ASSESSMENT REPORT OF GEOLOGICAL

MAPPING AND PETROGRAPHY

OF THE

COL GROUP

(KAEL #2, COL #1, COL #2 and COL #4 MINERAL CLAIMS)

OMINECA MINING DIVISION

NTS 93N/ 02 & 07

LAT 55 15' N , LONG 124 45'W

OWNER & OPERATOR: COLIN CAMPBELL

AUTHOR: COLIN CAMPBELL, P. GEO.

SEPTEMBER 1997

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1.0 Summary

The Col Group, owned by Colin Campbell, consists of 67 units and is located five kilometres north of the west end of Chuchi Lake in the Omineca Mining Division. The Col group claims cover high grade copper mineralization found by Colin Campbell in 1969. Diamond drilling by Falconbridge Nickel, in 1970, 1971 and 1972, indicates two million tons of 0.6% copper in Zone "A" (Smith)

Sampling of Zone "A" in 1985 found up to 1.68 ppm gold across ten feet associated with the higher grade copper mineralization. Further work, including sampling of the remaining core and soil sampling for gold, was recommended.

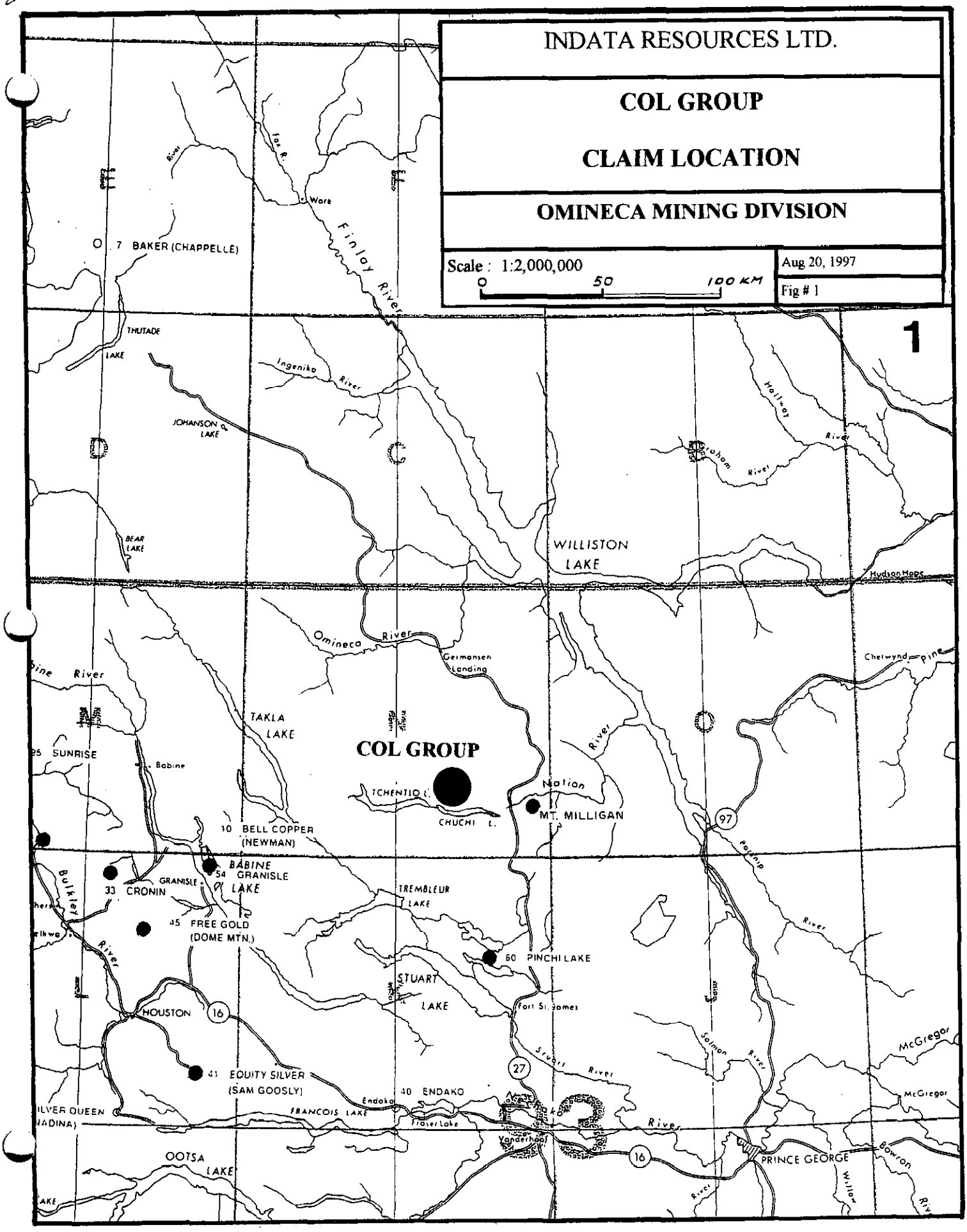
A grab sample of about ten pounds of spoil from Campbell's Trench #1 assayed .507 opt Au, .77 opt Ag and 6.98% Cu. This Trench was then cleaned out and sampled at one metre intervals; the average of the four samples assayed 4.82% Cu, .081 opt Au, and .36 opt Ag across 12.5 feet.

Discussion reveals that the Col Group has some similarities to the Palobora Complex and \or an Alkaline Intrusive Complex. Several drill holes recommended by Jenkins and Rivera have not been drilled and have the potential to rapidly improve the mine making potential of the property.

2.0 Introduction

At the 1997 Cordilleran Roundup, Don Mustard, the former Canadian Exploration Manager for B.P. Resources Canada Ltd. and president of Lysander Resources Ltd., proposed a "Palobora" model for an area surrounding the Lorraine Cu-Au prospect, which is some 87 km northwest of the Col Group and also occurs in syenites of the Hogem Batholith. This led us to review the Col data to see if the "Palobora" model might apply.

