikes of several ages and compositions cut the Brenda stock. At least four types, aplite-pegmatite, andesite, trachyte porphyry and basalt, have been identified in the Brenda orebody. Similar dikes, as well as felsite, dacite and quartz diorite have been mapped beyond the limits of economic mineralization. The aplite-pegmatite dikes are cut by all other dikes and by all mineralized fractures. The andesite dikes have been altered and mineralized during ore formation. Two types of quartz diorite dikes are found and both are cut by quartz-sulphide veins. Dacite porphyry and felsite dikes are also cut by quartz-sulphide veins.*

*A trachyte porphyry dike up to 4.5 metres wide and 300 metres in strike length is exposed in the Brenda pit. A weakly mineralized vein was observed in the dike which suggested an intermineral age for the dike. Further evidence has clearly shown that the dikes cut all stages of mineralization, except some of the latest quartz veins (Canadian Institute of Mining and Metallurgy Special Volume 15). Several post-mineral hornblende lamprophyre dikes also occur within the Brenda orebody and are probably genetically related to the trachyte porphyry dikes. Irregular, branching basalt dikes, probably related to Tertiary volcanism, have been intruded along pre-existing fault zones. They cut all phases of mineralization and alteration.*

*Initial potassium-argon dating of two samples from the Brenda mine area resulted in different ages for hornblende (176 Ma) and biotite (148 Ma). Interpretation of these results suggests that the Brenda stock crystallized about 176 million years ago. Biotite samples from the pit area have been dated at about 146 Ma, which probably represents the age of mineralization (Canadian Institute of Mining and Metallurgy Special Volume 15).*

*Faults in the Brenda pit are expressed as fracture zones in which the rock is intensely altered to clay minerals, sericite, epidote and chlorite. These fracture zones range in width from a few centimetres to 9 metres. Most strike 070 degrees and dip steeply south. Northwest-striking faults exhibit left-lateral movement. The faults transect all mineralization, except some calcite veins. Sulphides, especially molybdenite, have been smeared along fault planes. Shear zones are wider and more numerous in the north half of the pit, where they control bench limits.*

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

MINFILE 092HNE058

Four kilometres west

*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).*

**Geology: Property Area (cont'd)****HN Wen prospect (cont'd)**

*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 volcanoclastic 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).*

*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).*

**ELK** past producer (Intrusion-related Au pyrrhotite veins; Polymetallic veins Ag-Pb-Zn +/-Au; Au-quartz veins)  
MINFILE 092HNE096  
Six kilometres south

*The Elk property is underlain by Upper Triassic volcanics and sediments of the Nicola Group and by Middle Jurassic granites and granodiorites of the Osprey Lake batholith. The contact between these units trends northeasterly across the property. Early Tertiary feldspar porphyry stocks and dikes of the Otter intrusions occur throughout the property. The western property area is underlain by steeply west-dipping andesitic to basaltic flows, agglomerates, tuffs and minor siltstone and limestone units of the Nicola Group. The eastern half of the property is underlain by granitic rocks of the Osprey Lake batholith.*

**AU-WEN** prospect (Intrusion related Au pyrrhotite veins; Polymetallic veins Ag-Pb-Zn +/-Au)  
MINFILE 092HNE144  
Nine kilometres west

*The AU 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 in southern British Columbia (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).*

**Geology: Property Area (cont'd)****Au Wen prospect (cont'd)**

*This assemblage mainly consists of well-bedded submarine volcanoclastic rocks, ranging from tuffaceous volcanic siltstones characteristic of the lower part, to coarse volcanic conglomerate and laharic breccias in the upper part. The assemblage is characterized by a paucity of intrusive rocks in comparison to the main Aspen Grove copper camp in the Central belt a few kilometres to the west, separated by the Kentucky-Alleyne fault system (Bulletin 69).*

*The AU occurrence is centred on the main gold showing, a small stripped, drilled and trenched area just off a gravel road south of Quilchena Creek (Assessment Reports 5766, 16008).*

*This and most of the surrounding area is underlain by andesitic to dacitic tuff, cherty tuff, black argillite, and volcanic sandstone and siltstone. The rocks are strongly fractured in a variety of orientations. Bedding in the tuff has been measured to strike 060 degrees and dip 54 degrees northwest, but it varies.*

*About 1 kilometre to the north of the main showing is biotite hornblende granodiorite and quartz monzonite of the Early Jurassic Pennask batholith, and about 500 metres to the west are porphyritic andesitic and basaltic volcanic rocks (Bulletin 69; Assessment Report 16008). Small bodies of diorite and micromonzonite, possibly subvolcanic, are quite common in the area, on the surface and in drill core (Assessment Report 16008). Some of the volcanics have sustained carbonate and epidote alteration, and locally they have pervasive hematite (Assessment Report 16008).*

**BREW showing (Alkalic porphyry Cu-Au; Subvolcanic Cu-Ag-Au; As-Sb)**

MINFILE 092HNE275

Two kilometres south

*This occurrence is hosted in volcanics and minor sediments of the Upper Triassic Nicola Group, 2.6 kilometres northwest of the Middle Jurassic Osprey Lake batholith. The volcanics consist primarily of andesite and fine-grained diorite. The contact between the two units is gradational, suggesting the diorite may be a subvolcanic equivalent of the andesite. Minor tuffs, lapilli tuffs, agglomerates, and feldspar porphyritic andesite are also present. The sediments consist of mudstone, siltstone, shale, and rare carbonate, intercalated with the pyroclastic units.*

*A major fault zone, the Brew fault, striking 140 degrees and dipping steeply southwest, is exposed along the Coquihalla Highway for 600 metres.*

*The zone is approximately 40 metres wide. It is somewhat gossanous and exhibits carbonate and clay alteration and sporadic silicification. Some quartz +/- calcite stringers and blebs are present but not common. Pyrite is ubiquitous along the entire fault. Sections of the zone are strongly mineralized with massive veins, narrow stringers and occasional disseminations of marcasite, pyrite and pyrrhotite. Samples of pyritic clay-altered sections have yielded up to 0.280 gram per tonne gold and 0.445 per cent arsenic (Assessment Report, 18041, page 8, samples 128665, 44719)*

*A sample from a zone of quartz stringers analysed 0.600 gram per tonne gold (sample 239716).*

*This fault is traversed by several significant fault/shear zones striking 100 to 120 degrees. One major crossfault, the Mugwump fault, is exposed west of the Brew fault, striking 100 degrees and dipping 60 degrees south.*

**Geology: Property Area (cont'd)****PEN 5** showing (Polymetallic veins Ag-Pb-Zn+/-Au: Au skarn)

MINFILE 092HNE300

Three kilometre east

*The occurrence is hosted in a small elongate stock of granodiorite, near its eastern margin. This north-trending stock is 1.8 kilometres long and intrudes andesitic ash and lapilli tuff of the Upper Triassic Whistle Creek Formation (Nicola Group). The stock may be related to the Early Jurassic Pennask batholith, which surrounds the Nicola Group volcanics and sediments comprising this roof pendant.*

**PEN 8** showing (Cu skarn, Au skarn)

MINFILE 092HNE301

Three kilometre east

*The showing occurs in tuffaceous siltstone and argillite of the Upper Triassic Whistle Creek Formation (Nicola Group), at the south end of a small north-trending stock of granodiorite, 1.8 kilometres long. This stock may be related to the Early Jurassic Pennask batholith, which surrounds the Nicola Group volcanics and sediments comprising this roof pendant.*

**WAVE 1** anomaly (Polymetallic veins Ag-Pb-Zn+/-Au)

MINFILE 092HNE311

Two kilometres east

*The area is underlain by granitic rocks of the Jurassic Pennask batholith and basaltic volcanics of the Triassic Nicola Group.*

**WAVE 2** anomaly (Polymetallic veins Ag-Pb-Zn+/-Au)

MINFILE 092HNE312

One kilometre north

*The area is underlain by granitic rocks of the Jurassic Pennask batholith and basaltic volcanics of the Triassic Nicola Group.*

**GEOLOGY: PROPERTY**

As indicated by the BC government supported MapPlace geological maps, the Toni 1044603 Claim Group is predominantly underlain in the north by the Pennask Batholith and in the southeast by a localized capping of Eocene volcanic rocks which cap a succession of Upper Triassic Nicola Group sedimentary rocks which in turn cap Nicola Group volcanic rocks. Along the southwest fringes of the Property the Pennask Batholith is in northeasterly contact with the Nicola volcanics.

**SNOW** showing (Porphyry Cu +/- Mo +/- Au; Polymetallic veins Ag-Pb-Zn+/-Au)

MINFILE 092HNE292

Within Tenure 833943

*A sample of drill core from 28.0 metres depth contained fine-grained magnetite accompanied by fine-grained chalcocite or bornite along the margins of a zeolite vein. Copper mineralization also occurs along fractures and as disseminations in the granite.*

**Geology: Property Area (cont'd)****Snow showing (cont'd)**

*Two assays of a grab sample taken in the vicinity of the drillhole yielded less than 0.3 gram per tonne gold, 3.1 grams per tonne silver and 0.54 per cent copper, and 0.45 gram per tonne gold, 3.1 grams per tonne silver and 0.30 per cent copper, respectively (Assessment Report 3415, assay certificates).*

**MINERALIZATION: PROPERTY AREA**

The mineralization on some of the more selected significant reported *MINFILE* mineral properties, peripheral to the Property is reported as follows. The distance is relative to the Toni 1044603 Claim Group.

