

GEOLOGICAL, TRENCHING, AND DRILLING REPORT

BABIY/RUST OPTION: RUST 1, 2, 3, and 4 CLAIMS

BET/COMINCO OPTION: BET 1, 2, 3, and 5 CLAIMS

VICTORIA RESOURCES OPTION: BLUFF 1, 2, 4 AND PERCY 1 CLAIMS

RAVEN 1 and 2 CLAIMS

AND

MAC CLAIM

BIRK CREEK PROPERTY

KAMLOOPS MINING DIVISION

BRITISH COLUMBIA

NTS 82M/05W

51°25'00", 119°55'00"

FALCONBRIDGE LIMITED

202-856 HOMER STREET

VANCOUVER, B.C.

V6B 2W2

GEOLOGICAL TRANSPORT  
ASSESSMENT REPORT

DECEMBER, 1990

A.D. McLAUGHLIN and C.W.P. RUSSELL

Edited and compiled by R. Stewart, February, 1991

21,209  
Part 1 of 4  
Rec'd 9/14/10 T.R.

## SUMMARY

Falconbridge Limited completed a surface and drill exploration program on the Birk Creek Property in 1990. This program was designed to discover a volcanogenic massive sulphide property hosted by the Devonian Eagle Bay Formation. Work included linecutting, gradient array IP, VLF and MAG surveys, trenching, geological mapping along with rock and soil sampling completed between June 19 and November 14, 1990. Eight diamond drill holes, totalling 2377 metres were completed along with downhole Pulse-EM surveys during the program's final phase.

Three mineralized trends were drill tested in 1990 with the following results:

### **Central Trend**

Diamond drill hole BC90-01 tested the trend's northern half and intersected 11.76 metres (drill thickness) grading 0.17% Cu, 0.48% Pb, 1.08% Zn, 11.21 g/t Ag and 0.06 g/t Au. This mineralization is in the Central Trend Unit and is specifically hosted by silicified and sericitic felsic tuff and tuff breccia. Further downsection for 100 metres sporadic massive sulphide bands up to 0.88 metres occur in variably sericitized and chloritized intermediate to felsic volcanic tuff. The best assay intervals are:

0.66% Cu, 4.32% Pb, 8.86% Zn, 25.37 g/t Ag and 0.48 g/t Au over 0.88 metres and  
0.59% Cu, 5.47% Pb, 6.33% Zn, 40.11 g/t Ag and 0.34 g/t Au over 1.0 metre.

Strong chloritization and increased copper content suggest these lower zones are more proximal to sulphide vents or are feeder zones to the upper horizon. The entire section is strongly hydrothermally altered with sodium and calcium depletion along with very high Ishikawa Alteration Indices.

Trench FLTR90-01, 230 metres east of drill hole BC90-01, uncovered similarly altered volcanic rock with two narrow massive sulphide intervals grading up to 1.1% Zn, 0.70% Pb, 262 ppm Cu, 8.5 g/t Ag and 33 ppb Au over 1.5 metres.

Drill testing both 200 metres down dip and 500 metres along strike to the southeast intersected similar stratigraphy, but only minor sulphide mineralization and much less alteration. However, drill hole BC90-03, located 1250 metres southeast, intersected 0.92%

Cu, 0.37% Pb, 3.30% Zn, 25.02 g/t Ag and 0.10 g/t Au over 4.28 metres in a felsic volcanic breccia. This mineralization is situated at the top of a 75 metre thick hydrothermal alteration zone marked by sodium depletion and high Ishikawa Alteration Indices.

### **Birk Creek Trend**

Mapping by Falconbridge Limited personnel combined with sampling and relogging previously drilled core has outlined an intermittently mineralized and hydrothermally altered felsic volcanic tuff section intercalated with argillite and limestone up to 1400 metres in length and 25 metres thick. Two or three mineralized horizons are present. The best mineralized interval assayed 0.14% Cu, 0.52% Pb and 1.25% Zn over 2.0 metres from Ducanex drill hole D71-7. Between 1938 and 1940, 234 tonnes in bulk samples from lower Birk Creek yielded 4800 kilograms copper, 13,499 grams silver and 6501 grams gold (Schiarizza and Preto, 1987).

Drill holes BC90-4, BC90-7 and BC90-8 completed by Falconbridge Limited in October, 1990 intersected weak Cu-Pb-Zn mineralization with the best assay interval grading 0.25% Cu, 1.70 % Pb, 2.51% Zn, 7.8 g/t Ag and 106 ppb Au over 0.20 metres (drill hole BC90-07).

### **Uke and Epiclastic Trends**

Previous work on the Epiclastic Trend indicated mineralization is weakly copper enriched. In 1982, Pruessag hole P82-1 intersected 0.43% Cu and 2.4 g/t Ag over 9.3 metres. Falconbridge Limited's drilling and trenching along the Uke and Epiclastic trends did not intersect any significant mineralization.

Reopening the Uke Trench indicated the massive sulphide lens occurs at the contact between hydrothermally altered felsic and intermediate rocks, and plunges gently to the southwest.

A new, strong IP anomaly coincident with high copper and zinc soil values was identified in 1990 southeast of Harper Creek. These anomalies remain to be tested in 1991.

## CONCLUSIONS

- 1) Significant volcanogenic massive sulphide horizons have been encountered at depth in the Central Trend within a thick hydrothermally altered volcanic sequence. Both the coarser grained volcanic rocks and the increased copper content in the sulphide intervals suggest proximity to volcanic and sulphide venting, possibly located to the northwest. The plunge of the massive sulphide pod present in the Uke Trench indicates a structural control on the sulphide mineralization that must be considered in further exploration.
- 2) The Pulse EM borehole survey from the Central Trend does not clearly outline offhole responses comparable to the mineralization located, but does suggest a conductive body lying about 50 to 100 metres below the current drilled section. This may be the Uke stratigraphic horizon. These targets are too deep to be detected by the surface geophysical surveys.
- 3) The Birk Creek Trend contains massive pyrite lenses within strongly hydrothermally altered rocks, but only intermittent and weak Cu-Pb-Zn mineralization occurring along two or three horizons.
- 4) Previous drilling at the Uke Trench site has not fully explored the down plunge potential of this zone.
- 5) A new, coincident IP and soil geochemistry anomaly southeast of Harper Creek may be an extension to the Epiclastic or Uke trends.
- 6) Strong deformation throughout the Eagle Bay assemblage has complicated stratigraphic relationships and may have remobilized sulphide lenses to new locations. Despite this deformation, known sulphide lenses are accompanied by "conventional" hydrothermal alteration assemblages which would imply that they are in situ. Conventional volcanogenic massive sulphide deposit exploration techniques should therefore still be successful in locating large, viable deposits.

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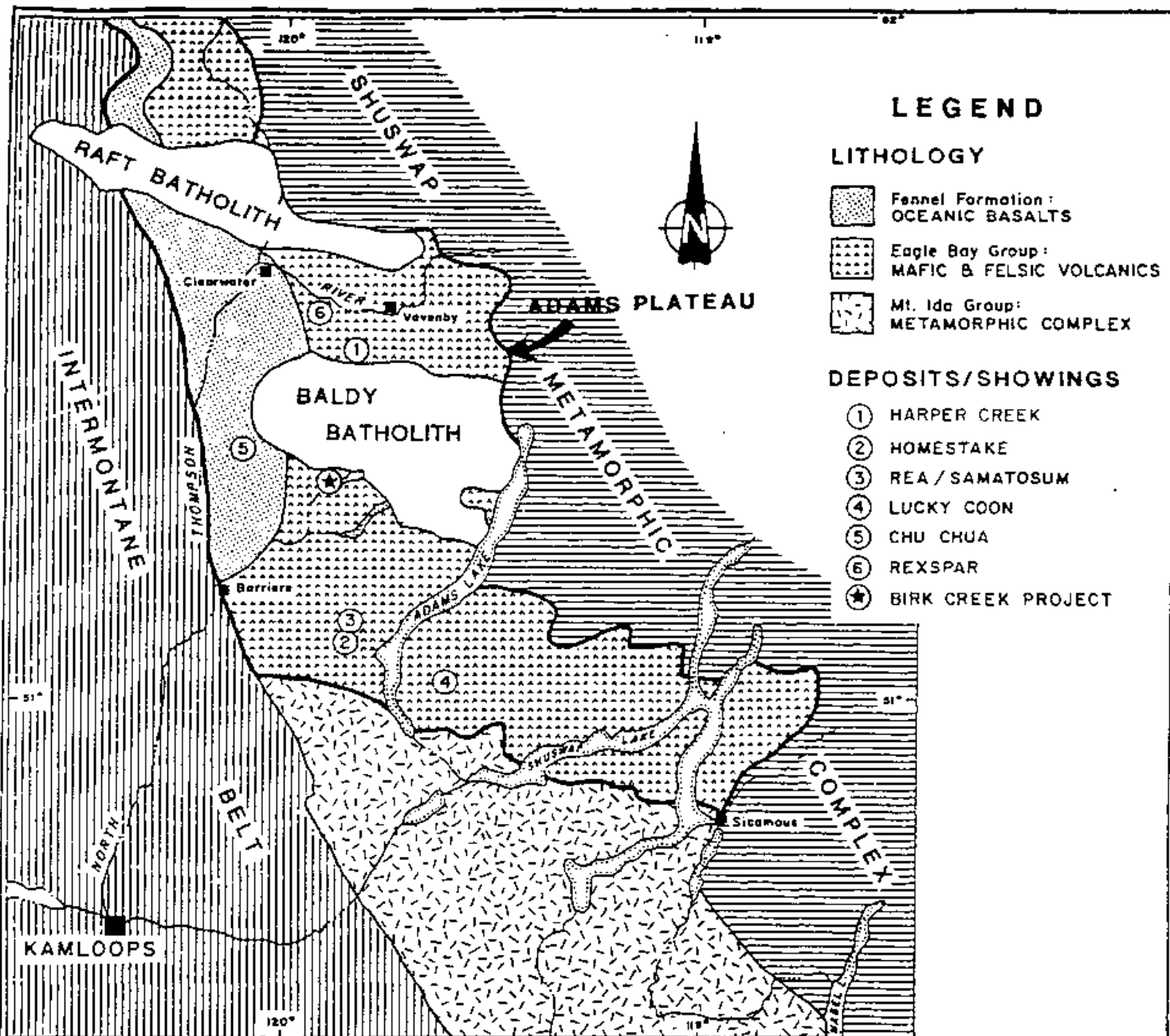
## INTRODUCTION

Falconbridge Limited's Birk Creek property includes the Babiy/Rust Option (PN 1145), Victoria Resources Option (PN 1146), Bet/Cominco Option (PN 1147) and MAC Claims (PN 1148). These projects are located about 25 kilometres northeast of Barriere, British Columbia in the Kamloops Mining District (Figure 1) and are centered about 51°25'N, 119°55'W on NTS mapsheet 82M/05.

Access to the property is by provincial roads and private logging roads. Existing logging roads provide good 4 wheel drive access to most areas on the property. To reach the property from Kamloops drive north along the Yellowhead Highway #5 for 63 kilometres to Barriere; turn east on East Barriere Lake Road for 16 kilometres to the North Barriere Lake turnoff. Continue northerly for 9 kilometres to the Mabel Creek logging road which provides access to most of the claims.




All 1990 work on the Birk Creek Project was permitted through Energy, Mines and Petroleum Resources under Annual Work Permit Number: Kam90-1500011-55 Reclamation was bonded under Falconbridge Limited's Reclamation Permit MX-General-5. Timber harvesting was arranged with Tolko Industries Ltd. of Louis Creek, British Columbia. Special conditions under our permits include proper slash disposal, reseeding disturbed areas with crested wheatgrass or playground lawn mix and coordination of activities with loggers and free range ranchers.

Topography varies widely with relief ranging from 640 to 1550 metres above sea level. Terrain is mostly a gentle south facing slope which is cut by the Birk Creek Canyon on the western part of the property. Vegetation ranges from open to dense forests of pine, fir, spruce, and cedar. Timber has been harvested over about half the property. Summers are generally hot and dry with temperatures up to 30° Celsius. Winter snow levels may reach 3 to 5 metres at higher elevations.



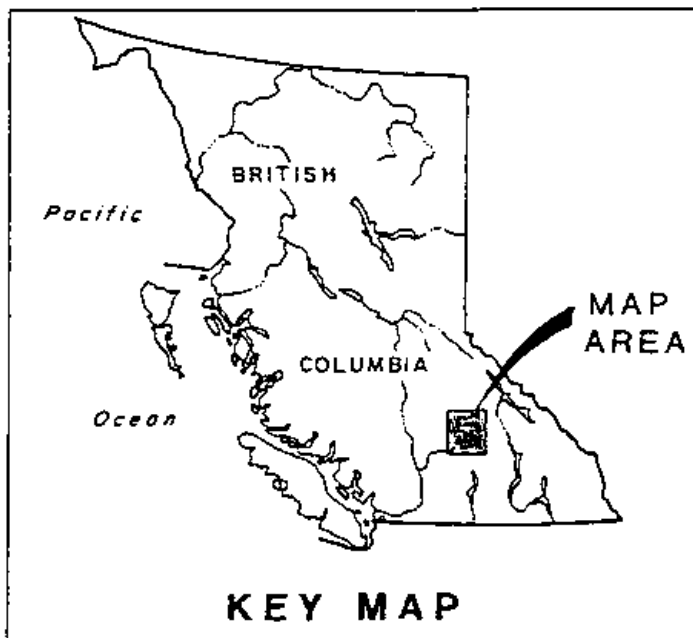
### LEGEND

#### LITHOLOGY

-  Fossil Formation : OCEANIC BASALTS
-  Eagle Bay Group : MAFIC & FELSIC VOLCANICS
-  Mt. Ida Group : METAMORPHIC COMPLEX

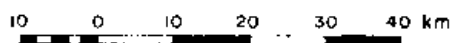
#### DEPOSITS/SHOWINGS

- ① HARPER CREEK
- ② HOMESTAKE
- ③ REA / SAMATOSUM
- ④ LUCKY COON
- ⑤ CHU CHUA
- ⑥ REXSPAR
- ★ BIRK CREEK PROJECT



**KEY MAP**

SCALE 1 : 10 000



<b>FALCONBRIDGE LIMITED</b>			
<b>BIRK CREEK PROJECT</b>			
<b>LOCATION MAP</b>			
DATE OF WORK:	CLASS:	PROJECT NUMBER:	FIGURE NO:
ORIGINAL BY: ADM	DATE: 12-90	146/147	1
REVIEWED BY:	DATE:	INT'L NO: B2M/05W	
DRAWN BY: Y.J.G	DATE: 12-90	MAP # 147-1-0023	
APPROVED BY:	DATE:		

## CLAIM STATUS

Five claim groups based on ownership comprise the property (Figure 2). Each claim group is summarized below. Expiry dates marked by an asterisk are subject to approval of pending assessment reports by the Gold Commissioner.

The MAC claim consists of one 4-post claim totalling 12 units owned by Falconbridge Limited. Assessment work for 1990 was filed under Statement of Work #620 dated December 18, 1990.

<u>CLAIM</u>	<u>UNITS</u>	<u>RECORD NO.</u>	<u>RECORD DATE</u>	<u>EXPIRY DATE</u>
MAC	12	7984	August 17, 1988	August 17, 1993 *

The RAVEN claims which are also owned by Falconbridge Limited comprise two 4-post claims totalling 20 units grouped into the 1990-228 or RAVEN90 group under Statement of Work #621 filed December 18, 1990.

<u>CLAIM</u>	<u>UNITS</u>	<u>RECORD NO.</u>	<u>RECORD DATE</u>	<u>EXPIRY DATE</u>
RAVEN 1	10	8485	May 14, 1988	May 14, 1994 *
RAVEN 2	10	8486	May 19, 1988	May 19, 1994 *

The Babiy/Rust Option acquired from A. Babiy, Kamloops, B.C. comprises four 2-post mineral claims, grouped into the RUST89 group. No assessment work from 1990 was filed.

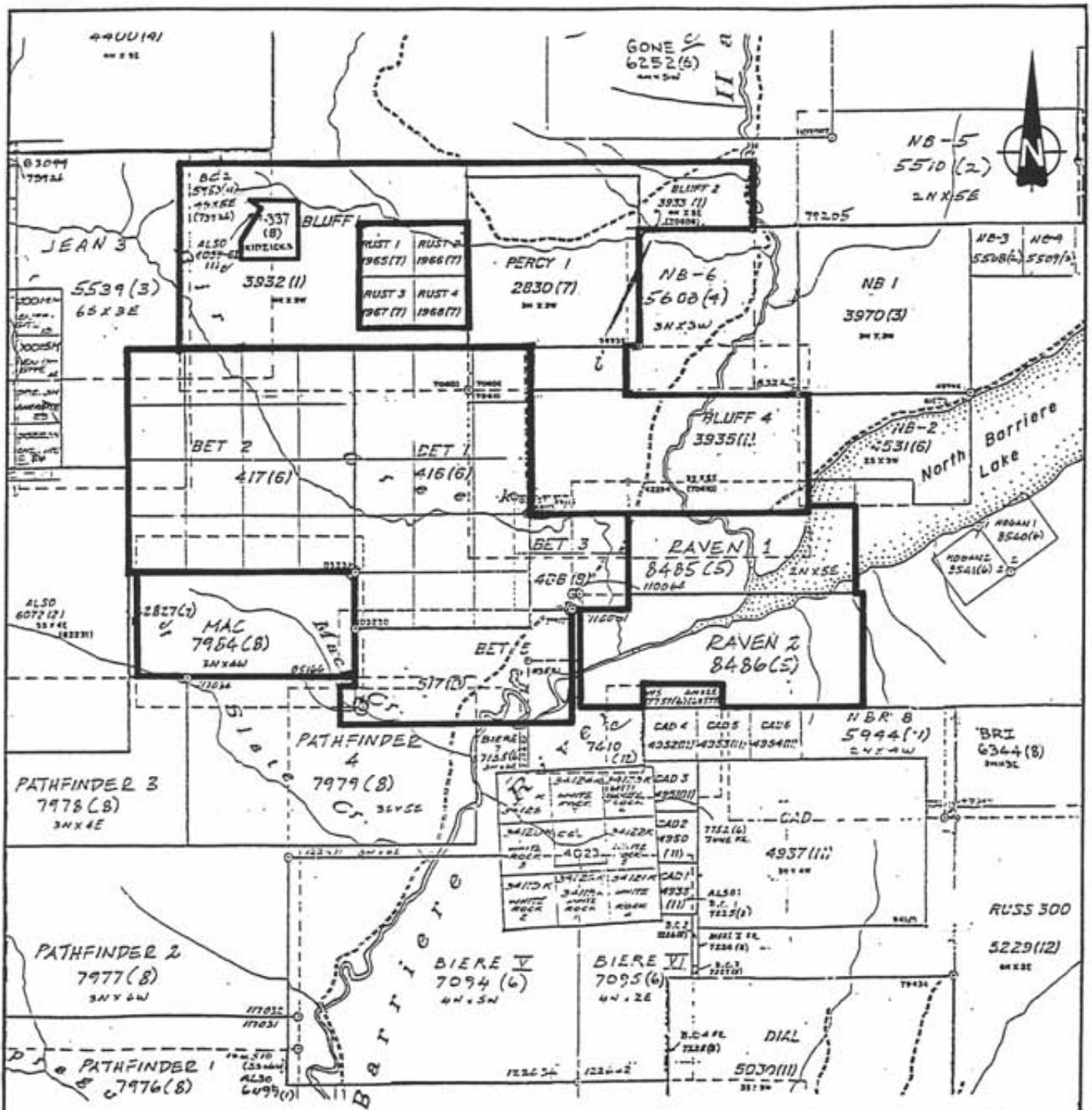
<u>CLAIM</u>	<u>UNITS</u>	<u>RECORD NO.</u>	<u>RECORD DATE</u>	<u>EXPIRY DATE</u>
RUST 1	1	1965	July 27, 1979	July 27, 1999
RUST 2	1	1966	July 27, 1979	July 27, 1999
RUST 3	1	1967	July 27, 1979	July 27, 1999
RUST 4	1	1968	July 27, 1979	July 27, 1999

The claims optioned from Victoria Resources Limited of Vancouver, B.C., include four MGS mineral claims totalling 67 units that were grouped into the VIC90 group under Statement of Work #618 dated December 18, 1990.

<u>CLAIM</u>	<u>UNITS</u>	<u>RECORD NO.</u>	<u>RECORD DATE</u>	<u>EXPIRY DATE</u>
BLUFF 1	20	3932	January 25, 1982	January 25, 2001 *
BLUFF 2	20	3933	January 25, 1982	January 25, 2001 *
BLUFF 4	18	3935	January 22, 1982	January 22, 2001 *
PERCY 1	9	2830	July 21, 1980	July 21, 2001 *

The BET claims owned by Cominco Limited include 4 mineral claims totalling 43 units, grouped into the BET90 group under Statement of Work #619 dated December 18, 1990.

<u>CLAIM</u>	<u>UNITS</u>	<u>RECORD NO.</u>	<u>RECORD DATE</u>	<u>EXPIRY DATE</u>
BET 1	15	416	June 14, 1976	June 14, 2001 *
BET 2	16	417	June 14, 1976	June 14, 2001 *
BET 3	4	488	August 30, 1976	August 30, 2001 *
BET 5	8	517	September 23, 1976	September 23, 2001 *




FALCONBRIDGE LIMITED: Mac Claim, Raven 1 and 2 Claims

VICTORIA RESOURCES OPTION: Bluff 1, 2, 4 and Percy 1 Claims

BABIY/RUST OPTION: Rust 1-4 Claims

BET / COMINCO OPTION: Bet 1, 2, 3 and 5 Claims

<b>FALCONBRIDGE LIMITED</b>			
<b>BIRK CREEK PROPERTY</b>			
<b>CLAIM MAP</b>			
			
DATE OF WORK:	SCALE:	PROJECT:	FIGURE NO.:
DESIGNED BY: SC	DATE: 11-89	PROJECT: 145-148	<b>2</b>
REVISED BY: RDS	DATE: 02-91	NUMBER:	
DRAWN BY: VJO	DATE: 11-89	SCALE: 82M/05W	
APPROVED BY:	DATE:	MAP # 146-1-0003	

## REGIONAL GEOLOGY

Regional studies by Schiarizza and Preto (1987) form the basis for understanding the area's geology and their results are summarized below.

The Adams Lake area is underlain by a structurally complex belt of weakly metamorphosed Palaeozoic marine sedimentary and volcanic rocks known as the Eagle Bay Formation and the Fennel Formation (Figure 1). Shushwap Complex high grade metamorphic rocks flank the area to the east, with the Intermontane Belt sedimentary and volcanic rocks forming the western margin.

The Eagle Bay assemblage is a Cambrian to Late Mississippian volcano-sedimentary succession divided into eight units (Schiarizza and Preto, 1987). This stratigraphy, as presented in Table I, reflects not only the lithologies, but also the area's complex structural history

To the west, the Fennel Formation occurs in fault contact with Eagle Bay rocks. Two structural divisions make up the Fennel Formation which is essentially a mafic volcanic sequence with subordinate chert and rhyolite. The formation is Devonian to Early Pennsylvanian in age, coeval with the upper Eagle Bay.

Both formations are intruded by Cretaceous granite to granodiorite known as the Baldy Batholith and Raft Batholith. Contact metamorphic zones are locally well-developed. Completing the section are late Tertiary porphyry and lamprophyre dykes.

The Palaeozoic rocks were initially deformed by a late Triassic to Jurassic east directed thrust event which brought in the Fennel against Eagle Bay rocks. A subsequent late Jurassic to Cretaceous compressional event developed large southwest verging overturned folds and thrusting concurrent with greenschist to amphibolite metamorphism. The event's complexity resulted in the division of the rocks into four structural slices, each separated by southwest directed thrust faults. The upper three fault slices contain Eagle Bay

units, while the Fennel Formation with some Eagle Bay strata forms the fourth division which underlies the Birk Creek projects.

Later west trending folds and kinks, and rare reverse faults are associated with the Cretaceous plutonic event. Younger, possibly Eocene, north and northeast striking faults, and kink folds occur throughout the area.

<p style="text-align: center;"><b><u>TABLE I</u></b></p> <p style="text-align: center;"><b><u>EAGLE BAY and FENNEL FORMATIONS</u></b></p> <p style="text-align: center;"><b><u>STRATIGRAPHY</u></b></p>		
FORMATION	AGE	DESCRIPTION
Fennel- Upper Division	Devonian to Permian	Basalt, massive to pillowed
Fennel- Lower Division	Devonian to Permian	Basalt, chert, rhyolite
Eagle Bay- EBP	Mississippian	Phyllite
- EBF	Mississippian to Devonian	Intermediate volcanic rocks
- EBA	Devonian	Intermediate to felsic volcanics
- EBM	Lower Palaeozoic	Greenstone
- EBL	Lower Palaeozoic	Limestone
- EBK	Lower Palaeozoic	Calc-silicates, skarn
- EBS	Lower Palaeozoic	Phyllites and limestone
- EBQ	Lower Cambrian	Phyllites and amphibolite
- EBG	Lower Cambrian	Mafic volcanic and limestone



## Economic Mineralization

The Adams Lake area hosts a variety of mineral occurrences. Comments included here have largely been selected from the broader and more comprehensive review by Schiarizza and Preto (1987). Recent exploration has focused on volcanogenic massive sulphides hosted in Devonian-Mississippian felsic to intermediate volcanic rocks (Table II). These deposits are classed as Kuroko type and are characterized by high silver contents along with lead, zinc and copper. Minnova Incorporated's Samatosum Mine, possibly an altered Kuroko type, is the only current producer in the area. Cyprus type massive sulphide mineralization is recognized in both the Fennel and Eagle Bay Formations. The Chu Chua deposit, currently being explored by Minnova is the largest yet found.

**TABLE II**

**VOLCANOGENIC MASSIVE SULPHIDE DEPOSITS**

**EAGLE BAY and FENNEL FORMATIONS**

**ADAMS LAKE AREA**

DEPOSIT	TYPE	TONNAGE (mt)	Cu %	Pb %	Zn %	Ag g/t	Au g/t
Samatosum	Kuroko	0.64	1.2	1.7	3.6	1,035	1.9
Homestake	Kuroko	1.01	0.55	2.5	4.0	200.0	-
Rea Gold	Kuroko	0.14	0.7	3.1	3.6	120.0	18.2
Chu Chua	Cyprus	2.0	2.0	-	0.4	-	-

## EXPLORATION HISTORY

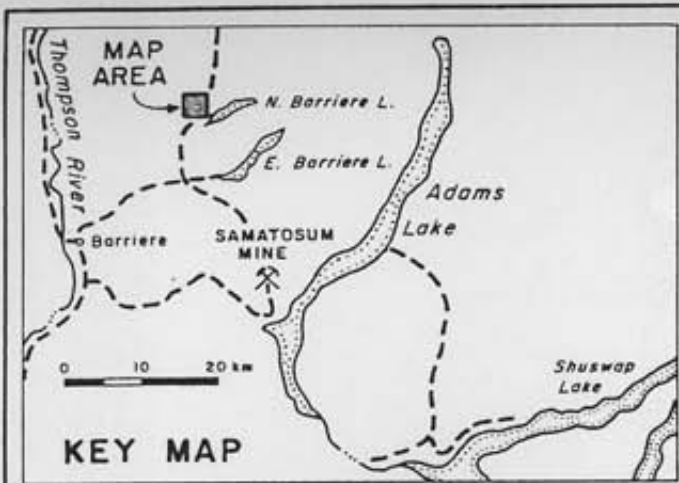
Exploration activity in the area began about 1920 with the excavation of adits and trenches along Birk Creek. Later between 1938 and 1940, 234 tonnes grading 2.0% Cu, 57.0 g/t Ag and 28.0 g/t Au were shipped from the Copper Cliff Showing on lower Birk Creek.

