

**RECEIVED**

**AUG 13 1997**

Gold Commissioner's Office  
VANCOUVER, B.C.

GEOLOGICAL  
ASSESSMENT REPORT

on the

COPPER KEG CLAIM GROUP

ASHCROFT AREA

KAMLOOPS MINING DIVISION

by

MURRAY S. MORRISON, B.Sc.

CLAIMS: Copper Keg 1-14 and Copper Kettle 1-4 (18 units)  
LOCATION: The Copper Keg Claim Group is situated on the south side of the  
Thompson River Valley, 9 km northeast of Ashcroft, B.C.  
Lat. 50°45'; Long. 121°10';  
N.T.S.: 92-I-11 & 14E  
OWNER: M. Morrison  
OPERATOR: M. Morrison  
DATE STARTED: May 8, 1997  
DATE COMPLETED: May 13, 1997

Kelowna, B.C.

August 8, 1997  
GEOLOGICAL SURVEY BRANCH  
ASSESSMENT REPORT

25,094

## TABLE OF CONTENTS

	<u>PAGE</u>
Summary	1
Introduction	4
Location and Access	6
Physical Features and Climate	6
Claim Status	9
History	10
Regional Geology	11
Property Geology	13
Summary from 1992 Geological Report	13
Summary of 1997 Mapping Program	14
Upper Triassic Nicola Group Andesite Agglomerate (Unit 1)	15
Early Jurassic Guichon Creek Intrusive (Unit 2)	16
Tertiary Kamloops Group Volcanics (Unit 3)	17
Pleistocene Sediments	18
Faulting	18
Barnes Creek Fault	18
The East-West Inferred Fault	19
Alteration and Mineralization	20
Discussion	21
Conclusions and Recommendations	24
References	26
Appendix A Statement of Qualifications	27
Appendix B Statement of Expenditures	28

## ILLUSTRATIONS

Figure 1	Location Map (British Columbia)	3
Figure 2	Claims and Access, Copper Keg Property	8
Figure 3	Regional Geology - Guichon Creek Batholith	12
Figure 4	Geology	in pocket
	Copper Keg 9-11 & Copper Kettle 1	
	Mineral Claims	

## SUMMARY

The Copper Keg Claim Group, comprised of 18, 2-post mineral claims, covers a spectacular gossan on the southern side of the Thompson River Valley 9 km northeast of Ashcroft, B.C. The property is owned by the writer, M. Morrison, of Kelowna, B.C., who staked the mineral claims in May, 1995 and 1996.

The property is located at the northern edge of the Early Jurassic Guichon Creek Batholith and it is dissected by a northwest-striking regional fault, the Barnes Creek Fault, which crosses the northern portion of the batholith. The fault separates andesitic rocks of the Upper Triassic Nicola Group on the southwest from a quartz diorite intrusive on the northeast. The intrusive is believed to be a hybrid phase of the Guichon Creek Batholith.

The gossan, comprised of pyritic, limonitic and clay-altered decomposed rock, overlies the quartz diorite-andesite contact zone. The bright-coloured altered zone is well exposed in a steep-sided ravine at the northern end of the property, but the southern extent of the zone is unknown. Deep Pleistocene drift and thin flows of the Kamloops Group volcanics cover the southern portion of the property.

It is thought that the intense alteration and pyritization on the Copper Keg property postdates the intrusion of the Guichon Creek Batholith and that the hydrothermal solutions that brought about the alteration and mineralization have emanated from a later cooling intrusive of possible Early Tertiary Age that is associated with the Barnes Creek Fault.

It is suggested that the spectacular gossan on the property could mark just the edge (i.e. halo) of a very large hydrothermal system that could have deposited concentrations of copper, molybdenum, or precious metals at any point along the Barnes Creek Fault. It is believed that there is potential for finding both primary and supergene ore along the Barnes Creek Fault.

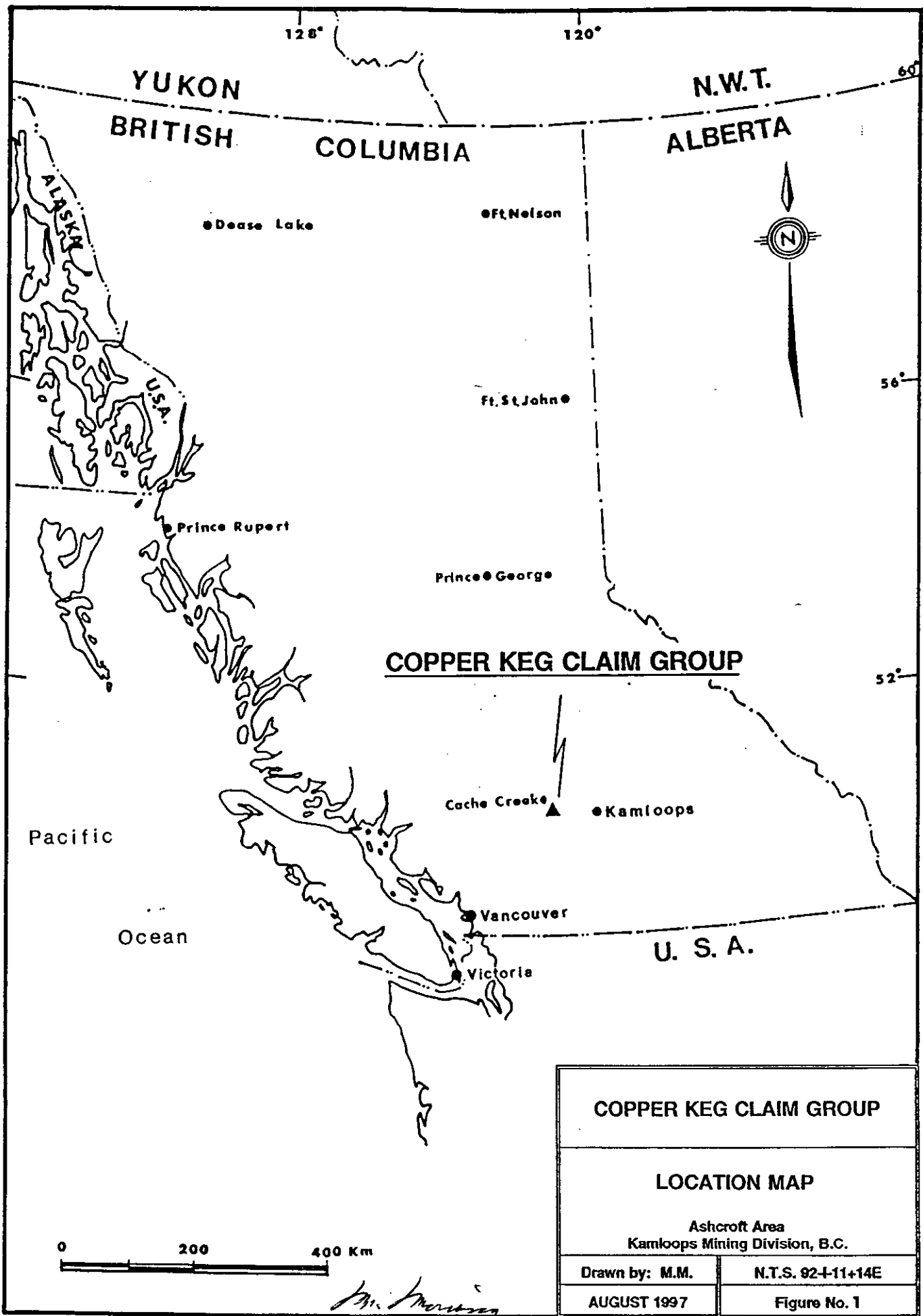
SUMMARY continued

An east-west valley which runs obliquely towards the Barnes Creek Fault from the east was the focus of this year's geological mapping program on the Copper Keg 9-11 and Copper Kettle 1 Mineral claims. The valley may represent another zone of faulting with associated clay-alteration and pyritization at the southern contact of the quartz diorite plug in a situation similar to that occurring at the Barnes Creek Fault on the southwest edge of the intrusive.