**SIMILCO (COPPER MOUNTAIN) producer (Alkalic porphyry Cu-Au)**

MINFILE 092HSE001

Sixty nine kilometres south

*Three major orebodies are confined to a 1100 by 4300-metre belt. Numerous other occurrences of copper mineralization related to the Copper Mountain Intrusions are found over an area with maximum dimensions of 10 by 11 kilometres.*

*Development by Granby Consolidated Mining, Smelting and Power Company Ltd. during the 1950's and by Newmont Mining Corporation of Canada during 1968-69, outlined two areas of economic grade mineralization centred on Pit 1 and Pit 2. The Pit 1 (Princess May) orebody lies in a chalcopyrite zone immediately northwest of the underground mine. It is 700 metres long and up to 300 metres wide, with open pit ore extending to a maximum depth of 170 metres. The bulk of the ore was emplaced along the Main fault in massive and fragmental volcanic rocks above the lower bedded tuff horizon. Recognizable pre-ore porphyritic intrusive rocks are scarce. Sulphides occur mainly as fine disseminations of chalcopyrite and pyrite and only rarely as blebs and stringers. Mineralization at the west end of the orebody, between the stock contact and the fault, consists typically of thin fracture coatings of bornite and chalcopyrite in the fine-grained tuff bed. Pits 1 and 7 are developed in this orebody.*

*The Pit 2 orebody is 900 metres long, 90 to 360 metres wide and appears to have a maximum mineable depth of 170 metres. It is located 240 metres northeast of Pit 1. It lies along an indistinct and irregular contact of volcanic rocks with Lost Horse intrusive rocks, both rock types being host to ore. Faults control the boundaries of the orebody to a considerable degree. The northern boundary is formed in part by a zone of faulting and crushing; the southern boundary, although relatively straight, has not been related to any structure to date. To the west, the ore diminishes in grade in the vicinity of a strong northerly fault; to the east, the outline of the orebody becomes most irregular and mineralization grades to predominant pyrite with minor chalcopyrite. Within the orebody, ore-grade material is distributed irregularly, but several local trends and centres of copper mineralization occur. The sulphides are predominantly chalcopyrite and pyrite; bornite is rare. The largest known breccia pipe in the area, 90 metres in diameter and at least 150 metres deep, lies in the north-central part of the orebody. Although fine disseminations and fracture coatings of sulphide are common, the Pit 2 orebody has a much greater proportion of coarse blebs and veinlets than Pit 1.*

*The Pit 3 (Sunset) orebody begins 200 metres southeast of the Pit 1 orebody and continues southeast, along the eastern margin the Copper Mountain stock, for 1200 metres.*

**Mineralization: Property Area (cont'd)****Copper Mountain producer (cont'd)**

*This zone is located over old caved and collapsed workings of the underground mine and is therefore also referred to as the Subsidence Area zone (Bulletin 59, page 68). The orebody is 120 to 250 metres wide over most of its length, and is hosted almost entirely in the Nicola Group volcanics. Mineralization occurs along the northwest-striking intrusive contact, along major faults such as the Main fault or the "Mine breaks" or at the intersection of a series of steeply-dipping, west-striking, Lost Horse porphyry dykes with northeast-striking breaks and pegmatite-sheeted zones. Mineralization penetrates only a metre or so into the diorite of the stock. The form of the orebody segments is pipe-like in many places, as a result of their control by steep planar elements and division by a series of barren north-striking felsite dykes. The diameter of the segments that were mined ranged from about 15 to 60 metres. The contact orebody, which produced about half of the underground ore, was mined over widths of 9 to 38 metres, along a length of 900 metres and a maximum depth of 400 metres. The most productive areas of the mine consisted mainly of sequences of fine-grained bedded tuffs.*

*These rocks, being more brittle than the adjacent flows, tuffs and agglomerates, shattered readily and yielded more "ore fractures". The lower bedded unit warped downward near the contact of the stock, so that it also formed a hostrock on deeper levels of the orebody. In addition, Lost Horse Intrusions which occur within the less favourable massive flows and coarse tuffs contained more fractures, and copper mineralization was concentrated in the contact areas of these irregular masses. Ore minerals are bornite and chalcopyrite in roughly equal proportions, with most of the bornite occurring within 60 metres of the stock contact. Minor chalcocite occurs with the best bornite ore. Pyrite exists in areas of chalcopyrite mineralization, but was absent in areas where bornite was present. The sulphide content of the rocks generally decreases sharply at the limits of the mine area. This orebody has been mined from the Nos. 3, 5 and 6 pits over a vertical elevation of 450 metres and from an elaborate system of underground workings.*

*Concentric patterns of rock alteration about individual orebodies at Copper Mountain are not evident. Alteration appears to be related mainly to the intrusive bodies and also controlled in distribution by faults and fractures. Biotite is well-developed along the stock contact in the underground mine and appears to be associated with the orebodies, and also forms selvages on bigger veins. Pale green bleaching of both volcanic and intrusive rocks is best developed at Pit 2, but also occurs and is locally intense at several other localities throughout the camp, such as along the Lost Horse contact, in portions of Pit 1 and in the outer part of the underground mine. Pink potash feldspar developed along fractures in the latest stage of alteration and is often accompanied by pegmatite veins. These "veins", found in most orebodies and elsewhere at Copper Mountain, consist of potash feldspar, biotite, calcite, fluorite, apatite and also some chalcopyrite and bornite. They are usually less than 0.3 metre wide and have formed in part by replacement of the wallrock. Closely-spaced thin pegmatite veins form the northeast sheeted zones of ore fractures. As at the Ingerbelle mine, copper mineralization appears to have occurred during the intermediate and late stages of alteration (Canadian Institute of Mining and Metallurgy Special Volume 15).*

*The well-differentiated Copper Mountain stock is thought to have been emplaced at the roots of an active volcanic centre. The various phases of the Lost Horse complex were intruded, with rapid uplift and erosion, as a series of separate injections from a differentiating magma.*



**Mineralization: Property Area** (cont'd)**Copper Mountain producer** (cont'd)

*Their shallower, subvolcanic level of emplacement is indicated by their finer grained porphyritic texture, their highly variable contact relationships, including chilled margins, and the pipes and irregular bodies of breccia. The various characteristics of the orebodies suggest that they formed during the later stages of this magmatism. The Copper Mountain stock was probably not the immediate source of hydrothermal fluids at that time, but it most likely was still a hot mass and could easily have provided a temperature gradient as well as a physical and chemical barrier to the sulphide-bearing fluids which probably came from the same source as the Lost Horse rocks.*

*Magnetite-rich parts of the Copper Mountain orebodies demonstrate textures of magmatic origin; the elevated PGE (platinum group elements) content of sulphide ore supports a mantle source similar to that of coeval and possibly cogenetic PGE-rich zoned Alaskan-type intrusions in eastern Quesnellia (e.g. Tulameen Ultramafic Complex, Polaris Intrusive Complex). Analyses of sulphide concentrate from the mine yielded up to 2.8 grams per tonne palladium and 0.155 gram per tonne platinum. A sample of a bornite- chalcopyrite vein from the glory hole yielded 3.25 grams per tonne palladium (Property File - Cordilleran Roundup 1991, Program and Abstracts Volume).*

**MAL** prospect (Cu skarn; Fe skarn; Au skarn)

MINFILE 092HNE002

Seven kilometres west

*Copper mineralization is concentrated in the skarn zones. Pyrite and subordinate magnetite and chalcopyrite are associated with quartz-calcite veins, or are disseminated in variable amounts (Assessment Report 1586). Chalcocite and malachite are also present at the main showing (Assessment Report 8453). Finely disseminated pyrite is common in most rocks, particularly the argillaceous rocks (Assessment Reports 1718, 9590). A zone of massive, medium-grained pyrite between 1 and 13 metres thick, in altered volcanic rocks, has been found below the surface by diamond drilling; the paragenesis is epidote, magnetite, pyrite (Assessment Report 9590).*

*Copper values appear to be erratic. In early diamond drilling, the best result reported is 1.62 per cent copper over 6 metres; this section contained at least 50 per cent magnetite (Assessment Report 449, page 6). More recent diamond drilling has resulted in generally low metal values, although one split core sample assayed 0.37 per cent copper and 6.8 grams per tonne silver (Assessment Report 9590).*

*More recent diamond drilling has resulted in generally low metal values, although one split core sample assayed 0.37 per cent copper and 6.8 grams per tonne silver (Assessment Report 9590). A grab sample from the main trenched and drilled area assayed 0.34 gram per tonne gold, 3.4 grams per tonne silver, and 0.2 per cent copper (Assessment Report 8453).*

*The high magnetite and pyrite content of the rocks at this occurrence is reflected in significant magnetic and induced polarization anomalies, respectively, over the mineralized zones (Assessment Reports 1586, 8453).*

**BRENDA** past producer (Porphyry Cu +/- Mo +/- Au)

MINFILE 092HNE047

Eleven kilometres east

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**Mineralization: Property Area (cont'd)****Brenda past producer (cont'd)**

The Brenda orebody is part of a belt of copper-molybdenum mineralization that extends north-northeast from the Nicola Group-Brenda stock contact.

Mineralization of economic grade (0.3 per cent copper equivalent) is confined to a somewhat irregular zone approximately 720 metres long and 360 metres wide. Ore-grade mineralization extends more than 300 metres below the original surface.

Lateral boundaries of ore-grade mineralization are gradational and appear to be nearly vertical.

Primary mineralization is confined almost entirely to veins, except in altered dike rocks and in local areas of intense hydrothermal alteration which may contain minor disseminations. The grade of the orebody is a function of fracture (vein) density and of the thickness and mineralogy of the filling material. The average total sulphide content within the orebody is 1 per cent or less.

Chalcopyrite and molybdenite, the principal sulphides, generally are accompanied by minor, but variable, quantities of pyrite and magnetite. Bornite, specular hematite, sphalerite and galena are rare constituents of the ore.

Johnson (1973), in a study of 17 samples from the deposit, reported minor pyrrhotite, mackinawite, carrollite, cubanite, ilmenite, rutile and native gold (?), as well as several secondary sulphides (Canadian Institute of Mining and Metallurgy Special Volume 15).

Pyrite is most abundant in altered andesite dikes and in quartz-molybdenite veins. The ratio of pyrite to chalcopyrite in the orebody is about 1:10, with the chalcopyrite content diminishing beyond the ore boundaries.

Because mineralization is confined almost entirely to veins in relatively fresh homogeneous rock, the veins are divided into separate stages, based on crosscutting relations and their mineralogy and alteration effects on the hostrock. The vein density within the orebody is not uniform.

Ranges are recorded from less than 9 per metre near the periphery of the orebody to 63 per metre and occasionally 90 per metre near the centre of the orebody. Some veins have very sharp contacts with wallrocks, but most contacts are irregular in detail where gangue and sulphide minerals replace the wallrock. A vein may show features characteristic of fracture-filling in one part and of replacement in another. Mineralized solutions were introduced into fractures and, during development of the resultant veins, minor replacement of the wallrock ensued.

The chronological stages of mineralization are as follows: (1) biotite-chalcopyrite (oldest); (2) quartz-potassium feldspar-sulphide; (3) quartz-molybdenite-pyrite; (4) epidote-sulphide-magnetite; and (5) biotite, calcite and quartz. Stages 1 through 4 are all genetically related to a single mineralizing episode, which was responsible for the orebody. Stage 5 represents a later, probably unrelated, event(s) (Canadian Institute of Mining and Metallurgy Special Volume 15). Stage 2 veins form the bulk of the mineralization in the deposit, and are the most important source of ore.

Hydrothermal alteration at the Brenda deposit generally is confined to narrow envelopes bordering veins. These alteration envelopes commonly grade outward into unaltered or weakly propylitic-altered rock. Where veins are closely spaced, alteration envelopes on adjacent veins may coalesce to produce local areas of pervasive alteration.