Previous work on the Col, conducted by Falconbridge Nickel and Kookaburra Gold Corp. (1988 to 1992) followed the "Porphyry Copper" model even though Woodcock (1972) defined the mineralization as that of a "syenite copper" deposit.


INDATA RESOURCES LTD.
COL GROUP
CLAIM LOCATION
OMINECA MINING DIVISION
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Aug 20, 1997
Fig # 1
1
COL GROUP
7 BAKER (CHAPPELLE)
THUTADE LAKE
Ingenika River
JOHANSON LAKE
BEAR LAKE
Finlay River
Ware
Graham River
Halfway River
WILLISTON LAKE
Hudson Hope
Omineca River
Germansen Landing
Pine River
TAKLA LAKE
95 SUNRISE
Babine
TCHENTIL L.
CHUCHI L.
Nation
MT. MILLIGAN
10 BELL COPPER (NEWMAN)
BABINE
54 GRANISLE
GRANISLE
33 CRONIN
35 FREE GOLD (DOME MTN.)
TREMBLEUR LAKE
60 PINCHI LAKE
STUART LAKE
Fort St. James
HOUSTON
16
41 EQUITY SILVER (SAM GOOSLY)
40 ENDAKO
Endako
FRANCOIS LAKE
Fraser Lake
Vanderhoof
27
97
Parsnip River
Salmon River
Stuart River
McGregor
PRINCE GEORGE
Bowron River
Willow River
Chetwynd
OOTSA LAKE
Bulkley River

p2

2.1 Location, Access and Claim Status

The Col group consists of the Kael and Col Mineral Claims (67 units) and is located five kilometres north of the west end of Chuchi Lake in the Omineca Mining Division (Fig. # 1). The Col Group claims are owned by Colin Campbell and Indata Resources Ltd. Access to the property is from Fort St. James by the all weather Germansen road (105 km), then by the Germansen - Indata Forestry access road (32 km), which then connects to a 7.5 km road leading to the claims. A temporary bridge would have to be rebuilt to cross a small stream in order to support a drill program.

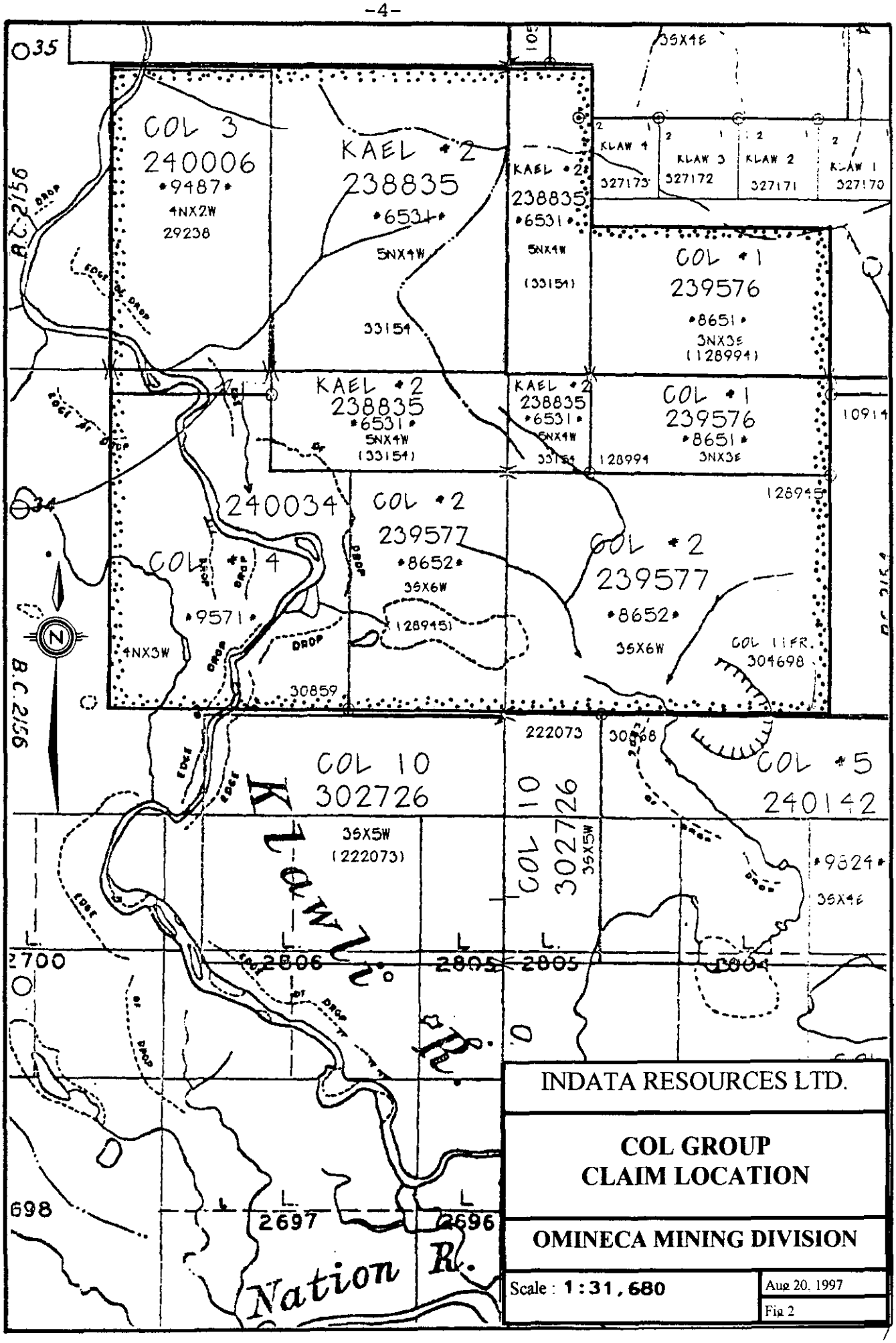
CLAIM NAME	TITLE NUMBER	NEW NUMBER	SIZE	EXPIRY
Kael # 2	6531	238835	20	09 -28-2001
Col # 1	8651	239576	9	08-05-1998
Col # 2	8652	239577	18	08-05-1998
Col # 3	9487	240006	8	06-21-1998
Col # 4	95771	240034	12	07-20-1998