A strong east-west VLF EM conductor identified during a 1996 survey aligns with a portion of the east-west valley and lends support to the fault hypothesis.

The intersection of the Barnes Creek Fault and the inferred east-west fault occurs on a portion of the property where the Pleistocene drift and Tertiary basalt cover is relatively thick, and although this area represents a prime exploration target it is recommended that some lower cost preliminary surveys be carried out along the two fault zones to the northwest and east of the intersection where the overburden is not so deep.

A program of biogeochemical surveying, using sagebrush as a medium, is recommended for each drift covered target area. A low-cost, Percussion Drilling Program is also recommended to test each zone for alteration and mineralization at shallow depths. Any success obtained during the preliminary surveys should prompt an expanded drilling program.



**COPPER KEG CLAIM GROUP**

**COPPER KEG CLAIM GROUP**

**LOCATION MAP**

Ashcroft Area  
Kamloops Mining Division, B.C.

Drawn by: M.M.

N.T.S. 92-11+14E

AUGUST 1997

Figure No. 1

*M.M. Morrison*

## INTRODUCTION

This report, written for government assessment work requirements, discusses the results of a geological mapping program carried out over portions of the Copper Keg 9-11 and Copper Kettle 1 mineral claims by the writer during early May, 1997.

The Copper Keg Group, comprised of 18 contiguous 2-post mineral claims, was staked by the writer in May, 1995 and 1996, to cover a spectacular gossan located on the southern side of the Thompson River, 9 km northeast of Ashcroft, B.C. The writer has, for several years, thought that the pyritic gossan could represent the outer limits of a large mineralized system associated with the Barnes Creek Fault which could host sizeable deposits of copper, molybdenum or precious metals.

The gossan, located immediately south of the Canadian Pacific Railway tracks, is coincident with a zone of highly fractured, altered and pyritized rock that is well exposed in a steep-sided ravine. The ravine marks the northwestern end of the Barnes Creek Fault - a late fault that cuts diagonally across the northeast corner of the Guichon Creek Batholith (McMillan, 1976). The fault separates a quartz diorite hybrid phase of the Early Jurassic Guichon Creek Batholith on the northeast from the Upper Triassic Nicola Group rocks that lie to the southwest on the Copper Keg property.

The Barnes Creek Fault is very well exposed in the ravine on the northern half of the Copper Keg Claim Group, but is hidden beneath a thin cover of Pleistocene drift and Tertiary basalt on the southern half of the property. Over a period of years the writer has conducted several surveys (geological, magnetometer and VLF-EM) in an attempt to trace the fault from the ravine to the southern half of the property (Morrison, 1984, 91, 92 & 96).

During 1996 an east-west valley inferred to be a cross fault which lies immediately south of the main quartz diorite exposure on the property was the focus for a VLF-EM survey. The

## INTRODUCTION (continued)

inferred fault intersects the Barnes Creek Fault at an oblique angle and it is considered that any mineralization associated with the Barnes Creek Fault might also be associated with the cross fault. The survey did identify a strong conductor underlying the eastern side of the valley.

Based on the 1996 survey results a decision was made to geologically map the cross-valley region in an attempt to find evidence of a fault and any mineralization that might be found to be associated with it. A secondary purpose of the mapping program was to determine the extent and thickness of the Kamloops Group volcanics lying immediately south of the cross-valley.

The results of this year's geological mapping program are presented at a scale of 1:2500 on Figure 4 along with three profile diagrams that illustrate an interpretation of the geology in cross-section.

The contoured elevations on Figure 4 were derived from an altimeter survey that was conducted in conjunction with the mapping program.

## LOCATION AND ACCESS

The Copper Keg Claim group is situated immediately south of the Thompson River, 9 km northeast of Ashcroft, B.C. (Lat. 50°45'; Long. 121°10'; N.T.S. Maps 92-I-11 & 14E). The property is reached from Ashcroft via the Highland Valley Highway (#97C) and the Barnes Lake Road (which is also known as logging road #44). A dirt road branches north from logging road #44 at the 10 km sign, and this road gives access to the central portion of the property as illustrated on Figure 2.

The dirt road requires a four-wheel-drive vehicle during the wet Spring and Autumn seasons.

## PHYSICAL FEATURES AND CLIMATE

The first four Copper Keg mineral claims (Copper Keg 1-4) cover a steep, rocky slope immediately south of the Canadian Pacific Railway tracks on the south side of the Thompson River. The slope rises from the 350 metre elevation at the tracks to the 670 metre elevation over a distance of just 0.5 km. The slope continues at a more moderate grade to the 760 metre elevation across the Copper Keg 5-8 mineral claims, and then levels out over the southern half of the property (Copper Keg 9-14 mineral claims) with an average elevation of 820 metres above sea level.

Precipitous bluffs on the eastern side of the Copper Keg 1 & 3 mineral claims are coincident with outcrop of intrusive rock.

A light, patchy forest of Ponderosa pine, Douglas fir, and juniper occurs on northern slopes and in ravines. Elsewhere, sagebrush is widespread across the property.