The area remained essentially dormant until 1951-1952 when Kennco tested the Birk Creek showings, with limited geophysics and seven drill holes (550 metres). From 1969 to 1972, Cambridge Mines and Ducanex carried out soil sampling, IP surveys, trenching, mapping and drilling (7 holes, 711 metres). Only minor Cu-Pb-Zn mineralization was found during this program.

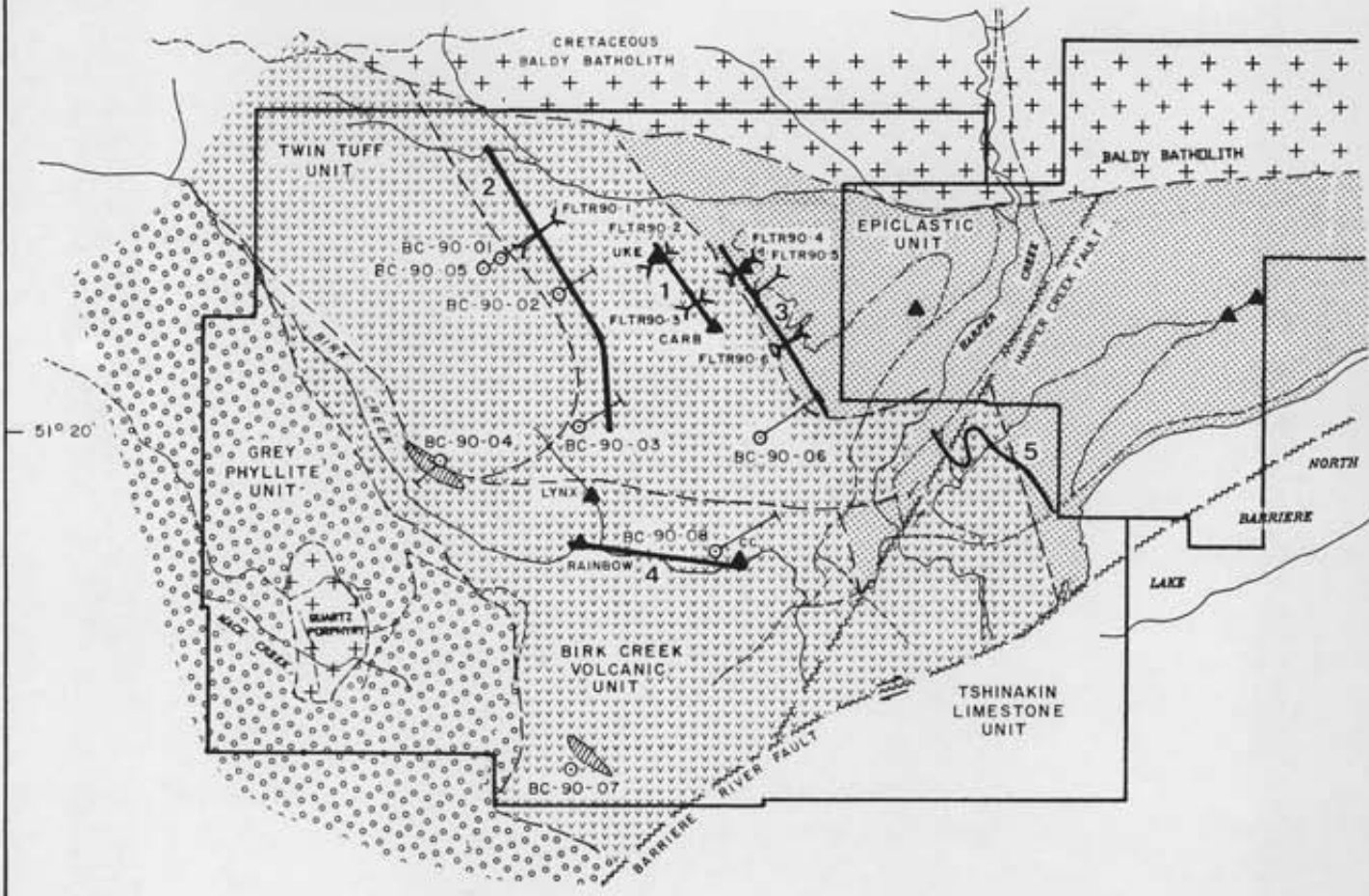
Craigmont Mines completed soil geochemical, EM and magnetometer surveys in 1973 on the Babiy/Rust Option. In 1976, Kennco carried out soil and rock geochemical surveys on the Babiy/Rust and Victoria Resources options. Between 1976 and 1978, Cominco mapped the Bet/Cominco Option, completed geochemical and geophysical surveys and drilled 6 holes (500 metres). Semco carried out minor exploration on the Victoria Resources and Babiy/Rust options between 1979 and 1980. Preussag worked on the Babiy/Rust Option from 1982 to 1983 completing mapping, horizontal loop EM surveys and drilling (6 holes, 962 metres).

Noranda carried out a program between 1985 and 1987 on the Victoria Resources Option and Babiy/Rust Option. Geophysical surveys, soil sampling, 2257 metres of trenching, 704 metres in seven diamond drill holes, and thirteen reverse circulation drill holes totalling 1453 metres were completed. This work located a massive sulphide pod in the Uke Trench, but otherwise found only minor base metal mineralization.

In 1989 Falconbridge Limited acquired the Victoria Resources Option and the Babiy/Rust Option, and staked the MAC and RAVEN Claims. Work included gridding, IP, VLF and MAG surveys, geological mapping, and soil sampling. Three mineralized trends were defined; the Epiclastic, Uke and Central Trends presented in Figure 3.



119° 55'



51° 20'

SCALE 1 : 50,000



**LEGEND**

- SYMBOLS**
- ▲ Massive Sulphide Showing
  - ~ Fault
  - Roads
  - Geological Contact
  - - - Creeks, Rivers
  - Property Boundaries
- 1 Uke Trend
  - 2 Central Trend
  - 3 Epiclastic Trend
  - 4 Birk Creek Trend
  - 5 Harper Creek Trend

- LITHOLOGY**
- Mafic to Intermediate Volcanics and Sediments
  - Felsic-intermediate Volcanics and Sediments
  - Grey Phyllite
  - 1990 Drill Hole
  - Trench
  - IP Anomaly

FALCONBRIDGE LIMITED

**BIRK CREEK PROJECT  
COMPILATION  
MAP**

DATE OF WORK:		CLAIMS:		<b>3</b>
ORIGINAL BY: ADM	DATE: 12-90	PROJECT NUMBER:	146/147	
REVISED BY:	DATE:	INT'L. NO.:	82M/05	
DRAWN BY: V.J.G.	DATE: 12-90	MAP #:	147-1-0003	
APPROVED BY:	DATE:			

## 1990 EXPLORATION PROGRAM

In early 1990 Falconbridge Limited optioned the BET 1, 2, 3 and 5 claims from Cominco Limited, Vancouver B.C. These claims were the focus of this year's exploration work conducted between June 19 and September 30. Work consisted of 63.6 kilometres of linecutting, 60.0 kilometres IP, VLF and MAG geophysical surveys and geological mapping, along with rock and soil sampling. Most of the Cominco and Ducanex diamond drill core was located and relogged along with Preussag's P-82-1 (renamed P-82-1A). Work on the previously acquired Victoria Resources and Babiy/Rust options consisted of 700 metres of trenching, geophysical surveys as above, rock sampling and geological mapping, and relogging of four Ducanex drill holes. Minor geological and geophysical surveys were conducted over the MAC and RAVEN claims.

Diamond drilling totaled 2377 metres on the Victoria Resources and Bet/Cominco options carried out between October 1 and November 1, 1990. All drill holes except BC90-04 were surveyed with downhole Pulse EM.

## PROPERTY GEOLOGY

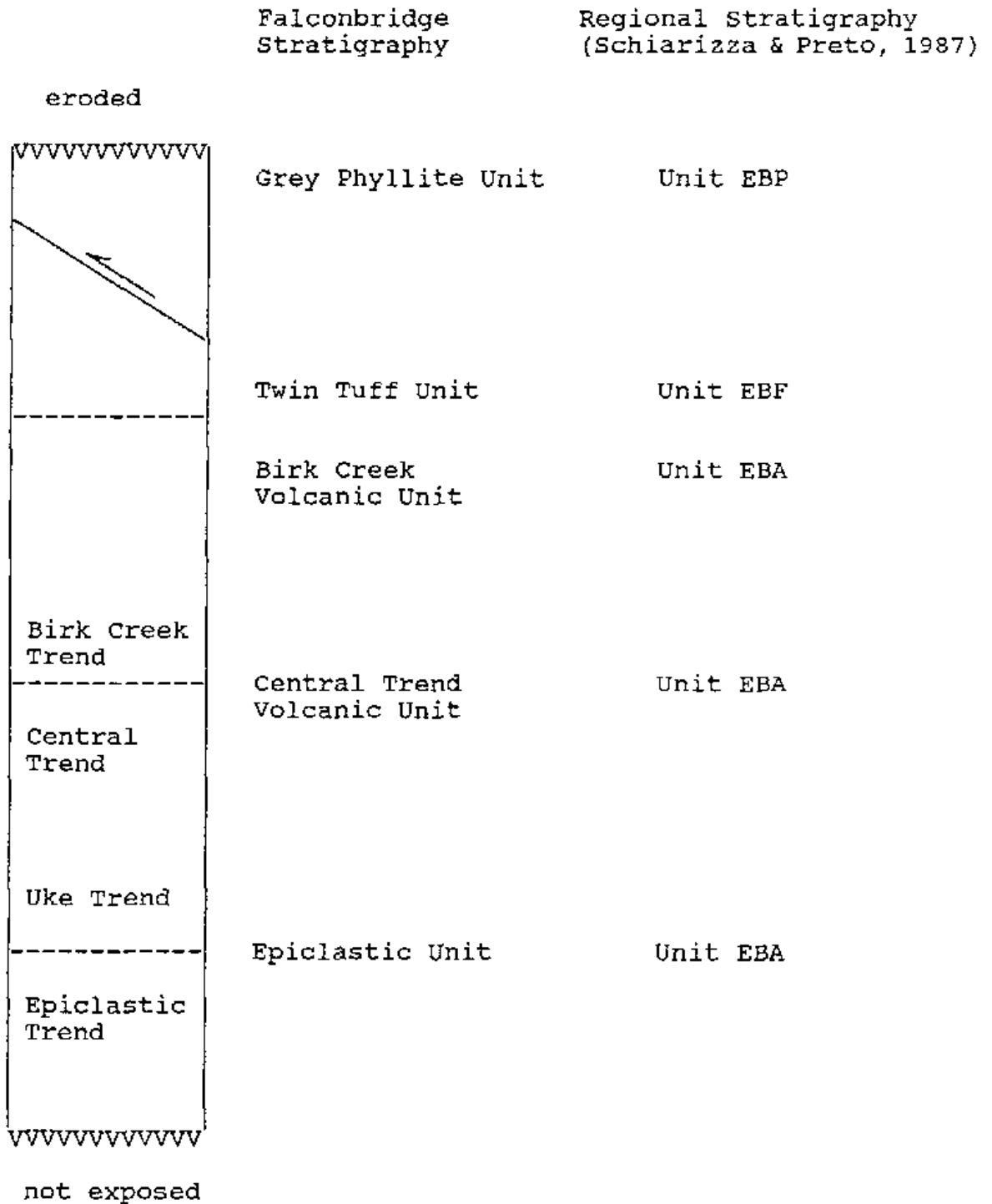
This year's surface geological mapping concentrated on the BET claims with some follow up work on claims previously mapped by Clemmer (1989). The mapping was conducted at 1:5,000 scale, but the data is presented on Figure 4 at 1:10,000 to provide a broader overview. Figure 4b presents the stratigraphic column and a property cross-section is on Figure 5.

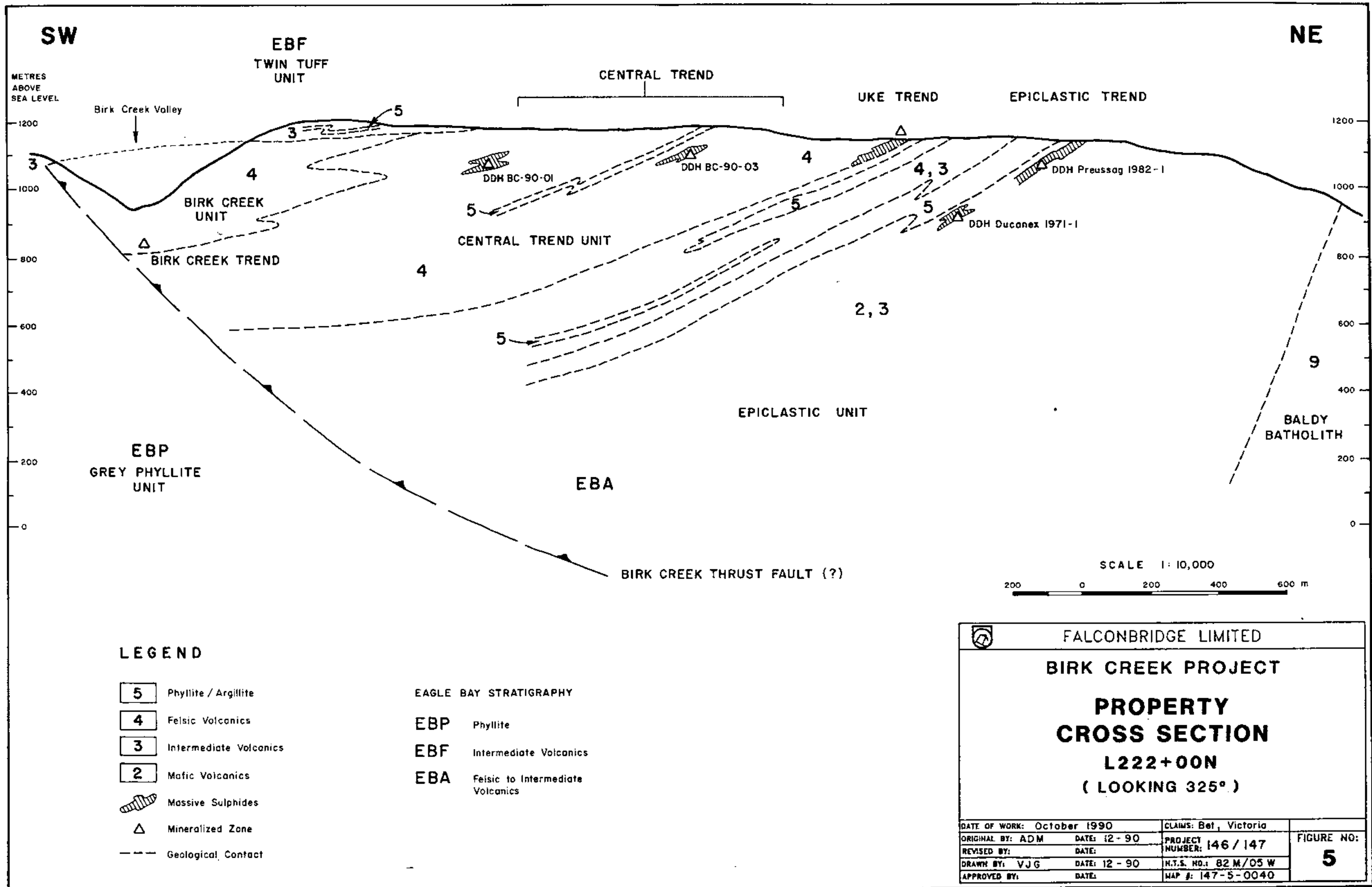
Outcrop occurs on less than 5 per cent of the property, found mainly along Birk Creek and scattered along old logging roads. Much of the stratigraphy is relatively flat lying or dips parallel to slope giving a poor cross-sectional exposure, along with many heaved outcroppings. A further complication is the strong deformation which has overprinted virtually all primary textures. Often only a few crystals and/or fragments remain in a schistose recrystallized groundmass. Lapilli size material is highly stretched and locally recognizable only as irregular wisps or aggregates. As a result rock names such as quartz crystal tuff or lapilli tuff are used even when the constituent material makes up as little as five per cent thus permitting the division of an otherwise uniform sequence.

Lithologic names are based primarily on field description with some thin section study. Whole rock lithogeochemistry used for identifying hydrothermal alteration patterns has also been applied for petrologic purposes. Rocks with greater than  $>60\%$   $\text{SiO}_2$  and  $<0.50\%$   $\text{TiO}_2$  were typically named felsic if the colour indices were low. Intermediate volcanic rocks contained between 50 and 60%  $\text{SiO}_2$  with  $>0.50\%$   $\text{TiO}_2$  while the few mafic rocks present on the property contained less than 50%  $\text{SiO}_2$  and greater than 1.0%  $\text{TiO}_2$ . Obviously due to modification of the rock chemistry because of the Baldy Batholith or any VMS alteration assemblages these numerical constraints are a guideline only. Furthermore, the all volcanic rocks appear to be pyroclastics and mainly distal in origin, and therefore much of the lithogeochemistry may be mapping mixed or reworked lithologies. Nonetheless, if the Ishikawa Alteration Index was less than 50, the resultant rock name as calculated by AFM diagrams or the Jensen cation plot was used (RP2000 Reports, Appendix B).




Lithogeochemistry procedures are discussed in the next section and thin section work is presented in Appendix C.

Figure 4b: Stratigraphic Column  
Birk Creek Project





**LEGEND**

- 5 Phyllite / Argillite
- 4 Felsic Volcanics
- 3 Intermediate Volcanics
- 2 Mafic Volcanics
-  Massive Sulphides
-  Mineralized Zone
-  Geological Contact

- EAGLE BAY STRATIGRAPHY**
- EBP** Phyllite
  - EBF** Intermediate Volcanics
  - EBA** Felsic to Intermediate Volcanics

FALCONBRIDGE LIMITED  
 BIRK CREEK PROJECT  
**PROPERTY  
 CROSS SECTION**  
 L222+00N  
 ( LOOKING 325° )

DATE OF WORK: October 1990	CLAIMS: Bel, Victoria	<b>FIGURE NO: 5</b>
ORIGINAL BY: ADM	DATE: 12-90	
REVISOR BY:	DATE:	
DRAWN BY: VJG	DATE: 12-90	
APPROVED BY:	DATE:	PROJECT NUMBER: 146/147
		M.T.S. NO.: 82 M/05 W
		MAP #: 147-5-0040

## Stratigraphy

The property is underlain predominantly by volcanic and lesser sedimentary rocks belonging to the Eagle Bay Assemblage, striking west-northwest and dipping gently to the southwest. Mapping in 1989 by Clemmer divided the stratigraphy into four major conformable units named from oldest to youngest; the Epiclastic Unit, the Upper Volcanic Unit, the Lower Volcanic Unit and the Grey Phyllite Unit. With the addition of the Bet/Cominco Option to the property and further mapping, this stratigraphy has been modified and integrated into the regional stratigraphy developed by Schiarizza and Preto (1987). These informally named units are discussed below from oldest to youngest. Reference is made throughout to their position in the formal stratigraphic column.

### Tshinakin Limestone Unit (Unit EBG)

This Cambrian limestone forms massive brown cliffs on the southern edge of the property south of Barriere River. The unit is in fault contact with the younger volcanic and sedimentary rocks by the Barriere River Fault. No significant mineralization or alteration was found in this unit.

### Epiclastic Unit (part of Unit EBA)

The Epiclastic Unit underlies the eastern section of the property extending to the Baldy Batholith. Very little of it is exposed on surface so the unit, as defined by Clemmer, is based mainly on drill core and trenches. It is composed of interbedded mafic tuff, andesite to dacite ash and lapilli tuff, and quartz eye rhyolite tuff intercalated with argillite, siltstone and minor chert and limestone. The more mafic intervals are found on the eastern side forming the oldest stratigraphy. Coarse grained "fragmental" beds with siliceous volcanic and sediment clasts in a finer grained groundmass occur throughout the sequence.

Grey calcareous argillite limestone ten to thirty metres thick forms the apparently conformable contact with the overlying Central Trend Volcanic rocks, while the lower section is marked only by quartz-feldspar gneiss (hornfels from volcanic protolith?) exposed occasionally along the margin of the Baldy Batholith. The unit is at least 300 metres thick.



A reinterpretation of the fragmental textures common in this unit suggests that many are of cataclastic origin and do not represent epiclastic material. The thinly bedded and varied lithologies have apparently deformed incompetently and developed assorted tectonites and autobreccias along with multiple thin shear zones. Typically, the harder beds form clasts within a softer malleable groundmass.

Lithogeochemical results indicate a mixture of predominantly calc-alkaline rocks ranging in composition from basalt to rhyolite (Clemmer, 1989).

#### Central Trend Volcanic Unit (part of Unit EBA)

The Central Trend volcanic rocks conformably overlying the Epiclastic Unit, were formerly named by Clemmer (1989) as the Lower Volcanic Unit. Possibly up to 500 metres thick, the unit is composed of felsic to intermediate quartz crystal ash to lapilli tuff with argillite and minor limestone. In hand specimen the volcanic rocks are typically a grey to green, often with a "phyllitic look", containing scattered quartz eyes and crystals, or lapilli in a sericite to chlorite groundmass. Rare tuff breccia intervals have been intersected in this year's drilling, but due to the deformation their origin remains problematic.

Thin section analysis indicates a fine grained quartz rich groundmass, generally recrystallized, with lesser indistinct lithic (?) fragments, sericite-carbonate-clay, and discontinuous chlorite rich wisps to stringers. Interestingly, field and thin section work suggest the intermediate and felsic units are not that dissimilar, unlike the lithogeochemical data discussed below, which indicates a clear chemical division. Most are intermediate in composition with a few dacite and even less rhyolite, generally plotting within the calc-alkaline field.

Argillite up to fifty metres thick is common in the lower half and is variably graphitic or siliceous.

### Birk Creek Volcanic Unit (part of Unit EBA)

This unit is interpreted to conformably overlie the Central Trend Volcanic Unit as observed in drill hole BC90-07 (Figure 21). Here coarser grained quartz crystal tuff of the overlying Birk Creek Volcanic Unit grade into finer grained Central Trend volcanic rocks with minor argillite and, interestingly, a thin sulphide bearing cherty tuff.

Monotonous quartz crystal tuff and local feldspar-quartz crystal tuff comprise most of the section explored so far. Occasional very stretched lapilli with greater than 20:1 length to width ratios are present, but rarely make up more than five per cent of an interval. The felsics have a distinctive "quartz eye" texture although the quartz eye content is generally less than five per cent. Minor intermediate volcanic rock is present towards the base of the unit. Total unit thickness is unknown.

A significant break occurs in the Birk Creek Unit volcanism as exposed along Birk Creek and on the north slope facing the creek. Here a five to ten metre thick intercalated sequence is present containing limestone, calcareous argillite, fine grained intermediate to felsic tuff and minor cherty tuff. Interbedded to laminated pyrite rich sulphide lenses up to three metres thick occur intermittently within the fine grained volcanic rocks. Many of the old workings in this area were following this horizon including; Rainbow, Lynx, Copper Cliff, E and F and possibly the CC Showing.

This unit likely represents a facies change from the fine grained, possibly reworked volcanic rocks of the Central Trend to more proximal coarser grained felsic volcanism. However, the lack of any coarse fragmentals, flow rock or sub-volcanic intrusives suggests the depositional environment is still distal. Much of the lithochemical data indicates calc-alkaline rhyolites.

### Twin Tuff Unit (Unit EBF)

The Twin Tuff Unit is a sequence of intermediate hornblende and feldspar crystal to lithic lapilli tuff at least 200 metres thick. More massive intervals, likely representing flow or subvolcanic intrusive rock to the pyroclastic sections, are abundant in the upper half of

the unit. Overall the unit changes from grey moderately foliated feldspar tuff to massive lapilli tuff and flows upsection. Thin interbedded graphitic argillite are found throughout the section.

Lithochemical results indicate the volcanic rocks are predominantly calc-alkaline andesite. Although this unit appears to be the least altered of any on the property, thin section studies from 1989 work indicate strong albitization of unknown origin after the original feldspars.

Regionally the Twin Tuff Unit conformably (?) overlies the underlying units. On this property, however, the Twin Tuff directly overlies the Central Trend Volcanic rocks in the northern half of the property and the Birk Creek Volcanic rocks to the southwest inferring a structural contact. In Falconbridge Limited's drill hole BC90-04 (Figure 14), however, the contact with the Birk Creek Volcanic rocks appears to be transitional over twenty metres.

#### Grey Phyllite Unit (Unit EBP)

Grey, locally graphitic argillite and siltstone with minor quartzites, make up this unit which outcrops along and to the west of Birk Creek. It is part of Unit EBP, the youngest Eagle Bay stratigraphic unit and regionally conformably overlies the other units. However, in the property area, the contact has been interpreted as a late southwest directed thrust. This is in agreement with Falconbridge Limited's work which indicates the eastern margin of the Grey Phyllite truncates the underlying volcanic stratigraphy. Furthermore, in the southwestern corner of the property, felsic volcanic rocks have been observed in a shallow southwesterly dipping fault contact overlying a thick sequence of grey phyllite.

Falconbridge Limited's drill hole BC90-07 (Figure 21) testing a nearby IP Anomaly intersected 350 metre thick section of Birk Creek Volcanic indicating the thrust fault, if it exists, must be steeper than fifty degrees in this area.

### **Intrusive Rocks**

Granite to granodiorite of the Cretaceous Baldy Batholith intrude the Eagle Bay stratigraphy in the northeast section of the property. Thin granitic dykes and sills are common close to the intrusion. Much of the Epiclastic and Central Trend Volcanic Units lie within the contact aureole of the batholith marked by spotted chlorite-biotite hornfels often with disseminated pyrrhotite.

To the west, on the MAC Claims, the Grey Phyllite Unit is intruded by a foliated quartz feldspar porphyry interpreted by some workers as intrusive rock for overlying volcanic rocks (Schiarizza and Preto). Possibly related is a narrow highly altered felsic intrusive accompanied by multiple centimetre size deformed dykes and sills found in the apparent footwall to the mineralized interval intersected in drill hole BC90-03 (Figure 9) in the Central Trend.

Several fine grained quartz porphyry dykes (?) are present in the northeastern section of the property.