2.2 Topography and Vegetation

The Col Group covers a south slope with elevations ranging from 1000 to 1300 meters. Vegetation consists of an open growth of older pine and spruce with balsam at higher elevations and "burned" areas of dense alder and young pine.

2.3 Regional Geology

The Nation Lakes area lies within Quesnellia (Fig 2a) a Mesozoic island arc terrain with late Paleozoic arc and marginal basin basement, which is tectonically juxtaposed with the ancestral North America continental margin (Nelson et al 1996). The Col Group is mainly underlain by Hogem intrusive suite with early Jurassic Chuchi Lake succession volcanic on the Northeast side. Quesnellia is bounded to the West by the Pinchi fault and to the East by the Manson fault. Beavon (1997) interprets the shape of Chuchi Lake as a ring fracture associated with his newly defined Chuchi Lake volcanic complex. Alternatively Chuchi Lake could represent right lateral movement on a deep seated structure or transfer fault between the Pinchi and Manson faults.



INDATA RESOURCES LTD.

COL GROUP
CLAIM LOCATION

OMINECA MINING DIVISION

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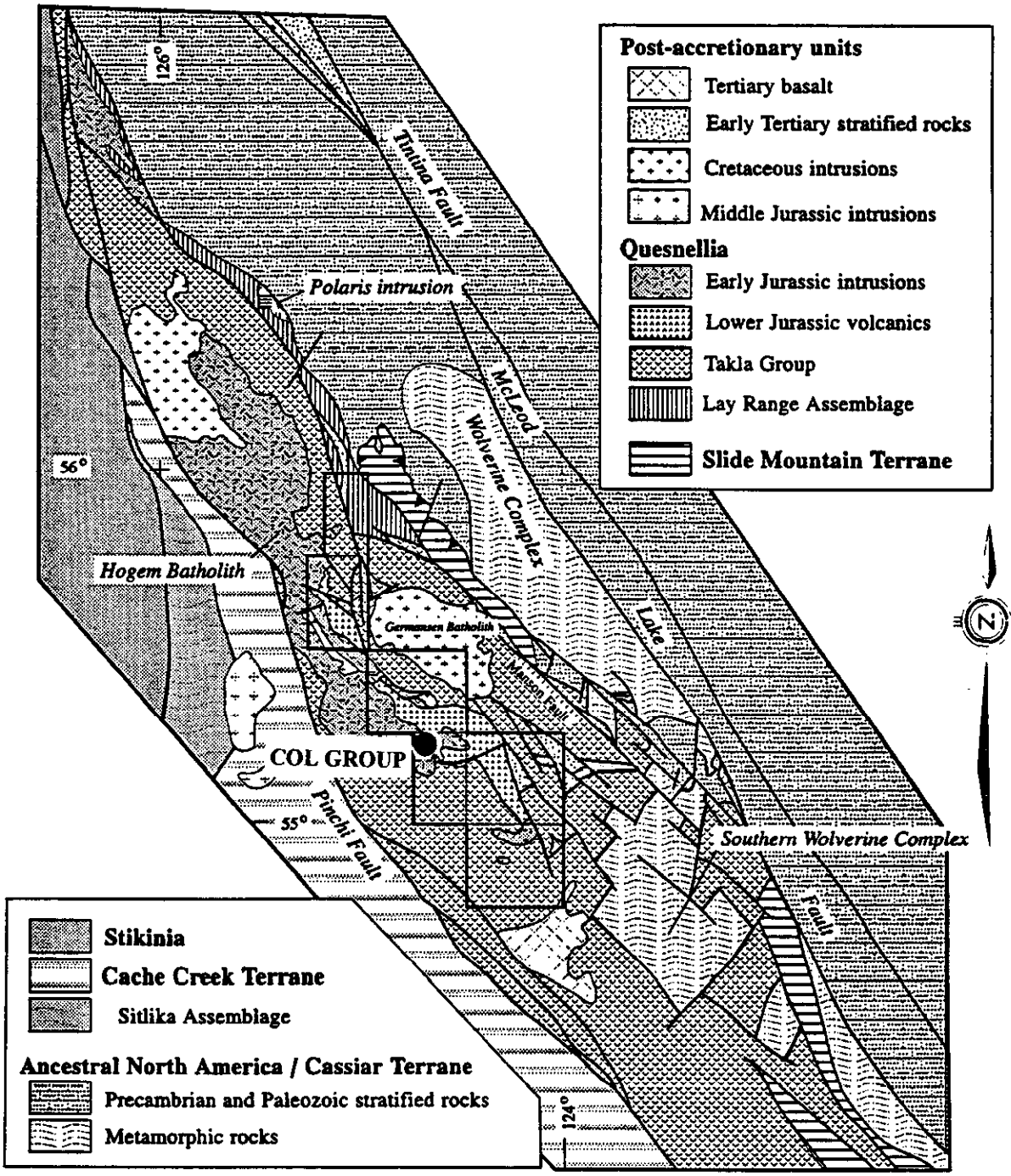
Aug 20, 1997

Fig 2



2b. Regional geology and tectonic setting of the project area in north-central Quesnellia. Geology from Wheeler and McFeely (1991), Struik (1989, 1992), Ferri and Melville (1994), Ferri (unpublished compilation) and this study.