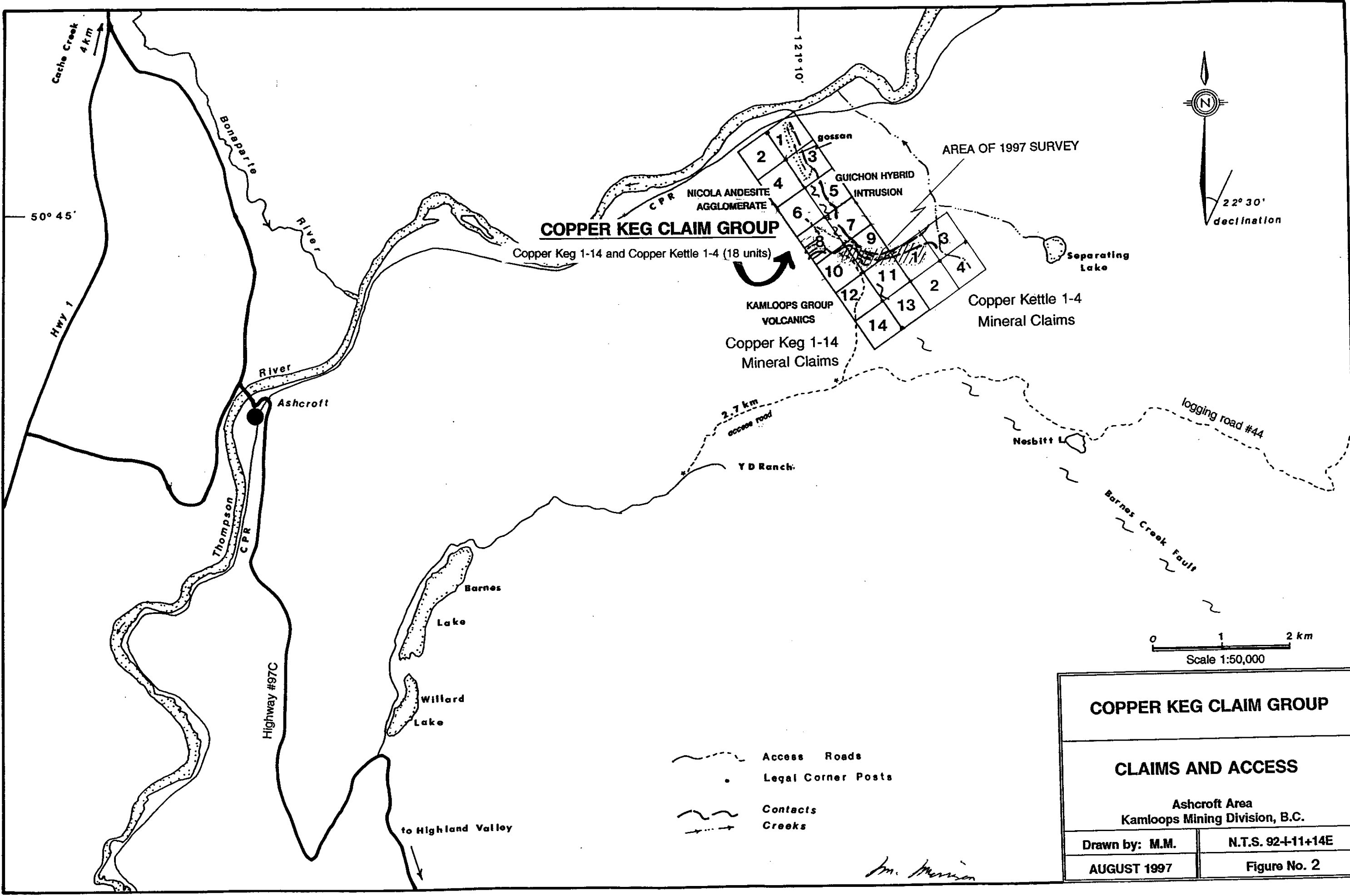
The Thompson River Valley at Ashcroft has a desert climate with less than 25 cm of precipitation annually and summer temperatures often greater than 30°C. The lower slopes on



**PHYSICAL FEATURES AND CLIMATE** (continued)

the Copper Keg property have the same desert climate as Ashcroft, but there is a marked increase in precipitation and vegetation with each 100 metre increase in elevation above the river. Much of the upland portion of the property receives enough precipitation to support summer range land for cattle. A creek lying just to the east of the property provides drinking water for the livestock.

The winter snow pack seldom exceeds 30 cm on the Copper Keg property and the snow lasts only from November until early March.



### COPPER KEG CLAIM GROUP

Copper Keg 1-14 and Copper Kettle 1-4 (18 units)

KAMLOOPS GROUP  
VOLCANICS  
Copper Keg 1-14  
Mineral Claims

Copper Kettle 1-4  
Mineral Claims

### COPPER KEG CLAIM GROUP

### CLAIMS AND ACCESS

Ashcroft Area  
Kamloops Mining Division, B.C.

Drawn by: M.M.

N.T.S. 92-11+14E

AUGUST 1997

Figure No. 2

- Access Roads
- Legal Corner Posts
- Contacts
- Creeks

*M. Morrison*

**CLAIM STATUS**

The mineral claim, making up the Copper Keg Group are 100% owned by the writer, M. Morrison of Kelowna, B.C. Specifics related to the 18, 2-post mineral claims located within the Kamloops Mining Division are given below:

<b><u>CLAIM NAME</u></b>	<b><u>UNITS</u></b>	<b><u>DATE OF RECORD</u></b>	<b><u>TENURE NUMBER</u></b>	<b><u>EXPIRY DATE*</u></b>
Copper Keg 1	1	May 15, 1995	336345	May 15, 1998
Copper Keg 2	1	May 15, 1995	336346	May 15, 1998
Copper Keg 3	1	May 15, 1995	336347	May 15, 1998
Copper Keg 4	1	May 15, 1995	336348	May 15, 1998
Copper Keg 5	1	May 14, 1995	336349	May 14, 1998
Copper Keg 6	1	May 14, 1995	336350	May 14, 1998
Copper Keg 7	1	May 14, 1995	336351	May 14, 1999
Copper Keg 8	1	May 14, 1995	336352	May 14, 1999
Copper Keg 9	1	May 14, 1995	336353	May 14, 1999
Copper Keg 10	1	May 14, 1995	336354	May 14, 1999
Copper Keg 11	1	May 14, 1995	336355	May 14, 1998
Copper Keg 12	1	May 14, 1995	336356	May 14, 1998
Copper Keg 13	1	May 14, 1995	336357	May 14, 1998
Copper Keg 14	1	May 14, 1995	336358	May 14, 1998
Copper Kettle 1	1	May 15, 1996	345861	May 15, 1998
Copper Kettle 2	1	May 15, 1996	345862	May 15, 1998
Copper Kettle 3	1	May 15, 1996	345863	May 15, 1998
Copper Kettle 4	1	May 15, 1996	345864	May 15, 1998

Note: The new Expiry Date is based on the acceptance of this report for Assessment Work Credits.

## HISTORY

The large gossan located immediately south of the Canadian Pacific Railway Tracks, and now covered by the Copper Keg Claim Group, was one of British Columbia's early prospects. It was known as the Burr property and it was first described in the Minister of Mines Annual Report for 1898, p. 1107 as follows:

"The Burr group of eight claims is situated about 5.5 miles east of Ashcroft, on the C.P. Railway, which runs through the property. It has a large body of ore, carrying gold and silver, but principally copper, and lies between diorite and granite. The country rock is diorite.

About 80 feet of tunnelling has been run in on the claims which are most favourably situated for working, as the ore can be dumped into the cars without extra handling."

It wasn't until the late 1960's that the prospect was recorded again in the Minister of Mines Annual Reports (1969, p. 263; 1970, p. 348; and 1971, p. 362). It was called the Pyrite property. Soil geochemical and Induced Polarization surveys were conducted on the Pyrite property and this work was followed-up with the drilling of three diamond drill holes in 1970.

The exact locations of the three drill holes are unknown to the writer, but drill core lying on the ground at two sites, well to the west of the gossan zone, suggests that at least two of the drill holes were drilled to test targets other than the gossan zone.

The Burr 1 mineral claim was staked by the writer in 1982 to cover the main gossan zone. The gossan and surrounding region were prospected late in 1982 (Morrison, 1983). In 1984, the Burr 2 mineral claim of 20 units was added to the south side of the Burr 1 mineral claim and a ground VLF-EM survey was conducted over ground lying to the southeast of the gossan zone (Morrison, 1984).

**HISTORY** (continued)

The Burr property was allowed to lapse, but in May, 1990, the writer staked the Key 1-18, 2-post mineral claims to cover the gossan and territory lying to the southeast.