### Structure

The property lies within the northwest limb, near the axis, of the overturned southwest verging Slate Creek anticline (Schiarizza and Preto, 1987). Mapping by Falconbridge Limited personnel in 1989 indicated that volcanic and sedimentary rocks form a homoclinal sequence dipping gently to the southwest, but steepening closer to the Baldy Batholith suggesting an antiform (Clemmer, 1989). The dominant fabric present is schistose and is west to west-northwest striking and shallowly dipping. It is defined by smeared or attenuated mineral aggregates commonly sericite and chlorite, quartz eyes or altered feldspars and mafic minerals. Bedding is only rarely preserved and is mainly parallel to the foliation when observed. Occasional graded bedding sequence indicates the stratigraphy is right side up on the property. Several small isoclinal folds have been inferred in argillite by the presence of a strong fabric (bedding ?) perpendicular to the schistose texture.

A weakly developed lineation is found throughout generally plunging gently to the southwest. It is most commonly observed in outcroppings with contrasting lithologies such as sulphide layers within volcanic rocks at the Uke Trench. Here the sulphide pod plunges 23 degrees at 250° azimuth.

Numerous faults have been mapped on the property, but with few marker horizons little is known of their geometry and scale. An apparent early east directed thrust has been mapped west of western boundary of the southern half of the Epiclastic Volcanic Unit. It dips subparallel to the stratigraphy and outcrops in only one location, although shear zones present in the 1971 Ducanex drilling to the southeast may represent an extension of the structure.

Many of the massive sulphide intervals in the Central and Uke Trend have sheared margins. It is not clear if this represents the response of varying rock competencies to the compressional deformation with minimal rock movement, or if the sulphide zones have been remobilized or faulted into their present location. According to D.E. Shaw, a structural geologist contracted by Falconbridge Limited, the latter situation is quite possible here.

Both the Barriere River Fault and the Harper Creek Fault are late strike slip faults. The former brings the Tshinakin limestone Unit into contact with the younger units (Schiarriza and Preto), while the latter may have offset the Epiclastic Unit to the north along the east side of Harper Creek. Later strike slip movement along the Birk Creek Fault is also suggested by small scale shearing and fault controlled mineralization and alteration present in the creek area. A few orthogonal lineaments interpreted from the MAG survey may be related.

## Lithogeochemistry

A lithogeochemical survey of the volcanic and rarely sedimentary rocks begun in 1989 was completed this year during the geological mapping of the property. The survey was conducted to identify volcanogenic massive sulphide alteration patterns and to assist in the naming of rock types. Representative samples were taken from most outcrops examined and analyzed by Cominco Exploration Laboratories of Vancouver, B.C. for whole rock chemistry and some trace elements. Samples were also collected from the relogged Ducanex, Cominco and Preussag drill core, and from the 1990 Falconbridge Limited trenches. Surface sample locations for both years' surveys are shown on Figure 6 and the results for sodium, calcium, magnesium and the Ishikawa Alteration Index are recorded on Figures 7 and 8. Anomalous values have been defined using standard statistical methods. All results are presented in Appendix B, along with an explanation of the laboratory procedures.

The Epiclastic Unit exhibits strong, but erratic sodium and lesser calcium depletion with values less than 1.0% for each. Magnesium enrichment is also prevalent, but the well developed spotted chlorite hornfels in this area suggests the Baldy Batholith may have introduced some magnesium.

Sodium depletion along with a less pronounced calcium depletion and intermittent magnesium enrichment are characteristic of the altered Central Volcanic Unit. Within the Central and Uke Trends sodium values are less than 1.0% with a significant percentage less than 0.1% NaO. Calcium is commonly less than 1.0% and Ishikawa Alteration Indices are typically greater than ninety.

The Birk Creek Trend is marked by an alteration pattern 1400 metres in strike length consisting of strong sodium depletion and high Ishikawa Alteration Indices. A weak calcium depletion is locally present, but there is little indication of any magnesium enrichment with only a few values greater than 6.0 % Mg. Northwest of the Rainbow Showing only scattered

outcroppings show weak hydrothermal alteration while there is no indication of alteration to the south and east beyond the CC Showing.

Little hydrothermal alteration is indicated from the Twin Tuff Unit. Only apparent barium enrichment in the intermediate volcanic rocks is present, similar to that encountered last year.



## ECONOMIC GEOLOGY

Significant syngenetic base metal mineralization occurs within four stratigraphic horizons associated with hydrothermally altered felsic to intermediate volcanic rocks of the Epiclastic, Uke, Central and Birk Creek Trends (Figures 3 and 4, Table III). There is a pronounced transition from copper mineralization in the lower more intermediate to mafic Epiclastic Volcanic Unit, to the relatively lead and zinc rich mineralization in the upper felsic volcanic section of the Birk Creek Volcanic Unit. The style of mineralization is similar though with each trend having massive to stringer like mineralization, all showing recrystallization effects.

<b><u>TABLE III</u></b>			
<b><u>BIRK CREEK PROJECTS</u></b>			
<b><u>MINERALIZED TRENDS</u></b>			
TREND	TYPE	HOST ROCK	UNIT
Birk Creek	Zn Pb	Felsic volcanic rocks, Argillite	Birk Creek
Central	Cu Pb Zn	Felsic, Intermediate volcanic rocks	Central
Uke	Cu Pb Zn	Felsic, Intermediate volcanic rocks	Central
Epiclastic	Cu	Intermediate volcanic rocks	Epiclastic

Surface rock geochemistry samples from these trends are plotted on Figure 6 and the results are recorded on Figure 9.

### **Epiclastic Trend**

The Epiclastic Trend is a zone of weak copper mineralization striking for 1000 metres and located near the top of the Epiclastic Unit. As defined by Clemmer the trend is marked by high chargeabilities, low apparent resistivities and anomalous copper soil geochemistry. It is open both along strike and downdip. Work in 1990 included trenching and relogging and sampling of that core recoverable from the 1971 Ducanex diamond drill program. Drill sections are presented on Figures 10 and 11; drill logs and all lithogeochemical results are in Appendices A and B respectively.

Mineralization is found near the top of a fine grained intermediate volcanic tuff underlying a graphitic argillite-siltstone section that marks the top of the Epiclastic Unit. Chalcopyrite with very minor sphalerite and galena generally occur with thinly banded to locally semi-massive bands of pyrite and pyrrhotite. The host volcanic rocks are extensively chloritized and variably silicified. To date, the best interval is 9.3 metres of 0.43% Cu and 2.4 g/t Ag from a semi-massive pyrrhotite lense intersected in a Preussag 1982 drill hole (P-82-1; Clemmer, 1989) in the northern half of the Trend and a 8.53 metres of 0.44% Cu and 0.03% Zn from Ducanex drill hole 1971-1 (140.21-148.74m) drilled to the south.

Lithogeochemical results are erratic with irregular sodium and calcium depletion along with locally strong, but also poorly developed magnesium enrichment.

### **Uke Trend**

The Uke Trend lies at the base of the Central Trend Volcanic Unit. It has been traced intermittently along strike for 850 metres and consists of narrow semi-massive to massive sulphide bands hosted by chloritized and pyritic intermediate and felsic volcanic tuff with local argillite and chert beds (Clemmer). To date the best assay interval is from the Uke Trench uncovered by Noranda which returned 0.62% Cu, 5.27% Pb, 4.15% Zn, 35 g/t Ag and 1.0 g/t Au over 2.00 metres.

### **Central Trend**

This trend was originally defined by Clemmer on the basis of weak lead-zinc mineralization present in the upper half of the Central Trend Volcanic Unit. It was further characterized by high chargeabilities and low resistivities coincident with a lead soil anomaly and intermittent high copper and zinc soil values. Hosted by strongly altered andesitic to dacitic and local rhyolite volcanic tuff it is up to 200 metres thick and at least 1700 metres in strike length. The trend is open along strike and at depth.

Mineralization typically consists of thin centimetre size semi-massive to massive bands of sphalerite, galena, local chalcopyrite, pyrite and occasional pyrrhotite occurring in five and possibly six discrete zones parallel to foliation. Drilling this year (discussed in a later section) along the northwest extension of the Trend suggests the mineralization is becoming higher grade in that direction (Table VI). Prior to this year's drill program the mineralized intervals generally contained 1-2% combined lead and zinc with only minor copper.

Wallrock alteration is marked by strong sodium depletion, weak to moderate calcium depletion and high Ishikawa Alteration Indices throughout the section.

### **Birk Creek Trend**

This mineralized trend has been explored since 1920 with minimal success. Diamond drilling by Falconbridge Limited in 1990, and previously by Preussag, Cominco, Ducanex and Kennco has intersected a series of weakly mineralized intervals up to two metres thick, but very discontinuous along both strike and dip. Much of this drill core was recoverable, and relogged and sampled in 1990: one Preussag drill hole, five of six Cominco drill holes, and both Ducanex drill holes. The Kennco drill core could not be located, so the old logs were used. The data are presented on Figures 12-16 and Table IV records the significant results. Drill logs and geochemical analytical data are in Appendices A and B. Only drill sites for the Preussag and Cominco work were found. The surface rock geochemistry sample location map and results are on Figures 6 and 7.

The main mineralized trend consists of intermittent massive pyrite lenses up to 3.0 metres thick intercalated with intermediate to felsic ash tuff, cherty tuff, calcereous argillite and limestone totalling up to 10 metres thick present within the quartz crystal tuffs of the Birk Creek Volcanic Unit. Exposed predominantly along Birk Creek in the old workings, it appears to form a gently dipping stratiform sheet extending from the Lynx and Copper Cliff Showings to Birk Creek within a one kilometre area. Mineralization consists of irregular aggregates or disseminations to centimetre size bands of sphalerite, chalcopyrite and galena occurring with the pyrite lenses. To the southeast, however, this interbedded sequence is not present and the mineralization is hosted by quartz crystal tuffs (e. g. : CC Showing). Here Cominco and Preussag drilling indicates two weakly mineralized intervals about 60 metres apart (Figures 15 and 16). The upper horizon is hosted by quartz phytic tuff while the lower horizon is found at the contact of the quartz phytic tuff and intermediate ash tuff. Drill testing by Falconbridge Limited's drill hole BC90-08 tested these horizons to the north, but intersected only a single weakly mineralized interval in quartz crystal tuff.

**TABLE IV**  
**BIRK CREEK DRILLING AND SHOWINGS**  
**SELECT ASSAY RESULTS**

DRILL HOLE /SHOWING	FROM TO	WIDTH (m)	Cu % (ppm)	Pb % (ppm)	Zn % (ppm)	Ag g/t	Au g/t (ppb)
Lynx drill hole D-7	42.98 45.11	2.13	0.14	0.52	1.25	-	-
Lynx drill hole K-6	2.13 3.66	1.53	0.40	-	5.50	-	-
BET 1	127.20 128.20	1.00	0.30	0.61	1.40	11.34	0.11
BET 3	121.70 123.90	2.20	0.07	0.05	0.08	1.70	0.14
BET 6	8.80 10.40	1.60	0.34	0.02	0.17	-	-
	12.20 17.70	1.50	0.32	0.33	0.66	-	-
P-82-1A	96.59 99.36	2.77	0.13	0.10	0.57	4.20	10
CC	(chip)	0.30	0.34	1.20	3.10	0.50	-
BC90-07	236.36 237.36	1.00	998	8086	9629	5.40	244
	247.98 248.18	0.20	0.25	1.70	2.51	7.80	106
BC90-08	81.00 82.80	1.80	1835	1863	1510	3.30	76

Weakly mineralized pyritic chert and chert breccias located by Cominco drilling (Figure 14, drill holes BET-1 and BET-3) 200 metres to the south are possible equivalents to the Birk Creek Trend.

The lithogeochemical results indicate a hydrothermal alteration zone enveloping the mineralized intervals about 1400 metres in length and 25 metres thick. It is marked by strong sodium depletion and high Ishikawa Alteration Indices. Weak calcium depletion is locally present along with even weaker magnesium enrichment. Overall, the alteration is less developed than the Central Trend.

## DIAMOND DRILLING AND TRENCHING

Prior to this year's Falconbridge Limited drilling, all these trends had been explored on surface or with drilling generally less than 100 metres true depth. Thus, this year's program was designed to test the economic potential at depth. Eight drill holes totalling 2377.78 metres were completed by Falconbridge Limited; 1310.97 metres in four drill holes on the Victoria Resources Option and 1066.81 metres in four drill holes on the Cominco Option. Table V provides a summary of this work. Six trenches totalling 700 metres were also excavated to test the Uke and Epiclastic Trends.

Figure 3 presents a compilation of the work completed this year. Drill logs are found in Appendix A while assay, geochemical and lithochemical analyses are catalogued in Appendix B. The borehole Pulse EM survey was completed by Scott Geophysical Surveys, Vancouver, B.C. and is in Appendix E. Falconbridge Limited geophysicist, Tony Watts, interpreted the results and his conclusions are presented here. The drill results will be discussed in order of importance.

### Central Trend

Four drill holes tested the trend this year and two intersected significant Cu-Pb-Zn mineralization. Table VI presents the best results, and the drill sections are on Figures 17-19. Trench FLTR90-01 was excavated over the trend (Figure 20)

In drill hole BC90-01, a broad zone of Cu-Pb-Zn disseminated to massive mineralization about 110 metres thick is present hosted by felsic to intermediate ash to tuff breccia. Five discrete sulphide intervals are present in this zone. The uppermost interval between 133.18 and 144.94 metres (11.76 metres drill thickness) is hosted by ash tuff and tuff breccia. Polymetallic mineralization occurs as disseminations, rimming fragments or as aggregates in the groundmass, and as rare centimetre size bands parallel to foliation. A narrow interval of semi-massive mineralization occurs between 139.32 and 140.0 metres and grades 1.13% Cu, 6.60% Zn, 2.07% Pb, 81.60 g/t Ag and 270 ppb Au. The mineralization has been recrystallized and remobilized with chalcopyrite especially common along fractures.

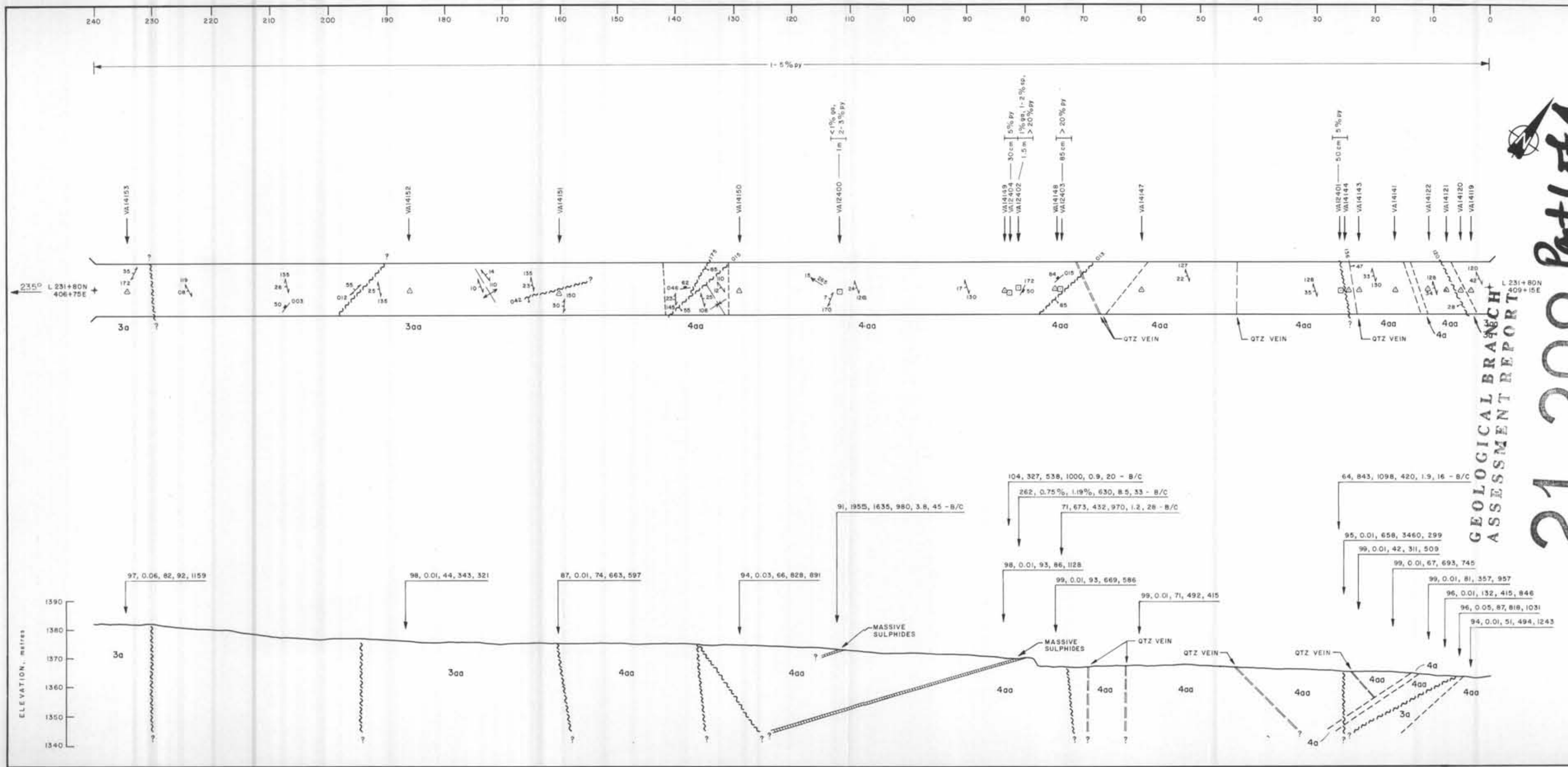
The lower contact is sheared. Strong sericitization and variable silicification has occurred throughout.

Immediately below, the four lower sulphide intervals occur within a 100 metre thick zone containing sporadic narrow sulphide bands parallel to foliation or locally along fractures. The four largest intervals, as reported in Table VI, are composed of massive pyrite with lesser sphalerite, galena, chalcopyrite, rare bornite and local pyrrhotite. Most sulphide bands have sharp contacts parallel to the foliation with the wallrock which is generally pervasively chloritized over narrow widths along thin quartz or silica stringers. Again all show the effects of shearing and recrystallization with pyrite often forming subeuhedral crystals up to one centimetre in size. In the lower section a 0.19 metre band of massive sphalerite with lesser amounts of the other sulphides is the main contributor to the interval. With depth the mineralization decreases as spotted hornfels increases.

Drill hole BC90-05 tested this zone 200 metres downdip and intersected similar lithologies, but no significant mineralization. To the southeast 500 metres, drill hole BC90-02 also intersected the same stratigraphy, but encountered only weak and erratic sphalerite, galena and rare chalcopyrite. However, 100 metres along strike to the southeast, Falconbridge Limited trench FLTR90-01 uncovered two narrow semi-massive sulphide horizons hosted by fine grained sericitically altered felsic to intermediate tuff (Figure 20). The highest assay returned was 1.19% Zn, 0.75% Pb, 262 ppm Cu, 8.5 g/t Ag and 33 ppb Au over 1.5 metres.

Core stored on property near main access road and Birk Cr.





- LEGEND**
- 9 Felsic Intrusives
  - Sediments
  - 5i Argillite
  - 5o Limestone
  - Felsic Volcanics
  - 4a Felsic Tuff
  - 4aa Quartz Phyrlic Felsic Tuff
  - 4ao Argillitic Felsic Tuff
  - Intermediate Volcanics
  - 3a Intermediate Tuff
  - 3aa Quartz Phyrlic Intermediate Tuff
  - 3ao Argillitic Intermediate Tuff
  - 2a Chlorite Schist

- Massive Sulphides
  - Foliation
  - Fracture
  - Fault, attitude
  - Geological Contact
  - Quartz Vein
  - Lithochemical Sample
  - Rock Geochemical Sample
  - 1m Chip Sample
  - 95, 0.01, 42, 311, 509 Cominco Sample
  - SHIKAWA, Na<sub>2</sub>O, Cu, Zn, Ba
  - 71, 673, 432, 1.2, 28, 970 - B/C Bandar-Clegg Sample
  - Pb, Zn, Ba, Ag, Au
- All numbers are shown in PPM except Au (PPB) unless otherwise indicated

SCALE 1 : 500

Note: 6x horizontal exaggeration in plan view of trenches (width). Vertical scale in profile is 1 : 1000.

FALCONBRIDGE LIMITED

**BIRK CREEK PROJECT**

**TRENCH FLTR90-1**

**L232N**

**SECTION LOOKING NW**

DATE OF WORK: August 1990	CLARK:	FIGURE NO.:
ORIGINAL BY: C.W.P.R.	DATE: 08-90	PROJECT NUMBER:
REVISED BY:	DATE:	
DRAWN BY: V.J.G.	DATE: 12-90	K.T.S. H.S.J. 82M/05
APPROVED BY:	DATE:	MAP # 147-1-0037

**20**

21,200 Part 1 of 4  
 GEOLOGICAL BRANCH  
 ASSESSMENT REPORT

TABLE V

## DIAMOND DRILLING DATA - 1990 BIRK CREEK PROJECT

HOLE	CLAIM	UTM N	UTM E	ELEV	GRID COOR	AZI	DIP	TOTAL	COST	START	COMPLETE	LOGGED BY	MET	WR	
BC-90-01	BLUFF 1	5691880	296115	1405	23270N 40440E	55	-45	306.94	\$18,373.34	10.4.90	10.6.90	A.D. MCLAUGHLIN	84	36	
BC-90-02	BLUFF 1	5691650	296640	1302	22790N 40725E	55	-60	236.22	\$12,538.58	10.7.90	10.9.90	M. VANDE GUCHTE	62	18	
BC-90-03	BET 2	5690730	296680	1175	22005N 40275E	55	-55	203.3	\$11,894.34	10.10.90	10.12.90	A.D. MCLAUGHLIN	34	14	
BC-90-04	BET 2	5690610	295770	1200	22400N 39464E	235	-64	213.06	\$13,731.98	10.13.90	10.16.90	M. VANDE GUCHTE	27	16	
BC-90-05	BLUFF 1	5691785	295990	1413	23270N 40290E	55	-65	422.76	\$23,080.84	10.16.90	10.21.90	M. VANDE GUCHTE	51	31	
BC-90-06	BLUFF 4	5690640	297700	902	21370N 41075E	55	-65	345.05	\$17,956.40	10.22.90	10.25.90	M. VANDE GUCHTE	83	17	
BC-90-07	BET 1	5688350	296390	725	20182N 38700E	0	-90	349.61	\$18,473.26	10.25.90	10.28.90	C.W.P. RUSSELL	80	25	
BC-90-08	BET 3	5689780	297540	748	20707N 40440E	55	-65	300.84	\$17,788.42	10.28.90	10.31.90	M. VANDE GUCHTE	63	18	
TOTAL 1990 PROGRAM: 8 HOLES								2377.78	\$133,837.16				484	175	
								COST/m=	\$56.29						

**TABLE VI****1990 CENTRAL TREND DRILLING****SUMMARY RESULTS**

DRILL HOLE	FROM TO	WIDT H (m)	Cu % (ppm)	Pb % (ppm)	Zn % (ppm)	Ag g/t	Au g/t (ppb)
BC90-01	133.18 144.94	11.76	0.17	0.48	1.08	11.21	63
	139.32 140.00	0.68	1.13	2.07	6.60	81.60	270
	186.31 187.19	0.88	0.66	4.32	8.68	25.37	0.48
	206.99 207.41	0.42	0.86	7.29	5.12	36.34	0.34
	231.00 231.49	0.49	0.35	1.61	2.70	18.86	0.34
	247.38 248.38	1.00	0.59	5.47	6.33	70.97	0.34
BC90-02	51.50 52.00	0.50	2977	0.87	1.33	40.11	61
BC90-03	20.07 20.42	0.35	0.68	1.78	5.03	36.60	326
	68.15 72.43	4.28	0.92	0.37	3.30	25.02	0.10

Drill hole BC90-03 tested the Central Trend about 1250 metres to the southeast. Interbedded felsic lapilli to dust tuff and argillite are present similar to both Central Trend and Birk Creek Volcanic Units. Significant mineralization is hosted by a sericitized felsic tuff containing 20% angular and fine grained felsic intrusive fragments up to 12 centimetres in size. These are rarely flow banded. Texturally the mineralization occurs similar to that found in the upper section of drill hole-90-01, but the mineralogy is primarily sphalerite and chalcopyrite with minor galena and rare bornite. Alteration appears to be less pronounced with the footwall moderately sericitized and pyritic, and weakly chloritized. The hangingwall is not strongly altered.

Very thin felsic intrusives similar to the fragments are found throughout the footwall for 50 metres. These are strongly foliated and rarely folded or boudinaged indicating a much older age than the nearby Baldy Batholith. Interestingly these are accompanied by sphalerite, chalcopyrite and galena bands along foliation and fractures parallel to foliation.

A second semi-massive sulphide horizon is present in this drill hole 44 metres up section. Semi-massive pyrite and pyrrhotite with lesser sphalerite and chalcopyrite 0.19 metres thick is hosted by chloritized felsic tuff.

The overlying felsic tuff immediately below the Twin Tuff is strongly pyritic, but contains only trace base metal mineralization.

#### Central Trend: Lithochemistry

Lithochemical data indicates a strong sodium and calcium depletion zone, about 150 metres thick enveloping the mineralized section in drill hole BC90-01. Values are commonly 0.01% Na<sub>2</sub>O and between 0.20% and 0.50% CaO compared to greater than 1.0% for both in non-mineralized rock. As expected the Ishikawa Alteration Indices are indicative of strong hydrothermal alteration with values greater than eighty throughout the section. The sodium depletion persists downdip to drill hole BC90-05 although weaker, but the other whole rock data does not indicate significant alteration. Up section and along strike in FLTR90-01 the volcanic rocks have also undergone strong sodium and calcium

depletion with values less than 0.7% Na<sub>2</sub>O and 1.0% CaO; many sodium results are less than 0.01%. Resultant Ishikawa Alteration Indices are also indicative of hydrothermal alteration.

In drill hole BC90-03 the main mineralized interval is located near the top of a 75 metre thick sodium depletion zone. The footwall is marked by very high Ishikawa Alteration Indices accompanied by weak magnesium enrichment and calcium depletion extending for 40 metres.

A lead age date by Colin I. Godwin of the University of British Columbia on a galena sample taken from the massive section in drill hole BC90-01 at 186.45 metres indicates a Devonian age (Appendix C). This is the age of the host volcanic rocks and is also similar to other deposits hosted by the Eagle Bay volcanic rocks.

#### Central Trend: Borehole Pulse EM Geophysics

A distant 75-100 metre off-hole conductor to the north is indicated corresponding to the upper mineralized zone in BC90-01. It is not clear if this response is related to mineralization along strike to the northwest and not yet tested, or the mineralization intersected up dip by Noranda. In drill hole BC90-03 the mineralization is only weakly discernable from the overlying argillite and there is no off-hole response to it.

Of significant interest is an increasing conductive response occurring in the lower sections of three drill holes, BC90-01, BC90-02 and BC90-05. Falconbridge Limited geophysicist T. Watts, suggests a source 50 to 100 metres below the current tested depth, possibly an extension to the Uke Trend horizon.