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**Mineralization: Property Area (cont'd)****Brenda past producer (cont'd)**

For the most part, hydrothermal alteration at the Brenda deposit is exceptionally weak for a porphyry copper system.

Four types of alteration are recognized in the Brenda deposit, three of which are related to the mineralizing process. Two of these are potassic (potassium feldspar) and biotite, and the other is propylitic. Later argillic alteration has been superimposed on the system along post-mineral faults.

Potassium feldspar and biotite alteration generally are separated in space, but locally occur together. Both types of alteration accompanied sulphide deposition. Potassium feldspar replaces plagioclase adjacent to most stage 2 and, to a lesser extent, stage 3 veins. These irregular envelopes range in width from a centimetre or less up to a metre, with an average of about 2 centimetres. Potassium feldspar also occurs as a minor constituent of stage 1 veins.

Hydrothermal biotite replaces magmatic mafic minerals (hornblende, biotite) and, more rarely, plagioclase in hostrock adjacent to stage 2 and especially stage 3 veins. These envelopes of hydrothermal biotite range in width from less than 1 millimetre to several centimetres.

Weak to intense propylitic alteration, which is characterized by the development of chlorite and epidote, as well as less obvious microscopic sericite and carbonate, is sporadically distributed throughout the Brenda stock.

Large areas within the orebody have not been propylitized and in these areas, veins with potassic alteration envelopes clearly cut across propylitized quartz diorite, indicating an early hydrothermal or even a pre-ore origin for the propylitization (Canadian Institute of Mining and Metallurgy Special Volume 15). A second period of propylitization accompanied the development of stage 4 veins and is reflected as envelopes of epidote and chlorite.

Locally intense argillic alteration is confined to post-mineral fault zones where the hostrock has been highly shattered. Kaolinite, sericite and epidote have almost completely replaced the host rocks.

Surface weathering, which is expressed predominantly by the development of limonite, extends as a highly irregular blanket over the mineralized zone for depths ranging from a few metres to greater than 30 metres. In this weathered area, limonite stains all fractures. Fault zones have been especially susceptible to surface weathering, and the argillic alteration of these zones may be primarily the result of groundwater action. Secondary minerals developed during weathering, all highly subordinate in quantity to limonite, include malachite, azurite, hematite, ferrimolybdate, powellite and cupriforous manganese oxides. Cuprite, covellite, chalcopyrite, native copper, tenorite and ilsemanite are rare constituents. Copper-molybdenum mineralization in the Brenda deposit was developed during several sequential stages, all of which constitute one mineralizing episode.

Each stage occupies unique sets of fractures, which are filled with specific combinations of metallic and gangue minerals. Although the attitudes of veins in each stage are unique in detail, most stages include conjugate steeply dipping sets of northeast and northwest striking veins. If these veins occupy shear fractures, it is probable that they were formed by generally east-west compressive forces. Examination of the structure in the Nicola Group rocks to the west reveals that north-northwest and north trending fold axes also indicate an east-west compression.

**Mineralization: Property Area** (cont'd)**Brenda** past producer (cont'd)

*It is suggested that intermittent east-west compressional forces intensely fractured the rocks of the Brenda stock during several stages of time and tapped a hydrothermal source, either a later phase of the Brenda stock or a separate intrusive system. As each stage of fractures developed, hydrothermal fluids introduced vein material which healed the fractures. Renewed build-up of compressional forces again fractured the rocks, which were again healed. Repetition of this sequence can explain all stages of mineralization within the Brenda deposit. East-west compression continued after ore deposition ceased and produced prominent east-northeast and northwest striking shear zones (Canadian Institute of Mining and Metallurgy Special Volume 15).*

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

MINFILE 092HNE058

Four kilometres west

*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.*

**ELK** past producer (Intrusion-related Au pyrrhotite veins; Polymetallic veins Ag-Pb-Zn

+/-Au; Au-quartz veins)

MINFILE 092HNE096

Six kilometres south

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**Mineralization: Property Area (cont'd)****Elk past producer (cont'd)**

Gold-silver mineralization on the Elk property is hosted primarily by pyritic quartz veins and stringers in altered pyritic granitic and, less frequently, volcanic rocks.

Crosscutting relationships indicate that the veins are Tertiary in age; they may be related to Tertiary Otter intrusive events.

To date, mineralization has been located in four areas on the Elk property: Siwash North, South Showing (092HNE261), North Showing (092HNE281) and Siwash Lake (092HNE041, 295).

The Siwash Lake zone is 800 metres south of the Siwash North deposit; the North Showing and South Showing areas are 2 and 3 kilometres south of Siwash North respectively.

In the Siwash North area, gold occurs in veins measuring 5-70 centimetres wide, hosted by a zone of strongly sericitic altered granite and, in the west, volcanic rocks.

In general, the mineralized zone trends east-northeast with southerly dips from 20-80 degrees (from east to west), and appears to be related to minor shearing. Quartz veining occurs in a number of parallel to subparallel zones. Each zone consists of one or more veins within an elevation range of 5 to 10 metres that can be correlated as a group to adjacent drill holes. In the eastern parts of the area, up to six subparallel zones occur.

Five of these zones are consistent enough to be labelled the A, B, C, D and E zones.

Mineralization in the west has been identified in one or locally two zones (the B and C zones). The main mineralized zone (B) is consistent, with only minor exceptions, across the entire drill grid.

The Siwash North structure has been tested to 335 metres down dip and along a strike length of 925 metres. The zone remains open to depth and along strike.

At surface, supergene alteration has leached out most of the sulphides with some pyrite and chalcopyrite remaining. Mineralization occurs primarily as native gold, occasionally as spectacular aggregates of coarse flakes in frothy quartz (strong pyrite boxwork) or in fractures in the vein. Electrum was noted in one area as very coarse-grained flakes associated with strong manganese staining. Gold is rarely seen in boxworks in sericitic (phyllic) alteration.

In drill core, mineralization has not been affected by supergene processes. Metallic minerals in drill core include pyrite, chalcopyrite, sphalerite, galena, tetrahedrite, maldonite? pyrrhotite and native gold in order of decreasing abundance. Gold is strongly associated with pyrite and with a blue-grey mineral. Photomicrographs show the gold commonly in contact with this mineral, which may be a gold-bismuth alloy (maldonite?) or a copper-bismuth-antimony sulphosalt.

Gangue mineralogy consists primarily of quartz and altered wallrock fragments. Ankerite is commonly present, with lesser amounts of calcite. Minor barite is also present. Fluorite was noted in one vein as very small (less than 1 millimetre) zoned purple cubes scattered in the quartz.

Stronger alteration generally accompanies higher grade gold mineralization. Seven main types of alteration were recognized in the granitic rocks throughout the property: propylitic, argillic, sericitic, potassium feldspar stable phyllic, phyllic, advanced argillic and silicic. Locally, potassic alteration, skarnification and silicification are evident, but are relatively minor and do not appear to be related to mineralization.

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**Mineralization: Property Area (cont'd)****Elk past producer (cont'd)**

Propylitic alteration is generally light green with biotite and hornblende altered to chlorite, and plagioclase is saussuritized. In volcanics, the colour is generally olive green, and the rock is soft. Argillic alteration is exemplified by bleached rock, with plagioclase white and clay-altered; potassium feldspar is slightly altered.

Volcanics are bleached to light green or grey. Sericitic alteration is typically pale green with a micaceous sheen, with plagioclase altered to sericite; trace disseminated pyrite may be present. This type of alteration is often associated with quartz veins and appears to be the lowest grade alteration associated with gold mineralization. It is not recognized in volcanics.

Potassium feldspar stable phyllic alteration is light pink, green or yellowish with potassium feldspar fresh and pink and blocky. Plagioclase and mafic minerals are altered to fine-grained quartz-sericite-pyrite. It often occurs with veins and is associated with gold mineralization; it is not recognized in volcanics.

Phyllic alteration is generally grey, fine-grained quartz-sericite-pyrite alteration usually associated with veins and often gradational to quartz and often auriferous. Advanced argillic alteration is exemplified by most or all of feldspar being destroyed, quartz is "free-floating". The alteration is often sheared and white in colour and is often associated with quartz veins.

Volcanics are white or blue coloured. Silicic alteration is quartz veining or replacement that is hard with moderate conchoidal fracture

There is a strong symmetrical zoning of alteration around the quartz veins: vein-advanced argillic-phyllic-potassium feldspar stable phyllic-argillic-propylitic.

Measured geological reserves of the Siwash North deposit are 308,414 tonnes grading 22.17 grams per tonne gold and 24.68 grams per tonne silver using a cutoff grade of 10 grams per tonne gold.

Reserves are based on results from 107 drillholes at 50-metre grid spacings along 804 metres of strike length to 304 metres downdip. All veining intercepts have been adjusted for true width and assays diluted to 2-metre mining widths (George Cross News Letter No. 223 (November), 1991).

The revised drill indicated reserve, based on more realistic open pit and underground mining widths of 0.39 to 0.79 metre with a 20.5 grams per tonne gold cutoff grade, is 122,458 tonnes averaging 54.5 grams per tonne gold (George Cross News Letter No. 65 (April 2), 1993).

Surface drilling was done on fences 10-50 metres apart, underground drilling on fences 10 metres apart.

Reserve calculations by the company and consultant Roscoe Postle gave the following results (Explore B.C. Program 95/96 - A38):

Probable (undiluted) 16,991 tonnes at 28,200 tonnes at 50.2 g/t gold 26.6 g/t gold

Possible (undiluted) 50,260 tonnes at 66,400 tonnes at 42.0 g/t gold 31.4 g/t gold

The 1996 exploration program consisted of 6873 metres of drilling in 91 holes. The Siwash zone has been traced along a 914 metre strike length and downdip to 245 metres.

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**Mineralization: Property Area (cont'd)****Elk past producer (cont'd)**

Reserves estimated by the company at January 1, 1996 were 121,350 tonnes grading 25.4 grams per tonne gold and 35.3 grams per tonne silver.

These include a diluted, probable open-pit resource of 11,340 tonnes grading 58.97 grams per tonne gold, an underground probable resource below the open pit of 20,225 tonnes grading 26.74 grams per tonne gold, and a further possible underground resource of 89,790 tonnes grading 23.66 grams per tonne gold (Information Circular 1997-1, page 21).

Surface diamond drilling totaling 1413.96 metres in 12 holes was completed on the Siwash Mining lease during 2000 testing the B, WD and Gold Creek West (GCW) zones.

A trenching program was carried out in 2001 in the Siwash East Area consisting of six trenches totaling 202 meters. Almaden Resources and Fairfield Minerals Ltd. merged into Almaden Minerals Ltd. in February, 2002.