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COL COPPER-GOLD PROSPECT

REGIONAL GEOLOGY

Fig. 2b January 1997

2.4 Previous Work

The Col Group was found by Colin and Heather Campbell in 1969, following a silt geochemical survey. In 1970 it was optioned to Falconbridge Nickel. From 1970 to 1972 Falconbridge cut lines, ran I.P., E.M. 16, magnetometer, soil geochemical and geological surveys over the Group.

Diamond drilling by Falconbridge consisted of 541' XRPS, 4 694' AQ and 2 506' BQ, indicating by my calculations, 2.72 million tons of 0.54% Cu in Zone A. An independant calculation by Canex Placers Limited states: "We find that 2 000 000 tons of 0.6% Cu are indicated by diamond drill holes in the anomaly area" (Smith, 1973).

Sampling by Campbell in 1984 found up to 2.175 ppm Au with 1% Cu across ten feet and prompted the 1986 rock sampling program of Zone A.

In October of 1987, David Jenkins examined the Col Group on behalf of Placer Dome and recommended they option the property. They did not. However, this examination resulted in Kookaburra Gold optioning the property. (Jenkins, Sept., 1988)

Kookaburra Gold conducted soil surveys (Fig # 4, Fig # 5), I.P., and trenching programs, culminating in 1991 with an 11 hole, 5000 foot diamond drill program to the east and northeast of Zone A. "The results were generally disappointing; a large shattered zone of intensely chloritized syenite and monzonite, containing no more than about 1% disseminated pyrite, was encountered in all holes. Copper mineralization occurs over narrow widths accompanied by intense potassic alteration; the best interval averaged 0.50% Cu over 20 feet." (Nebocat, Oct., 1991)

Drill Targets

Both Rivera (1972) and Jenkins (1988) recommended several drill holes north and northwest of Zone A. None of these holes have been drilled. Rivera's Hole No. 1 and Jerkins's Hole No. 4 are both very close to each other 500 meters north of Zone A in a strong I.P. anomaly, which is overlain by one of the best copper and gold in soil anomalies on the property. This anomaly is also up-ice from Dr. A. Plouffe's above mentioned till sample. A second high grade zone here would warrant an open pit to mine both it and Zone A. It should be noted that none of the drill targets recommended by Rivera and Jenkins were drilled. It is also important to note that all of the targets, with the exception of Rivera's No. 2 & 5, now have roads accessible to a skid mounted drill and a drill program would receive quick approval and rapidly increase the mine making potential of the property.

Two drill holes in Zone A, one twinning Falconbridge's No. 9 hole and the other at depth, could increase both the tonnage and the grade significantly. Jenkins (1988, pg. 13) notes that "comparisons between assays of core and assays of sludge prove that

considerable copper was lost from the core ... [and] sludge assays are 50% to 85% greater than assays of core. In some high grade intervals no core assays are available."

In conclusion, the data on the Col Cu-Au property is voluminous and I have tried to indicate what I consider to be the obvious targets. The possibility of a relatively high grade bulk tonnage Cu-Au deposit clearly exists and gives the property the potential to be a 'company maker'.

3.0 Geology

The Col Group covers Chuchi Syenite of Jurassic age which has intruded monzonite of the Hogem Batholith and Takla Group volcanic rocks. Mineralization consists of quartz lenses with locally abundant bornite and as bornite and lesser chalcopyrite disseminated in altered potash feldspathized mesocratic monzonite (Garnett, 1971). Garnett mapped the Chuchi Syenite on the Col Group as a 1 km by 5 km unit striking northeast across it (Fig # 7).

4.0 Discussion & Recommendations

Rock Sampling & Mapping of Syenite Outcrop

Two days were spent mapping a possible breccia pipe on the Klawli river examining an airborne anomaly and mapping three areas of syenite outcrops on the Col Group (Fig 3). Nine rock samples were examined by Dr. J. Harris (appendix c). A McPhar model TV-1A Spectrometer was used to check outcrops for uranium. Two sharp cones of syenite at areas A and B (Fig 3) were examined. Area C consists of scattered outcrops of course grained syenite with quartz veinlets and minor malachite

In brief, we found several similarities to Don Mustard's Palabora or Alkaline Igneous Complex which led to the rock sampling and mapping of syenite in this report.

1) A five kilometer in diameter circular structure (C.J. Ring) (Fig # 2, Fig # 6) with a roughly concentric magnetic feature (Fig # 3) defined by six distinct highs and a central low. One of these highs flanks both Campbell's trenches and Zone A.
2) Mineralized pegmatites (Harper, 1972 pg55 and Fig # 9). These pegmatites are associated with the highest grade mineralization found so far on the Col, including 12.5' of 4.82% Cu, 0.081 opt Au, and 0.36 opt Ag.
3) Several Uranium anomalies (Fig # 2)(Aeroradiometric data from Rob Shives, G.S.C.). Field examination obtained spectrometer readings of greater than 4000 counts per minute (10 -20 times background); however, no specific mineral could be determined as causing the anomaly.

4) A pipe-like structure occurs in a canyon on the Klawli River. A quick field examination revealed carbonated and brecciated hornblende pyroxenites and altered ultra-mafics (Harris, March, 1997, attached report).
5) Harper (1972 DDH 10, sheet #5) describes a "fenetized" section: "[the] whole rock has a metasomatic, altered appearance". Note: this hole was drilled to the north, away from Zone A and supports the No. 1 drill hole recommended by Rivera.
6) Till sampling by Alain Plouffe (G.S.C. Geochemist, 1994) near the Col Camp, returned values of 6,124 ppm copper and >1% phosphate (indicating several % apatite). He notes that "it is the highest Cu concentration in the clay size fraction for the whole area (NTS 93K and N)". This sample is down-ice from Rivera's recommended No. 1 drill hole.