#### Central Trend: Conclusions

The Central Trend appears to becoming more coarser grained both with depth and to the northwest. Concurrently there is a significant increase in the base metal content, which are now becoming more copper rich and massive in occurrence. This suggests a greater proximity to the volcanic source and sulphide venting, likely in the northwest direction. A wide spread hydrothermal alteration event has accompanied the deposition of these syngenetic sulphides.

## Birk Creek Trend

Drill hole BC90-08 tested the trend 220 metres north of the CC Showing, and to the south 1.5 kilometres with drill hole BC90-07. Both drill holes tested chargeability highs and apparent resistivity lows with a coincident copper and zinc soil anomaly present in the CC Showing area. The latter drill hole was also designed to test the thickness of the volcanic stratigraphy above the interpreted Birk Creek thrust fault. Drill hole BC90-04 drill tested a strong chargeability anomaly and VLF anomalies occurring near the contact with the Birk Creek Volcanic Unit and the overlying Twin Tuff Unit. Downslope copper and zinc soil anomalies had been outlined by Ducanex in 1971. These drill sections are plotted on Figures 21-23 and significant drill results are presented in Table IV.

Drill hole BC90-08 intersected a thick sequence of moderately sericitized and chloritized felsic to intermediate ash tuff with minor five metre thick argillite interbedds. Below 256.00 metres the section is graphitic argillite with argillaceous felsic ash tuff. A possible extension to Birk Creek Trend mineralization occurs between 81.00 and 82.80 metres where minor sphalerite and galena is hosted by pyritic felsic ash tuff overlying a graphitic argillite. No other significant mineralization was found in the drill hole.

Drill hole BC90-07 intersected coarse grained quartz phyric ash and lapilli tuff grading into fine grained locally argillaceous intermediate tuff of the Central Trend Volcanic Unit (?) at the base. Three weakly mineralized intervals are present in the upper volcanic section including a 0.20 metre thick semi-massive pyrite section hosted by cherty tuff. The other intervals are chert breccias up to 2.65 metres thick containing minor fracture controlled chalcopyrite, sphalerite and galena. The section is moderately altered with sericite, disseminated ankerite and calcite, and locally weak silicification.

There is no evidence of the interpreted underlying Birk Creek thrust fault. Increased fracturing and shearing or disruption of the foliation and bedding patterns were not observed to suggest the thrust is close by. If the thrust exists it must be steeper than  $50^\circ$  in this area not to have been intersected in this drill hole.

Testing the geophysical anomalies north and stratigraphically above the Birk Creek Trend, drill hole BC90-04 intersected Twin Tuff feldspar and mafic lithic ash to lapilli tuff conformably overlying quartz phyrlic ash and lapilli tuff of the Birk Creek Trend. Two graphitic argillite beds are present including the lower thirteen metres. The contact between the two units appears to be transitional with grey-green tuffs grading into grey quartz phyrlic ash tuff both moderately hornfels. Wallrock alteration is minimal with the development of chlorite, carbonate, sericite and pyrrhotite after the Twin Tuff Unit and sericite with local carbonate and silica development after the underlying Birk Creek Unit.

#### Birk Creek Trend: Lithochemistry

There is a 150 metre thick sodium depletion zone in drill hole BC90-07 with the three mineralized intervals located in the lower half. The upper forty metres of section is marked by Ishikawa alteration Indices greater than eighty and calcium values less than 1.0% CaO. Results from the other drill holes are not indicative of hydrothermal alteration.

#### Birk Creek Trend: Borehole Pulse EM Geophysics

There is a strong response in drill hole BC90-08 at about 260.00 metres correlating with a graphitic argillite. The remainder of the survey and that completed in drill hole BC90-07 do not indicate any significant anomalies. Drill hole BC90-04 could not be surveyed due to downhole blockage. It is not clear why the survey is not responding to many of the graphitic argillite intervals.

## Birk Creek Trend: Conclusions

Drilling by Falconbridge Limited and previous drilling by others did not intersect the main massive sulphide bearing sedimentary-volcanic sequence, but rather quartz crystal tuff hosted mineralization. This may reflect the thinning of the sedimentary sequence from the Lynx Showing south to Birk Creek and the CC Showing. However, low angle thrust (?) faults mapped at the Rainbow Showing may have truncated the mineralized horizons. D. Shaw, a structural geologist, in reviewing the Birk Creek Trend, suggests late movement along pre-existing fractures concentrated near the Birk Creek fault may have severely disrupted the stratigraphy. This would explain the lack of lithologic continuity present especially in the Lynx area.

A broader hydrothermal alteration to the south is indicated by drill hole BC90-07, but mineralization continues to be weak and associated with distal felsic relatively fine grained volcanic rocks and rare cherty tuff. The IP and VLF surveys appear to be responding to the graphitic argillite present in the Birk Creek Trend with the weakly pyritic volcanic rocks are contributing factor.

## Uke Trend

Work this year consisted of re-opening the old Noranda Trench to permit more detailed examination of the zone and trenching along strike 350 metres to the south. The trench maps are presented on Figures 24 and 25, and the geochemical analyses are in Appendix B. The age date report by Colin I. Godwin is in Appendix C.

The Uke massive sulphide zone forms a pod like structure 2 by 3 metres hosted by a larger size pod of strongly chloritized felsic (?) rock plunging  $23^{\circ}$  at  $250^{\circ}$  azimuth. Margins of the sulphide pod are highly sheared and dip parallel to regional foliation. The footwall is a moderately chloritized and pyritic intermediate tuff while the hangingwall is a variably silicified, sericitized and pyritic felsic tuff. Two very narrow massive sulphide bands occur in the hangingwall, but appear to have limited strike potential.



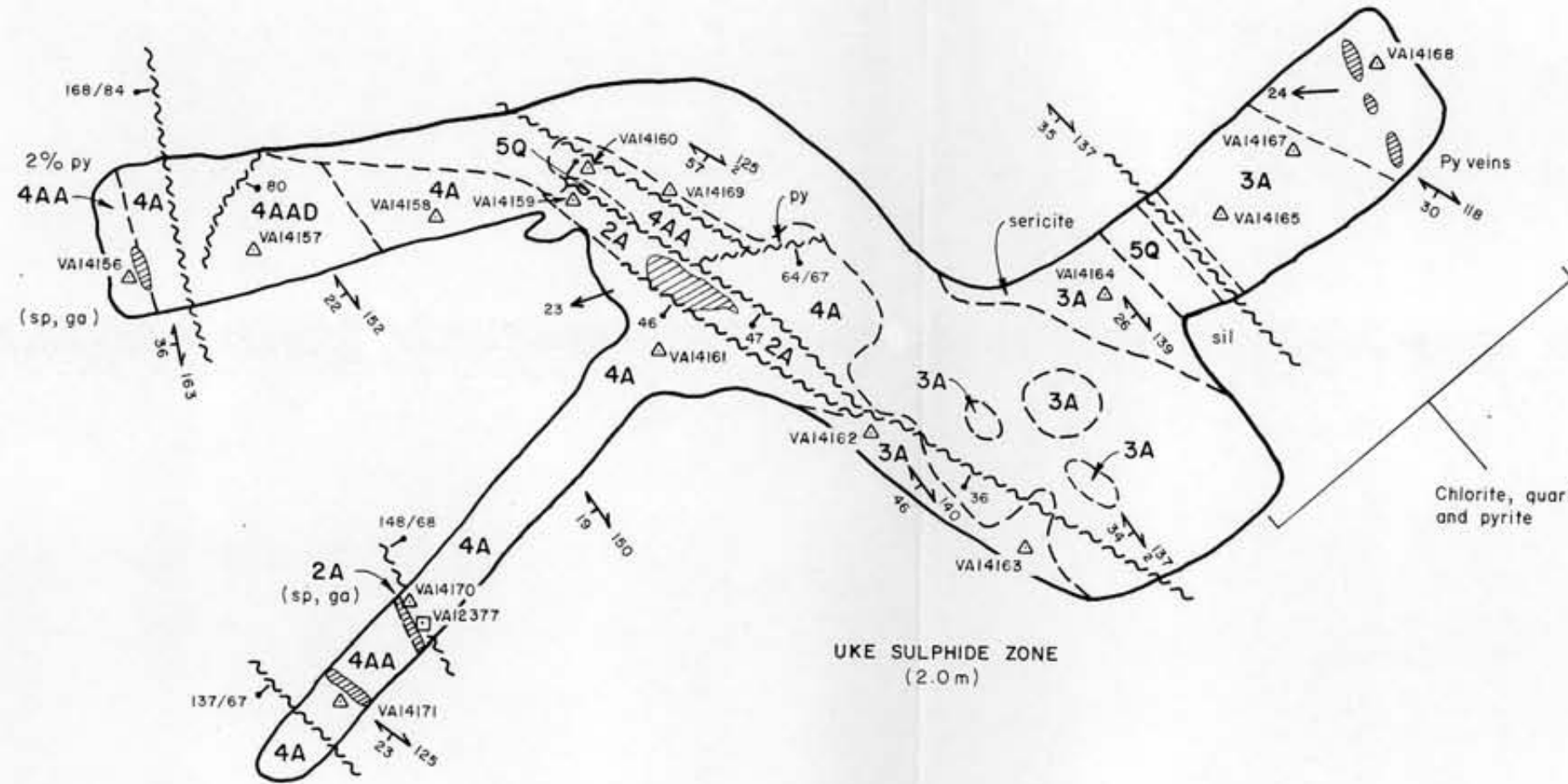
Trench FLTR90-03 tested the trend to the south, but did not locate any significant mineralization in outcrop. Several small massive sulphide boulders resembling the mineralization in the Uke Trench were found in the till. The trench was only extended for a short distance due to the "hardpan" and deep overburden.

Lithogeochemical data indicates the volcanic rocks are strongly altered with sodium and calcium depletion more pronounced in the hangingwall. Magnesium enrichment is also prevalent, especially in the footwall.

Lead age dating of a massive sulphide sample from the Trench FLTR90-02 indicates the mineralization is also Devonian in age similar to the Central Trend mineralization and conformable with the host volcanic rocks.

#### Uke Trend: Conclusions

The Uke Trend contains only intermittent base metal mineralization. Nonetheless the massive sulphide zone exposed in the Uke Trench contains significant quantities of base metals and should be tested further. Previous drilling by Noranda has not fully tested the down plunge potential of the trend. The lithogeochemical data indicate a conventional hanging and footwall relationship with the sulphide zone suggesting it is in situ.



**LEGEND**

- 2a Chlorite Schist
- 3a Intermediate Tuff
- 4a Felsic Tuff
- 4aa Quartz Phyric Tuff
- 4aad Quartz-Mafic Phyric Tuff
- 5q Tuffaceous Sediment
- Massive Sulphides
- Contact
- Fault, attitude
- Foliation
- Lamination
- Lithogeochemical Sample
- Rock Geochemical Sample

**LITHOGEOCHEMICAL SAMPLES**

SAMPLE NO.	ISHIKAWA INDEX	Na <sub>2</sub> O wt. %	MgO wt. %	CaO wt. %
VA14156	98	0.06	5.18	0.15
VA14157	90	0.23	8.17	0.95
VA14158	97	0.09	8.85	0.19
VA14159	91	0.16	18.54	1.86
VA14160	91	0.10	6.11	0.85
VA14161	99	0.01	9.92	0.16
VA14162	98	0.01	8.77	0.20
VA14163	99	0.01	8.21	0.13
VA14164	99	0.01	4.59	0.09
VA14165	99	0.01	12.87	0.09
VA14167	99	0.04	12.30	0.08
VA14168	98	0.01	7.84	0.23
VA14169	94	0.01	10.51	0.76
VA14170	93	0.29	14.17	0.75
VA14171	92	0.05	5.09	0.12

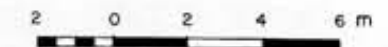
**ROCK GEOCHEMICAL SAMPLES**

SAMPLE NO.	Cu ppm	Pb %	Zn %	Ba ppm	Ag ppm	Au ppb
VA12377	1121	1.64	0.60	330	10.5	30
UKE	0.62%	5.27	4.15	-	35g/T	1.0g/T

L 226+00N, 413+50E



SCALE 1:200



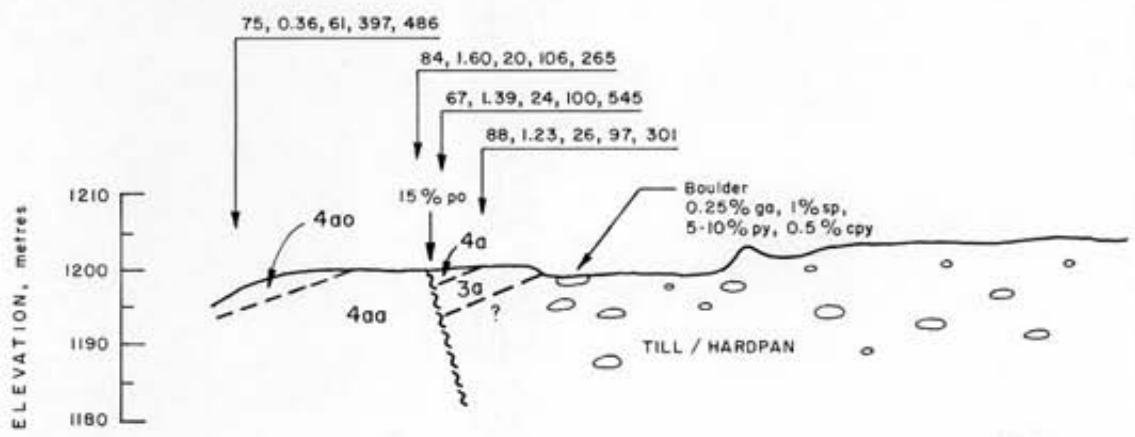
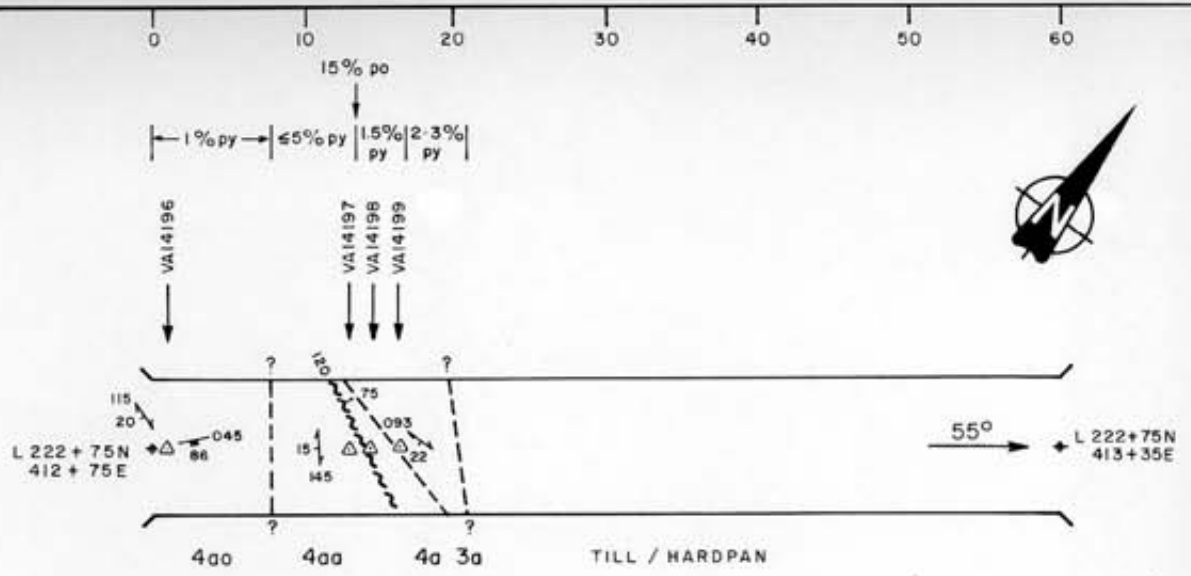
FALCONBRIDGE LIMITED

**BIRK CREEK PROJECT**

**FLTR90-02**

**L 226-00N**

DATE OF WORK:		CLAIMS:	<b>FIGURE NO:</b> <b>24</b>
ORIGINAL BY: ADM	DATE: 10-90	PROJECT NUMBER: 146/147	
REVISED BY:	DATE:	N.T.S. NO.: 82 M/05 W	
DRAWN BY: VJG	DATE: 12-90	MAP #: 147-1-0024	
APPROVED BY:	DATE:		



**LEGEND**

- 9 Felsic Intrusives
- Sediments
- 5i Argillite
- 5o Limestone
- Felsic Volcanics
- 4a Felsic Tuff
- 4aa Quartz Phyric Felsic Tuff
- 4ao Argillitic Felsic Tuff
- Intermediate Volcanics
- 3a Intermediate Tuff
- 3aa Quartz Phyric Intermediate Tuff
- 3ao Argillitic Intermediate Tuff
- 2a Chlorite Schist
- Massive Sulphides
- Foliation
- Fracture
- Fault, altitude
- Geological Contact
- Quartz Vein
- Lithochemical Sample
- Rock Geochemical Sample
- Chip Sample

95, 0.01, 42, 311, 509 Cominco Sample  
 ISHIKAWA, Na<sub>2</sub>O, Cu, Zn, Ba  
 71, 673, 432, 1.2, 28, 970 - B/C Bondar-Clegg Sample  
 Cu, Pb, Zn, Ba, Ag, Au  
 All numbers are shown in PPM except Au (PPB) unless otherwise indicated

SCALE 1 : 500



Note: 6x horizontal exaggeration in plan view of trenches (width). Vertical scale in profile is 1 : 1000.

FALCONBRIDGE LIMITED

**BIRK CREEK PROJECT**

**TRENCH FLTR90-3**

**SECTION LOOKING NW**

DATE OF WORK: August 1990		CLAIMS:
ORIGINAL BY: CWPR	BATH: 08-90	PROJECT NUMBER: 146/147
REVISED BY:	BATH:	N.T.S. NO: 82M/05
DRAWN BY: VJG	BATH: 12-90	MAP #: 147-1-0038
APPROVED BY:	BATH:	

25

## **Epiclastic Trend**

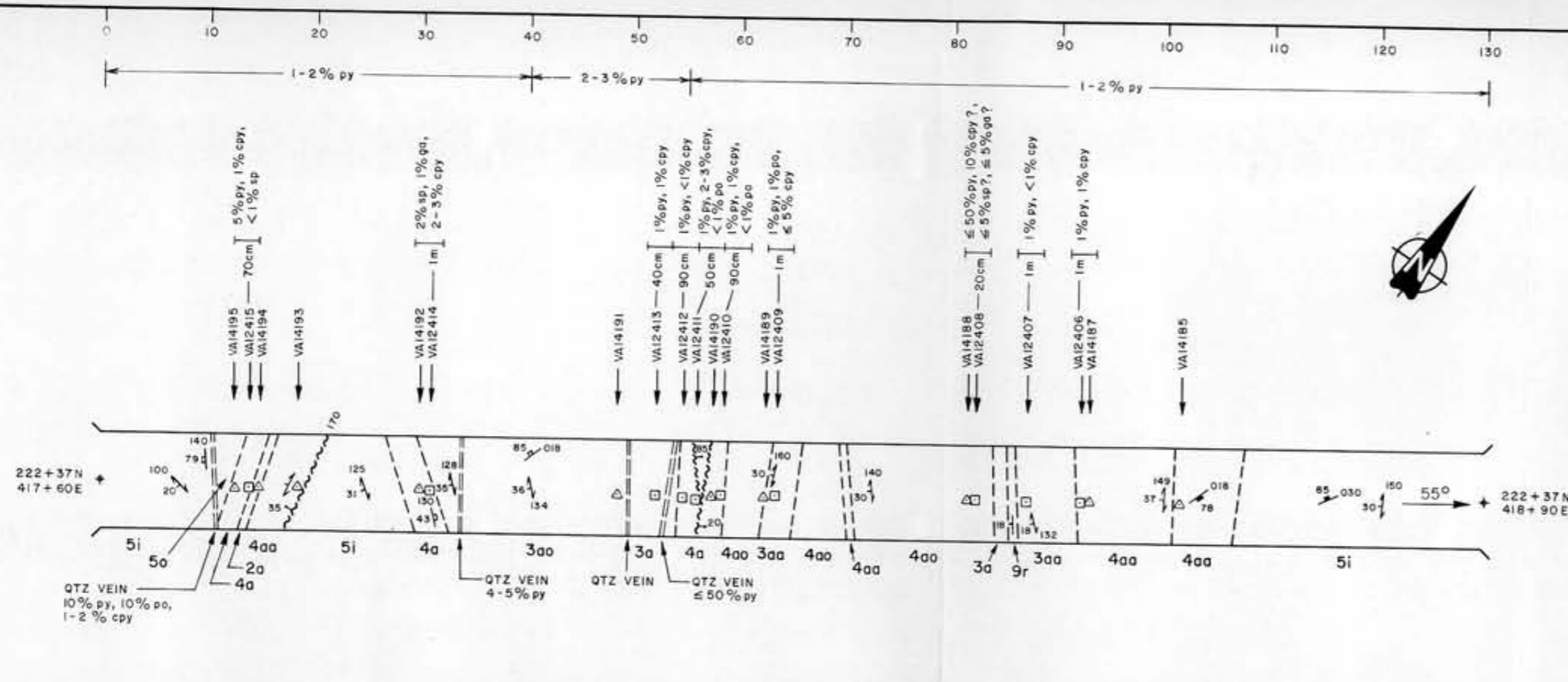
This year Falconbridge Limited tested the southeastern extension of the Trend with one trench and one drill hole, BC90-06 (Figures 26 and 27). Soil sampling was completed over an IP anomaly southeast of Harper Creek overlying the interpreted offset of this trend (Figure 28).

Work this year did not locate any significant mineralization or alteration zones. Trench FLTR90-04, investigating the updip section from the semi-massive pyrrhotite lens discovered by Preussag in 1982, uncovered only a minor semi-massive sulphide pod grading 0.98% Cu, 0.04% Pb and 0.33% Zn hosted by thinly bedded felsic to intermediated tuff with local argillite and limestone. Trenches FLTR90-05 and FLTR90-06 were unsuccessful due to thick overburden and hardpan.

Falconbridge Limited's drill hole BC90-06 tested the strong IP response coincident with copper and zinc soil anomalies. The drill hole intersected sixty metres of weakly chloritized felsic tuff overlying pyrite and pyrrhotite bearing graphitic argillite. A thick section of weakly altered intermediate to felsic ash tuff intruded by thin felsic dykes likely related to the Baldy Batholith completes the section.

The Epiclastic Trend occurs between 180.00 and 187.00 metres with trace to 0.50% chalcopyrite locally present. The best interval grades 1.28% Cu, 0.01% Pb, 0.04% Zn, 7.3 g/t Ag and 93 ppb Au over 0.90 metres. The overlying graphitic argillite is not mineralized.

Lithochemical results indicates only weak hydrothermal alteration from this drill hole.



- LEGEND**
- 9 Felsic Intrusives
  - Sediments
  - 5i Argillite
  - 5o Limestone
  - Felsic Volcanics
  - 4a Felsic Tuff
  - 4aa Quartz Pyritic Felsic Tuff
  - 4ao Argillitic Felsic Tuff
  - Intermediate Volcanics
  - 3a Intermediate Tuff
  - 3aa Quartz Pyritic Intermediate Tuff
  - 3ao Argillitic Intermediate Tuff
  - 2a Chlorite Schist

- Massive Sulphides
- Foliation
- Fracture
- Fault, attitude
- Geological Contact
- Quartz Vein
- Lithochemical Sample
- Rock Geochemical Sample
- Chip Sample

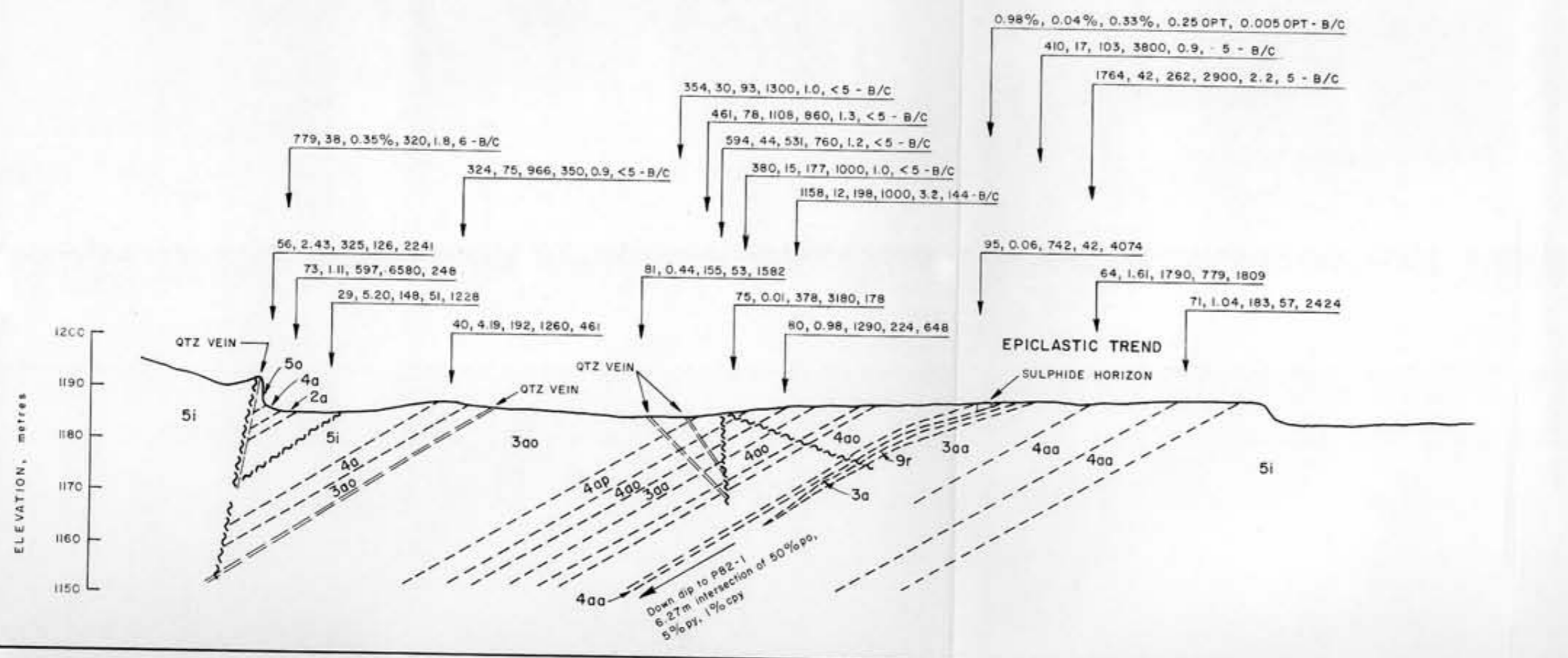
95, 0.01, 42, 311, 509 Cominco Sample  
 ISHIKAWA, Na<sub>2</sub>O, Cu, Zn, Ba  
 71, 673, 432, 1.2, 28, 970 - B/C Bondar-Clegg Sample  
 Cu, Pb, Zn, Ba, Ag, Au

All numbers are shown in PPM except Au (PPB) unless otherwise indicated

SCALE 1 : 500



Note: 6x horizontal exaggeration in plan view of trenches (width). Vertical scale in profile is 1 : 1000.