In 2002, Almaden undertook a 26 hole surface diamond drill program for a total of 4995.67 metres testing the B, WD, GCW and Bullion Creek zones. During the 2003 field season a 6570 metre, 30 hole, diamond drill program was carried out by Almaden in the Siwash North area testing the WD zone. The WD vein system is located approximately 100 metres north of the Siwash B zone vein and has been tested over a strike length of 610m and down dip for 380m.

By the end of May 2004, a total of eight mineralized veins had been discovered on the property. Four vein systems had been drilled in the Siwash area: the B system with a strike length of 900 m has been tested down dip to 320 m; the WD zone with a strike length of 650 m has been tested to 370 m down dip; the GCW zone with a strike length of 300 m has been tested to 130 m down dip and the Bullion Creek (BC) zone which has been tested with two holes to a depth of 75 m.

A new 43-101 compliant resource was calculated using drill data for the Siwash B and WD veins, just two of eight known mesothermal vein structures on the property.

Global (bulk-tonnage and underground mineable) measured and indicated resources were reported to total 668,300 tonnes grading 9.66 grams per tonne gold (207,600 ounces) plus an additional 1,317,200 tonnes grading 4.91 grams per tonne gold (207,800 ounces) in the inferred category (News Release, Almaden Minerals Limited, May 28, 2004).

Included in the global figures is a higher grade, underground-mineable resource totaling 164,000 tonnes grading 33.69 g/t gold in the measured and indicated category, plus another 195 200 tonnes grading 16.38 g/t gold in the inferred category.

In 2004 a diamond drill program consisting of 10,265 meters of NQ drilling in 44 holes was completed.

Included in the global figures is a higher grade, underground-mineable resource totaling 164,000 tonnes grading 33.69 g/t gold in the measured and indicated category, plus another 195 200 tonnes grading 16.38 g/t gold in the inferred category.

In 2004 a diamond drill program consisting of 10,265 meters of NQ drilling in 44 holes was completed.

As reported by Almaden in 2001, a possible extension to the B and WD vein systems was found roughly two kilometres along strike to the east, on the other side of an area of overburden cover and no outcrop, as part of a trenching program.

**Mineralization: Property Area (cont'd)****Elk past producer (cont'd)**

Grab samples of the vein material taken at surface returned averaged analyses of 31.6 grams per tonne gold and 104.4 grams per tonne silver (News Release, Almaden Minerals Limited, March 4, 2005. This discovery added about two kilometres of prospective, unexplored strike length to the high-grade vein system.

**Update**

Gold Mountain Mining Corporation, the present owner of the Elk property reports (2012 Corporate Presentation) on recent information at the Elk Property; past gold production at 51,500 ounces at 97 g/t (>3 opt) and an existing gold resource of 301,000 ounces gold in a measured and indicated category with 263,000 ounces of gold in an inferred category.

**AU-WEN** prospect (Intrusion related Au pyrrhotite veins; Polymetallic veins Ag-Pb-Zn+/-Au)

MINFILE 092HNE144

Nine kilometres west

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.

The overall extent of the mineralisation has not been determined, although diamond drilling has demonstrated that minor pyrite, pyrrhotite and chalcopyrite, disseminated or associated with quartz or calcite fracture veinlets, does persist below the surface (Assessment Reports 11241, 16008).

Gold values in the area are generally low, but high values have been obtained from trench sampling and drill core at the main showing. Significant gold assays in chip samples range from 6.8 grams per tonne over 5.1 metres to 10.8 grams per tonne over 4.9 metres (Assessment Report 16008).

Copper is associated with the gold mineralisation; one rock sample from the main trench yielded 0.29 per cent copper (Assessment Report 7293).

Grab and select samples assayed between 14.4 and 91 grams per tonne gold (Assessment Reports 5766, 16008). The best drill core intersection assayed 4.97 grams per tonne gold over 1.5 metres (Assessment Report 16008).

**BREW** showing (Alkalic porphyry Cu-Au; Subvolcanic Cu-Ag-Au; As-Sb)

MINFILE 092HNE275

Two kilometres south

The zone has been traced on surface for 400 metres and is 30 to 40 centimetres wide. It is comprised of strongly gossanous clay and fault gouge containing 1 to 2 per cent pyrite. Quartz and quartz-calcite stringers and quartz blebs occur sporadically throughout the zone. A sample of quartz vein material yielded 0.14 gram per tonne gold and 14.4 grams per tonne silver (Assessment Report, 18041, page 8, sample 239774).

**PEN 5** showing (Polymetallic veins Ag-Pb-Zn+/-Au: Au skarn)

MINFILE 092HNE300

Three kilometre east



**Mineralization: Property Area (cont'd)****Pen 5 showing (cont'd)**

*Selected grab samples of sericite and chlorite-altered granodiorite, with clots and stringers of arsenopyrite, sphalerite and pyrite, assayed 1.6 grams per tonne gold and 5.0 grams per tonne silver (Assessment Report 22304, page 17, Table 2, sample PEN91-R8).*

*The volcanics near the granodiorite contact contain small massive sulphide pods in skarn and quartz-arsenopyrite veins. Selected grab samples of angular quartz vein float fragments up to 4 centimetres wide, with sparse to abundant arsenopyrite, yielded 3.77 grams per tonne gold and 3.2 grams per tonne silver (Assessment Report 22304, page 17, Table 2, sample PEN91-R9).*

**PEN 8 showing (Cu skarn, Au skarn)**

MINFILE 092HNE301

Three kilometre east

*The siltstone and argillite are hornfelsed and intercalated with calc-silicate and quartz-garnet bands.*

*The bands are mineralized with disseminated pyrrhotite, arsenopyrite, chalcopyrite and sphalerite (?). Selected grab samples of outcrop and talus analysed 0.0075 gram per tonne gold and 1.0 gram per tonne silver (Assessment Report 22304, page 18, Table 2, sample PEN91-R19).*

**WAVE 1 anomaly (Polymetallic veins Ag-Pb-Zn+/-Au)**

MINFILE 092HNE311

Two kilometres east

*Locally, mineralized quartz vein float was found and contain disseminated pyrite and limonite with occasional specks of chalcopyrite, galena or sphalerite.*

*Between 1986 and 1995, Fairfield Minerals conducted exploration, including a program of wide-spaced grid soil sampling. In 1991, samples of mineralized vein float, up to 0.20 metre in diameter, returned up to 8230 parts per billion gold, 249.3 parts per million silver, 844 parts per million copper and 4091 parts per million lead (Assessment Report 22864). Recently, the area has been explored by Sookochoff Consultants as a part of the Toni property.*

**WAVE 2 anomaly (Polymetallic veins Ag-Pb-Zn+/-Au)**

MINFILE 092HNE312

One kilometre north

*Locally, mineralized quartz vein float was found and contain disseminated pyrite and limonite with occasional specks of chalcopyrite, galena or sphalerite. In 1991, samples of mineralized vein float, up to 0.20 metres in diameter, returned up to 25.7 parts per million silver, 1732 parts per million lead and 2107 parts per million zinc (Assessment Report 22864).*

*Locally, mineralized quartz vein float was found and contain disseminated pyrite and limonite with occasional specks of chalcopyrite, galena or sphalerite. In 1991, samples of mineralized vein float, up to 0.20 metres in diameter, returned up to 25.7 parts per million silver, 1732 parts per million lead and 2107 parts per million zinc (Assessment Report 22864).*

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## MINERALIZATION: PROPERTY

**SNOW** showing (Porphyry Cu +/- Mo +/- Au; Polymetallic veins Ag-Pb-Zn+/-Au)

MINFILE 092HNE292

Within Tenure 833943

*A sample of drill core from 28.0 metres depth contained fine-grained magnetite accompanied by fine-grained chalcocite or bornite along the margins of a zeolite vein. Copper mineralization also occurs along fractures and as disseminations in the granite. Two assays of a grab sample taken in the vicinity of the drillhole yielded less than 0.3 gram per tonne gold, 3.1 grams per tonne silver and 0.54 per cent copper, and 0.45 gram per tonne gold, 3.1 grams per tonne silver and 0.30 per cent copper, respectively (Assessment Report 3415, assay certificates).*

## STRUCTURAL ANALYSIS

### a) Purpose

The purpose of the structural analysis was to delineate any area of 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 could 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 indication of a masked 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.

### b) Method

The structural analysis was performed on a MapPlace DEM image hillshade map of Tenure 1044603 by viewing of the map and marking the lineaments, or indicated structures, thereon. A total of 60 lineaments were marked as shown on Figure 5. The lineaments were compiled into a 10 degree class interval and plotted as a rose diagram as shown on Figure 6. The indicated primary structural trend was then plotted on the lineament map with the general trend influenced by the predominant lineaments as shown by the Rose Diagram.

### c) Results

One cross-structure, "A", was delineated from an indicated primary northerly trending structure intersected by a indicated northwesterly trending structure. The cross-structure is located in an area of mudstone, siltstone, shale, fine clastic sedimentary rocks of the Nicola Group (uTrNsf) which is indicated to cap an inlier. of basaltic volcanic rocks of the Nicola Group