Colin J. Campbell

References

Aerodat, 1989 Col Group - Total Field Magnetics, Private Report for Kookaburra Gold Corp.

Band, 1970. Geochemical report - Col Claims, Falconbridge Nickel Mines. Feb. 10, 1971.

Beavon, Roy 1997 - Exploration Proposal for Chuchi Lake Property of Nation River Resources Ltd., Omineca Mining Division, British Columbia, Private Report

Campbell, Colin 1986. Lithogeochemical Survey of the Kael #2 Mineral Claim B.C. Dept. of Mines A.R..

Garnett, 1971. Geology, Exploration and Mining in British Columbia, B.C. Dept. of Mines p. 196.

Harper, Jan. 1972. Progress Report for 1971 on the Chuchi Lake option- P.N. 161 Private report for Falconbridge Nickel Mines

Jenkins, David M. Geological Report on the Col Claim Group, September 30, 1988.

Nebocat, 1991 - Report on 1991 Geological Geochemical, Induced Polarization Surveys and Diamond Drilling Program, Col Group Claim

Nelson, et al 1996 - The Geology and Mineral Deposits of North - Central Quesnellia, Tezzeron Lake to Discovery Creek, Central British Columbia, Bulletin 99, B.C. Ministry of Employment and Investment

Plouffe, Alain 1994, Geological Survey of Canada - Personal Letter to Colin J. Campbell

Rivera, R.A., Review of Geophysical Data on the Falconbridge Chuchi Lake Property, B.C., unpublished map, 1973.

Shives, Rob 1994, Geological Survey of Canada - Personal Letter to Colin J. Campbell

Smith, 1973. Personal Letter, September 24, 1973.

Woodcock, J.R., Chuchi Copper Property, unpublished letter to Colin Campbell, 1972.

Appendix A

Statement of Qualification

I, Colin Campbell, of the town of Courtenay, in the Province of British Columbia, do hereby state that:

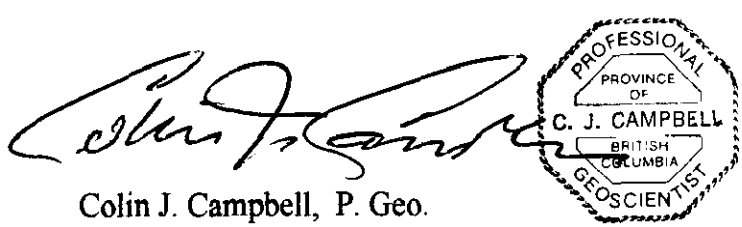
1. I am a Professional Geoscientist registered and in good standing with the Association of Professional Engineers and Geoscientists of the Province of British Columbia.

2. I graduated from the University of British Columbia in 1966 with a B.Sc. Degree in Honours Geology.

3. I have worked steadily in mining exploration in British Columbia and Yukon Territory from 1966 to 1973, intermittently from 1974 to 1983 and steadily from January 1984 to present.

4. I personally carried out, or supervised, the rock sampling and geological mapping on the **Col Group** mineral claims.

5. I own the **Col Group**.



Colin J. Campbell, P. Geo.

Appendix B

Statement of Cost

Wages

Geologist
June 17, 18, 19 field
June 21,22 office

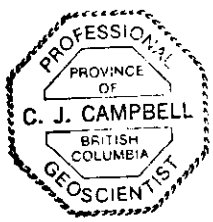
5 days @ $450.....$2,125.00

Prospector
June 17,18,19 field
June 21 office

4 days @ $150.....$600.00

Petrographic Report.....$545.70

$3270.00



Harris
EXPLORATION
SERVICES

MINERALOGY AND GEOCHEMISTRY

534 ELLIS STREET, NORTH VANCOUVER, B.C., CANADA V7H 2G6 TELEPHONE (604) 929-5867

Report for: Colin Campbell,
Site 480 R.R. #4,
COURTENAY, B.C.
V9N 7J3

Report 97-31

March 3, 1997

PETROGRAPHIC EXAMINATION OF ROCK SAMPLES

Introduction:

5 samples, labelled C 97-1 through 5, were submitted for examination. Typical portions of each were prepared as thin sections (slide numbers 97-2246 through 2250 respectively). Sample C 97-4 contains substantial sulfides and was prepared as a polished thin section.

Summary:

Sample 97-5 is a fresh rock of intrusive ultramafic aspect. It consists of intergrown clinopyroxene and hornblende, of grain size 1 - 6 mm, with minor accessory biotite (now chloritized).

Sample 97-1 is possibly a related rock, but shows intense pervasive alteration, with the primary texture pseudomorphed by carbonate-rich, brown, sub-opaque material and a felted mineral which may be talc. It differs from 97-5 in having higher contents of original biotite and disseminated opaques. The relict primary granularity is also somewhat finer.

Sample 97-2 shows a slice of fresh leucogranite sandwiched between fresh hornblende pyroxenite (similar to 97-5) and vein-type quartz. It may be part of a coarse breccia.

Sample 97-4 consists of partially replaced remnants of strongly biotitized K-feldspar (original granite or syenite?) engulfed in a matrix of quartz. Bornite occurs as disseminated flecks in the remnants, and as coarser pockets in the quartz.

Sample 97-3 is a heterogenous, vari-granular breccia, incorporating fragments of leucogranite (similar to that in 97-2) and intensely carbonated and chloritized mafic material (hornblende and probable pyroxene - possibly similar to 97-1) in a matrix of carbonate.

The suspicion of unusually abundant apatite in some of these samples is not confirmed by the petrographic study.

J.F. Harris Ph.D.