During April, 1991, a ground magnetometer survey was conducted over portions of the Key 3-10 mineral claims (Morrison, 1991) and in 1992 a geological mapping program was carried out on the Key 5-8 mineral claims (Morrison, 1992).

The property was restaked for a second party as the Copper Key 1-18 mineral claims in 1994 and then restaked again by the writer in 1995 and 1996 as the Copper Keg 1-14 and Copper Kettle 1-4 mineral claims that now make up the Copper Keg Claim Group.

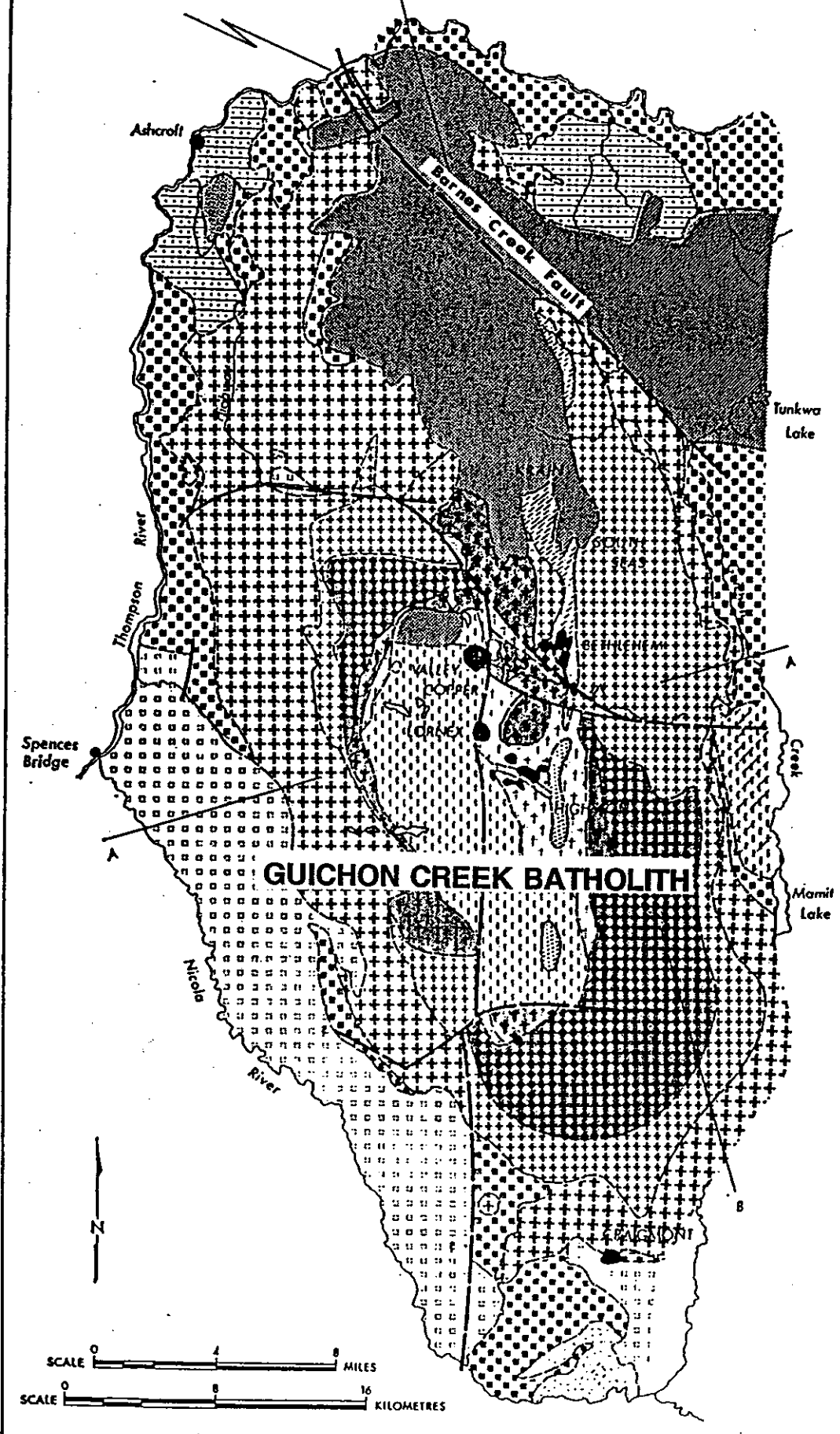
In 1996, a VLF-EM ground survey was conducted over portions of the Copper Keg 9 & 11 mineral claims.

**REGIONAL GEOLOGY**

The regional geology of the Highland Valley Copper-Molybdenum District which extends from Ashcroft on the northwest to the old Craigmont Mine (near Merritt) on the southeast is illustrated on Figure 3 accompanying this report. The map which is centered over the Guichon Creek Batholith has been reproduced from a map appearing in C.I.M. Special Volume 15 titled "Porphyry Deposits of the Canadian Cordillera." The map by W.J. McMillan accompanies a paper in Volume 15 entitled "Geology and Genesis of the Highland Valley Ore Deposits and the Guichon Creek Batholith."

The outline of the Copper Keg property, situated northeast of Ashcroft, has been added to the regional map to illustrate the location of the property with respect to: the Barnes Creek Fault; the hybrid phase of the Guichon Creek Batholith; and the world class copper-molybdenum mines (Valley Copper, Lornex and Bethlehem) that lie 30 to 35 km to the southeast.

**COPPER KEG CLAIM GROUP**



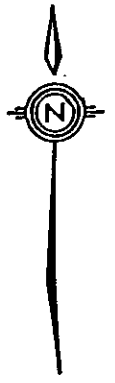
- TERTIARY**  
 VOLCANIC AND SEDIMENTARY ROCKS  
**CRETACEOUS (?)**  
 VOLCANIC AND SEDIMENTARY ROCKS  
**JURASSIC**  
 SEDIMENTARY ROCKS  
**INTRUSIVE ROCKS OF THE BATHOLITH**  
 POST-BETHSAIDA DYKES  
 BETHSAIDA PHASE  
 POST-SKEENA DYKES AND PLUGS  
 SKEENA VARIETY  
 POST-BETHLEHEM DYKES AND PLUGS  
 BETHLEHEM PHASE \*  
 HIGHLAND VALLEY PHASE  
 CHATAWAY VARIETY  
 GUICHON VARIETY  
 HYBRID PHASE  
**INTRUSIVE ROCKS OF UNCERTAIN AFFILIATION**  
 GUMP LAKE PHASE  
 COYLE "GRANITE"  
**UPPER TRIASSIC**  
 VOLCANIC AND SEDIMENTARY ROCKS

- SYMBOLS**  
 BRECCIA BODIES ..... AA OR BB  
 ORE DEPOSITS, IMPORTANT PROSPECTS ..... X  
 AREAS WITH SWARMS OF PORPHYRY DYKES .....  
 FAULTS, MAPPED, INFERRED .....  
 SECTION LINES FOR GRAVITY PROFILES ..... A

\* DESIGNATION OF GRANITIC UNITS AS PHASES OR VARIETIES FOLLOWS THE USAGE OF NORTHCOTE, 1969.

from CIM Special Volume No. 15

*J.M. Morrison*



<b>COPPER KEG CLAIM GROUP</b>	
<b>REGIONAL GEOLOGY</b>	
<b>GUICHON CREEK BATHOLITH</b>	
Ashcroft Area Kamloops Mining Division, B.C.	
AUGUST 1997	N.T.S. 92-I-11+14E Figure No. 3

Geology of the Guichon Creek batholith.