Figure 5. Lineaments as Indicated Structures on Tenure 1044603

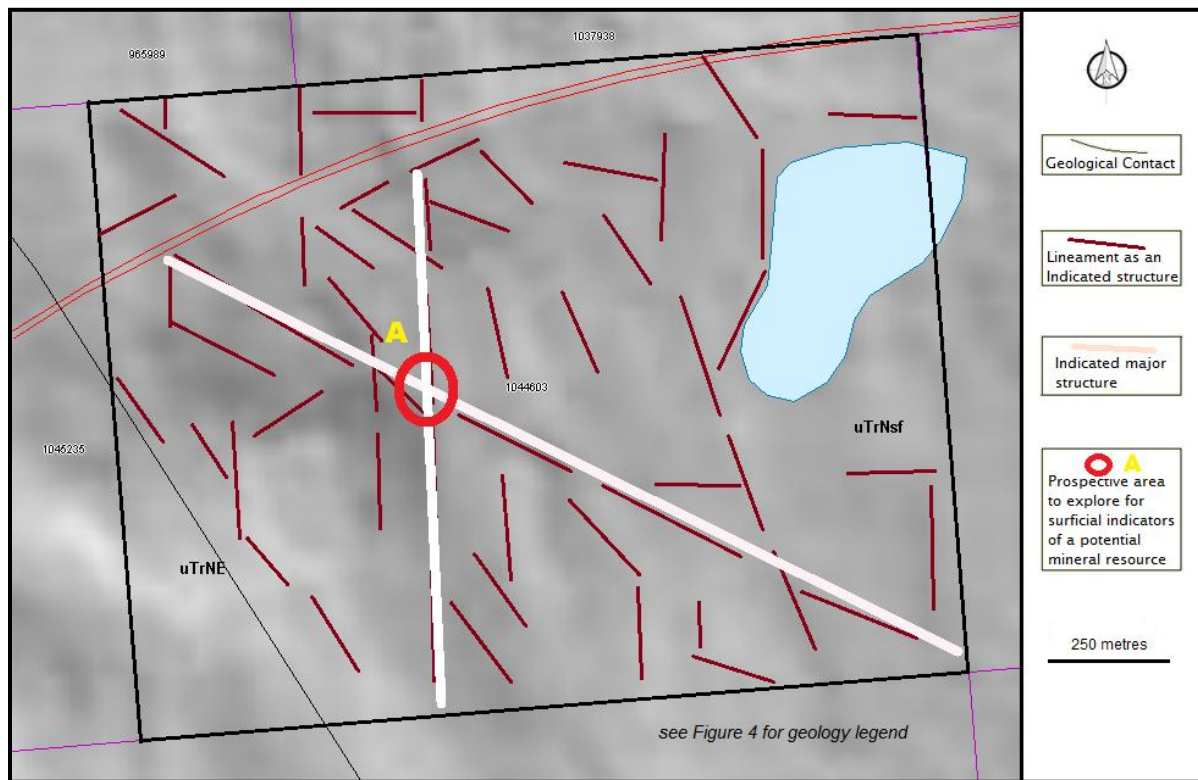
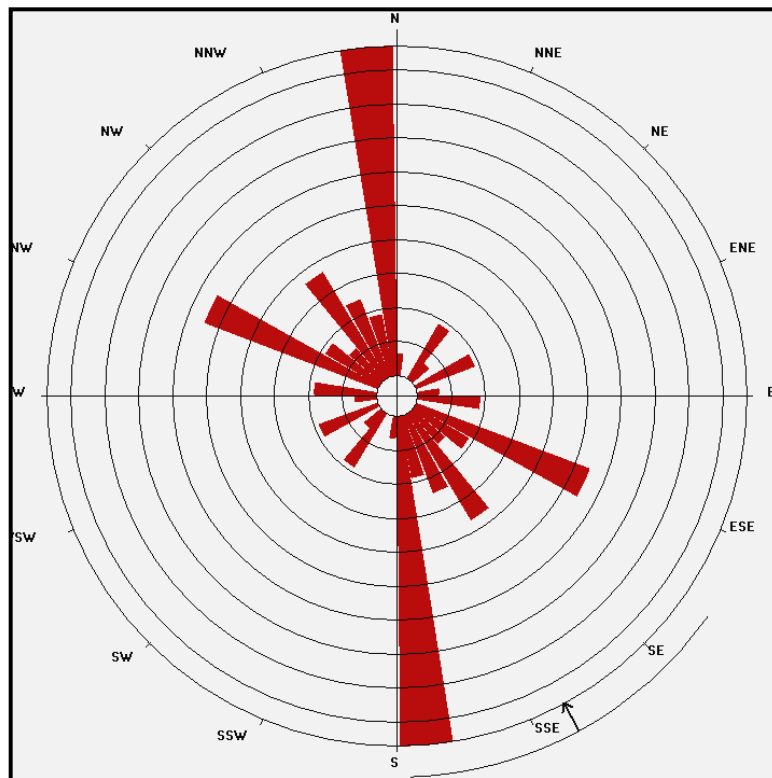


Figure 6. Rose Diagram from indicated structures on Tenure 1044603



## STATISTICS

Axial (non-polar) data

No. of Data = 55

Sector angle = 10°

Scale: tick interval = 3% [1.7 data]

Maximum = 29.1% [16 data]

Mean Resultant dir'n = 152-332

[Approx. 95% Confidence interval = ±26.3°]  
(valid only for unimodal data)

Mean Resultant dir'n = 151.5 - 331.5

Circ. Median = 155.0 - 335.0

Circ. Mean Dev. about median = 31.8°

Circ. Variance = 0.21

Circular Std. Dev. = 39.34°

Circ. Dispersion = 2.81

Circ. Std Error = 0.2261

Circ. Skewness = 1.52

Circ. Kurtosis = -8.76

kappa = 0.85

(von Mises concentration param. estimate)

Resultant length = 21.43

Mean Resultant length = 0.3896

'Mean' Moments: Cbar = 0.2122; Sbar = -0.3267

'Full' trig. sums: SumCos = 11.673; Sbar = -17.9675

Mean resultant of doubled angles = 0.1466

Mean direction of doubled angles = 167

(Usage references: Mardia & Jupp,

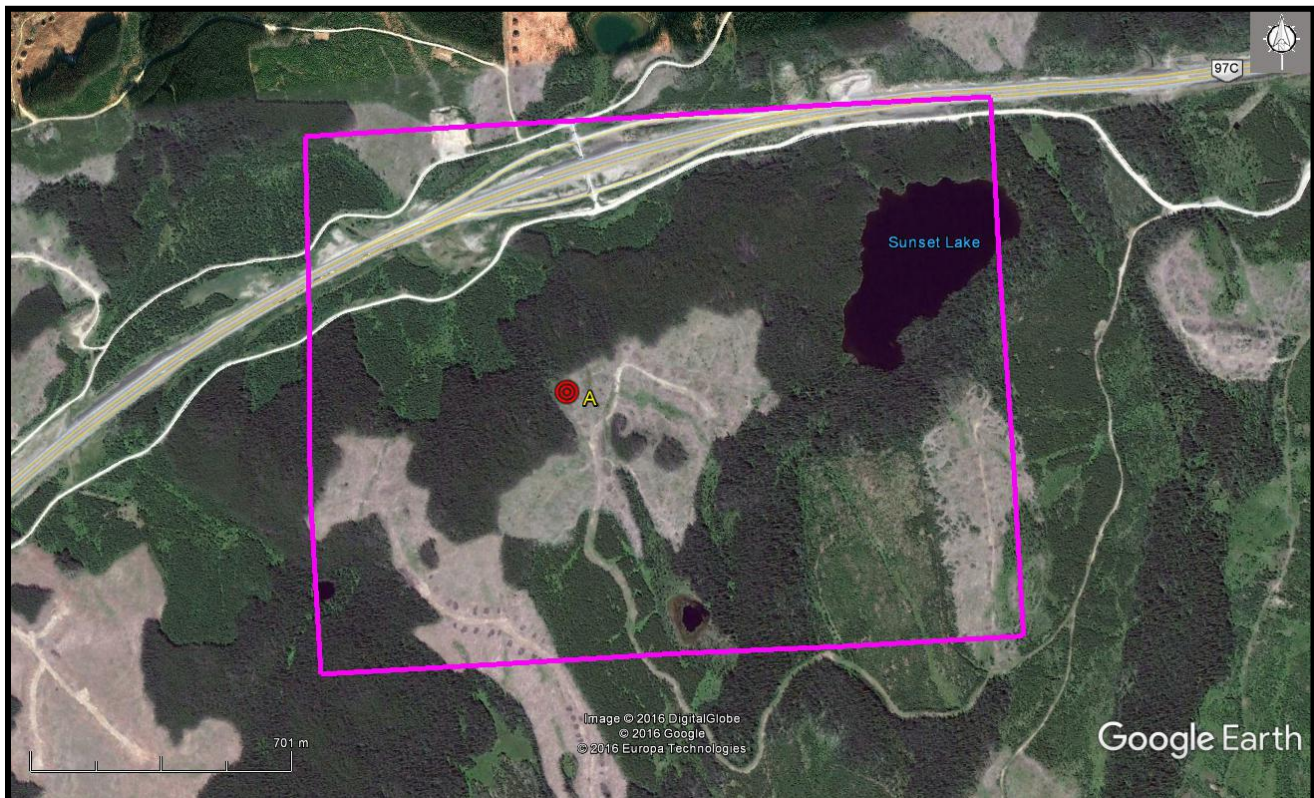
'Directional Statistics', 1999, Wiley;

Fisher, 'Statistical Analysis of Circular Data', 1993, Cambridge University Press)

Note: The 95% confidence calculation uses

Fisher's (1993) 'large-sample method'

**Figure 7. Cross-structural locations on Google Earth**  
(Base map from MapPlace & Google Earth)



**Table II. Approximate location of cross-structure**  
(UTM 10NAD 83)

Cross-Structure	UTM East	UTM North	Elevation (metres)
A	703,467	5,530,639	1,700

## Magnetometer Survey

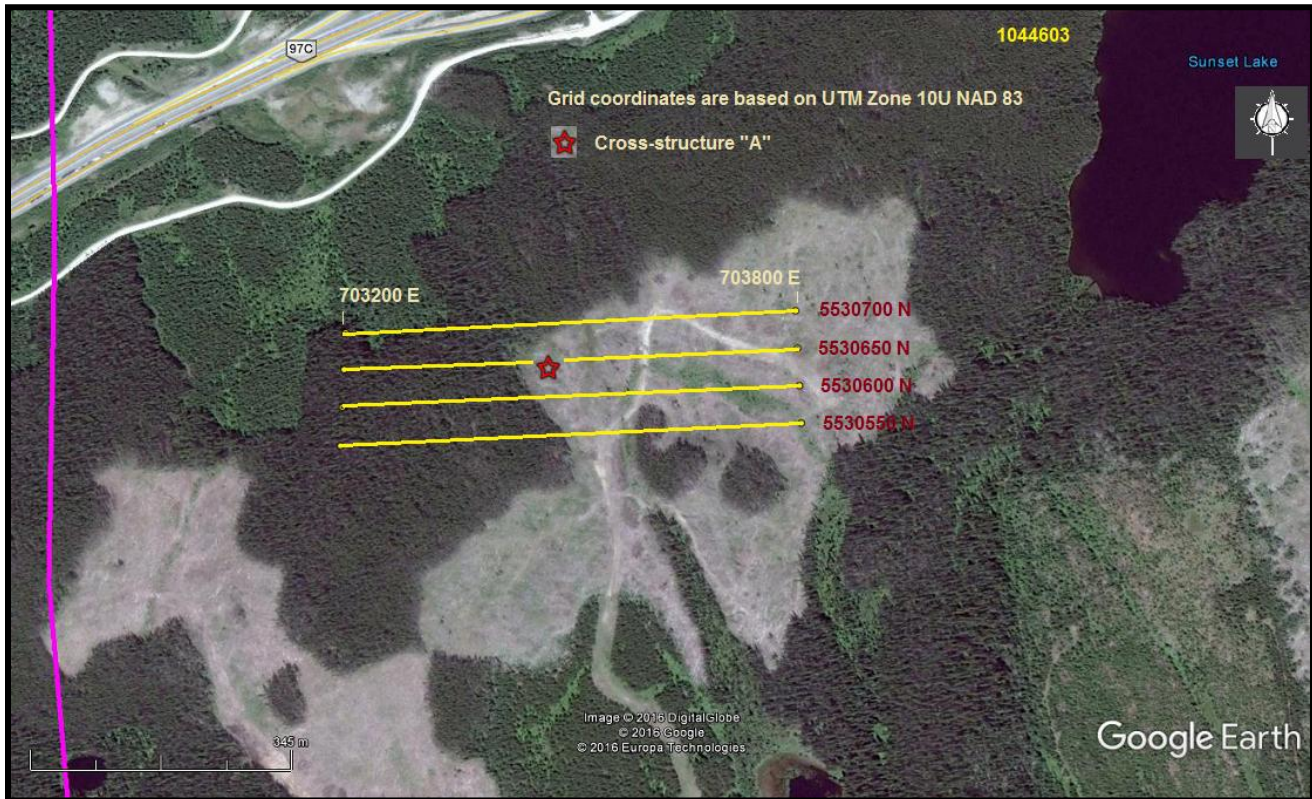
### a) Instrumentation

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 as a reconnaissance tool for mapping geologic lithology and structure since different rock types have different background amounts of magnetite and/or pyrrhotite.