SAMPLE C 97-1 (Slide 97-2246) ALTERED ULTRAMAFIC(?)

Estimated mode

Carbonated brown material	50
Sericite?) Talc?)	28
Carbonate	5
Altered biotite	5
Green secondary mineral	trace
Apatite	trace
Opaques	12

This sample is a totally altered rock in which the original grain structure is perfectly preserved, although its original composition can only be guessed at.

It is made up of two distinctive secondary assemblages. One is an indeterminate, brownish, turbid material with a high content of fine-grained pervasive carbonate. The other is a compact felted aggregate of what looks like talc (rather than sericite - although these two minerals cannot be distinguished with certainty by optical means).

The original texture appears to have been an aggregate of sub-equant grains, mainly in the size range 0.2 - 0.8 mm, but apparently coalescent to coarser clumps up to 2 or 3 mm in size, with some mutual intergrowth of small grains of one type within clumps of the other.

Two other components are present in accessory proportions. One of these consists of sporadic, mostly rather large, skeletal, lamellar-textured plates of what clearly originated as a mica, but is now pseudomorphed by brown, sub-opaque material (probably mainly leucoxene); and the other is an opaque mineral of oxidic aspect, occurring as abundant, rather evenly disseminated, small, equant/subhedral grains, 0.2 - 0.5 mm in size, sometimes aggregated as small clumps. This mineral is non-magnetic, and is possibly ilmenite.

Other constituents of much lower abundance are sparsely scattered subhedra of probable apatite, 0.2 - 1.0 mm in size; and (in one corner of the slide) pockets of a green, minutely felted secondary mineral - possibly secondary amphibole or a form of chlorite.

The rock is cut by a few, thin, sub-parallel veinlets of carbonate.

Initially it was supposed that the principal altered components were feldspars, but no remnants survive to confirm this. The total absence of quartz, and the high content of opaque oxides, suggest that the rock may, in fact, have originated as an intergrowth of two mafic constituents (possibly pyroxene and amphibole). It is tentatively interpreted as a strongly altered (though undeformed) ultramafic - possibly a hornblende pyroxenite.

SAMPLE C 97-2 (Slide 97-2247)
BRECCIA(?) WITH GRANITE, PYROXENITE AND VEIN QUARTZ

Estimated mode

Ultramafic	
Pyroxene	15
Amphibole	15
Leucogranite	
Quartz	12
K-feldspar	14
Plagioclase	13
Sericite	1
Carbonate	trace
Vein quartz	
Quartz	30
Carbonate	trace
Sericite	trace

The sectioned portion of this sample incorporates three distinctly different lithologies in sharp, vein-like contact. The rock is said to be a coarse breccia, but it is not clear from the section (or from the remaining portion of the hand specimen) which phase(s) represent the fragments, and which the matrix or cement.

In the thin section a central band, about 1 cm wide, is made up of a rock of leucogranite aspect, composed of an intergrowth of quartz, K-feldspar and plagioclase of grain size 1 - 6 mm. Areas of much smaller scale mutual intergrowths, of micrographic or granophyric character, are superimposed on the relatively coarse grain structure. The rock locally shows networks of microgranulation, and is cut by a few hairline veinlets of carbonate.

This granite is totally devoid of mafics. The feldspars show argillic turbidity and, locally, mild dusting by fine-grained sericite.

The granite slice is in contact on one side with a coarse-grained aggregate of monomineralic quartz of vein aspect. The contact is demarked by a thin selvedge of foliaceous sericite about 1 mm thick. The hairline carbonate veinlets and zones of microgranulation observed in the granite extend across this selvedge to continue through the quartz. There are also films of sericite (off-shoots of the contact selvedge) occupying some of the grain boundaries in the coarse quartz aggregate.

The lithotype on the other side of the central granite slice is an ultramafic assemblage of intergrown clinopyroxene and hornblende, as an anhedral aggregate of grain size 0.5 - 5.0 mm. The hornblende forms homogenous grains in its own right, and is also developed as small-scale lamellar and patchy intergrowths within coarse pyroxene grains. Both minerals are fresh.

Sample C 97-2 cont.

The contact of the ultramafic with the granite is sharp, with small-scale crenulate irregularities but no clear indication as to whether one intrudes the other. There is a striking absence of any recognizable contact effects (reaction or hybridizing).

The zone of maximum fracturing and granulation in the granite also appears to affect the immediately adjacent area of ultramafic, but to a much milder degree.

SAMPLE C 97-3 (Slide 97-2248) CARBONATED BRECCIA

Estimated mode

K-feldspar	27
Plagioclase	22
Quartz	10
Altered amphibole	10
Chlorite	10
Carbonate	20
Apatite	trace
Opaques	1

Macroscopic examination of the off-cut and thin section of this sample show it to be a feldspar-rich rock with abundant greenish mafic material. It has a heterogenous, crypto-fragmental or brecciated appearance, and is cut by a central vein of carbonate.

The breccia character is clearly apparent in thin section, with fragments ranging from 0.2 mm to 1 cm or more in size.

The largest fragments (prominent yellow-stained areas in the off-cut) are leucogranite, composed essentially of intergrowths of fresh K-feldspar and quartz, often exhibiting graphic textures. Plagioclase is a minor accessory. The granite fragments are transected by networks of hairline microfracture filled by carbonate.

Other parts of the sectioned area are much more heterogenous, consisting of fragments 0.1 - 2.0 mm or so in size of K-feldspar and carbonated plagioclase and small chips of quartz. There are also prominent grains of greenish appearance, showing strong pervasive replacement by carbonate; relict cleavages indicate these to be altered amphibole. Very likely other totally carbonated grains may be original pyroxene.

In some areas these mineral grains and rock fragments are tightly cemented by fine-grained carbonate, and in others are defined by abundant interclast wisps and pockets of foliaceous chlorite.