FALCONBRIDGE LIMITED

**BIRK CREEK PROJECT**

**TRENCH FLTR90-4**

**SECTION LOOKING NW**

DATE OF WORK: August 1990	CLAIMS:	FIGURE NO:
ORIGINAL BY: CWPR	DATE: 08-90	PROJECT NUMBER: 146/147
REVISED BY:	DATE:	N.T.S. NO.: 82M/05
DRAWN BY: V.J.G.	DATE: 12-90	MAP #: 147-1-0039
APPROVED BY:	DATE:	<b>27</b>

### Epiclastic Trend: Borehole Pulse EM Geophysics

Borehole survey of this drill hole detected a strong response at 180.00 metres located fifteen metres below a ten metre thick graphitic argillite. The magnitude of this anomaly is too large to be located up section to the Ducanex 1971 drill hole and the stronger response from the northwest loop than the southeast loop suggests the source is downsection extending to the northwest. Similar to the other borehole surveys not all graphitic argillite sections are responding to the survey.

### Epiclastic Trend; Soil Geochemistry

Soil samples taken over the Harper Creek IP anomaly were collected from the A horizon, but usually contained a large amount of glacially derived sand material. Acme Labs of Vancouver, B.C. performed the analyses for copper, lead, zinc and silver using ICP on the 165 samples. The results are in Appendix B and are plotted on Figure 28.

There is a well defined copper and zinc anomaly correlating with the IP anomaly. Maximum values are 231 ppm Cu and 1460 ppm Zn, substantially higher than background in this area of apparently thick overburden. A weak lead and silver association is also present.

### Epiclastic Trend Conclusions

The Epiclastic Trend contains continuous, but weak copper mineralization. The IP anomalies are responding primarily to the graphitic argillite unit and are not indicating significant mineralization. Only the Pulse EM anomaly lying to the northwest of drill hole BC90-06 is unexplained, but the abundance of argillite in this section suggests it is the likely source. An interpreted extension of this trend to the southeast along Harper Creek is further supported by the copper and zinc soil anomaly, coincident with the IP results.

## **SURFACE GEOPHYSICS**

Delta Geoscience Limited of Vancouver, B.C. completed about 60 line kilometres each of gradient array IP, VLF and MAG surveys over the Birk Creek property between August 9 and September 4, 1990. This survey, mostly carried out over the BET claims, was combined with last year's work by the same contractor with a few stations on each line resurveyed for continuity. Gridlines 200 metres apart were surveyed with 25 metre station separation for the IP Survey and 12.5 metres for the VLF and MAG surveys. The resultant survey maps at 1:5,000 scale and the contractor's report including survey specifications, maps and detailed interpretation is found in Appendix E. Discussed here are the more geologically significant points.

### **Central Trend**

Most of the Central Trend had been surveyed in 1989, but an extension of this trend was detected in 1990 with a coincident chargeability high and an apparent resistivity low centred about Line 224+00N and 404+00E. Falconbridge Limited's drill hole BC90-03 located 400 metres southeast, intersected interbedded graphitic argillite and felsic tuff within sixteen metres of a 4.28 metre thick (drill thickness) banded sulphide horizon. From here the anomaly "joins" with a strong IP response over the Lynx Showing within the Birk Creek Volcanic Unit. Based on the borehole Pulse EM survey it appears the anomaly is due to the argillite which is masking any response from the sulphide horizon.

### **Birk Creek Trend**

The Lynx Showing is marked by a high chargeability and low apparent resistivity results, and VLF anomalies correlating with an graphitic argillite unit possibly up to ten metres thick. Massive pyrite lenses up to one metre thick occur interbedded with the argillite.

Narrow, but strong chargeability responses were detected one kilometre to the north centred on Lines 224+00N/392+00E and 222+00N/392+00E, corresponding with graphitic argillite outlined from mapping and drilling this year (drill hole BC90-04). Interestingly these are flanked to the southeast by an apparent resistivity high overlying outcropping quartz crystal tuff not noticeably different from other areas. A possible buried silicified zone or intrusive is proposed to explain the anomaly which could not be tested with drill hole BC90-04 since it was lost due to a cave-in.

Several weaker chargeability anomalies (<20 msec) again with a low apparent resistivity response are found centred about the CC Showing in the Birk Creek area. Falconbridge Limited's drill hole BC90-08 intersected graphitic argillite with minor disseminated sulphides, similar to previous drilling in the area by Cominco (1977) and Preussag (1982).

Further to the southwest three moderate chargeability anomalies (up to 20 msec) occur within a broader lower response coincident with an apparent resistivity low. This year's drilling over the most southerly peak, drill hole BC90-7, intersected pyritic and minor chalcopyrite, sphalerite and galena hosted by felsic volcanic rocks.

### **Epiclastic and Uke Trends**

These trends were surveyed last year and are characterized by high chargeabilities and low apparent resistivities. To the east 1990 results indicate the Baldy Batholith is marked by a moderate apparent resistivity high.

There is a very strong IP response lying southeast of the Harper Creek Fault, dipping 30 to 40 degrees grid west parallel to stratigraphy. It appears to be a relatively deep source anomaly that is open to the north and south of the Falconbridge Limited claims. It may represent the offset extensions of the Epiclastic and Uke Trends.



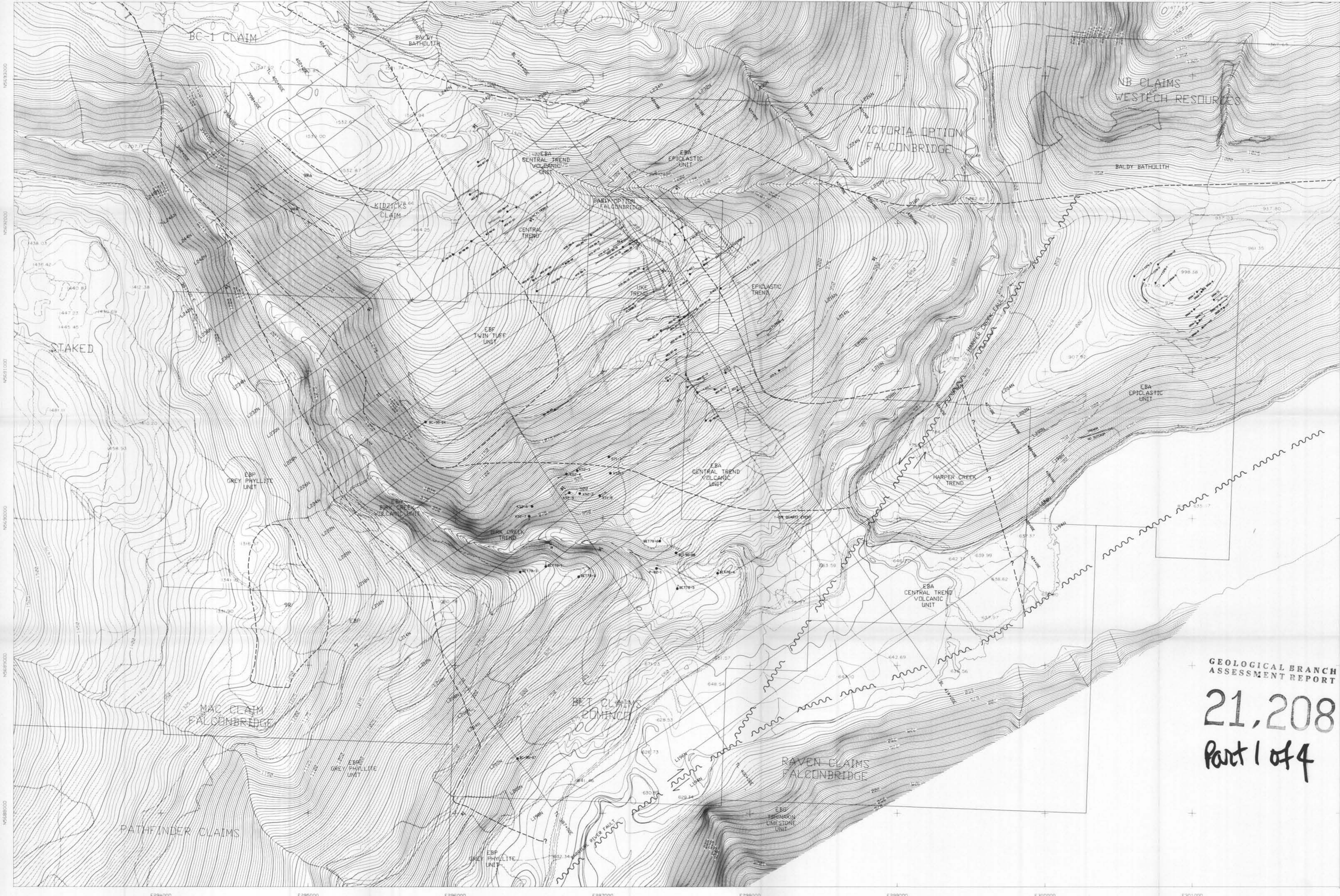
### **Other Areas**

Overall the surveys correlate well with the known geology and especially the apparent resistivity. The volcanic rocks are commonly marked by an apparent resistivity high and moderate chargeability, while the sedimentary rocks, including the Grey Phyllite Unit respond with a pronounced chargeability high and apparent resistivity low. The magnetic data also corresponds well, although it is sensitive to local pyrrhotite rich areas in sedimentary rocks from the Epiclastic Unit. The lower magnetic response close to the Baldy Batholith is likely due to the increased overburden thickness. This is also occurring in the southern section of the property towards Barriere River.

Both the Birk Creek and the Harper Creek Faults show as pronounced magnetic lows. In the former, very weak and short strike length magnetic lows are present perpendicular to the main magnetic lineament. These may represent orthogonal structures related to the Birk Creek Fault.

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**LEGEND**

**EAGLE BAY STRATIGRAPHY**  
 EBP Phyllite  
 EBF Intermediate Volcanics  
 EBA Felsic to Intermediate Volcanics  
 EBG Tshinaklin Limestone Unit

**MAJOR ROCK UNITS**

10	Late Mafic Intrusions
9	Felsic Intrusions
8	Intermediate Intrusions
7	Mafic Intrusions
6	Ultramafic Intrusions
5	Sediments
4	Felsic Volcanics
3	Intermediate Volcanics
2	Mafic Volcanics
1	Ultramafic Volcanics

**ROCK UNIT LETTER QUALIFIERS**

The second letter indicates the type of rock; if omitted a dash should be inserted if a third letter is used.

A	Tuff	K	Wacke
B	Lapilli Tuff	L	Conglomerate
C	Tuff Breccia	M	Chert
D	Massive Flow	N	Iron Formation
E	Pillow Flow	O	Limestone
F	Flow Breccia	P	Exhalite/Sulphides
G	Pillow Breccia	Q	Tuffaceous Sediments
H	Intrusive	R	Fine Grained
I	Argillite	S	Medium Grained
J	Siltstone	T	Coarse Grained

The third and fourth letters are placed in alphabetical order; they are optional and further define the rock.

A	Quartz Phytic	K	Bedded
B	Feldspar Phytic	L	Chloritic
C	Quartz-Feldspar Phytic	M	Graphitic
D	Mafic Phytic	N	Calcareous
E	Mafic-Feldspar Phytic	O	Argillaceous
F	Amphibolitic	P	Siliceous/Cherty
G	Spherulitic	Q	Sheared
H	Variolitic	R	Massive
I	Laucocratic	S	Ulnic
J	Melanocratic	T	Dolomitic

**OTHER**

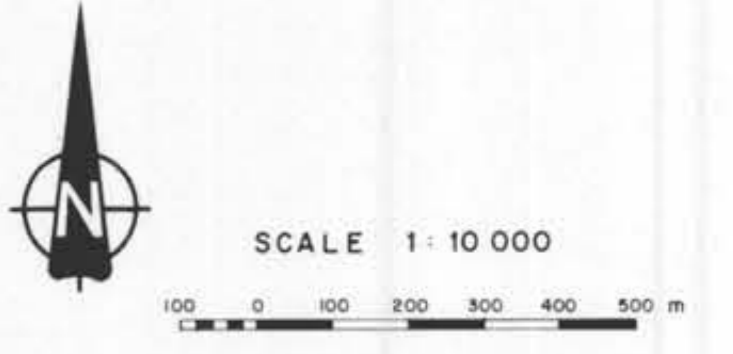
MS	Massive sulphides	SS	Stringer sulphides
LS	Laminated to banded sulphides	DS	Disseminated sulphides
PY	Pyrite	CPY	Chalcopyrite
FZ	Fault zone	PO	Pyrrhotite
FB	Fault breccia	SP	Sphalerite
QV	Quartz vein	GA	Galena
BX	Breccia	MT	Magnetite

**SYMBOLS**

/ Bedding  
 - - - Fracture  
 - - - Stratigraphic top  
 - - - Lineation  
 M S N Drag fold (M, S, Z symmetry, plunge)  
 10/20 Fault, attitude  
 --- Lithological contact  
 --- Unit contact  
 --- Thrust Fault  
 O Outcrop  
 Frost heave  
 Trench  
 Mineral showing  
 Adit  
 Claim post (Legal Corner Post)  
 Diamond drill hole (vertical)  
 Reverse circulation drill hole  
 NRD Noranda reverse circulation drilling (1987)  
 NDD Noranda diamond drilling (1986)  
 P Preussag diamond drilling (1982, 1983)  
 D Duconex diamond drilling (1971)  
 K Kennco diamond drilling (1952)  
 BET Cominco diamond drilling (1978)  
 SR Scurry-Rainbow diamond drilling (1965)  
 CS Canadian Superior (1976)

**GEOLOGICAL BRANCH ASSESSMENT REPORT**

**21,208**  
*Part 1 of 4*



**FALCONBRIDGE LIMITED**  
**BIRK CREEK PROJECT**  
 North Barriere Lake, British Columbia  
**PROPERTY GEOLOGY**

DATE OF WORK: 1952-82, 1989, 1990 CLAIMS: BET & OTHERS  
 ORIGINAL BY: SC DATE: NOV 27 1989 PROJECT NUMBER: 146/147  
 REVISION BY: ADM DATE: DEC 1990  
 DRAWN BY: PW DATE: JUN 27 1990 N.T.S. NO.: 82M/SW  
 APPROVED BY: DATE: MAP #: 147-1-0041

APPENDIX A:

FALCONBRIDGE 1990 SUMMARY AND DRILL LOGS  
RELOGS OF COMINCO, DUCANEX AND PREUSSAG DRILLING

## DRILL HOLE SUMMARY

DRILL HOLE: BC-90-01

LOCATION: Grid: 232+70N/404+40E  
Azimuth: 055° Dip: -045°  
Elevation: 1405 metres  
Claim: Bluff 1

DATE: October 4-6, 1990

TOTAL DEPTH: 306.94m

OBJECTIVE: Deep Test of Northern Central Trend below strongly sodium depleted fine grained felsic to intermediate volcanics containing weak polymetallic mineralization, previously encountered in Noranda Exploration drilling and trenching. Narrow massive sulphide horizons were located this year in Falconbridge Trench FLTR90-01.

RESULTS: The volcanic stratigraphy becomes coarser grained including local tuff breccia units, and more felsic in composition downdip. Significant polymetallic mineralization occurs as bands, matrix filling and stringers rimming lithic fragments in a felsic breccia to ash tuff horizon between 133.18-144.94 metres. Total sulphide content in this horizon averages 15% consisting of pyrite, 1-2% sphalerite, 0.5% galena and minor chalcopyrite. Semi-massive bands up to 0.68 metres with 10% polymetallic sulphides occur throughout the sequence. The host felsics are silicified and moderately sericitized. The immediate footwall is moderately chloritized for 5.0 metres while the hangingwall is moderately pyritic.

Massive polymetallic sulphide bands up to 0.88 metres thick, are also present in the underlying intermediate to felsic volcanics for approximately 100 metres. The host felsics are strongly pyritic and variably silicified and sericitized. The sulphide bands are accompanied by thin chloritic and silicified alteration zones.

The drill hole closed in biotite and chlorite hornfels felsic volcanics with weak pyrrhotite and pyrite.

**INTERPRETATION:**

The Lower Volcanic Unit underlying the Central Trend is becoming more felsic, thicker (?) and coarser grained with depth. This coupled with the greater variety of lithologic types in this drillhole suggests a much closer volcanic centre than previously recognized. The amount and style of sulphide mineralization are also indicative of more proximal sulphide venting. Source would be downdip or to the northwest.

DRILLHOLE SUMMARY BC-90-01

<u>Interval (m)</u>	<u>Field Description</u>
0.00-9.10	Overburden
9.10-14.35	Intermediate Ash Tuff -minor to 2% pyrite
14.35-20.65	Intermediate Lapilli Tuff -1% pyrite
20.65-30.30	Felsic Ash Tuff -1% pyrite
30.30-55.23	Felsic Dust Tuff -up to 10% pyrite increasing with depth
55.23-64.58	Felsic Ash Tuff -5% pyrite
64.58-67.05	Felsic Feldspar Crystal Lapilli Tuff -3% pyrite
67.05-73.91	Felsic Tuff Breccia -5% pyrite
73.91-90.75	Felsic Quartz Crystal Tuff -5% pyrite, fault lower 1.25m
90.75-94.62	Felsic Lapilli Tuff -cherty tuff fragments, 10% pyrite
94.62-97.04	Hornfels Felsic Volcanic -spotted chlorite and biotite, 5% pyrite
97.04-103.25	Felsic Ash Tuff -up to 5% pyrite
103.25-110.00	Felsic Dust Tuff -7 % pyrite, lower contact faulted
110.00-126.07	Felsic Ash Tuff -local lapilli intervals, 3-5% pyrite -fault between 122.01-122.28m
126.07-132.40	Felsic Tuff Breccia -sheared, 5% pyrite
132.40-133.18	Felsic Ash Tuff -3% pyrite, minor sphalerite -silicified

Summary BC-90-01 Continued

<u>Interval (m)</u>	<u>Field Description</u>
133.18-144.94	Felsic Tuff Breccia/Felsic Ash Tuff -sulphides as stringers to matrix filling and rimming fragments; typically 1-2% sphalerite, 0.5% galena, minor chalcopyrite and 10% pyrite, intervals up to 0.68 m of massive sulphide, generally silicified, weakly calcareous and sericitic wallrock
144.94-145.80	Felsic Ash Tuff -5% pyrite, sheared
145.80-148.90	Felsic Ash Tuff -up to 5% pyrite with minor sphalerite, chalcopyrite and galena especially with quartz veins
148.90-163.57	Felsic Quartz Crystal Ash Tuff -5% pyrite, minor sphalerite, galena and chalcopyrite
163.57-186.31	Felsic Ash Tuff -1 to 5% pyrite
186.31-187.19	Massive Sulphide -60% pyrite, 5% sphalerite, 0.5% galena and minor chalcopyrite in chloritic and sericitic altered volcanic wallrock
187.19-206.99	Intermediate Ash Tuff -up to 5% pyrite, 1% sphalerite in upper 0.8m
206.99-207.42	Massive Sulphide -70% pyrite, 10% sphalerite, 3% galena, 0.5% chalcopyrite, in chloritic and sericitic altered volcanic wallrock
207.42-221.35	Intermediate Ash Tuff -moderately chloritized decreasing with depth, 3-5% pyrite, 1% massive sulphide bands to 3cm
221.35-230.00	Felsic Ash Tuff -4 to 7% pyrite with local polymetallic massive sulphide bands typically to 2cm and rarely to 20cm
230.00-247.38	Intermediate Ash Tuff -5% pyrite with local polymetallic sulphide bands to 2cm



Summary BC-90-01 Continued

<u>Interval (m)</u>	<u>Field Description</u>
247.38-253.20	Felsic Lapilli Tuff -10% pyrite with minor polymetallic massive sulphide bands and stringers to 2 cm rarely 19cm, lower contact faulted
253.20-264.34	Felsic Ash Tuff -3% pyrite 258.12-260.68 Mafic Intrusive
264.34-290.83	Hornfels Felsic Ash Tuff -spotted to banded chlorite and biotite hornfels, 3% pyrite with minor pyrrhotite
290.83-293.22	Hornfels Felsic Tuff Breccia -similar hornfels as above, 1% pyrite and pyrrhotite
293.22-306.94	Hornfels Felsic Ash Tuff -similar hornfels as above, 1-2% pyrrhotite and pyrite, local bleached and silicified zones to 1.5m with late quartz veins
306.94	END OF HOLE

### DRILL HOLE SUMMARY

DRILL HOLE : BC-90-02

LOCATION : GRID : 227+90N, 407+25E  
AZIMUTH : 55° DIP : 60°  
ELEVATION : 1302.0 metres  
CLAIM NAME : BLUFF 1

DATE : OCTOBER 7-9, 1990

TOTAL DEPTH : 236.22 metres

OBJECTIVE : Test Central Trend felsic volcanics marked by a broad high chargeability/low resistivity response and coincident Cu and Zn soil anomalies.

RESULTS : Drill hole BC-90-2 collared in argillaceous felsic (dacitic) pyroclastics passing into non-argillaceous dacitic pyroclastics below 66.6 metres to 131.1 metres. The felsic sequence consists of fine to medium grained ash tuff, lapilli tuff and local cherty tuff. Contacts between units are typically gradational. Weak to moderate sericitization is ubiquitous to this sequence with increasing biotite development (weak) below 55.0 metres to 131.1 metres. Splashes of disseminated and/or fracture controlled sphalerite and galena is common to a depth of approximately 75.0 metres. Variable, locally up to 10%, pyrite contents occur throughout the upper pyroclastic sequence.

The upper felsic sequence grades gradually, over several metres, into variable chlorite-biotite altered (hornfelsed) intermediate to felsic pyroclastics. Original rock type and textures are difficult to decipher with spotty, fracture controlled to pervasive chlorite hornfelsing persisting throughout the units to varying degrees. Pyrite contents are generally less than 2% with local pyrrhotite mineralization.

INTERPRETATION : The broad IP response correlates well to the upper mineralized argillaceous dacitic pyroclastics of the central trend felsic volcanics. Disseminated and thin bands of sphalerite-galena mineralization is typical of the felsic volcanics throughout this Central Trend.

### DRILL LOG SUMMARY

### Field Description

0.00 - 16.20m	:	CASING
16.30 - 26.70m	:	ARGILLACEOUS FELSIC ASH TUFF - trace to 0.5% sphalerite/galena, cherty tuffite horizon (24.25-24.4m.) with 0.75% sphalerite and galena.
26.70 - 36.60m	:	ARGILLACEOUS FELSIC LAPILLI-ASH TUFF - trace to 0.5% galena and sphalerite associated with quartz veins.
36.60 - 38.50m	:	FELSIC ASH TUFF - trace to 1% fine disseminated pyrite
38.50 - 55.00m	:	ARGILLACEOUS FELSIC ASH TUFF - trace to 0.5% sphalerite and galena between 41.5 to 53.6 metres
55.00 - 66.60m	:	ARGILLACEOUS FELSIC LAPILLI-ASH TUFF - trace to 2% disseminated pyrite, local pyritic stringers (61.0-66.6m) with trace to 0.5% sphalerite.
66.60 - 84.50m	:	FELSIC LAPILLI ASH TUFF - trace to 2% disseminated pyrite, local pyritic stringers to 75.5m with trace to 0.5% sphalerite and galena.
84.50 - 87.50m	:	CHERTY FELSIC ASH TUFF - 5% fracture controlled pyrite, trace to 0.2% galena
87.50 - 97.60m	:	FELSIC LAPILLI ASH TUFF - 3% disseminated/fracture controlled pyrite
97.60 - 102.75m	:	CHLORITIC FELSIC ASH TUFF - 3% disseminated/fracture controlled pyrite
102.75 - 110.30m	:	INTERMEDIATE ASH TUFF - 3% disseminated/fracture controlled pyrite
110.30 - 112.10m	:	FINE GRAINED MAFIC INTRUSION - magnetic
112.10 - 131.10m	:	FELSIC ASH TUFF - 3% disseminated/fracture controlled pyrite
131.10 - 146.85m	:	HORNFELS FELDSPAR PHYRIC INTERMEDIATE ASH TUFF
146.85 - 152.55m	:	HORNFELS INTERMEDIATE ASH TUFF
152.55 - 157.30m	:	HORNFELS FELDSPAR PHYRIC INTERMEDIATE ASH TUFF
157.30 - 160.63m	:	HORNFELS INTERMEDIATE ASH TUFF
160.63 - 163.90m	:	HORNFELS QUARTZ-FELDSPAR PHYRIC INTERMEDIATE ASH TUFF
163.90 - 168.30m	:	HORNFELS INTERMEDIATE ASH TUFF
168.30 - 175.30m	:	HORNFELS INTERMEDIATE ASH TUFF
175.30 - 198.20m	:	HORNFELS QUARTZ-FELDSPAR PHYRIC FELSIC ASH TUFF
198.20 - 214.90m	:	HORNFELS INTERMEDIATE ASH TUFF
214.90 - 225.90m	:	HORNFELS QUARTZ-FELDSPAR PHYRIC INTERMEDIATE ASH TUFF
225.90 - 230.60m	:	FELSIC ASH TUFF 3% disseminated/fracture controlled pyrite
230.60 - 236.22m	:	HORNFELS INTERMEDIATE ASH TUFF
236.22	:	E.O.H.

## DRILL HOLE SUMMARY

DRILL HOLE: BC-90-03

LOCATION: Grid:220+05N/402+75E  
Azimuth: 055° Dip: -055°  
Claim: Bet 1  
Elevation: 1175m

DATE: October 10-12, 1990

TOTAL DEPTH: 203.30m

OBJECTIVE: Test of southern extension of Central Trend volcanics with strong sodium depletion and high Ishikawa Alteration Indices.

RESULTS: The drill hole intersected approximately 60 metres of felsic ash tuff with interbedded argillite up to 8.0 metres thick. Pyrite is present throughout the sequence, but rarely more than 3%. A narrow band of massive pyrite occurs between 20.10 and 20.29 metres accompanied by minor chalcopyrite, sphalerite and pyrrhotite.

The ash tuff is underlain by a 60 metre thick sequence of coarser felsic fragmentals containing elongate chloritic lithic lapilli. At the top a coarse felsic breccia is present between 68.15 and 72.45m, containing strongly silicified angular felsic sub-intrusive (?) fragments that are rarely flow banded. Variably sericitic and chloritic altered felsic volcanic forms the matrix to the fragments. The breccia hosts polymetallic sulphide mineralization occurring as stringers, bands and along fractures averaging 4% sphalerite, 1% chalcopyrite, minor galena and bornite, and 7% pyrite with minor pyrrhotite. The footwall lapilli units are moderately pyritic with the occasional narrow stringer or band of massive sulphide, and are weakly chloritized and sericitized. The hangingwall finer grained ash tuff does not appear to be especially altered although minor polymetallic mineralization is found near the base. Similar felsic intrusives generally strongly fractured or microfolded cut the volcanic sequence.