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



Magnetometer Survey (cont'd)

Figure 9 .Magnetometer Survey Data

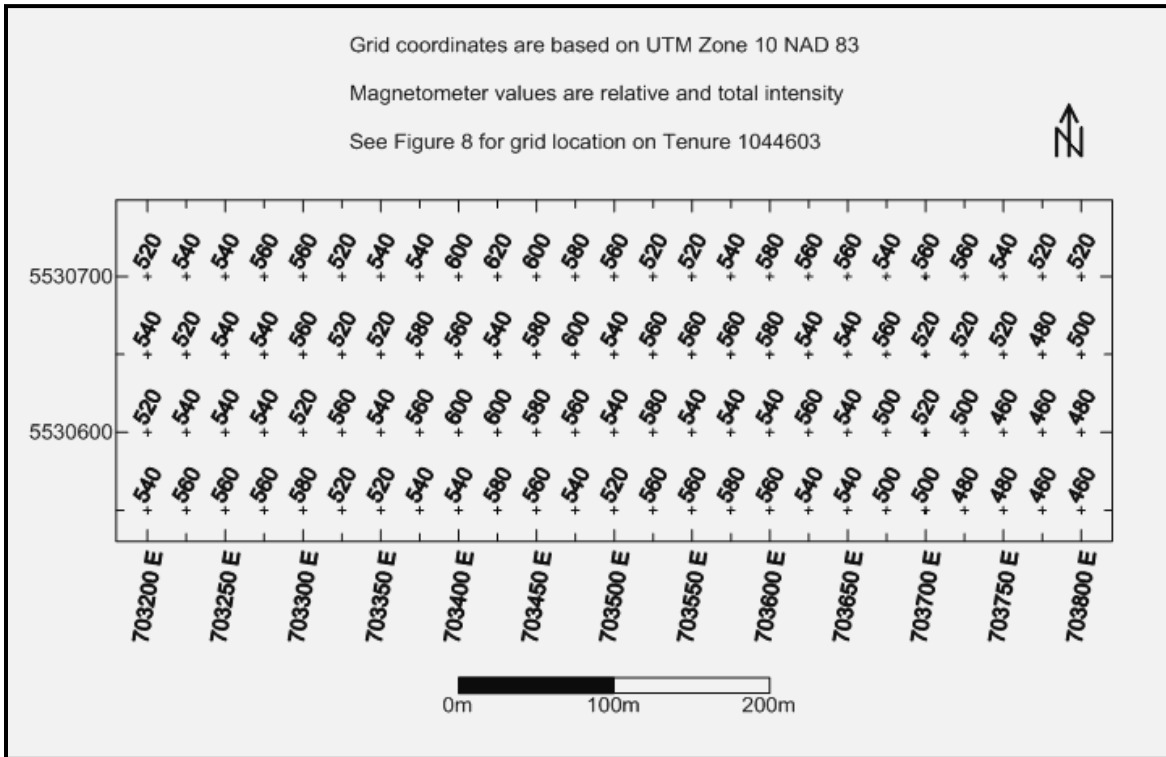
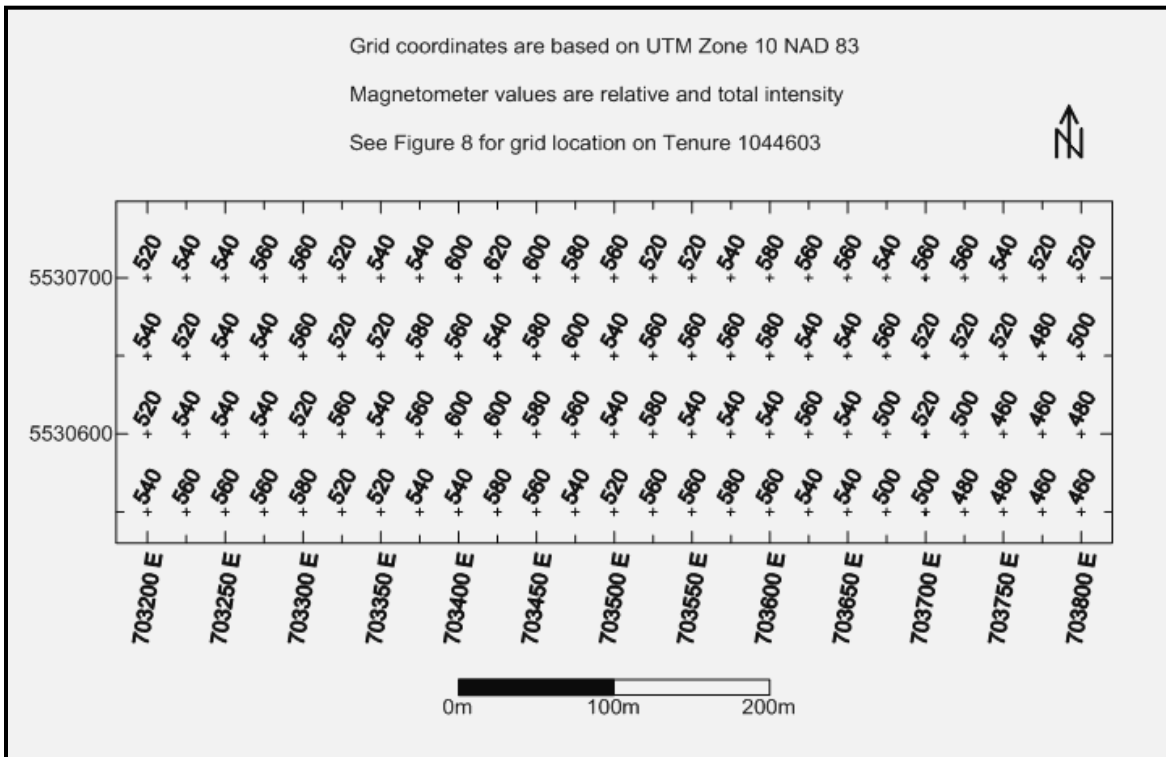


Figure 10. Magnetometer Survey Data Contour Map



**Magnetometer Survey (cont'd)**

**c) Survey Procedure**

From an initial grid station at 5530700N 703800E three additional base-line station was established southerly at 50 metre intervals. Magnetometer readings were taken at 25 metre intervals along each of the four grid lines from 703800E to 703200E. The grid line stations were located with a GPS instrument. Line kilometres of magnetometer survey completed was 2.4. The field data is reported herein in Appendix I.

**e) Results**

The localized magnetometer survey which covered Nicola Group sedimentary rocks capping indicated Nicola Group volcanics, indicated one anomalous magnetometer low (mag LO) and one anomalous magnetometer high (mag HI).

The anomalous mag LO in the eastern sector is an open-ended (southeast) 75 metre wide zone in the southeast corner with a northwest indicated trend.

The anomalous mag HI is a localized 50 metre wide zone open to the north and enveloped by a general open-ended north-south trending mag HI zone varying in an irregular width from 25 to 75 metres.

Cross-structure "A" is located within the general north-south trending mag HI zone centralized in a location where the configuration of the mag HI zone shows a strong northwest trending indentation which generally correlates with the northwesterly trending structure, one of the structures which develops the cross-structure.

**Figure 11. Magnetometer Survey Data Coloured Contour Map**

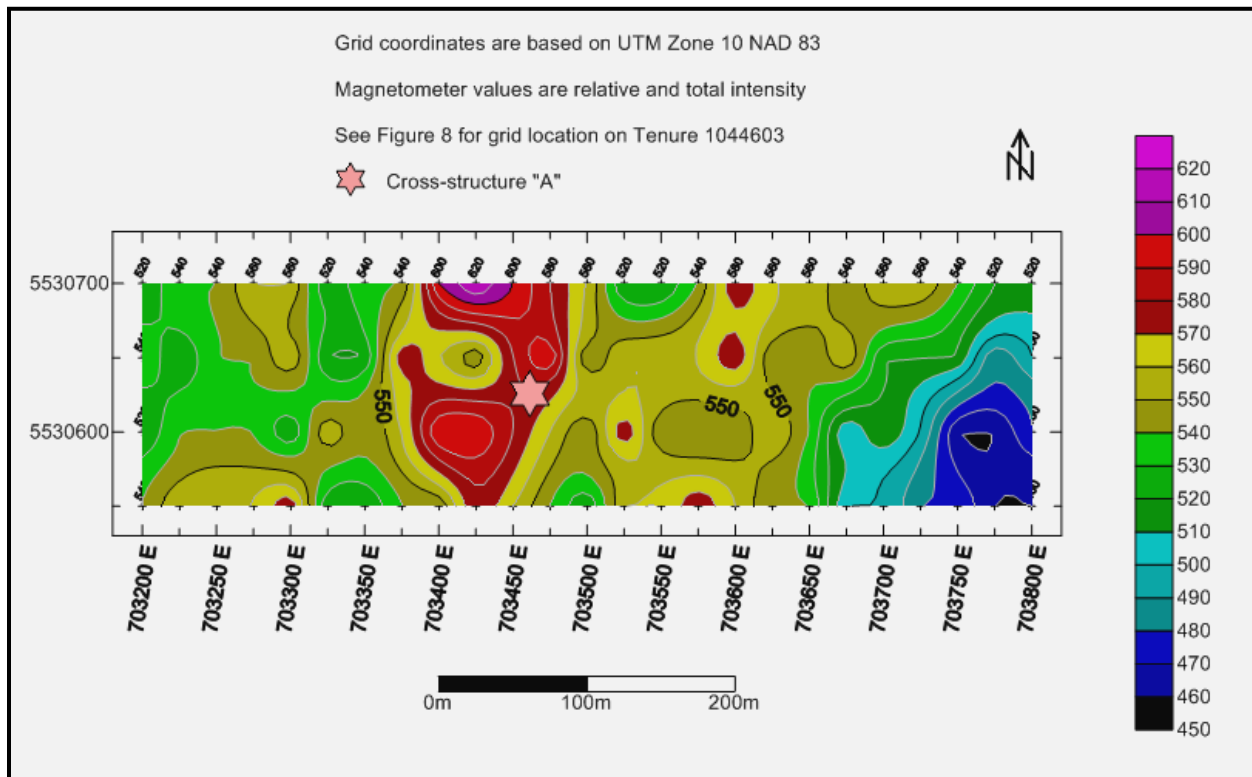


Figure 12. Tenure 1044603: Cross-structure location in a 1st derivative aeromag setting