## **REGIONAL GEOLOGY** (continued)

Several excellent geological papers have been written about the Guichon Creek Batholith and the large mines located near the centre of the batholith and the reader is referred to the paper cited above for further details.

In the vicinity of the Copper Keg Claim Group, Figure 3 shows that the Barnes Creek Fault dissects the property, separating a hybrid phase of the Guichon Creek Batholith on the northeast side of the property from Upper Triassic Nicola Group rocks on the southwest. Movement on the fault is believed to be left-lateral.

Tertiary volcanics unconformably overlie pre-Tertiary rocks on the southern half of the Copper Keg property.

A mantle of Pleistocene drift covers three-fourths of the property.

## **PROPERTY GEOLOGY**

### **SUMMARY FROM 1992 GEOLOGICAL REPORT**

The geology of the Copper Keg property is relatively simple. A wide fracture zone (Barnes Creek Fault) is coincident with the contact of a quartz diorite plug that is intrusive into an andesite agglomerate. The quartz diorite lying to the northeast of the fracture zone is a medium grained hybrid phase of the Guichon Creek Batholith, while the andesite lying to the southwest is part of the Upper Triassic Nicola Group.

The fracture zone is pyritized, hydrothermally altered and bleached over a width of up to 200 metres. The fracturing, pyritization and clay alteration are particularly well exposed in the steep sided ravine on the Copper Keg 1 & 3 mineral claims, but less well exposed to the southeast where a creek has just begun to cut through the deep drift to bedrock. Further south, on the Copper Keg 9-14 mineral claims, the southeast projection of the Barnes Creek Fault is entirely concealed by Tertiary Kamloops Group volcanics up to 35 metres thick.

**PROPERTY GEOLOGY** (continued)

Geological mapping in 1992 confirmed that the alteration and pyritization of the quartz diorite and andesite agglomerate postdates the Guichon Creek Intrusion. Both the quartz diorite and andesite have been altered by late hydrothermal solutions that have percolated through the Barnes Creek Fault Zone. It is thought that the hydrothermal solutions have emanated from a late-cooling magma that lies at some shallow depth below surface. Although the mineralization exposed in the ravine is pyrite it is thought that copper, molybdenum, or precious metals may have been deposited by these same hydrothermal solutions at some point along the Barnes Creek Fault.

An east-west valley that is coincident with the southern edge of the quartz diorite intrusive may represent another fault that could be mineralized with pyrite and/or copper and molybdenum. This fault (inferred) which runs into the Barnes Creek Fault at an oblique angle from the east was the focus of this year's mapping program.

**SUMMARY OF 1997 MAPPING PROGRAM**

The three major geological units that are described in the foregoing summary (i.e. Upper Triassic Nicola Group andesite, Early Jurassic Guichon Creek Intrusive, and Tertiary Kamloops Group Volcanics) underlie portions of the Copper Keg 9-11 and Copper Kettle 1 mineral claims mapped this year. The specifics related to these major lithological units will be described in the paragraphs that follow.



**PROPERTY GEOLOGY** (continued)**UPPER TRIASSIC NICOLA GROUP ANDESITE AGGLOMERATE (UNIT 1)**

A black andesite agglomerate of the Upper Triassic Nicola Group (Unit 1) underlies much of the Copper Keg 5, 6 and 8 mineral claims that were mapped in 1992. The agglomerate has been intruded by the Guichon Hybrid plug on the Copper Keg 5 mineral claim in the vicinity of the Barnes Creek Fault.

Although the andesite does not outcrop in this year's map area it is thought to occur below overburden as a narrow band just north and beyond the Tertiary volcanic contact at the northwest corner of the Copper Keg 9 mineral claim. Some angular float of andesite was found at this location.

A second broad area of Nicola Group andesite is thought to lie beneath relatively shallow overburden at the eastern end of the east-west valley on the central portion of the Copper Kettle 1 mineral claim (see Figure 4).

The profile diagrams of Figure 4 show the relationship between the Nicola Group andesite, the intruding Early Jurassic plug, and the Tertiary basalt cover rock.

The 1992 mapping found that the andesite agglomerate is highly indurated and often massive to blocky in outcrop. Some banding suggests that the agglomerate may strike at 150 degrees and dip vertically.

The agglomerate is made up of amorphous and porphyritic andesite lapilli and bombs of 1 to 15 cm, set in a matrix of tuff (20%). The andesite clasts (or bombs?) contain either white feldspar or black augite phenocrysts. The agglomerate is sometimes hornfelsic, or it can contain up to 5% epidote. Near the Barnes Creek Fault the rock has been well fractured and argillically altered or highly bleached to a white clay by hydrothermal solutions.

**PROPERTY GEOLOGY** (continued)**Upper Triassic Nicola Group Andesite Agglomerate (Unit 1)** (continued)

The highly altered andesite weathers easily and this fact may account for the lack of outcrop of andesite in this year's map area.

**EARLY JURASSIC GUICHON CREEK INTRUSIVE (UNIT 2)**

The intrusive plug (unit 2 on Figure 4) is a quartz diorite hybrid phase of the Early Jurassic Guichon Creek Batholith. It was mapped on the Copper Keg 5 and 7 mineral claims in 1992 and it occurs mostly to the north of Baseline 10N in this year's survey area on the northeastern halves of the Copper Keg 9 and Copper Kettle 1 mineral claims.

The quartz diorite intrudes the Upper Triassic Nicola Group andesite agglomerate on the property. In 1992, it was found that a contact zone of mafic-rich quartz diorite grades into hornfelsic andesite over a distance of 20 metres near the centre of the Copper Keg 5 mineral claim. At this location a wide fracture zone (Barnes Creek Fault) is coincident with the intrusive contact. The fracture zone extends only 10 to 20 metres into the intrusive, but up to 175 metres southwest into the andesitic rocks. Northeast of the fracture zone the intrusive is blocky to massive and it forms precipitous bluffs up to 60 metres high on the Copper Keg 5 mineral claim.

The same blocky to massive quartz diorite occurs along the northern edge of this year's survey area. Towards the southwest, however, the quartz diorite becomes finer grained and more mafic, and some aplite dykes cut the rock. It would seem that the hornfelsic andesite country rock is near at hand on this part of the property, but if so, it is concealed by overburden and the Tertiary volcanics.

The quartz diorite a short distance away from the contact zone is a fresh, white to grey, medium grained, equigranular rock comprised of 65% plagioclase, 15% quartz, 10%

**PROPERTY GEOLOGY** (continued)**Early Jurassic Guichon Creek Intrusive (Unit 2)** (continued)

hornblende, 5% biotite and minor orthoclase and augite. The mafic minerals vary from 10 to 25% locally and are noted to increase towards the perimeter of the intrusive. The rock is weakly chloritized near fractures.

**TERTIARY KAMLOOPS GROUP VOLCANICS (UNIT 3)**

Tertiary Kamloops Group basalts underlie the southern half of the Copper Keg Claim Group and occur for the most part to the south of Baseline 10N in this year's map area.

The basalts are thought to be up to 35 metres in thickness and flat-lying as they form a plateau immediately to the south of this year's map area. They cover the pre-Tertiary rocks as illustrated on the cross-sections of Figure 4, and they may thin to the east as demonstrated by the profiles of L 7+50W and L 10+50W.