The coarse fragmentals grade into fine grained ash to dust tuff that is often argillaceous. Chert is locally present. Near the top a strongly silicified light coloured felsic intrusive is present with highly fractured margins. This intrusive is texturally similar to the breccia fragments hosting the mineralization at the top of the lapilli sequence, but contains only disseminated pyrite and trace galena. The fine grained volcanics are generally unaltered with minor pyrite. The drill hole closed in this sequence.

**INTERPRETATION:** The drill hole intersected felsic volcanics similar to the northern half of the Central Trend, but with a more developed coarse fragmental section. Although less obviously altered than the volcanics to the north, this is the best polymetallic intersection yet drilled on the property. This horizon may correlate with that intersected in DDH BC-90-01.

DRILLHOLE SUMMARY

<u>Interval (m)</u>	<u>Description</u>
0.00-6.71	Overburden
6.70-14.39	Felsic Ash Tuff -8.20-10.00 Mafic Intrusive
14.39-17.00	Interbedded Argillite and Felsic Tuff
17.00-20.42	Quartz Crystal Tuff -2% pyrite -semi-massive pyrite with pyrrhotite, minor chalcopyrite and sphalerite between 20.10 and 20.29m
20.42-23.85	Argillaceous Felsic Ash Tuff -2% minor pyrite
23.85-38.89	Felsic Lapilli Tuff -minor pyrite
38.89-44.65	Quartz Crystal Tuff -fault 41.88-42.93m
44.65-52.83	Argillite -graphitic
52.83-68.15	Felsic Ash Tuff -3% pyrite, rare 2cm massive sulphide band -fault 56.20-57.00m
68.15-72.43	Felsic Breccia -polymetallic sulphide bands and stringers often rimming or along fractures of felsic intrusive ? fragments in volcanic matrix -moderately sericitized and weakly chloritized
68.15-69.60	3% sph, 0.5% cpy, minor gl trace bornite, minor po 5% py
69.60-70.27	1% sph, 1% cpy, trace gl 7% py
70.27-72.43	7% sph, 2% cpy, trace gl trace bornite, 10% py

Summary BC-90-03 Continued

- 72.43-92.05 Felsic Lapilli Tuff  
-7% pyrite, minor chalcopyrite  
and sphalerite, moderately  
chloritized
- 92.05-94.42 Chert Tuff Breccia  
-4% pyrite, weakly sericitized  
and chloritized
- 94.42-99.45 Felsic Lapilli Tuff  
-5% pyrite, weakly sericitized  
and minor chlorite
- 99.45-102.90 Felsic Ash Tuff  
-6% pyrite, minor sphalerite and  
chalcopyrite
- 102.90-130.10 Felsic Lapilli Tuff  
-up to 5% pyrite, minor  
sphalerite and galena
- 130.10-138.60 Interbedded Cherty and Dust Tuff  
-6% pyrite, trace sphalerite  
and chalcopyrite
- 138.60-140.82 Felsic Intrusive  
-5% pyrite and trace galena  
-local hornfels including lower  
0.50 m
- 140.82-151.57 Felsic Dust tuff  
-2% pyrite, minor sphalerite  
-hornfels upper 7.1m
- 151.27-157.30 Felsic Dust Tuff  
-1% pyrite, trace galena and  
sphalerite  
-moderately chloritized
- 157.30-166.40 Argillaceous Felsic Dust Tuff  
-1% pyrite
- 166.40-174.25 Felsic Ash Tuff  
-minor pyrite, rare 3cm massive  
sulphide band
- 174.25-183.43 Felsic Ash Tuff  
-less than 1% pyrite  
-moderately sericitized

Summary BC-90-03 Continued

183.43-203.30 Felsic Ash Tuff  
                  -less than 1% pyrite

203.30            END OF HOLE



## DRILL HOLE SUMMARY

DRILL HOLE : BC-90-4

LOCATION : GRID : 224+00N, 394+64E  
AZIMUTH : 235° DIP : 64°  
ELEVATION : 1200.0 metres  
CLAIM NAME : BET 2

DATE : OCTOBER 13-16 , 1990

TOTAL DEPTH : 213.06 metres

OBJECTIVE : Test IP and VLF anomalies over felsic and intermediate volcanics with downslope Cu and Zn anomalies.

RESULTS : Drill hole BC-90-4 collared into a series of variable feldspar/mafic phyric to aphyric intermediate lapilli and ash tuff, to a depth of 77.0 metres. Spotty, chloritic alteration ("hornfelsing") between 77.0 to 81.30 metres marks a downhole change to a dominately felsic pyroclastic succession beginning at 88.30 to 213.06 metres. This thick felsic pyroclastic sequence is only locally interrupted by thick bedded, variably graphitic argillite/siltstone horizons between 88.20-98.80m and 199.15-213.06m.

Visible alteration is confined to weak sericite and/or chlorite/carbonate alteration. Sulphide mineralization is sparse with overall pyrite contents generally less than 5% pyrite. Evidence of fining upwards sequences (lapilli to ash tuff) suggests tops are uphole (southwest).

INTERPRETATION : The sharp IP anomaly is presumably correlative to graphitic argillite between 88.2 and 98.8 metres. A broad VLF response, located downslope, was projected to occur between downhole depths of 140.0 to 235.0 metres. Graphitic argillites located between 199.15 and 213.06 (E.O.H) are interpreted to correspond to the VLF anomaly.

BC-90-4 SUMMARY LOG

- 0.00 - 15.84m : CASING  
15.85 - 22.25m : FELDSPAR-MAFIC PHYRIC INTERMEDIATE LAPILLI-ASH TUFF  
-up to 5%, 1-7mm chlorite altered mafic (hornblende) phenocrysts.  
22.25 - 24.40m : FELDSPAR PHYRIC INTERMEDIATE LAPILLI-ASH TUFF  
24.40 - 27.25m : FELDSPAR-MAFIC PHYRIC INTERMEDIATE LAPILLI-ASH TUFF  
-similar to previous from 15.85 to 22.25m  
27.25 - 29.70m : QUARTZ-FELDSPAR PHYRIC FELSIC ASH TUFF  
29.70 - 30.65m : FAULT ZONE  
30.65 - 41.00m : FELDSPAR PHYRIC INTERMEDIATE ASH TUFF  
41.00 - 59.00m : FELDSPAR PHYRIC INTERMEDIATE LAPILLI ASH TUFF  
59.00 - 61.40m : PYRRHOTITE-BEARING FELDSPAR PHYRIC INTERMEDIATE LAPILLI-ASH TUFF  
- up to 7%, less than 1cm, disseminated wisps of pyrrhotite/biotite, trace to 2% pyrite  
61.40 - 62.55m : FELDSPAR PHYRIC INTERMEDIATE LAPILLI-ASH TUFF  
62.55 - 68.20m : PYRRHOTITE-BEARING FELDSPAR PHYRIC INTERMEDIATE LAPILLI-ASH TUFF  
- similar to previous from 59.0 to 61.4 metres  
68.20 - 77.00m : FELDSPAR PHYRIC INTERMEDIATE LAPILLI-ASH TUFF  
77.00 - 81.30m : SPOTTY-HORNFELSED INTERMEDIATE/FELSIC ASH TUFF  
- spotty chlorite alteration, fracture-controlled (quartz veined) arsenopyrite (8%) from 77.0-77.1 metres  
81.30 - 88.20m : QUARTZ-FELDSPAR PHYRIC FELSIC ASH TUFF  
- trace to 2% disseminated pyrite  
88.20 - 89.20m : GRAPHITIC ARGILLITE  
- graphite on fractures  
89.20 - 91.50m : ARGILLACEOUS FELSIC ASH TUFF  
- intercalated argillaceous sediment and argillite fragments  
91.50 - 98.80m : GRAPHITIC ARGILLITE  
- thick bedded, graphitic  
98.80 - 101.80m : ARGILLACEOUS FELSIC ASH TUFF  
- interbedded graphitic argillite horizons  
101.80 - 115.25m : QUARTZ PHYRIC FELSIC ASH TUFF  
- thin chert bands between 102.7-103.65m  
115.25 - 119.77m : FELSIC ASH TUFF  
- weakly sericitic, 2-3% disseminated pyrite  
119.77 - 124.30m : FELDSPAR PHYRIC FELSIC ASH TUFF  
- weakly sericitic  
124.30 - 128.70m : FELSIC ASH TUFF  
- weakly sericitic, chlorite rimmed calcareous spots  
128.70 - 130.70m : FELSIC LAPILLI ASH TUFF  
-weakly sericitic

130.70 - 139.40m : FELDSPAR PHYRIC FELSIC ASH TUFF  
-weakly chloritic, chlorite rimmed calcareous  
alteration spots

139.40 - 150.10m : FELSIC LAPILLI ASH TUFF  
-weakly chloritic/sericitic

150.10 - 151.50m : FELDSPAR PHYRIC FELSIC ASH TUFF  
-weakly chloritic, chlorite rimmed calcareous  
alteration spots

151.50 - 163.30m : FELSIC LAPILLI ASH TUFF  
- weakly sericitic

163.30 - 166.05m : FELSIC ASH TUFF  
-weakly sericitic

166.05 - 168.95m : FELSIC LAPILLI ASH TUFF  
-weakly sericitic

168.95 - 172.90m : FELSIC ASH TUFF  
-weakly chloritic/sericitic, chlorite rimmed  
calcareous alteration spots

172.90 - 175.60m : FELSIC LAPILLI ASH TUFF  
weakly chloritic/sericitic

175.60 - 199.15m : FELSIC ASH TUFF  
-local, spotty chlorite alteration

199.15 - 200.35m : GRAPHITIC ARGILLITE  
-thick bedded, graphitic

200.35 - 204.85m : ARGILLACEOUS FELSIC ASH TUFF  
-trace disseminated sphalerite at 203.90m

204.85 - 206.35m : FELDSPAR PHYRIC FELSIC ASH TUFF

206.35 - 211.60m : ARGILLITE/SILTSTONE  
-intercalated to finely interbedded, weakly  
graphitic

211.60 - 213.06m : ARGILLITE  
-graphitic, finely interbedded siltstone

## DRILL HOLE SUMMARY

DRILL HOLE : BC-90-05

LOCATION : GRID : 232+70N, 402+90E  
AZIMUTH : 55°      DIP : 65°  
ELEVATION : 1413 metres  
CLAIM NAME : Bluff 1

DATE : OCTOBER 16-21 , 1990

TOTAL DEPTH : 422.76 metres

OBJECTIVE : Two hundred metre downdip test of the mineralized horizon intersected in BC-90-01 (133.00-145.00m) projected to occur between 200 to 230.0 metres downhole.

RESULTS : Drill hole BC-90-05 intersected a similar volcanic sequence to that encountered in BC-90-01, however, comparable polymetallic mineralization was not repeated. Correlation between the two drill holes suggests a gently dipping (30 degrees) stratigraphy to the southwest. Pyritic felsic lapilli tuff with interbedded felsic ash units between 203.0-224.64 metres are interpreted to be analogous to the upper mineralized zone (133.0-145.0m) intersected in drill hole BC-90-01.

Weak spotty to pervasive chlorite, biotite, pyrrhotite and/or carbonate alteration (hornfels) occurs through many of the units becoming more intense below 335.0 metres. Effects of this alteration obscured many of the rock textures.

INTERPRETATION : A downdip extension of the mineralized horizon intersected in drill hole BC-90-01 is not repeated in drillhole BC-90-05. Massive sulphide mineralization encountered in BC-90-01 may be plunging more to the west (>250 degrees) with only flanking pyritic mineralization encountered in BC-90-50. A possible extension of the mineralization is marked by a pyritic felsic lapilli tuff (203.55-224.64m), but the lithogeochemistry is not supportive.

BC-90-05 SUMMARY LOG

**Field Description**

- 0.00 - 3.66 : CASING  
3.66 - 14.60 : FELSIC ASH TUFF  
-local chlorite spots (hornfelsing), trace to 2% pyrite, trace to 0.5% sphalerite/galena between 6.7-7.1 metres  
14.60 - 20.06 : INTERMEDIATE ASH TUFF  
-3-4% pyrite, weakly biotitic  
20.06 - 29.10 : FELDSPAR PHYRIC INTERMEDIATE ASH TUFF  
-1-2% pyrite  
29.10 - 36.60 : INTERMEDIATE ASH TUFF  
-weakly hornfelsed (chlorite rimmed carbonate spots), local thin cherty tuff horizons, 2% pyrite  
36.60 - 40.98 : FELSIC ASH TUFF  
-occasional felsic lapilli, trace to 1% pyrite  
40.98 - 60.90 : INTERMEDIATE ASH TUFF  
-occasional to 7% (locally) lithic fragments, weak biotite development, weakly chlorite-biotite rimmed calcareous spots below 50.0 metres  
60.90 - 67.10 : INTERMEDIATE LAPILLI TUFF  
-up to 15% felsic/intermediate lapilli fragments, trace to 1% pyrite, weakly biotitic, calcareous spots  
67.10 - 90.20 : HORNFELS INTERMEDIATE/FELSIC ASH TUFF  
-chlorite/biotite/calcareous spots (moderate to strong hornfelsing), 2% pyrite/pyrrhotite  
90.20 - 95.45 : QUARTZ PHYRIC FELSIC ASH TUFF  
-thin cherty tuffite horizons between 91.5-92.10 metres, 7-10% pyrite  
95.45 - 99.54 : QUARTZ PHYRIC FELSIC LAPILLI ASH TUFF  
-sericitic, 3-5% pyrite  
99.54 - 101.50 : QUARTZ PHYRIC FELSIC ASH TUFF  
-sericitic, 3-4% pyrite  
101.50 - 117.20 : QUARTZ PHYRIC FELSIC LAPILLI ASH TUFF  
-up to 7% felsic lapilli fragments, 2-3% pyrite, 3-7% calcareous spots below 106.50m.  
117.20 - 120.50 : FELDSPAR PHYRIC INTERMEDIATE ASH TUFF  
-trace to 2% pyrite  
120.50 - 125.60 : HORNFELS INTERMEDIATE/FELSIC ASH TUFF  
-moderate spotty chlorite locally with biotite, trace to 3% pyrite/pyrrhotite  
125.60 - 156.25 : FELDSPAR PHYRIC INTERMEDIATE ASH TUFF  
-weak biotite development and calcareous spots locally rimmed by biotite, trace to 1% pyrite, thin tuffite horizons between 128.0-133.0 metres  
156.25 - 158.70 : QUARTZ VEIN

- 158.70 - 162.55 : HORNFELS FELSIC LAPILLI TUFF  
 -up to 30% chlorite spots to calcareous spots rimmed by chlorite
- 162.55 - 166.05 : FELSIC ASH TUFF  
 -up to 10% calcareous spot rimmed by chlorite and biotite rimmed towards the lower contact, 1-2% pyrite
- 166.05 - 166.90 : INTERMEDIATE ASH TUFF  
 -weak biotite development, up to 2% pyrite
- 166.90 - 173.40 : FELSIC ASH TUFF  
 -up to 7% calcareous spots locally rimmed by biotite, trace to 35 pyrite
- 173.40 - 175.80 : HORNFELS FELSIC ASH TUFF  
 -moderate spotty chlorite, 2% pyrite
- 175.80 - 191.10 : FELSIC ASH TUFF  
 -calcareous spots (weak to moderate) locally rimmed by chlorite, 3-5% pyrite
- 191.10 - 203.55 : FELSIC ASH TUFF  
 -occasional, <1cm felsic fragments, 4-7% pyrite
- 203.55 - 224.64 : FELSIC LAPILLI ASH TUFF  
 -up to 7% felsic fragments, discontinuous banded appearance, local thin fine grained ash intervals, up to 7% pyrite
- 224.64 - 242.75 : FELSIC TUFFACEOUS SEDIMENT  
 -weakly argillaceous, occasional (locally to 7%) felsic fragments, 5-10% pyrite
- 242.75 - 243.75 : HORNFELS FELSIC LAPILLI ASH TUFF  
 -up to 20% chlorite and chlorite rimmed calcareous spots, 2-3% pyrite
- 243.75 - 244.80 : FELSIC ASH TUFF  
 -occasional felsic fragments, 2-3% pyrite
- 244.80 - 246.85 : FELSIC TUFACEOUS SEDIMENT  
 -weakly argillaceous (muddy-brown), 2-3% siliceous felsic fragments, 3-4% pyrite
- 246.85 - 261.50 : FELSIC ASH TUFF  
 -choritic, weak biotite development, 2-3% pyrite with local <0.5cm pyrite cubes
- 261.50 - 275.72 : FELSIC LAPILLI ASH TUFF  
 -weak pervasive biotite, 2-4% pyrite
- 275.72 - 280.00 : INTERMEDIATE ASH TUFF  
 -up to 12% calcareous spots, trace to 1% pyrite
- 280.00 - 284.00 : HORNFELS INTERMEDIATE LAPILLI ASH TUFF  
 -moderate spotty chlorite, 2% pyrite
- 284.00 - 286.25 : INTERMEDIATE ASH TUFF  
 -chloritic, trace pyrite
- 286.25 - 293.70 : HORNFELS FELSIC LAPILLI ASH TUFF  
 -up to 15% felsic fragments, up to 10% chlorite spots and up to 7% calcareous spots
- 293.70 - 304.40 : FELSIC LAPILLI TUFF  
 -up to 10% felsic fragments, local spotty chlorite, 2% pyrite

- 304.40 - 335.70 : FELSIC LAPILLI/ASH TUFF  
 -up to 15% felsic fragments with local finer grained sections, 2-4% pyrite
- 335.70 - 350.30 : HORNFELS FELSIC LAPILLI ASH TUFF  
 -moderate spotty to pervasive chlorite, up to 1% pyrite
- 350.30 - 375.20 : HORNFELS INTERMEDIATE/FELSIC TUFFACEOUS SEDIMENT  
 -local spotty chlorite and chlorite rimmed calcareous spots (weak), vaguely outlined lithic fragments, trace to 1% pyrite, strongly quartz veined below 370.8 metres
- 375.20 - 380.20 : FELSIC TUFFACEOUS SEDIMENT  
 -coarsening downhole with up to 15% cherty felsic fragments below 378.9 metres, 2% pyrite
- 380.20 - 389.50 : INTERMEDIATE ASH TUFF  
 -chloritic with <0.75cm chlorite wisps, 1% pyrite
- 389.50 - 414.00 : INTERMEDIATE LAPILLI ASH TUFF  
 -chloritic, similar to previous with up to 7% intermediate fragments, up to 10%, <1.0cm chlorite wisps, trace to 1% pyrite/pyrrhotite
- 414.00 - 416.30 : INTERMEDIATE INTRUSION  
 -massive, fine grained, fine pervasive-spotty chlorite, weakly magnetic, sharp contacts, possible hornfelsed felsic intrusion(?)
- 416.30 - 422.76 : HORNFELS INTERMEDIATE LAPILLI ASH TUFF  
 -up to 10% intermediate/felsic fragments, chloritic with up to 6%, <0.75cm chlorite wisps, trace to 1% pyrite
- 422.76: E.O.H.

DRILL HOLE SUMMARY

DRILL HOLE : BC-90-06

LOCATION : GRID : 213+70N, 410+75E  
AZIMUTH : 55°      DIP : 65°  
ELEVATION : 902.0 metres  
CLAIM NAME : Bluff 1

DATE : OCTOBER 22-25, 1990

TOTAL DEPTH : 345.05 metres

OBJECTIVE : Test IP anomaly with coincident copper and zinc soil anomalies representing the southern extension of the Uke and Epiclastic Trends.

RESULTS : Drill hole BC-90-06 intersected a 60 metre thick sequence of chloritized felsic tuff followed by a thick section of argillite and lesser interbedded argillaceous intermediate tuff. These sediments are typically pyrite and pyrrhotite bearing with graphite along fractures. Intermediate ash tuff underlies the sediments which in turn are underlain by intermediate and felsic tuffaceous sediments. Thin felsic dykes, likely related to the Baldy Batholith, are common especially near the top of the tuffaceous sediment sequence.

INTERPRETATION: Graphitic and iron sulphide bearing sediments are the main source of the IP anomaly. There is however, only sporadic copper and zinc mineralization present in the hole; thus the soil anomaly appears to represent downslope movement from another source.



BC-90-06 SUMMARY LOG

**Field Description**

- 0.00 - 5.00 : CASING  
3.66 - 63.20 : FELSIC ASH TUFF  
-chloritic, local trace to 0.5% sphalerite-galena and pyrite between 43.4 to 62.7 metres  
63.20 - 73.40 : INTERMEDIATE ASH TUFF  
-fine grained, chloritic, trace pyrite  
73.40 - 90.20 : GRAPHITIC ARGILLITE  
-intercalated to interlaminated argillite and silt, graphite developed on fractures, 2% pyrite and pyrrhotite aggregates (cubes)  
90.20 - 96.15 : FELSIC ASH TUFF  
-weakly argillaceous; light brown, hard mineral (sphalerite ?) associated with intensely quartz vein sections.  
96.15 - 158.40 : GRAPHITIC ARGILLITE  
-similar to previous from 73.40-90.20 metres  
158.40 - 163.95 : ARGILLACEOUS FELSIC TUFF  
-weakly argillaceous increasing near lower contact, up to 7% elongated siliceous felsic fragments, 1-2% pyrite and/or pyrrhotite aggregates (cubes).  
163.95 - 173.30 : GRAPHITIC ARGILLITE  
-similar to previous from 73.40-90.20 metres, 1-3% pyrite/pyrrhotite aggregates (cubes)  
173.30 - 179.10 : ARGILLACEOUS INTERMEDIATE LAPILLI ASH TUFF  
-weakly argillaceous increasing near lower contact, up to 12% elongated siliceous felsic fragments, 3-4% pyrrhotite/pyrite, trace chalcopyrite at 175.4 metres  
179.10 - 195.58 : INTERMEDIATE ASH TUFF  
-chloritic, thin (<3mm) chloritic stringers, trace to 0.5% chalcopyrite between 180.0-187.0 metres  
195.58 - 206.25 : INTERMEDIATE LAPILLI ASH TUFF  
-up to 10% elongated siliceous felsic fragments decreasing downhole, 2% pyrite/pyrrhotite  
206.25 - 217.80 : ARGILLACEOUS INTERMEDIATE ASH TUFF  
-2-3% pyrite/pyrrhotite, trace to 0.5% chalcopyrite between 207.1-212.4 metres  
217.80 - 221.30 : INTERMEDIATE ASH TUFF  
-fine grained, poorly foliated (intrusion ?)  
221.30 - 230.85 : INTERMEDIATE LAPILLI ASH TUFF  
-up to 10% elongated siliceous felsic fragments, trace to 1% pyrite  
230.85 - 245.75 : ARGILLACEOUS INTERMEDIATE ASH TUFF  
-weakly argillaceous, local pyritic stringers at 232.6m, 238.3m, and between 243.60-245.75m  
245.75 - 246.35 : FELDSPAR PHYRIC FELSIC INTRUSION  
-massive, non-foliated, up to 30% feldspars

246.35 - 255.60 : ARGILLACEOUS INTERMEDIATE ASH TUFF  
                   -weakly argillaceous, 2-3% pyrite/pyrrhotite  
                   with up to 20% pyritic zones between 249.9-  
                   250.15m and 250.7-250.85m.

255.60 - 256.40 : FAULT ZONE

256.40 - 272.35 : INTERMEDIATE TUFFACEOUS SEDIMENT  
                   -weakly argillaceous, intermediate to felsic  
                   fragments decreasing downhole, 3-4%  
                   pyrite/pyrrhotite with up to 10% pyrite  
                   between 260.4-265.40 metres

272.35 - 274.05 : FELDSPAR PHYRIC FELSIC INTRUSION  
                   -massive, non-foliated, 30% subrounded  
                   feldspars

274.05 - 275.85 : INTERMEDIATE ASH TUFF  
                   -trace to 2% pyrite

275.85 - 277.30 : FELDSPAR PHYRIC FELSIC INTRUSION  
                   -similar to previous from 272.35-274.05 metres

277.30 - 280.68 : INTERMEDIATE ASH TUFF  
                   -trace to 2% pyrite, weak hornfelsing  
                   (calcareous spots) below 377.80 metres

280.68 - 282.50 : FELDSPAR PHYRIC FELSIC INTRUSION  
                   -massive, non-foliated, 10% mottled feldspars

282.50 - 289.75 : INTERMEDIATE VOLCANIC WACKE  
                   -12% lithic fragments, intercalated  
                   argillaceous component, 2% pyrite/pyrrhotite  
                   aggregates (cubes)

289.75 - 294.20 : FELDSPAR PHYRIC FELSIC INTRUSION  
                   -massive, non-foliated, 15% mottled feldspars

294.20 - 295.19 : INTERMEDIATE TUFFACEOUS SEDIMENT  
                   -weak pervasive biotite development, trace to  
                   2% pyrite/pyrrhotite

295.19 - 296.18 : FELDSPAR PHYRIC FELSIC INTRUSION  
                   -similar to previous from 289.75-294.20 metres

296.18 - 322.15 : INTERMEDIATE TUFFACEOUS SEDIMENT  
                   -variable argillaceous component, up to 7%  
                   lithic fragments, trace to 2%  
                   pyrite/pyrrhotite

322.15 - 327.90 : FELSIC TUFFACEOUS SEDIMENT  
                   -5% subrounded lithic fragments locally to  
                   10%, trace to 3% pyrite/pyrrhotite, traces  
                   fushite

327.90 - 334.20 : INTERMEDIATE TUFFACEOUS SEDIMENT  
                   -locally argillaceous, 3-4% pyrite

334.20 - 335.55 : FELSIC TUFFACEOUS SEDIMENT  
                   -weakly chloritic, up to 10% siliceous  
                   fragments

335.55 - 336.85 : INTERMEDIATE TUFFACEOUS SEDIMENT  
                   -trace pyrite, weak biotite development below  
                   336.0 metres

336.85 - 342.00 : FINE GRAINED MAFIC INTRUSION  
                   -poorly foliated to massive

342.00 - 345.05 : INTERMEDIATE TUFFACEOUS SEDIMENT  
                   -similar to above metres, weak hornfels

345.05: E.O.H.

DRILL HOLE SUMMARY

DRILL HOLE : BC-90-07

LOCATION : GRID : 201+82N, 387+00E  
AZIMUTH : 000° DIP : 90°  
ELEVATION : 725.0 metres  
CLAIM NAME : BET 5

DATE : OCTOBER 25-28, 1990

TOTAL DEPTH : 349.61 metres

- OBJECTIVE :
1. Test southwest extension of Birk Creek zone coincident with IP anomaly and Cu-Zn anomaly.
  2. Test interpreted northeast dipping thrust fault (Birk Creek Fault) thrusting v o l c a n i c stratigraphy (EBA) over grey phyllite (EBP).

RESULTS : The drill hole collared into a series of felsic ash tuffs with local lapilli horizons. Occasional thin argillaceous felsic tuff horizons are present. A 0.20 metre thick massive pyrite band occurs between 247.98 to 248.18 metres hosted by felsic ash tuff. Two narrow chert breccia units up to 2.65m in apparent thickness are present containing up to minor chalcopyrite and galena; occurring as disseminations or along fractures. Generally, however, the volcanics are weakly pyritic with only trace chalcopyrite and galena.