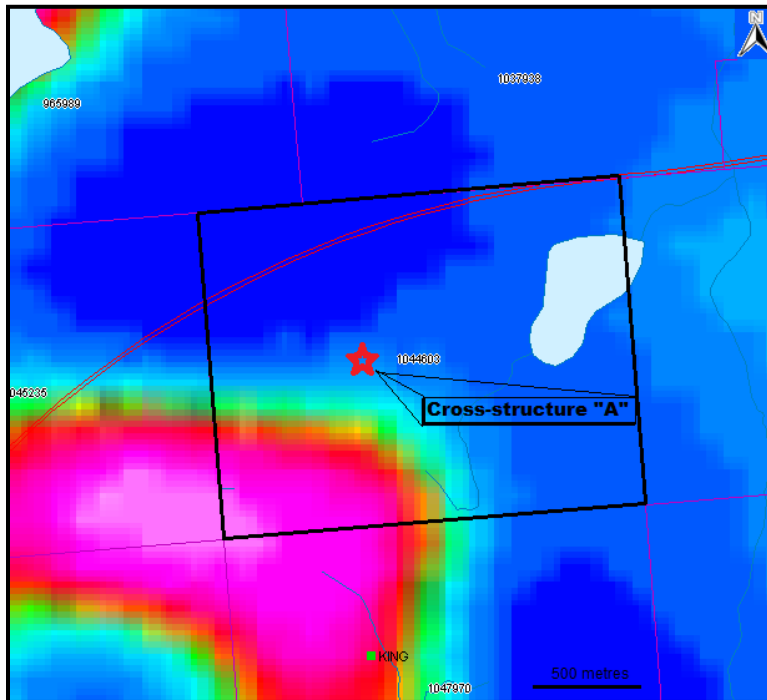
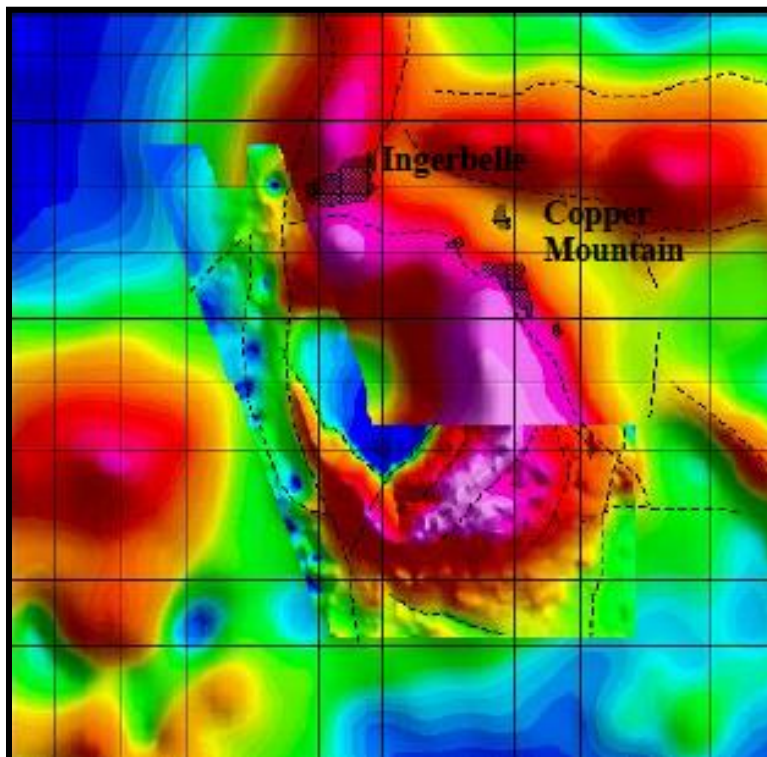


Figure 13. Copper Mountain: Magnetic Response of known mineral deposits (black cross-hatched polygons)

(Note the mineral deposit locations on the waning portion of the magnetic high)

(Map from Hasek, 2009 Figure 10)





**Figure 14. Copper Mountain: Geology and cross-structure at the Ingerbelle open-pit**

(Note the Ingerbelle mineral deposit location association relative to the Nicola Group/Copper Mountain Stock and also the cross-structure centralized at the open-pit)

(Maps & Caption from Hasek, 2009 Figure 5)

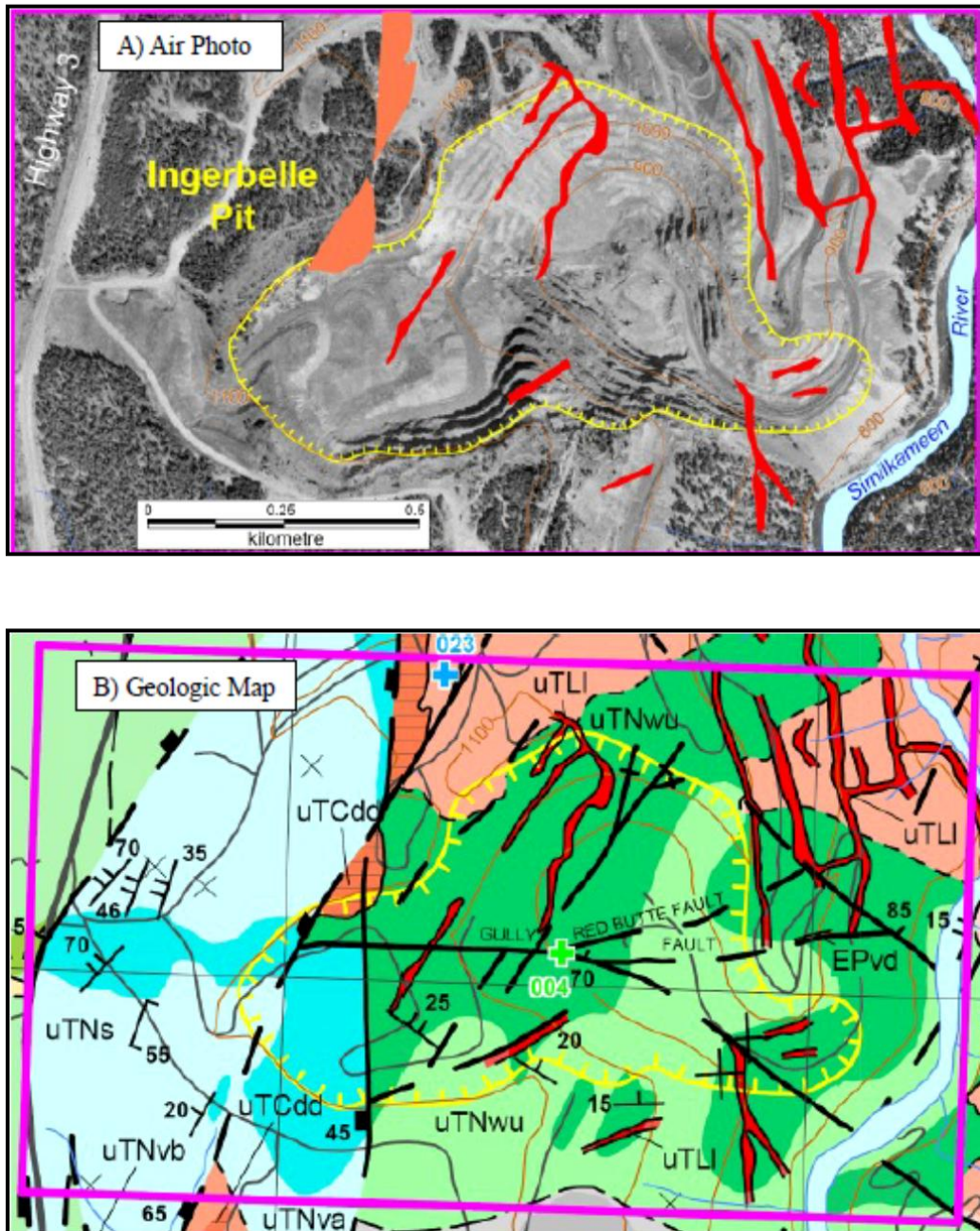
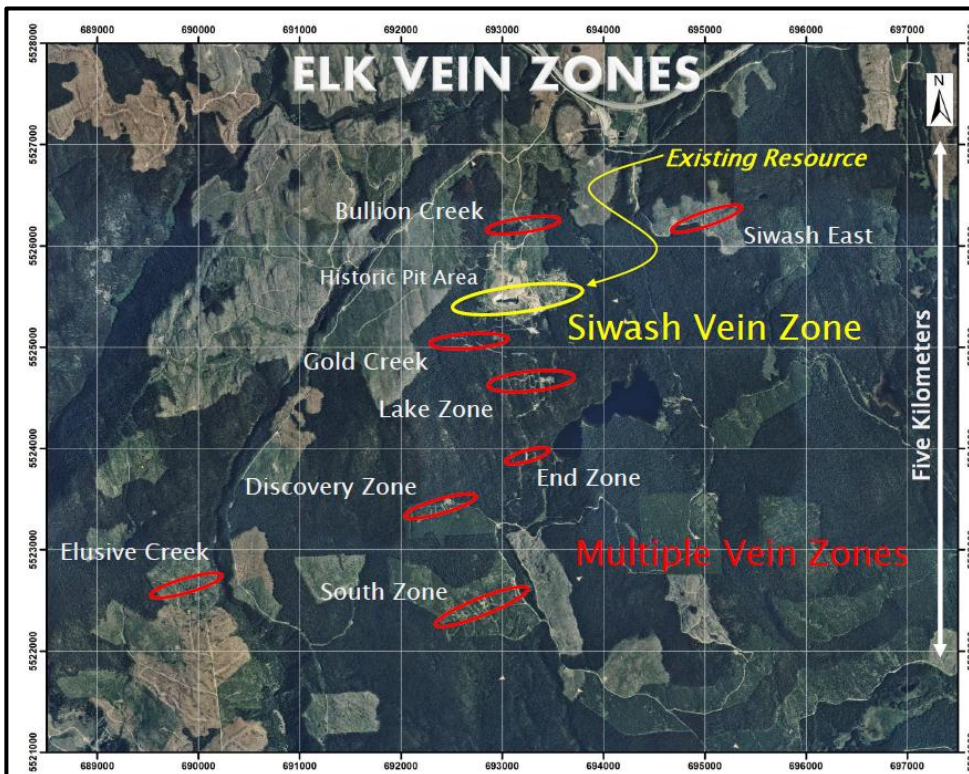
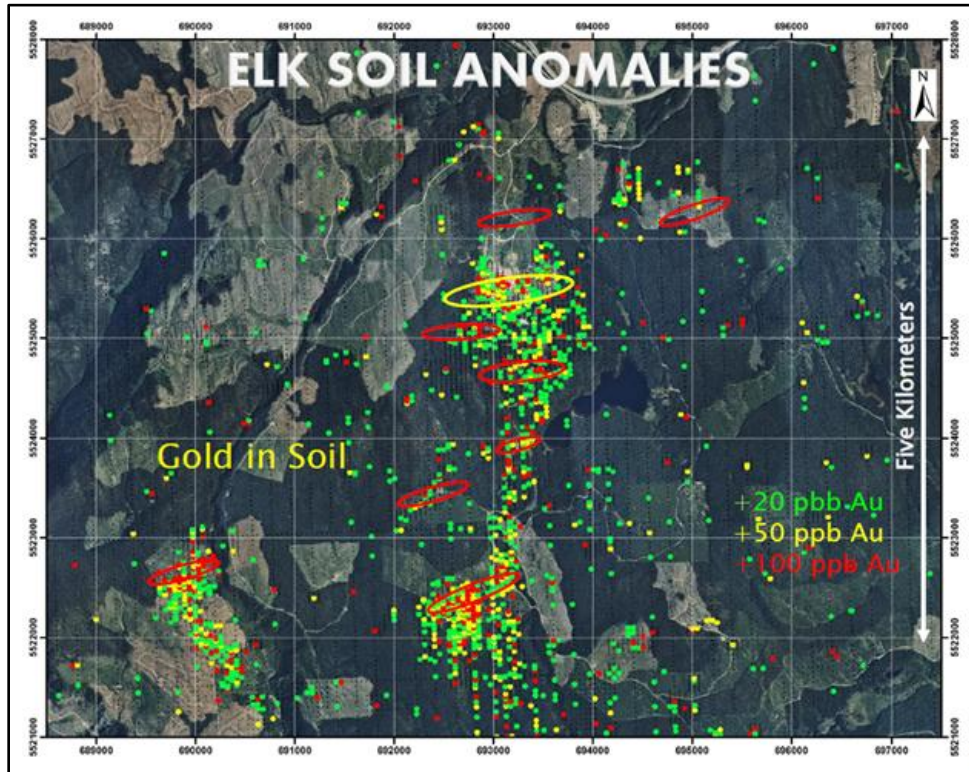