One local development of cherty quartz as a possible disrupted veinlet was also seen.

The central vein zone consists of monomineralic, mosaic-textured carbonate of grain size 0.2 - 2.0 mm. This sometimes has thin, diffuse selvedges of cherty quartz.

This rock is a varigranular breccia apparently incorporating the two principal lithotypes represented in this suite - leucogranite and hornblende pyroxeneite. The granite, though often finely fragmented, generally appears fresh, except for partial veining and peripheral replacement by the carbonate which is the principal matrix/cementing phase in this rock. The mafic material is intensely carbonated and partially cemented by bright green chlorite.

SAMPLE C 97-4 (Slide 97-2249)
SILICIFIED BIOTITIZED GRANITE, WITH BORNITE

Estimated mode

Quartz	47
K-feldspar	27
Biotite	18
Apatite	0.5
Rutile	1
Bornite	6
Covellite	0.5
Chalcopyrite	trace

The off-cut of this sample shows what appear to be partially replaced or assimilated remnants of a rock composed dominantly of K-feldspar (yellow-stained areas) with diffuse dark speckles. These are set in a matrix of quartz with sporadic pockets and fine disseminations of a dark purplish opaque constituent.

In thin section the rock is found to consist dominantly of quartz, K-feldspar and biotite.

The K-spar forms clumps of anhedral grains, 0.2 - 1.0 mm in size, locally showing strong micro-granulation.

Brown biotite of secondary aspect, as aggregates of non-oriented, tiny flakes 20 - 100 microns in size, forms more or less abundant intergranular networks throughout the remnant clumps of K-spar. It also occurs to some degree in the adjacent quartz (where the K-spar has been largely replaced). Fine-grained quartz (possibly representing incipient silicification) occurs in intimate interstitial relation to the K-spar/biotite assemblage. The biotite constitutes the dark speckled component seen in the off-cut.

The boundaries of the potassic remnants (which may be a form of biotitized granite or possibly a syenitic rock) are irregular and ill-defined, and appear to represent progressive replacement by the quartz. There is no direct evidence as to whether the protolith was brecciated prior to the silica flooding.

Sparsely scattered, small, subhedral/prismatic grains of apatite, 40 - 200 microns in size, are a trace constituent, and rutile flecks occur as inclusions in the biotite.

The opaque is bornite. This occurs as irregular grains and clumps, 0.05 - 0.5 mm in size, disseminated throughout the biotitized K-spar areas. It also forms a few coarser pockets, to several mm in size, in quartz at, or near, the peripheries of K-spar remnants.

The bornite typically has thin rims and grain boundary replacements of covellite - clearly of supergene origin. A little chalcopyrite

SAmple C 97-4 cont.

is associated with the bornite segregations, as discrete peripheral segregations and as lamellae within the bornite. These have the distinct aspect of being exsolution features - suggesting that the bornite is of primary depositional character (rather than being formed by supergene modification of chalcopyrite).

SAMPLE C 97-5 (Slide 97-2250) HORNBLENDE PYROXENITE

Estimated mode

Pyroxene	48
Amphibole	48
Chlorite	1
K-feldspar	1.5
Sericite	trace
Carbonate	1
Sphene	trace
Opaques	0.5

This sample is an ultramafic rock of intrusive aspect, composed essentially of a rather coarse intergrowth of clinopyroxene and hornblende of grain size 1 - 6 mm.

As in the ultramafic component of Sample 2 (which could well represent the same lithologic unit) the hornblende and pyroxene form homogenous, interlocking/anhedral grains, with the hornblende also occurring as clusters of small, discrete, emulsion-like bodies (in optical continuity) within some of the coarse pyroxene grains.

Both minerals are fresh.

Minor accessories include scattered small pockets of chlorite (which has the appearance of being secondary after original biotite or phlogopite), and of turbid, mildly sericitized K-feldspar. The contact relations of the latter to the surrounding hornblende and pyroxene suggest that it is most likely of primary magmatic origin. Small equant/irregular individual grains of opaques, 30 - 200 microns in size (rarely to 0.5 mm), occur sparsely disseminated throughout.

The rock is cut by a few multi-directional hairline veinlets of carbonate.

SAMPLE IR 97-101
EPIDOTIZED AND SILICIFIED FELDSPAR PORPHYRY, WITH Cu MINERALIZATION

Estimated mode

Plagioclase	28
Quartz	10
Epidote	55
Biotite) Chlorite)	2
Chalcopyrite	2
Bornite	1
Digenite) Chalcocite)	0.5
Limonite	1.5
Secondary Cu minerals	trace

This sample is a leucocratic andesite porphyry showing an advanced state of replacement by an epidote/quartz assemblage with disseminated Cu sulfides.

The white-etched areas on the off-cut block represent unreplaced remnants of the host rock. This consists of prismatic phenocrysts of well-twinned, fresh plagioclase (having a composition of andesine) 0.5 - 2.5 mm in size, randomly scattered through a groundmass of evenly felsitic plagioclase, of grain size 10 - 30 microns. Minor accessory proportions of an altered mafic mineral, now composed of felted aggregates of an olive green to brown mineral (secondary biotite and/or chlorite), occur as sporadic small patches.

The replacing phase consists of an intergrowth of epidote and lesser quartz, as a subhedral, granular to bladed aggregate of grain size 0.1 - 0.5 mm. This assemblage pervades the host as irregular coalescent clumps, with frequent examples of classic replacement relationships viz a viz the remnant areas of host rock.

The distribution of the replacing phase shows no apparent structural control.

Chalcopyrite and bornite form partially coalescent grains and angular pockets, 10 - 500 microns or more in size, within the epidote/quartz areas, and at the contact of this assemblage with patches of remnant host rock. The bornite typically shows rimming and alteration to the supergene enriched sulfides, chalcocite and digenite. These also occur as disseminated grains in their own right (presumably representing original bornite).