The basalts are generally black to grey, fine grained, and comprised of black feldspars and mafic minerals. Olivine equals less than 2% of the visible minerals, while vesicles equal up to 5% of the rock.

The basalt weathers blocky (unit 3) to platy (unit 3a) and some flows are less than 1 metre thick. Interflow horizons are occasionally rubbly and hematitic.

One unit near the base of the Kamloops Group at grid 9+95N, 9+50W is brecciated, hematitic and mended with up to 5% chalcedony veinlets.

Weak clay alteration, pyrite mineralization, and zones of chalcedony veinlets were noted at a few sites within the basalt (e.g. at 10+00N, 10+50W; at 9+15N 13+50W; at 8+95N, 13+75W; and at 9+25N 16+30W).

**PROPERTY GEOLOGY** (continued)**PLEISTOCENE SEDIMENTS**

Overburden comprised of Pleistocene drift, 1-3 metres deep, is common on much of the property. The drift deepens to a possible 15 metres on the northeast side of the Copper Keg 8 mineral claim where there are low moraines and glacial benches. The drift also fills the eastern side of the east-west valley on the Copper Kettle 1 mineral claim to depths estimated to be 5 to 10 metres.

Several low morainal ridges indicate that the last ice cover moved towards the southeast.

**FAULTING****Barnes Creek Fault**

The Barnes Creek Fault occurs as a wide shattered zone of rock that coincides with the Guichon Hybrid Intrusive - Nicola Group Andesite Agglomerate contact which is exposed on the Copper Keg 1-6 mineral claims. It was found, during the 1992 mapping program, that the well fractured rock extends for 20 metres into the intrusive and for up to 175 metres into the agglomerate on the Copper Keg 5 mineral claim. The zone is well exposed by the deep erosion of a ravine on the Copper Keg 1 & 3 mineral claims where the spectacular gossan occurs. The gossan extends 900 metres north-south and 200 metres east-west on this portion of the property. The gossan is comprised of intensely clay-altered and pyritized andesite and quartz diorite that has been flooded with hydrothermal solutions that have invaded the well fractured rock.

The shattered zone is made up of a complex series of fractures - none of which clearly define the strike of the Barnes Creek Fault that is thought to strike 150 degrees and dip nearly vertical.

**PROPERTY GEOLOGY** (continued)**Faulting** (continued)**Barnes Creek Fault** (continued)

Evidence of the Barnes Creek Fault is lost under Pleistocene deposits on the Copper Keg 8 mineral claim, and under the thin cover of Kamloops Group basalt on all mineral claims to the south (i.e. Copper Keg 9-18).

**The East-West Inferred Fault**

The east-west valley crossing the Copper Keg 9 and Copper Kettle 1 mineral claims is thought to be coincident with a fault which defines the southern contact of the quartz diorite intrusive with Nicola Group andesites. It is thought that the intensity of fracturing, clay-alteration and pyritization on this fault could match that of the Barnes Creek Fault.

A strong east-west VLF-EM conductor identified during the 1996 survey occurs in the middle of the valley on the eastern side of the survey area and it is thought that this conductor could represent the fault with associated clay-alteration and pyritization.

Very little evidence of the fault could be found in the region of this year's mapping due to the cover of drift and/or Kamloops Group Basalts. Some of the basalts near the valley are tectonically fractured and mended with late chalcedony, but the fracture zones are poorly exposed. The fracture zones do, however, suggest relatively recent tectonic activity and the possible reactivation of an old fault.

The quartz diorite lying north of the inferred fault is generally blocky to massive and fresh, but this is the same situation that occurs immediately to the northeast of the Barnes Creek Fault where the quartz diorite is also intact and fresh just metres away from the fault.

Therefore, the lack of fracturing of the quartz diorite lying north of Baseline 10N does not rule out the possibility that a strong fault could cross the property just tens of metres to the south.

**PROPERTY GEOLOGY** (continued)**Alteration and Mineralization**

The spectacular gossan on the Copper Keg 1-6 mineral claims represents an area of intense hydrothermal alteration that is associated with highly fractured rock related to the Barnes Creek Fault. The rock is entirely altered to white clay minerals over areas measuring up to tens of metres in diameter. The altered rock contains 2% pyrite (or limonite after pyrite) generally and up to 5% pyrite locally. The pyrite is usually disseminated throughout the rock, but occasionally forms blebs and masses up to 2 cm in size filling fractures. Chalcopyrite is sometimes present in small amounts.

The degree of alteration is directly proportional to the degree of fracturing, and it decreases sharply in either direction away from the fault. Both the Nicola Group andesite and the Guichon quartz diorite are altered, but the fracturing (and therefore, the alteration) extends much further into the andesite towards the southwest than towards the quartz diorite to the northeast. The quartz diorite forms massive cliffs just a few tens of metres northeast of the Barnes Creek Fault.

The hydrothermal alteration and pyritization clearly postdates the Guichon Intrusive event as the pyrite fills late fractures in both the quartz diorite and andesite agglomerate.

Weak clay alteration and pyritization of the Tertiary basalt was observed at a few scattered locations across the map area. Some of the alteration zones are cut by chalcedony veinlets and some vesicles are filled with chalcedony. Although the alteration of the basalt is nowhere intense the alteration does point out that relatively recent hydrothermal solutions have invaded regions of the property.

## DISCUSSION

The 1992 geological mapping on the property indicates that much of the movement (and fracturing) along the Barnes Creek Fault postdates the Early Jurassic intrusion of the Guichon Creek Batholith into the Upper Triassic Nicola Group andesite agglomerate and predates the Tertiary cover of Kamloops Group volcanics. The intrusive rocks and the andesites that they intrude are highly fractured, whereas the Kamloops Group volcanics are largely undisrupted.

As previously mentioned, the degree of alteration and pyritization associated with the gossan zone on the Copper Keg 1-6 mineral claims is directly proportional to the degree of fracturing associated with the Barnes Creek Fault. Much of the faulting postdates the Early Jurassic intrusion, and therefore, it is expected that the hydrothermal solutions that brought about the intense alteration and pyritization have emanated from a late-cooling intrusive associated with the fault that lies at depth below the Copper Keg property.

The intensity of alteration and pyritization of the gossan zone does not diminish to the southeast of the ravine exposure on the Copper Keg 1, 3 and 5 mineral claims. The gossan simply disappears under a cover of Pleistocene drift on the Copper Keg 7 mineral claim. It is expected that the same degree of faulting and alteration that is seen at the spectacular gossan could continue to the southeast across the property below the drift and Kamloops Group basalts.

Although there are no economic minerals of significance associated with the gossan it is thought that the pyrite mineralization could be peripheral to economic concentrations of copper, molybdenum or precious metals that could occur to the southeast (e.g. there are several case histories in exploration where pyrite halos lie adjacent to orebodies).

If copper mineralization does occur to the southeast then there is also the possibility that a prehistoric supergene copper deposit (formed during the Mesozoic Era and now lying 30

**DISCUSSION** (continued)

metres under a protective cover of Tertiary basalt) occurs on the property (e.g. part of the Afton copper deposit located near Kamloops, B.C. was supergene ore).