The underlying phyllite unit EBP was not intersected indicating the interpreted east dipping thrust fault must be steeper than 50°.

BC-90-7 SUMMARY LOG

**Field Description**

- 0.00 - 12.80m : CASING
- 12.80 - 69.70m : QUARTZ PHYRIC FELSIC ASH TUFF  
- 5 - 7% quartz eyes to 2mm  
- up to 4% disseminated and fractured controlled pyrite  
- 67.60 - 69.70m: fault zone  
- up to 2% disseminated pyrite
- 69.70 - 73.76m : QUARTZ FELDSPAR PHYRIC FELSIC ASH TUFF  
- up to 4% feldspar phenocrysts to 1mm  
- up to 1% fine disseminated/fracture controlled pyrite
- 73.76 - 78.70m : QUARTZ FELDSPAR PHYRIC FELSIC ASH TUFF  
- up to 3% disseminated/fracture controlled/pyrite
- 78.70 - 82.69m : FELSIC LAPILLI TUFF  
- up to 10% lapilli to 1cm  
- up to 3% disseminated/fracture controlled pyrite
- 82.69 - 87.20m : QUARTZ PHYRIC FELSIC ASH TUFF  
- up to 2% disseminated/fracture controlled pyrite  
- 83.23 - 83.62m: felsic lapilli tuff as above
- 87.20 - 93.57m : QUARTZ FELDSPAR PHYRIC FELSIC ASH TUFF  
- 5% quartz eyes to 2mm  
- up to 3% disseminated/fracture controlled pyrite
- 93.57 - 134.70m : QUARTZ PHYRIC FELSIC ASH TUFF  
- 2 to 3% disseminated/fracture controlled pyrite with 5 to 10% locally  
- 93.57 - 97.13m: fault zone  
- 131.15 - 134.70m: fault zone  
- 1 to 2% disseminated pyrite
- 134.70 - 137.40m : QUARTZ PHYRIC FELSIC ASH TUFF  
- 2% disseminated/fracture controlled pyrite  
- 136.94 - 137.40m : fault zone
- 137.40 - 146.93m : QUARTZ PHYRIC FELSIC ASH TUFF  
- 5 to 10% disseminated/fracture controlled pyrite, minor chalcopyrite, trace galena  
- 145.90 - 146.93m: fault zone  
- 5 to 10% disseminated pyrite
- 146.93 - 156.77m : ARGILLACEOUS FELSIC LAPILLI TUFF  
- up to 10% siliceous lapilli to 6cm  
- finely laminated/banded black argillaceous material within the matrix  
- up to 10% disseminated/fracture controlled pyrite locally, minor chalcopyrite and galena

- 156.77 - 157.55m : CHERT BRECCIA  
- 10 to 15% semi-massive pyrite locally  
- up to 1% chalcopyrite, minor galena
- 157.55 - 159.00m : ARGILLACEOUS FELSIC LAPILLI TUFF  
- as above
- 159.00 - 178.10m : QUARTZ PHYRIC FELSIC ASH TUFF  
- up to 5% disseminated/fracture controlled  
pyrite with up to 0.5% chalcopyrite over narrow  
intervals, trace galena  
- 177.30 - 178.10m: quartz vein with 1%  
pyrite
- 178.10 - 182.25m : FELSIC LAPILLI TUFF  
- 2 to 5% disseminate/fracture controlled  
pyrite
- 182.25 - 211.00m : QUARTZ PHYRIC FELSIC ASH TUFF  
- up to 5% quartz eyes to 2mm  
- up to 1% disseminated pyrite  
- 189.35m: 2cm band of semi-massive pyrite  
with 0.5% chalcopyrite, minor galena
- 211.00 - 217.90m : FELSIC LAPILLI TUFF  
- 15% lapilli  
- up to 2% disseminated pyrite
- 217.90 - 236.36m : QUARTZ PHYRIC FELSIC ASH TUFF  
- up to 2-5% disseminated/fracture controlled  
pyrite, minor galena  
- 217.90 - 218.67m: fault zone  
- up to 2% disseminated pyrite
- 236.36 - 240.00m : CHERT BRECCIA  
- up to 10% semi-massive pyrite locally, minor  
chalcopyrite and galena
- 240.00 - 273.65m : ARGILLACEOUS FELSIC ASH TUFF  
- weakly laminated argillaceous material  
- up to 1% disseminated/fracture controlled  
pyrite  
- 247.98-248.18m: massive pyrite  
- 248.38 - 248.92m: fault zone
- 273.65 - 304.15m : ARGILLACEOUS FELSIC ASH TUFF  
- finely laminated black argillaceous  
material  
- up to 3% disseminated/fracture controlled  
pyrite  
- 274.65 - 276.15m: quartz vein, trace galena
- 304.15 - 310.94m : QUARTZ PHYRIC FELSIC ASH TUFF  
- up to 10% quartz eyes to 2mm  
- up to 2% disseminated pyrite, trace  
chalcopyrite

310.94 - 313.47m : FELSIC LAPILLI TUFF  
- up to 10% strongly siliceous lapilli to 5cm  
- 1% disseminated pyrite

313.47 - 324.80m : FELSIC ASH TUFF  
- up to 2% disseminated/fracture controlled  
pyrite, decreasing towards bottom of hole  
- 2% quartz veins with 1-2% pyrite

324.80 - 328.92m : FELSIC LAPILLI TUFF  
- up to 10% strongly siliceous lapilli  
- up to 2% disseminated/fracture controlled  
pyrite

328.92 - 349.61m : FELSIC ASH TUFF  
- up to 5% intervals to 25cm of lapilli tuff  
with up to 15% strongly siliceous lapilli to  
3cm

349.61m : E.O.H

## DRILL HOLE SUMMARY

DRILL HOLE : BC-90-08

LOCATION : GRID : 207+07N, 404+40E  
AZIMUTH : 55°      DIP : 65°  
ELEVATION : 748.0 m.  
CLAIM NAME : Bet 3

DATE : OCTOBER 28-31, 1990

TOTAL DEPTH : 300.84 metres

OBJECTIVE : Test IP anomaly occurring across felsic volcanics which host the "CC" showing.

RESULTS :            The upper section of BC-90-08 intersected a sequence of variably sericitic and weakly pyritic intermediate and felsic ash tuffs from the collar to 94.20 metres. Three intervals up to 6.0 metres wide are present, containing minor disseminated to irregular mm size bands of sphalerite with trace chalcopyrite and galena along foliation and fractures planes. This sequence is underlain by graphitic argillite from 94.20 to 99.45 metres.

                         A thick, monotonous sequence of weakly sericitic felsic and intermediate ash tuffs follow to a depth of 255.85 metres. Gradational contacts, trace to 3% pyrite, and weak carbonate alteration are a common feature to these units. Breaks in the pyroclastic deposition is marked by siliceous-cherty fragments over 10 cm. (131.20m) and a thin graphitic argillite horizon (175.83-176.68m). A quartz-feldspar phyric felsic dyke cuts the lower pyroclastic section, parallel to foliation, at 179.35-182.93 metres.

                         The remaining stratigraphy, 255.85 to 300.84 metres, is comprised of variably sheared, massive to finely laminated, graphitic argillite and lesser interbedded argillaceous felsic ash horizons. Trace to 3% disseminated pyrite and pyrite aggregates (cubes) are common.

INTERPRETATION :      Cu-Pb-Zn mineralization is confined to the upper pyroclastic sequence, corresponding to the CC Showing, although a specific horizon is not discernable. The IP anomaly correlates with the mineralized interval and the underlying graphitic argillite unit. Similarly, graphitic argillite at 175.83-176.68m may have contributed to the anomaly. However, those below 255.85 metres presumably lie below the geophysical detection limit of 150 metres.

BC-90-08 SUMMARY LOG

**Field Description**

- 0.00 - 9.14 : CASING  
9.14 - 12.55 : FELSIC ASH TUFF  
-broken, blocky core  
12.55 - 17.00 : FELSIC ASH TUFF  
-Light green-grey, chloritic, broken, blocky sections; brecciated appearance - "cataclastic"  
17.00 - 22.47 : FELDSPAR PHYRIC INTERMEDIATE ASH TUFF  
-trace to 2% pyrite  
22.47 - 23.62 : MEDIUM GRAINED FELSIC INTRUSION  
-massive, non-foliated  
23.62 - 34.15 : INTERMEDIATE ASH TUFF  
-trace to 3% pyrite, traces chalcopyrite  
34.15 - 53.22 : FELSIC ASH TUFF  
-sericitic, local pyrite stringers with trace to 0.5% sphalerite between 41.4-47.4 metres.  
53.22 - 61.20 : FELDSPAR PHYRIC INTERMEDIATE ASH TUFF  
-sericitic/chloritic, local pyritic stringers with traces chalcopyrite  
61.20 - 72.32 : FELSIC ASH TUFF  
-sericitic, pyritic stringers with traces sphalerite/chalcopyrite below 66.0 metres  
73.32 - 80.46 : ARGILLACEOUS FELSIC TUFFACEOUS SEDIMENT  
-siliceous-cherty fragments (locally pyritic), up to 5% disseminated pyrite  
80.46 - 94.20 : FELSIC ASH TUFF  
-up to 5% pyrite, traces sphalerite/galena over the first 3.0 metres  
94.20 - 99.45 : GRAPHITIC ARGILLITE  
-black-grey, finely laminated to massive  
99.45 - 100.45 : ARGILLACEOUS FELSIC ASH TUFF  
-2% pyrite  
100.45 - 114.95 : FELSIC LAPILLI ASH TUFF  
-3-7% felsic fragments, local finer grained sections, 1-3% pyrite  
114.95 - 131.20 : FELSIC ASH TUFF  
-trace to 1% pyrite, brecciated-siliceous fragments mark lower contact  
131.20 - 175.83 : INTERMEDIATE ASH TUFF  
-1% pyrite; local up to 80 cm strongly carbonate altered zones  
175.83 - 176.68 : GRAPHITIC ARGILLITE  
-black, massive to interlaminated/interbedded silt  
176.68 - 179.35 : FELSIC ASH TUFF  
-trace to 1% pyrite  
179.35 - 182.93 : QUARTZ-FELDSPAR PORPHYRITIC FELSIC INTRUSION  
-massive, non-foliated  
182.93 - 216.30 : FELSIC ASH TUFF  
-traces pyrite



216.30 - 246.00 : FELSIC ASH TUFF  
-2-4% pyrite  
246.00 - 255.85 : ARGILLACEOUS FELSIC ASH TUFF  
-increasing argillaceous component downhole  
255.85 - 263.06 : GRAPHITIC ARGILLITE  
-black, finely laminated; 3% pyrite  
263.06 - 267.16 : ARGILLACEOUS FELSIC ASH TUFF  
trace to 1% pyrite, poorly foliated -  
"cataclastic- fragmental" texture  
267.16 - 277.22 : GRAPHITIC ARGILLITE  
-massive, numerous broken-blocky highly  
fractured sections, 2-3% pyrite  
277.22 - 293.50 : ARGILLACEOUS FELDSPAR PHYRIC FELSIC ASH TUFF  
-2-3% pyrite, variable - up to 20%  
argillaceous component, rare siliceous cherty  
fragments  
293.50 - 300.84 : GRAPHITIC ARGILLITE  
-black, massive, broken-blocky highly  
fractured core  
300.84 : E.O.H.

FALCONBRIDGE LTD  
DIAMOND DRILL LOG  
Property : BIRK CREEK (1990)

Hole # : BC-90-01      Zone # : CENTRAL      Contractor : BURWASH ENTERPRISES      Date started :10/ 4/1990  
Township: KAMLOOPS      Range:      Claim # :BLUFF 1      Date completed:10/ 6/1990  
Lot :

Level : SURFACE      Section: 232+70N      Location :

Collar coordinate :      Line : 232+70 N      Latitude: 5691880.00 N      Azimuth: 55° 0' 0"  
Reference frame :      Station: 404+40 E      Departure: 296115.00 E      Dip : -45° 0' 0"  
Elevation: 1405.00      Length : 306.94 M

Surveyed by: SPERRY-SUN

Deviation tests :

Depth	Dip	Azimuth
93.57 M	-53° 0' 0"	49° 0' 0"
142.34 M	-53°45' 0"	54° 0' 0"
188.06 M	-56°15' 0"	51°30' 0"
284.07 M	-59°30' 0"	54° 0' 0"
306.93 M	-59°15' 0"	52° 0' 0"

Remarks :

Water flow :  
Cimented :

Plugged:  
Core size: HQ

Logged by : A.D. MCLAUGHLIN

Date logged:10/ 6/1990

Note # : BC-90-01









FROM (M)	TO (M)	DESCRIPTION	Sampl.	FROM	TO	Leng. (M)	CU PPM	PB PPM	ZN PPM	BA PPM	AG PPM	AU PPB	AS PPM	KI PPM	Cu/Zn RATIO
		chlorite wisps, 1-3% quartz eyes round to elongated <1mm commonly <0.5mm in an sphanitic sericite matrix, unit becoming hornfelsed? below 69.0m with sericite-muscovite aggregates to stringers. Local defined tuff breccia texture with fragments to 7cm, sub-angular. Intermittent fracture zones commonly 10-80', locally between 69.0-73.0m, increasing with depth.  Mineralization & Alteration: Calcite, minor chlorite.  73.00- 73.91 FAULT ZONE Gouge and rubble, calcareous CAB 0-10' fractures													
73.91	90.75	QUARTZ PHYRIC INTERMEDIATE ASH TUFF 3AA Medium grey, massive bedded, moderately foliated, medium grained, 5-15% brown-green lithic fragments as wisps to aggregates to 3mm, 5-15% quartz crystals and eyes to 0.5mm in fine grained sericitic matrix. Unit becoming banded with depth. 5% light green bands 2cm thick -possible lapilli  Mineralization & Alteration: 5% disseminated pyrite, weakly silicified and calcareous.  89.54- 90.75 FAULT ZONE Gouge and rubble with contorted foliation, brecciated quartz veins, moderately sericitic CAB 45-60' foliation													
90.75	94.62	CHERTY TUFF BRECCIA 4AP Light to medium grey, fine grained, thinly bedded, strongly foliated. 10% cherty tuff elongate fragments to 2cm thick in sericitic to weakly siliceous matrix. Structure Wavy to kinked foliation CAB 78' foliation @ 91.3m	VA14505 VA14506	90.75 92.29	92.29 94.09	1.54 1.80	31 31	17 16	133 19	1100 1100	0.5 0.5	28 22	74 59	9 8	18.90 62.00

FROM (M)	TO (M)	DESCRIPTION	Sampl.	FROM	TO	Length (M)	CU PPM	PB PPM	ZN PPM	BA PPM	AG PPM	ALU PPB	AS PPM	NI PPM	Cu/Zn RATIO	
94.62	97.04	<p>Mineralization &amp; Alteration 10% disseminated to 1mm bands pyrite in matrix and fragments, weak blue-grey sericitization, 60% quartz veins to 15cm in lower 58cm @ 70', 50'</p> <p>FELSIC ASH TUFF (HORNFELS) 4A Dark grey, medium grained, massive bedded, weakly foliated, 25% biotite aggregates and wisps to 3mm in fine grained siliceous-sericitic matrix.</p> <p>Structure: Moderately fractured @ CAB 10-20'</p> <p>Mineralization &amp; Alteration: 5% pyrite rarely as 2cm pods with quartz veins</p>														
97.04	103.25	<p>INTERMEDIATE ASH TUFF 3A Medium grey, fine grained, massive bedded, moderately foliated, 1% quartz eyes to 0.5mm, 2% feldspar in sericitic to weakly siliceous matrix. Indistinct banding with depth.</p> <p>Mineralization &amp; Alteration 5-7% pyrite, weak patchy to bands to 5cm silicified zones, moderate light brown clay alteration aggregates. Upper 64m mainly fractured quartz veins</p> <p>Structure: CAB 71' foliation @ 99.0m</p>														
103.25	110.00	<p>INTERMEDIATE ASH/DUST TUFF 3A Light to medium grey, 1-2 cm bands, strongly foliated, minor quartz crystals and eyes, 1% lithic fragments to 1mm in sericitic matrix. Weak hornfels with 10% muscovite aggregates.</p> <p>Structure: Rare contorted foliation, increasing fractures with depth @ 20', lower contact sheared CAB 78' pyrite band @ 105.1m, 75-80' foliation</p> <p>Mineralization &amp; Alteration: 7% pyrite with 3cm semi-massive bands parallel to</p>	VA14507 VA14508 VA14509	103.25 105.25 107.25	105.25 107.25 109.20	2.00 2.00 1.95	26 23 22	17 17 21	25 43 18	810 880 1100	0.7 1.3 0.6	550 300 137	117 99 56	4 4 6	50.98 34.85 55.00	









FROM (M)	TO (M)	DESCRIPTION	Sampl.	FROM	TO	Leng. (M)	CU PPM	PB PPM	ZN PPM	BA PPM	AG PPM	AU PPB	AS PPM	NI PPM	Cu/Zn RATIO
137.82	139.32	FELSIC LAPILLI TUFF Fragments to 2cm, siliceous to sericitic with depth (green to blue-grey). 5% pyrite, 1% sphalerite, 0.5% galena, minor chalcopyrite, generally disseminated, but bands to 3cm in lower 20cm 138.38-138.60 Mafic Intrusive Black, fine grained, calcareous, 2% pyrite, CAB 62' contacts	VA14518	137.82	139.32	1.50	0.05%	0.37%	0.97%	0.12%	10.3	0.034	-	-	4.90
139.32	140.00	FELSIC ASH TUFF Apple green to grey with depth, minor quartz veins to 4cm with coarse grained sulphides, contorted foliation at base 40% pyrite, 4% sphalerite, 1% galena, 0.5% chalcopyrite in semi-massive bands to 20cm including 139.67-139.87m (pyrite band with sphalerite at base).	VA14519	139.32	140.00	0.68	1.13%	2.07%	6.60%	0.03%	51.6	0.240	-	-	14.62
140.00	141.91	FELSIC ASH TUFF Breccia texture in upper half grading to massive with depth, fragments siliceous to chert tuff, moderately blue-grey sericite, turquoise wisps in centre, minor quartz veins, pods 4% pyrite, 0.5% sphalerite, minor galena.	VA14520	140.00	141.91	1.91	0.06%	0.22%	0.56%	0.09%	3.4	0.034	-	-	9.68
141.91	143.85	FELSIC ASH TUFF Light green, 1-5% quartz crystals to 0.5mm, moderately chloritic, weakly calcareous, increasing shearing with depth, CAB 73' contact. 1% pyrite, trace chalcopyrite.	VA14521	141.91	143.85	1.94	0.05%	0.02%	0.10%	0.06%	1	0.034	-	-	33.33

FROM (M)	TO (M)	DESCRIPTION	Sampl.	FROM	TO	Length (M)	CU PPM	PB PPM	ZN PPM	BA PPM	AG PPM	AU PPB	AS PPM	NI PPM	Cu/Zn RATIO
		143.85- 144.94 FELSIC TUFF BRECCIA Fragments to 3cm, strong cataclastic textures. 7% pyrite, < 1% sphalerite, minor chalcocopyrite and galena. 144.53-144.94 Fault, brecciated wallrock and quartz veins with gouge, CAB 40' upper contact	VA14522	143.85	144.94	1.09	0.13%	0.39%	1.60%	0.10%	11.3	0.034	-	-	7.51
144.94	148.90	FELSIC ASH TUFF 4A Medium grey to green-grey with depth, massive bedded, strongly foliated, up to 2% quartz crystals and eyes to 0.5mm, 0-5% grey-green wisps to stringers in sericitic matrix.  Structure Sheared upper 85cm, gouge at base (CAB 45') with CAB 60-70' foliation. CAB 79' quartz vein with sulphide band 148.90m  Mineralization & Alteration Moderately silicified, moderately blue-grey sericitized in upper half. Unit becoming less altered with depth. Minor chalcocopyrite, sphalerite, galena and 5% pyrite, 1% quartz veins with increased sulphides along fractures and perimeters.	VA14523 VA14524 VA14525	144.94 145.80 147.30	145.80 147.30 148.90	0.86 1.50 1.60	159 69 861	233 367 0.42%	213 405 0.53%	820 950 890	1.2 1 15.6	58 58 50	214 135 74	5 6 6	42.74 14.56 13.98
148.90	163.57	QUARTZ PHYRIC FELSIC ASH TUFF 4AA Medium grey, massive bedded, fine-grained, strongly foliated, 5% quartz crystals and eyes to 0.5mm, 5% possible feldspar to 1mm in sericitic matrix, local light green bands to 15cm-possible lapilli.  Structure CAB 68' foliation @ 150.1m and 72' @ 154.9m  Mineralization & Alteration 5% pyrite with local narrow intervals to 10%, minor chalcocopyrite, sphalerite, galena, rarely to 5mm bands parallel foliation, weakly sericitized, thin chlorite stringers with	VA14526 VA14527 VA14528	148.90 151.00 153.00	151.00 153.00 155.00	2.10 2.00 2.00	40 102 70	422 1493 0.36%	652 2492 1411	970 1100 1100	0.9 1.3 2.4	6 47 27	70 135 121	5 5 8	5.78 3.93 4.73

FROM (M)	TO (M)	DESCRIPTION	Sampl.	FROM	TO	Length (M)	CU PPM	PB PPM	ZN PPM	BA PPM	AG PPM	AU PPB	AS PPM	NI PPM	Cu/Zn RATIO
		sulphides.													
		154.88- 155.50	VA14529	155.00	156.80	1.80	99	0.91%	553	790	6.5	29	97	9	15.18
		QUARTZ VEIN 1% galena, minor sphalerite along fractures, lower contact @ 42'													
		156.80- 161.73	VA14530	156.80	157.79	0.99	17	795	1797	10	0.6	3	7	3	0.94
		QUARTZ VEIN STOCKWORK	VA14531	157.79	158.74	0.95	52	365	581	840	0.6	16	126	9	8.21
		60% quartz veins to 0.99m wide, thin chlorite selvages, rare galena and sphalerite	VA14532	158.74	160.38	1.64	103	2534	645	260	1.7	6	31	6	13.77
		CAB 40-50', 10' veins	VA14533	160.38	161.73	1.35	167	0.53%	0.36%	440	3.4	6	109	5	4.43
		163.57	VA14534	161.73	163.57	1.84	61	680	1101	820	0.8	17	120	7	5.25
		FELSIC ASH TUFF 4A	VA14535	163.57	165.60	2.03	79	1388	1431	970	1.3	35	192	7	5.23
		Light grey, massive bedded, strongly foliated. 1-5% chloritic wisps, <1% quartz crystals and eyes to 0.25mm in fine-grained to aphanitic sericitic to siliceous matrix. Possible lapilli in lower 3m													
		Structure CAB 72' foliation @ 164.3m CAB 70-75' quartz veins parallel foliation													
		Mineralization & Alteration 3% pyrite, minor galena and sphalerite with quartz veins to 5cm between 163.85-163.91 and 164.3m. Weakly sericitized and silicified													
		165.60	VA14536	165.60	167.60	2.00	121	1001	1695	780	1.1	51	98	5	6.66
		FELSIC ASH TUFF 4A	VA14537	167.60	169.60	2.00	46	175	374	950	0.7	38	108	7	10.95
		Medium grey, massive bedded, strongly foliated	VA14538	169.60	171.60	2.00	175	904	865	740	1.1	27	130	8	16.83
		0-5% quartz crystals and eyes to 0.25mm, 0-3% grey lithic wisps, 0-10% chloritic-sericitic aggregates to 0.5mm in fine grained sericitic matrix.	VA14539	171.60	173.60	2.00	42	609	269	800	0.9	16	148	11	13.50
		Structure CAB foliation 72' @ 169.2m, 71' @ 177.8m, 70' @ 183.9m, 78' @ 185.4m 181.70-182.30m fracture zone, minor gouge, CAB 20' and 50'	VA14540	173.60	175.60	2.00	47	501	988	980	0.9	8	86	14	4.54
		Mineralization & Alteration	VA14541	175.60	177.60	2.00	38	540	789	950	0.9	29	110	10	4.59
			VA14542	177.60	179.60	2.00	40	146	592	640	0.8	8	110	10	6.33
			VA14543	179.60	181.60	2.00	26	549	2351	710	0.8	8	113	10	1.09
			VA14544	181.60	183.60	2.00	27	853	632	760	0.9	8	150	10	4.10
			VA14545	183.60	186.31	2.71	355	941	1206	800	1.1	8	129	6	22.74

FROM (M)	TO (M)	DESCRIPTION	Sampl.	FROM	TO	Leng. (M)	CU PPM	PB PPM	ZN PPM	BA PPM	AG PPM	AU PPB	AS PPM	NI PPM	Cu/Zn RATIO
		7% pyrite, minor sphalerite, galena and trace chalcocopyrite, rarely to 2cm bands. <1% quartz veins to 2cm parallel foliation or CAB 0-20' with minor pyrite, sphalerite, galena Weakly sericitized, locally weakly calcareous and chloritic along fractures increasing with depth.  186.12- 186.31 FAULT ZONE Gouge and fractured core @ 60-70' CAB, increasing pervasive chloritization with depth, pyrite and trace chalcocopyrite													
186.31	187.19	MASSIVE SULPHIDE 4ms 70% sulphide, coarse grained to 2cm, sheared and recrystallized in chloritic, quartz and sericitic altered intermediate volcanic (?), massive to weakly foliated, lower contact gradational over 5cm  Structure CAB foliation 65'  Mineralization & Alteration 60% pyrite, 10% sphalerite, 5% galena, and minor chalcocopyrite, trace malposite	VA14546	186.31	187.19	0.88	0.66%	4.32%	8.68%	0.01%	25.4g/t	480	1056	3	7.07
187.19	206.99	FELSIC ASH TUFF 4Ads Medium green, fine grained, massive bedded, moderately to strongly foliated. 10-20% feldspar crystals and aggregates to 0.5mm, 5% chloritic wisps to 1mm, minor quartz crystals and eyes to 1mm in fine grained sericitic matrix.  Structure Fractured core upper 70cm @ 55' Fracture zone 199.10-200.50m, 30' and 70', calcite and chlorite along fractures CAB foliation 62' @ 196.3m, 71' @ 203.3m CAB sulphide bands 70' 194.73m, 20' 198.86m, 74' @ 201.6m, 67' @ 205.9m	VA14547 VA14548 VA14549 VA14550 VA14551 VA14552 VA14553 VA14554 VA14555 VA14556 VA14557	187.19 187.74 189.80 191.75 193.75 195.75 197.75 199.75 201.00 202.56 203.30	187.74 189.80 191.75 193.75 195.75 197.75 199.75 201.00 202.56 203.30 205.18	0.55 2.06 1.95 2.00 2.00 2.00 2.00 1.25 1.56 0.74 1.88	0.45% 0.04%	5.14% 0.30%	2.80% 0.49%	0.05% 500	26.7g/t 2.1	343 34	477 163	4 5	13.85 7.55
							231	1529	1484	440	2.5	6	111	4	13.47
							38	805	516	300	2.1	6	93	4	6.86
							46	495	593	430	0.8	8	77	4	7.20
							25	1390	668	460	1.3	6	64	4	3.61
							289	5400	6100	420	3.3	12	126	6	4.52
							32	301	466	460	0.6	14	148	6	6.43
							94	2016	1498	710	1.4	6	92	6	5.90
							91	1427	2390	610	1.1	8	116	6	3.67
							73	740	1091	400	0.9	8	105	5	6.27