Chalcopyrite is sometimes seen as remnants within patches of translucent brown limonite - indicating that the sample has undergone partial oxidation. Small pockets of green secondary Cu minerals (malachite, etc.) are sometimes intergrown with the limonite.

The mineralization is unusual in that pyrite appears to be absent.

SAMPLE IR 97-102
EPIDOTIZED AND SILICIFIED FELDSPAR PORPHYRY, WITH Cu MINERALIZATION

Estimated mode

Plagioclase	17
Biotite	8
Chlorite	trace
Quartz	15
Epidote	55
Carbonate	trace
Chalcopyrite	3
Bornite	trace
Chalcocite) Digenite)	1

This sample is of essentially identical type to the previous one (IR 97-101).

It differs in that the unreplaced remnants of the porphyry host are less extensive, and partly occur as small patches totally enclosed (and partially assimilated) by the epidote-quartz assemblage.

Another difference is that the groundmass of the host rock in this sample contains relatively abundant, evenly intergrown, tiny flecks of probable biotite and/or chlorite. A little fine-grained carbonate occurs as rims around some of the smaller, totally engulfed host rock remnants.

The mineralization is of the same style as Sample 101, but includes a lower proportion of bornite (the latter having presumably been almost totally converted to chalcocite and digenite). The sulfides occur as individual angular pockets, 10 - 500 microns in size, sometimes in semi-coalescent clusters, intergranular to the compact epidote/quartz.

A proportion of the chalcopyrite pockets are partially to completely replaced by limonite.

SAMPLE IR 97-103 **ANDESITE PORPHYRY**

Estimated mode

Plagioclase	58
K-feldspar	5
Sericite	2
Quartz	trace
Epidote	21
Chlorite	12
Carbonate)	trace
Sphene)	
Fe oxides	2

This sample is a prominently porphyritic rock containing well-twinned, randomly oriented, prismatic phenocrysts of andesine, 0.2 - 3.0 mm in size, scattered through a minutely equigranular groundmass of grain size 10 - 50 microns. The latter is composed of an intergrowth of plagioclase and chlorite, plus accessory proportions of K-feldspar, epidote and Fe oxides.

The plagioclase phenocrysts show mild dustings of pervasive sericite, and some are speckled with sporadic small clusters of epidote granules.

The rock also contains mafic phenocrysts, similar in size to the plagioclase, but less abundant; these are totally pseudomorphed by aggregates of fine-grained epidote - in some cases with intergrown chlorite.

Fe oxides - apparently incipiently hematized magnetite - occur as sporadic, individual, equant grains, 0.1 - 1.0 mm in size - sometimes clustered, and sometimes associated with the altered mafic phenocrysts. The Fe oxide grains typically have thin rims and microfracture fillings of a high relief, high birefringent, brown mineral which may be sphene or carbonate (or both).

Extremely rare, small quartz phenocrysts are the remaining constituent. The thin section is devoid of sulfides.

This rock is clearly of generally similar type to that seen as unreplaced remnants in Samples 101 and 102, and may exemplify the protolithic host. It differs in detail in having an appreciable content of fine-grained mafics and a little K-feldspar in the groundmass, and in containing minor, but prominent, sub-phenocrysts of Fe oxides.

SAMPLE IR 97-104 **ALTERED ANDESITE PORPHYRY**

Estimated mode

Plagioclase	33
Sericite	15
Pyroxene	20
Chlorite	1
Sphene	1
Magnetite	trace
Quartz	12
Epidote	15
Chalcopyrite	2
Pyrite	trace
Limonite	1

This sample is another variant of the more or less strongly modified intermediate-mafic, porphyritic igneous rocks making up the suite.

This one differs mineralogically from the others in having clinopyroxene as a major constituent - as varigranular clumps sporadically scattered through the matrix of dominant plagioclase. Sphene is a scattered minor accessory.

The plagioclase in this sample shows rather strong pervasive alteration (saussuritization) to fine-grained sericite and epidote, in various proportions. This renders the plagioclase turbid, and partially obscures the textural features.

The pyroxene - though somewhat granulated in appearance - is generally fresh.

The host rock shows extensive superimposed silicification, as pervasive networks and pockety veinlets of mosaic-textured microgranular quartz, of grain size 20 - 100 microns.

In a clump 1.5 X 1.5 cm in size in the centre of the sectioned area, the quartz attains coarser grain size, and is intergrown with aggregates of well-crystallized epidote. This area incorporates pockets of partially limonitized chalcopyrite, and the assemblage clearly represents aggressive replacement of a similar type to that seen in Samples 101 and 102. Sporadic smaller clumps of the same minerals are developed elsewhere in the sectioned portion.

This sample differs from the others in containing occasional pyrite (also partially limonitized), and in the apparent absence of Cu species other than chalcopyrite.

N

5° 15'

55° 15'

COL 3

COL #1

COL #2

COL #4

COL #5

COL 18

KAEL #2

C 97-4

C 97-5
C 97-3
C 97-2
C 97-1

IR 97-104
IR 97-103
IR 97-102
IR 97-101

A

B

C

KLAWDETTELLE CREEK

KLAWLI RIVER

CHUCHI LAKE

1704

1561

1050
1100
1350
1450
1600
1200
1150
1250
1400
1300
1000
950
900

0 250 500 1000 metres

GEOLOGICAL SURVEY BRANCH
ASSESSMENT REPORT

25,152

INDATA RESOURCES LTD.

COL PROJECT

SAMPLE LOCATION & SYENITE OUTCROPS

OMINECA MINING DIVISION

93N/2,7	1:10,000	SEPT. 1997
		FIGURE 3