This year's mapping of the east-west valley yielded very little evidence in support of the inferred cross-fault, but no evidence to disprove it either. The strong east-west conductor identified on the Copper Kettle 1 mineral claim in 1996, however, does fit well with the fault hypothesis and it is expected that fracturing, alteration and pyritization could occur along the south contact of the quartz diorite intrusive in a situation similar to that at the Barnes Creek Fault.

Two zones of tectonically fractured basalts align with the east-west valley further suggesting that a fault could exist, and that it has been reactivated in recent times.

If the east-west inferred fault does in fact exist then the zone of intersection of this fault with the Barnes Creek Fault on the Copper Keg 9 mineral claim is a prime target for exploration. The zone of intersection however, occurs in an area where there are deep glacial deposits and moderately thick Tertiary volcanics and it is recommended that further preliminary surveys be carried out on the property before this site is drilled.

Two areas with relatively shallow overburden and easy access are suggested for the preliminary work programs. One area lies on the bench south of the main gossan area on the Copper Keg 7 mineral claim and coincides with the southeast projection of the Barnes Creek Fault. The second area lies in the east-west valley on the Copper Kettle 1 mineral claim and is coincident with a strong VLF-EM conductor which is thought to represent the inferred fault.

In both regions an initial program of biogeochemical sampling, using sagebrush as a sample medium, is recommended. It is expected that the sagebrush root systems penetrate the drift



DISCUSSION (continued)

to reach bedrock at these locations. The samples should be analyzed for the standard 30 ICP elements.

Even if the experimental biogeochemical survey does not outline anomalies a low-cost Percussion Drilling Program is recommended for the two regions. A series of inclined drilled holes should be positioned to cross the expected fault zones at shallow depths. Once the fault zones are confirmed then drill testing of the zone of intersection of the faults on the Copper Keg 9 mineral claim should be conducted.

Drilling along the projection of the Barnes Creek Fault through 30 metres of Tertiary basalt southeast of the Copper Keg 9 mineral claim should only be considered after success has been achieved with the initial drilling programs.

## CONCLUSIONS AND RECOMMENDATIONS

This year's geological mapping near the southern edge of the Early Jurassic Guichon Creek hybrid quartz diorite plug on the Copper Keg 9-11 and Copper Kettle 1 mineral claims did not yield conclusive evidence that a fault aligns with the east-west valley in the area. There are, however, several indirect indications that a fault may align with the valley - not the least of which is a strong VLF-EM conductor, identified during a 1996 survey, which crosses the Copper Kettle 1 mineral claim. The east-west conductor occurs near the centre of the valley and fits well with the fault hypothesis (Morrison, 1996).

It is thought that the strong VLF-EM conductor may represent faulted, well-altered and pyritized rock at the southern contact of the quartz diorite intrusive in a manner similar to that which occurs at the spectacular gossan on the Copper Keg 1 & 3 mineral claims coincident with the Barnes Creek Fault (see Property Geology).

It is also thought that the zone of intense alteration and pyritization on the Copper Keg 1 & 3 mineral claims may mark just the edge (i.e. halo) of a very large hydrothermal system that could have deposited economic concentrations of copper, molybdenum or precious metals at any point along the Barnes Creek Fault. It is believed that there is potential for finding both primary and supergene ore on the Copper Keg property, and the intersection of the inferred east-west fault with the Barnes Creek Fault is considered a prime exploration target.

The region of the property where the two faults are thought to intersect (on the Copper Keg 9 mineral claim) has a relatively deep cover of drift and Tertiary basalt and it is recommended that this target await the results of further testing along the two fault zones to the northwest and east of the zone of intersection (see Discussion).

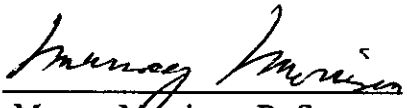
A program of experimental biogeochemical surveying, using sagebrush as a sample medium, is recommended for the two drift covered sites selected for a preliminary exploration program (see Discussion). A low-cost, shallow hole, Percussion Drilling Program is recommended for

CONCLUSIONS AND RECOMMENDATIONS (continued)

the same areas to test for alteration and mineralization along the two fault zones. If strong alteration and mineralization is confirmed with the preliminary drill program then the zone of intersection of the two faults should be tested with a follow-up drill program.

The two areas recommended for the preliminary drilling program are very accessible.

August 8, 1997  
Kelowna, B.C.

  
Murray Morrison. B. Sc.

**REFERENCES**

Duffell, S. and McTaggart, K.C.

1952: Ashcroft Map-Area, British Columbia, G.S.C. Memoir 262.

McMillan, W.J.

1976: Geology and Genesis of the Highland Valley Ore Deposits and the Guichon Creek Batholith. Porphyry Deposits of the Canadian Cordillera, C.I.M. Special Volume 15, pp. 85-103.

Morrison, M.S.

1983: Prospecting Report on the Burr #1 Mineral Claim, Ashcroft Area, Kamloops Mining Division.\*

1984: RAdem VLF-EM Ground Survey Assessment Report on the Burr 1 & 2 Mineral Claims, Ashcroft Area, Kamloops Mining Division.\*

1991: Geophysical Assessment Report, Key Claim Group, Ashcroft Area, Kamloops Mining Division.\*

1992: Geological Assessment Report, Key Claim Group, Ashcroft Area, Kamloops Mining Division.\*

1996: Geophysical Assessment Report, Copper Keg Claim Group, Ashcroft Area, Kamloops Mining Division.\*

Northcote, K.E.

1969: Geology and Geochronology of the Guichon Creek Batholith, B.C. Dept. of Mines and Petroleum Resources, Bulletin No. 56.


\* Assessment Reports filed with the Ministry of Employment and Investment of British Columbia.

**APPENDIX A****STATEMENT OF QUALIFICATIONS**

I, Murray Morrison, of the City of Kelowna, in the Province of British Columbia, do hereby state that:

1. I graduated from the University of British Columbia in 1969 with a B.Sc. Degree in Geology.
2. I have been working in all phases of mining exploration in Canada for the past twenty-eight years.
3. During the past twenty-eight years, I have intermittently held responsible positions as a geologist with various mineral exploration companies in Canada.
4. I have conducted several geological, geochemical, and geophysical surveys on mineral properties in Southern British Columbia during the past twenty-eight years.
5. I conducted the Geological Mapping Program outlined in this report.
6. I own a 100% interest in the Copper Keg 1-14 and Copper Kettle 1-4 mineral claims.

August 8, 1997  
Kelowna, B.C.

  
Murray Morrison - B.Sc.

**APPENDIX B****STATEMENT OF EXPENDITURES - ON THE COPPER KEG CLAIM GROUP**

Statement of Expenditures in connection with a Geological Mapping Program carried out on the Copper Keg Claim Group, located 9 km northeast of Ashcroft, B.C. (N.T.S. Maps 92-I-11 & 14E) for the year 1997.