Figure 5: The Ingerbelle mine. A) Air photo and B) geologic map of the open pit (outlined in yellow) with Lost Horse latite, microdiorite and microsyenite porphyry dykes in red and Copper Mountain microdiorite and latite porphyry dykes in salmon pink (Preto et al., 2004). Geologic legend of Figure 3 applies to this figure. The pink rectangles indicate the same area on both images.

Figures 15 & 15a. Elk Soil Anomalies & Vein Zones showing the indicated localized association to structural intersections of the major north trending Elk/Siwash fault and a subsidiary set of easterly to east-northeasterly trending faults. (Map from Gold Mountain Mining Corporation January 2012 Corporate Presentation)



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## INTERPRETATION and CONCLUSIONS

The significance of cross-structures in mineral controls is shown at the Ingerbelle and the Elk mineral deposits.

At Copper Mountain, the Ingerbelle mineral deposit is one of five productive mineral zones that exhibit cross-structural mineral controls where up to four structures merge to a central cross-structure at the centre of the open-pit (*Figure 14*). The major Copper Mountain Fault appears as the primary development to other structures.

At the Elk (*Minfile 092HNE058*) structural controls to the eight generally northerly aligned gold in soil anomalous zones (*Figure 15*) are indicated to be controlled by the major northerly ELK/Siwash fault and by a transverse easterly to northeasterly fault set. One of the anomalous locations was developed to an economic mineral deposit (*Figure 15a*) from which past production (1992-1995) reportedly recovered 1,518,777 grams (48,830 ounces) of gold and 1,903,000 grams (61,183 ounces) of silver. Recent additional exploration and development at the former mine-site reportedly delineated an additional gold resource of 301,000 ounces of gold in a measured and indicated category and 263,000 ounces of gold in an inferred category.

At Tenure 1044603, the one cross-structure delineated is not only significant as mineral controls to a potential mineral resource but the location of the cross-structure reveals comparative features to the locations of economic mineral resources at the Elk and the Copper Mountain properties. These attributes include:

- the presence of major structures (Copper Mountain, Elk and Tenure 1044603);
- the evident cross-structures (Copper Mountain, Elk and Tenure 1044603);
- the location of the cross-structures in an economic resource (Copper Mountain and Elk);
- the location of the cross-structures and/or mineral resources to the 1st derivative magnetometer (Copper Mountain and Tenure 1044603).

The results of the localized magnetometer survey within Tenure 1044603 possibly provided additional substance to a potential mineral resource to depth. Assuming that the variable sedimentary rock capping have not obstructed the magnetometer readings from the underlying rock formations, the magnetometer results are interpreted as:

- the anomalous mag HI within which cross-structure "A", may indicate a polymetallic vein hosted by the indicated northerly trending structure (*Figure 5*). These veins are common to the periphery of a porphyry mineral resource;
- the northwest trending indentation to the mag HI may indicate the northwest trend to the fault of cross-structure "A". The lower indicated mag intensity may be a result of a later structure which was altered by hydrothermal solutions emanating from an intrusive where the development of a porphyritic mineral resource was in evolving;
- the anomalous mag LO may indicate the actual location of cross-structure "A", or an undetermined cross-structure which would be one of the most prospective areas to explore for surficial indicators of a potential obscured mineral resource.

*Interpretation and Conclusions (cont'd)*

Thus, these anomalous magnetic areas are a priority in the exploration for surficial geological indicators of a potential concealed mineral resource. These geological indicators may be revealed as pathfinder minerals, minerals and/or alteration products that would be subject to interpretation as economic mineral indicators to follow-up exploration.

Respectfully submitted  
Sookochoff Consultants Inc.



Laurence Sookochoff, PEng

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**SELECTED REFERENCES**

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**Guilbert, J.M., Park Jr., C.F.** - The Geology of Ore Deposits. Waveland Press, Inc. 2007.

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**John, D.A.** - Porphyry Copper Deposit Model. Scientific Investigations Report 2010-5070-B.U.S. Department of the Interior. U.S. Geological Survey, Reston, Virginia: 2010.

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092HNE002 – MAL  
092HNE047 – BRENDA  
092HNE058 – HN-WEN  
092HNE096 – ELK  
092HNE144 – AU-WEN

092HNE275 – BREW  
092HNE292 – SNOW  
092HNE300 – PEN 5  
092HNE300 – PEN 8  
092HNE311 – WAVE 1  
092HNE312 – WAVE 2

**Similco Mines Ltd.** Copper Mountain Project. An Existing B.C. Porphyry Copper/Gold/Silver Mine. September 18, 2008.

[http://www.rdosmaps.bc.ca/min\\_bylaws/contract\\_reports/CorpBd/2008/09Sep18/4\\_1CooperMountainPresentation.pdf](http://www.rdosmaps.bc.ca/min_bylaws/contract_reports/CorpBd/2008/09Sep18/4_1CooperMountainPresentation.pdf)

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**Sookochoff, L.** – Structural Analysis on Tenure 966089 of the eight Claim Toni 966089 Claim Group of the Toni Property for Victory Resources Corporation. August 31, 2013. AR 34,170.

**Sookochoff, L.** – Structural Analysis on Tenure 966069 of the 11 Claim Toni 966069 Claim Group of the Toni Property for Victory Resources Corporation. September 5, 2013. AR 34,420.

**Sookochoff, L.** – Structural Analysis on Tenure 965989 of the five Claim 965989 Claim Group of the Toni Property for Victory Resources Corporation. December 10, 2014. AR 34,043.

**Sookochoff, L.** – Geological & Geophysical Assessment Report on Tenure 966009 of the seven Claim Toni 966009 Claim Group of the Toni Property for Victory Resources Corporation. August 14, 2015. AR 35,501.

**STATEMENT OF COSTS**

Work on Tenure 1044603 was completed from June 6, 2016 to June 12 2016 to the value as follows:

**Structural Analysis**

Laurence Sookochoff, P Eng. 3 days @ \$ 1,000.00/day ----- \$ 3,000.00

**Magnetometer Survey**

Rick Pearson & Ross Heyer

June 11-12, 2016

Four man-days @ \$ 250.00 ----- 1,000.00

Truck rental: 3 days @ \$135 ----- \$ 405.00

Kilometre charge: 483 @ \$0.70 ----- 338.10

Fuel ----- 79.30

Room & board 4 man days @ \$90.00 ----- 360.00

Mag rental 3 days @ \$80.00 ----- 240.00 1,422.40

\$ 5,422.40

Maps ----- 600.00

Report ----- 3,500.00

\$ 9,522.40

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## 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 forty-nine 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.
- 6) I am a director of Victory Resources Corporation.



Laurence Sookochoff, P. Eng.

*Appendix I*

**Magnetometer Data**



E 5606680 T 1044603											
East	North	Mag	East	North	Mag	East	North	Mag	East	North	Mag
703200	5530550	540	703200	5530600	520	703200	5530650	540	703200	5530700	520
703225	5530550	560	703225	5530600	540	703225	5530650	520	703225	5530700	540
703250	5530550	560	703250	5530600	540	703250	5530650	540	703250	5530700	540
703275	5530550	560	703275	5530600	540	703275	5530650	540	703275	5530700	560
703300	5530550	580	703300	5530600	520	703300	5530650	560	703300	5530700	560
703325	5530550	520	703325	5530600	560	703325	5530650	520	703325	5530700	520
703350	5530550	520	703350	5530600	540	703350	5530650	520	703350	5530700	540
703375	5530550	540	703375	5530600	560	703375	5530650	580	703375	5530700	540
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703750	5530550	480	703750	5530600	460	703750	5530650	520	703750	5530700	540
703775	5530550	460	703775	5530600	460	703775	5530650	480	703775	5530700	520
703800	5530550	460	703800	5530600	480	703800	5530650	500	703800	5530700	520