**GEOLOGICAL MAPPING (0.3 sq. km)**


M. Morrison, geologist	4 days @ \$300.00/day	\$1,200
Truck, 4 x 4 (including gasoline and insurance)	4 days @ \$75.00/day	300
Meals and Lodging	4 days @ \$75.00/day	300
Flagging and belt chain thread		<u>10</u>
	Sub-total:	\$1,810

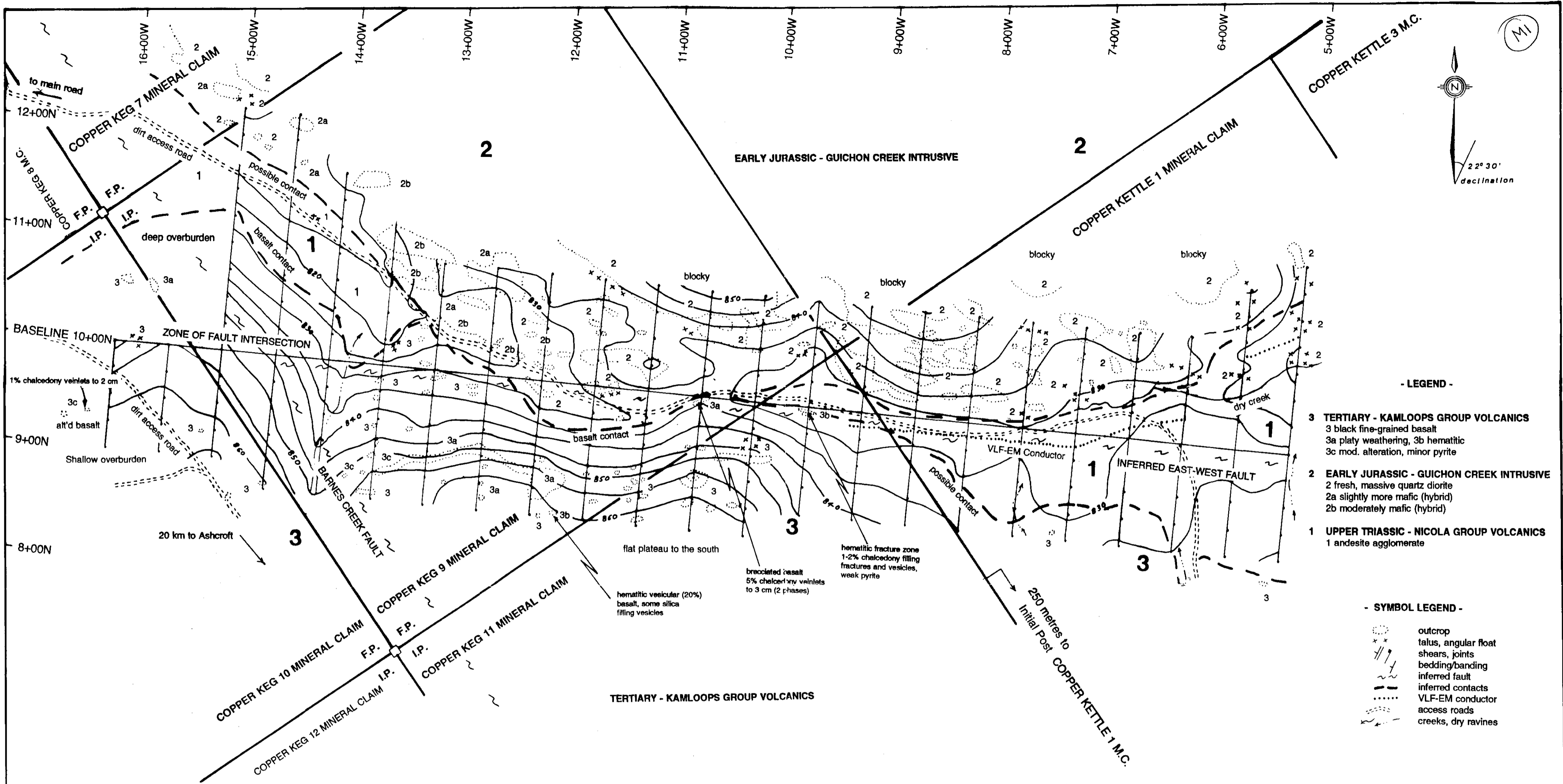
**REPORT PREPARATION COSTS**

M. Morrison, geologist	1 day @ \$300.00/day	\$ 300
Drafting		53
Typing		87
Copying reports		<u>20</u>
	Sub-total:	\$ 460
	<b>Grand Total:</b>	<b>\$ <u>2,270</u></b>

I hereby certify that the preceding statement is a true statement of monies expended in connection with the Geological Mapping Program carried out May 8 - 13, 1997.

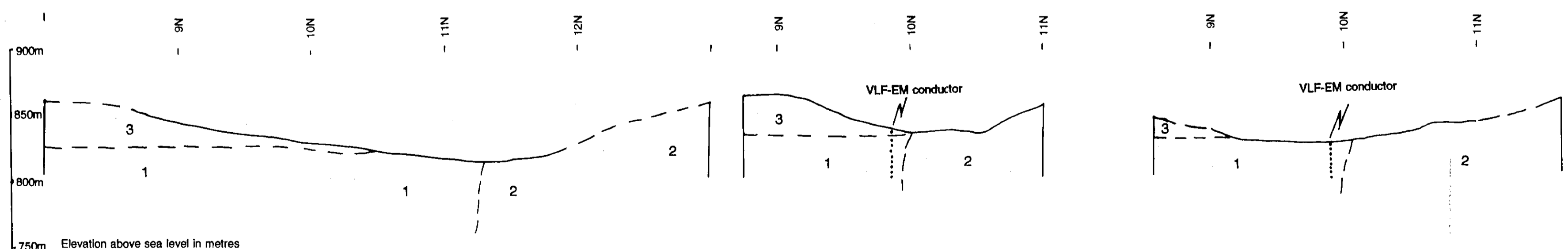
August 8, 1997  
Kelowna, B.C.

  
Murray Morrison - Geologist



- LEGEND -**
- 3 TERTIARY - KAMLOOPS GROUP VOLCANICS**  
 3 black fine-grained basalt  
 3a platy weathering, 3b hematitic  
 3c mod. alteration, minor pyrite
  - 2 EARLY JURASSIC - GUICHON CREEK INTRUSIVE**  
 2 fresh, massive quartz diorite  
 2a slightly more mafic (hybrid)  
 2b moderately mafic (hybrid)
  - 1 UPPER TRIASSIC - NICOLA GROUP VOLCANICS**  
 1 andesite agglomerate

- SYMBOL LEGEND -**
- outcrop
  - × talus, angular float
  - /// shears, joints
  - bedding/banding
  - - - inferred fault
  - · - · - · - inferred contacts
  - · - · - · - · - VLF-EM conductor
  - - - access roads
  - ~ ~ ~ creeks, dry ravines



Profile of L14+00W (looking west)      Profile of L10+50W (looking west)      Profile of L7+50W (looking west)

Elevations obtained from altimeter survey. Contour interval is 5 metres.

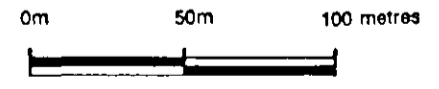
Claim posts tied-in to grid with a compass and belt chain.

To accompany a geological report by M. Morrison

*M. Morrison*

GEOLOGICAL SURVEY OF CANADA  
 ASSOCIATED COMPANY

25,004



Scale 1:2500

<b>COPPER KEG CLAIM GROUP</b>	
<b>GEOLOGY</b> Copper Keg 9 - 11 and Copper Kettle 1 Mineral Claims Ashcroft Area Kamloops Mining Division, B.C.	
Drawn by: M.M.	N.T.S. 92-11+14E
AUGUST 1997	Figure No. 4