FROM (M)	TO (M)	DESCRIPTION	Sampl.	FROM	TO	Length (M)	CU PPM	PB PPM	ZN PPM	BA PPM	AS PPM	AU PPB	AG PPM	NI PPM	Cu/Zn RATIO	
		<p>Mineralization &amp; Alteration 3-5% pyrite with up to 1% combined sphalerite, galena and minor chalcocopyrite in semi-massive bands to 40cm, generally to 2cm, minor pyrrhotite with depth, increasing sulphides and thickness of bands with depth.</p> <p>Moderately chloritized as pervasive to irregular stringers with sulphide bands, weakly calcareous and minor calcite microveins parallel foliation, 1% quartz veins generally to 8cm, often boudinaged and/or folded parallel foliation, with chlorite selvages and coarse grained sulphides along margins or fractures.</p> <p>187.19-191.75m semi-massive sulphide bands to 4cm 191.75-202.56m semi-massive sulphide bands to 6cm 202.56-206.99m semi-massive sulphide bands to 40cm</p>														
		<p>205.18- 205.58 SEMI-MASSIVE SULPHIDES 25% pyrite with some pyrrhotite, 4% sphalerite, 1% galena and minor chalcocopyrite, local massive bands to 4cm</p>	VA14558	205.18	206.35	1.17	1051	1.45%	1.94%	110	6.8	97	439	5	5.14	
		<p>205.58- 206.22 INTERMEDIATE ASH TUFF 5% massive sulphide bands to 4cm, mainly pyrite and sphalerite, lesser galena, minor chalcocopyrite</p>														
		<p>206.22- 206.35 MASSIVE SULPHIDES 60% pyrite with some pyrrhotite, 5% sphalerite, 2% galena, minor chalcocopyrite, brecciated</p>	VA14559	206.35	206.99	0.64	294	507	925	490	0.8	6	92	4	24.12	
206.99	207.41	<p>VA14560 MASSIVE SULPHIDES 4m 70% pyrite with pyrrhotite, 10% sphalerite, 3% galena, 0.5% chalcocopyrite in strongly chloritized and weakly sericitized intermediate volcanic (?).</p>	VA14560	206.99	207.41	0.42	0.86%	7.29%	5.12%	0.01%	36.3g/t	343	602	3	14.38	



FROM (M)	TO (M)	DESCRIPTION	Sampl.	FROM	TO	Leng. (M)	CU PPM	PB PPM	ZN PPM	BA PPM	AG PPM	AU PPB	AS PPM	NI PPM	Cu/Zn RATIO
207.41	221.35	CAB 66' lower contact Footwall chloritized for 20cm  FELSIC ASH TUFF 4A Medium green, fine grained, massive bedded, moderately to strongly foliated. 5-10% chloritic fragments to 0.5mm, minor quartz crystals and eyes to 1mm in chloritic matrix. 10% felsic tuff intervals to 3.0m thick increasing with depth.  Structure CAB foliation 60' @ 211.8m, 63' @ 221.2m  Mineralization & Alteration Moderately chloritized as thin stringers along foliation and as aggregates in matrix, weakly calcareous with microveins parallel foliation. Weak hornfels with 3% spotted muscovite-biotite aggregates. 5-7% pyrite, minor pyrrhotite, minor sphalerite, galena, chalcocopyrite in bands to 3cm, 7% pyrite in lower 4.5m. Sulphide bands @ 214.52m (2cm), 214.81m (2cm), 216.43m (3cm), 218.81m (3cm) 214.14-214.30 brecciated quartz veins	VA14561	207.41	209.40	1.99	334	2356	2565	640	1.8	6	86	6	11.52
		209.30- 212.30	VA14562	209.40	211.40	2.00	278	2613	2175	920	1.6	6	93	7	11.33
		FELSIC ASH TUFF Light green/grey, strongly foliated, 1% quartz eyes to 2mm in sericitic fine grained matrix Moderately chloritized	VA14563	211.40	212.87	1.47	325	0.54%	0.50%	720	3.1	6	113	7	6.10
			VA14564	212.87	214.42	1.55	433	0.58%	0.79%	740	3.3	59	412	5	5.20
			VA14565	214.42	216.51	2.09	297	2513	0.40%	810	1.6	8	225	4	6.91
			VA14566	216.51	219.05	2.54	1355	0.66%	0.62%	850	3.4	57	738	4	17.94
			VA14457	219.05	221.59	2.54	151	1942	2433	870	1.2	17	195	3	5.84
221.35	222.56	FELSIC ASH TUFF 4A Light grey, fine grained, massive bedded, strongly foliated, 1% quartz crystals and eyes in sericitic matrix.	VA14458	221.59	222.56	0.97	134	1941	1899	1100	0.9	39	150	5	6.59

FROM (M)	TO (M)	DESCRIPTION	Sampl.	FROM	TO	Length (M)	CU PPM	PB PPM	ZN PPM	BA PPM	AG PPM	AU PPB	AS PPM	NI PPM	Cu/Zn RATIO	
222.56	224.80	Structure CAB sulphide band 70' @ 221.9m  Mineralization & Alteration 7% pyrite, weakly sericitic and calcareous.  FELSIC ASH TUFF 4A Medium grey to brown, fine grained, massive bedded, strongly foliated, 5% chlorite-sericite aggregates to 1mm, 15% mica stringers and aggregates in sericitic matrix.  Mineralization & Alteration 4% pyrite, weakly chloritized increasing with depth.	VA14459	222.56	224.80	2.24	134	1704	2073	1100	1	36	172	4	6.07	
224.80	230.00	FELSIC ASH/DUST TUFF 4A Light grey, fine grained to aphanitic, massive bedded, strongly foliated. 1% quartz crystals and eyes to 0.5mm, 5% white aggregates (feldspar ?) in siliceous-sericitic matrix. Weak hornfels with up to 10% mica wisps to stringers parallel foliation.  Structure CAB 71' foliation @ 228.2m  Mineralization & Alteration 5% pyrite to rare 1cm bands with chlorite and quartz, weakly chloritic and calcareous.	VA14460 VA14461 VA14462	224.80 226.00 228.00	226.00 228.00 230.00	1.20 2.00 2.00	183 105 216	1343 1043 2575	1758 1476 2178	1100 990 980	1 0.6 1.3	48 56 57	154 212 281	5 5 5	9.43 6.64 9.02	
230.00	247.38	FELSIC ASH TUFF 4A Medium green/grey, fine grained, massive bedded, weakly foliated. 5% chlorite wisps to 0.5mm, minor quartz in sericitic-chloritic matrix.  Structure CAB sulphide bands 66' @ 231.10m, 81' @ 236.69m, 61' @ 241.70m  Mineralization & Alteration 5% pyrite, 0.5% sphalerite, minor galena and	VA14567	230.00	231.00	1.00	352	0.33%	0.37%	740	2.3	82	235	10	8.23	









HOLE NUMBER: BC-90-01

## GEOCHEM. SHEET

DATE: 26-February-1991

Sample	From (M)	To (M)	Length (M)	SiO2 wt%	TiO2 wt%	Al2O3 wt%	Fe2O3 wt%	MgO wt%	CaO wt%	Na2O wt	K2O wt%	P2O5 wt%	MnO wt%	Rb ppm	Sr ppm	Y ppm	Zr ppm	Ni ppm	Ba ppm	Cu ppm	Zn ppm	LOI wt%	Cu/Zn Ratio	Zn/Na Ratio	ISHIKA A.I.	ALUM A.I.	ACNK A.I.
VB09651	16.00	19.00	3.00	60.09	0.49	15.75	6.02	5.16	3.55	3.22	1.50	0.06	0.07	32.0	118	20	90	20	428	20	61	4.34	20	0.2	50	190	1.2
VB09652	24.00	27.00	3.00	49.80	0.61	19.62	5.36	4.39	5.70	2.58	4.05	0.08	0.08	88.0	217	20	136	20	976	62	72	7.36	62	0.3	50	159	1.0
VB09653	42.00	45.00	3.00	53.85	0.58	18.84	7.89	3.61	1.96	3.04	3.56	0.07	0.05	78.0	169	20	111	20	983	20	94	6.35	20	0.3	59	220	1.5
VB09654	59.00	62.00	3.00	59.83	0.46	14.89	5.92	2.68	4.39	0.32	3.61	0.06	0.09	84.0	177	20	93	20	729	20	131	7.38	20	4.1	57	179	1.2
VB09655	68.00	71.00	3.00	60.38	0.54	17.20	4.62	2.72	3.79	3.15	2.19	0.08	0.06	47.0	220	20	110	20	729	20	43	5.02	20	0.1	41	188	1.2
VB09656	81.00	84.00	3.00	58.40	0.63	20.04	5.59	2.89	1.46	5.09	2.14	0.09	0.03	45.0	133	20	104	20	866	20	52	3.95	20	0.1	43	231	1.5
VB09657	90.75	93.75	3.00	62.27	0.52	17.56	6.43	0.85	0.95	0.45	4.65	0.07	0.02	107.0	94	20	93	20	1269	24	53	6.07	24	1.2	80	290	2.3
VB09658	105.00	108.00	3.00	53.45	0.61	19.62	9.20	1.69	1.81	1.35	4.37	0.06	0.03	113.0	210	20	111	20	1141	31	52	7.71	31	0.4	66	261	1.9
VB09659	117.00	120.00	3.00	61.25	0.51	16.42	5.33	5.07	1.55	0.67	3.57	0.07	0.11	80.0	119	20	89	20	1077	20	101	5.56	20	1.5	80	284	2.1
VB09823	120.00	122.00	2.00	56.83	0.48	15.85	7.75	5.70	1.26	0.25	3.22	0.06	0.11	81.0	98	20	98	20	1004	81	1550	7.01	81	62.0	86	335	2.6
VB09824	122.00	125.00	3.00	52.39	0.61	19.32	10.05	5.83	0.45	0.13	3.52	0.07	0.11	87.0	68	20	123	20	1103	1910	195	6.81	1910	15.0	94	471	4.0
VB09825	125.00	128.00	3.00	58.18	0.50	16.51	7.88	7.44	0.51	0.01	2.55	0.07	0.13	69.0	40	20	92	20	794	56	116	6.07	56	116.0	95	538	4.5
VB09660	128.00	131.00	3.00	58.13	0.56	17.25	7.77	6.23	0.30	0.10	3.26	0.07	0.10	78.0	49	20	73	20	908	50	544	6.58	50	54.4	96	471	4.1
VB09826	131.00	132.40	1.40	57.82	0.56	18.03	6.69	6.35	0.42	0.01	3.62	0.06	0.11	98.0	32	20	89	20	925	24	508	5.97	24	508.0	96	445	3.8
VB09661	134.52	136.13	1.61	72.53	0.37	11.15	5.97	0.35	0.46	0.01	2.95	0.04	0.03	94.0	42	20	75	20	953	1340	5800	4.44	1340	5800.0	88	326	2.8
VB09662	141.91	143.85	1.94	66.36	0.45	14.30	6.64	4.39	0.52	0.01	2.56	0.06	0.14	68.0	42	20	69	20	887	228	247	4.66	228	247.0	93	463	3.8
VB09827	144.94	147.00	2.06	69.41	0.42	13.23	5.59	1.12	0.98	0.01	3.20	0.04	0.06	98.0	51	20	80	20	1042	55	57	5.53	55	57.0	81	316	2.5
VB09663	147.00	148.90	1.90	63.91	0.46	15.32	6.51	4.60	0.69	0.01	2.97	0.07	0.15	87.0	51	20	73	20	1055	34	160	5.41	34	160.0	92	417	3.4
VB09828	148.90	152.00	3.10	59.72	0.52	16.08	7.36	6.36	0.49	0.01	2.86	0.07	0.19	88.0	37	20	93	20	1112	59	1740	6.06	59	1740.0	95	479	4.0
VB09829	152.00	155.00	3.00	60.10	0.52	17.11	7.22	5.03	0.30	0.01	3.45	0.06	0.10	108.0	36	20	89	20	1217	54	886	5.71	54	886.0	96	455	4.0
VB09664	173.00	176.00	3.00	61.40	0.47	16.69	6.38	5.08	0.65	0.06	3.55	0.06	0.17	110.0	53	20	75	20	1134	31	607	5.50	31	101.2	92	392	3.3
VB09830	176.00	180.00	4.00	58.63	0.44	15.22	7.47	7.44	0.61	0.01	2.58	0.05	0.23	90.0	27	20	79	20	842	38	735	6.17	38	735.0	94	476	3.9
VB09831	180.00	183.00	3.00	64.15	0.44	14.28	6.23	6.19	0.48	0.01	2.42	0.04	0.17	82.0	22	20	80	20	785	26	518	5.28	26	518.0	95	491	4.1
VB09832	183.00	186.31	3.31	63.58	0.47	14.44	6.72	5.76	0.62	0.01	2.46	0.06	0.20	72.0	23	20	86	20	822	330	1110	5.60	330	1110.0	93	467	3.8
VB09833	187.19	190.00	2.81	56.25	0.47	14.82	9.60	10.51	0.25	0.01	1.12	0.06	0.31	42.0	20	20	80	20	365	410	2700	6.23	410	2700.0	98	1059	8.7
VB09834	190.00	192.00	2.00	65.93	0.43	13.04	6.35	6.88	0.27	0.01	1.93	0.06	0.25	57.0	20	20	76	20	626	21	188	4.65	21	188.0	97	590	5.0
VB09835	192.00	195.00	3.00	67.26	0.41	12.09	6.20	7.73	0.20	0.01	1.29	0.06	0.24	63.0	20	20	70	20	444	20	225	4.54	20	225.0	98	806	6.8
VB09665	195.00	198.00	3.00	65.05	0.43	12.18	7.07	8.85	0.24	0.01	1.05	0.05	0.26	32.0	20	20	64	20	345	20	374	4.86	20	374.0	98	937	7.7
VB09666	213.00	216.00	3.00	57.14	0.48	14.83	9.13	7.79	1.37	0.01	1.91	0.07	0.38	61.0	36	20	89	20	688	176	3490	6.08	176	3490.0	88	451	3.2
VB09667	233.00	236.00	3.00	66.97	0.41	12.93	6.53	6.25	0.20	0.01	1.97	0.05	0.19	58.0	32	20	78	20	696	105	845	4.51	105	845.0	98	593	5.1
VB09668	249.00	252.00	3.00	63.17	0.51	15.40	6.58	4.17	0.51	0.27	3.77	0.07	0.11	103.0	49	20	94	20	1265	77	150	5.49	77	5.6	91	338	2.8
VB09669	254.00	257.00	3.00	62.41	0.46	15.68	6.03	3.56	0.99	0.09	3.86	0.06	0.07	105.0	79	20	81	20	1266	47	169	6.99	47	16.8	87	317	2.6
VB09670	273.00	276.00	3.00	55.02	0.39	15.27	6.12	5.66	5.53	0.22	3.62	0.06	0.23	94.0	108	20	83	20	1234	41	177	6.21	41	8.1	62	163	1.1
VB09671	290.83	293.22	2.39	65.03	0.43	15.64	4.60	3.86	1.57	2.90	2.41	0.06	0.05	81.0	112	20	83	20	735	23	65	3.37	23	0.2	58	227	1.5
VB09672	303.00	306.00	3.00	58.68	0.41	15.15	5.37	3.19	6.92	0.63	3.23	0.06	0.10	82.0	172	20	94	20	459	27	47	6.16	27	0.8	46	141	0.9

HOLE NUMBER: BC-90-01

GEOCHEM. SHEET

PAGE: 1

FALCONBRIDGE LTD  
 DIAMOND DRILL LOG  
 Property : BIRK CREEK (1990)

Hole # : BC-90-02      Zone # : CENTRAL      Contractor : BURWASH ENTERPRISES      Date started :10/ 7/1990  
 Township: KANLOOPS      Range:      Claim # :BLUFF 1      Date completed:10/ 9/1990  
 Lot :

Level : SURFACE      Section: 227+90M      Location :  
 Collar coordinate :      Line : 227+90 M      Latitude: 5691650.00 N      Azimuth: 55° 0' 0"  
    Station: 407+25 E      Departure: 296640.00 M      Dip : -60° 0' 0"  
 Reference frame :      Elevation: 1302.00      Length : 236.22 M

Surveyed by: SPERRY-SUN

Deviation tests :

Depth	Dip	Azimuth
90.52 M	-62° 0' 0"	52° 0' 0"
142.34 M	-64°30' 0"	58° 0' 0"
191.10 M	-61° 0' 0"	56° 0' 0"
218.54 M	-66°30' 0"	53° 0' 0"

Remarks :

Water flow :  
 Cimented :

Plugged:  
 Core size: NQ



FROM (M)	TO (M)	DESCRIPTION	Sampl.	FROM	TO	Leng. (M)	CU PPM	PB PPM	ZN PPM	BA PPM	AG PPM	AU PPS	AS PPM	NI PPM	Cu/Zn RATIO
0.00	16.20	OVERBURDEN O/B													
16.20	26.70	ARGILLACEOUS FELSIC ASH TUFF 4A0 Fine to medium grained, medium to light grey-green. Trace to 1%, <2mm quartz phenocrysts, locally concentrated to 3%. Occasional, 1-2%, less than 3cm elongated chert felsic fragments orientated parallel to foliation. Weakly chloritic-sericitic matrix with up to 5% intercalated argillaceous component and locally up to 15% as depicted by darker bands. Strongly argillaceous between 24.0-25.0 metres (increasing downhole).	VA14579 VA14580 VA14581 VA14582 VA14583 VA14584 VA14585 VA14586 VA14587 VA14588 VA14589	16.20 17.00 18.00 19.00 20.00 21.00 22.00 23.00 24.00 25.00 25.50	17.00 18.00 19.00 20.00 21.00 22.00 23.00 24.00 25.00 25.50 26.70	0.80 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 0.50 1.20	896 488 348 219 185 107 58 127 209 449 126	8100 1165 1305 752 1300 321 637 330 566 5200 322	4100 1509 1214 2123 1740 559 1474 586 1177 4400 302	810 940 770 820 830 820 970 840 800 650 750	6.9 2 1.9 1.4 2 1.1 1.1 1.1 1.5 5.8 1.2	34 32 23 26 16 44 29 12 29 33 22	81 111 63 55 66 54 37 49 80 112 47	10 11 9 12 20 14 22 20 31 28 12	17.93 24.44 22.28 9.35 9.61 16.07 5.63 17.81 15.08 9.26 29.44
		25.25-25.30 : CHERTY FELSIC TUFFITE Fine grained, light grey, hard, with trace to 0.5% sphalerite/galena and 1-2% pyrite along upper contact. Sharp contacts at 70 degrees to core axis.													
		MINERALIZATION & ALTERATION : Trace to 2% fracture controlled and disseminated pyrite with occasional up to 0.5 cm pyrite aggregates (cubes). Trace to 0.25% sphalerite and galena at 16.3m, 16.8m, 17.7m, 19.6m, 20.0m, 20.3m, 22.0m, 2.3m, 25.25m.													
		Weak to moderate pervasive sericitization													
		STRUCTURE : Faults: 23.3m: Fault slip with gouge at 35 degrees CAB 24.3m: Fault slip with gouge at 40 degrees CAB 24.5m: 5 cm fault with gouge at 83 degrees CAB 26.3m: Fault slip with gouge at 50 degrees CAB													
		Foliations: 19.0m: 70 degrees CAB 23.0m: 75 degrees CAB 26.0m: 80 degrees CAB													
26.70	36.60	WEAKLY ARGILLACEOUS FELSIC LAPILLI-ASH TUFF 4B0 Fine to medium grained, medium to light grey-green, decitic lapilli ash tuff. Up to 25% elongated felsic fragments	VA14590 VA14591 VA14592 VA14593	26.70 27.50 28.50 29.50	27.50 28.50 29.50 30.50	0.80 1.00 1.00 1.00	426 398 296 184	729 1026 638 294	684 1071 589 313	870 960 1100 1200	2.4 2.7 1.9 1.2	26 21 23 28	91 56 72 72	7 4 6 6	38.38 27.09 33.45 37.02

FROM (M)	TO (M)	DESCRIPTION	Sampl.	FROM	TO	Length (M)	CU PPM	PB PPM	ZN PPM	BA PPM	AG PPM	AU PPB	AS PPM	NI PPM	Cu/Zn RATIO
		stretched parallel to foliation imparting a streak, discontinuous banded appearance. Poorly visible fragment outlines. Traces to 1%, <1mm quartz phenocrysts. Weak to moderately sericitic/chloritic matrix with up to 5%, locally stronger, intercalated argillaceous component. Trace - 3% wispy chlorite. Trace to 3% disseminated/fracture controlled pyrite mineralization and local up to 1 cm pyrite aggregates. Poorly defined (gradational) upper and lower contact. Strongly quartz veined from 30.7-31.2m with local quartz flooding along vein margins.  MINERALIZATION & ALTERATION: 30.7-31.2m: Quartz veins with 2-3% pyrite, trace to 0.25% galena, and trace sphalerite.  STRUCTURE : Foliation 37.0m: 72 degrees CAB	VA14594	30.50	31.50	1.00	1368	2900	2922	780	7.1	32	81	6	31.89
			VA14595	31.50	32.50	1.00	400	1683	2485	930	3.6	41	139	6	13.86
			VA14596	32.50	33.50	1.00	131	427	736	1100	1.3	16	36	6	15.11
			VA14597	33.50	34.50	1.00	101	275	1073	1100	1.1	14	41	7	8.60
			VA14598	34.50	35.50	1.00	150	965	786	1000	2.1	24	52	8	16.03
			VA14599	35.50	36.60	1.10	108	289	461	960	1.3	19	41	6	18.98
36.60	38.50	FINE GRAINED FELSIC ASH TUFF 4A Fine grained, medium to light grey "dacitic" ash tuff. Occasional, up to 1.5 cm, elongated cherty felsic fragments stretched parallel to foliation with up to 15% fragments over the last 0.5 metre. Weakly chloritic, traces wispy chlorite. Trace to 1% fine disseminated pyrite.  MINERALIZATION & ALTERATION: 36.6-38.5: Weak to moderate pervasive sericitization.  STRUCTURE : Foliation 37.0m: 72 degrees CAB.	VA14600	36.60	37.70	1.10	144	338	434	980	1.6	22	55	7	24.91
			VA14601	37.70	38.50	0.80	88	219	501	960	1.1	23	48	8	14.94
38.50	55.00	WEAKLY ARGILLACEOUS FELSIC ASH TUFF 4A0 Medium grained to locally finer grained, medium to light grey-green ash tuff. Local streaky	VA14602	38.50	39.50	1.00	85	92	349	890	1	26	52	9	19.59
			VA14603	39.50	40.50	1.00	84	715	1680	940	1.1	14	33	8	4.76
			VA14604	40.50	41.50	1.00	108	833	2353	960	1.2	16	38	9	4.39



FROM (M)	TO (M)	DESCRIPTION	Sampl.	FROM	TD	Leng. (M)	CU PPM	PB PPM	ZN PPM	BA PPM	AG PPM	AU PPB	AS PPM	NI PPM	CU/Zn RATIO
55.00	66.60	(cross-cutting foliation). ARGILLACEOUS FELSIC LAPILLI TUFF 4B0 Similar to previous from 26.7-36.8m. Fine to medium grained, medium to light grey-green/brown "dacitic" lapilli-ash tuff. Variably colour banded appearance of highly stretched lapilli fragments parallel to foliation. Up to 25% stretched "dacitic" to rhyolitic lapilli. Fragment outlines poorly defined with overall mottled-banded appearance. Sericitic/chloritic matrix with minor intercalated argillaceous component and up to 1% chlorite wisps. Rare, up to 2%, <1.5mm quartz phenocrysts. Trace - 3% fine disseminated/fracture controlled (wispy) pyrite increasing down hole. Occasional, less than 2cm wide pyrite bands or "stringers" with local chlorite developed along pyritic zones. Weak to very weak biotite development commonly associated with pyrite "wisps" (discontinuous fracture- filling pyrite).  MINERALIZATION & ALTERATION 61.8-61.9m: Pyritic "stringers" 6% pyrite, trace - 0.25% sphalerite/traces chlorite. 63.2-63.3m: Pyritic "stringer" - 5-10% pyrite, trace - 0.25% sphalerite. 65.9m: 2cm pyrite "stringer" (7% pyrite, trace sphalerite).  Weak pervasive sericitization, local fracture controlled carbonate alteration.  STRUCTURE Foliation: 57.0m: 64 degrees CAB. 63.0m: 75 degrees CAB. 66.0m: 74 degrees CAB.	VA14618 VA14619 VA14620 VA14621 VA14622 VA14623 VA14624 VA14625 VA14626	55.00 56.50 58.00 59.50 61.00 62.00 63.00 64.50 65.50	56.50 58.00 59.50 61.00 62.00 63.00 64.50 65.50	1.50 1.50 1.50 1.50 1.00 1.00 1.50 1.00 1.10	80 77 71 114 74 59 141 64 101	1270 736 461 698 789 462 3700 362 320	1253 674 762 954 1402 483 3800 390 1337	1200 1100 1100 1200 1200 1200 1200 1100 1300	1.5 1.3 0.9 1 1.2 0.9 3.9 1 1.2	32 26 30 28 39 12 60 38 33	87 55 97 82 213 54 138 60 121	5 5 5 6 5 7 7 5 5	6.00 10.25 8.52 10.67 5.01 10.89 3.58 14.10 7.02
66.60	84.50	FELSIC LAPILLI - ASH TUFF 4B Similar to previous without argillaceous component. Light to medium grey, brown, banded appearance. Up to 30%, <5cm felsic fragments strongly stretched parallel to foliation. Banded appearance - suggestive of lapilli with	VA14627 VA14628 VA14629 VA14630 VA14631 VA14632	66.60 68.00 69.00 70.00 70.50 71.50	68.00 69.00 70.00 70.50 71.50 72.00	1.40 1.00 1.00 0.50 1.00 0.50	63 48 52 129 96 180	490 363 405 4700 894 1463	654 422 631 10400 743 3100	1200 1200 1200 1200 1200 1200	1.3 1.1 1.2 8 1.6 2.5	36 37 49 88 88 75	127 119 163 275 2000 234	6 4 5 5 6 5	8.79 10.21 7.61 1.23 11.44 5.49



FROM (M)	TO (M)	DESCRIPTION	Sampl.	FROM	TO	Leng. (M)	CU PPM	PB PPM	ZK PPM	BA PPM	AG PPM	AU PPM	AS PPM	NI PPM	Cu/Zn RATIO	
97.60	102.75	<p>STRUCTURE Foliation: 97.0m: 68 degrees CAB.</p> <p>Fault: 92.8-93.0m: with fault gouge at 40 degrees CAB crosscutting foliation. 95.6m: Fault slip @ 40 degrees CAB crosscutting foliation.</p> <p>CHLORITIC FELSIC ASH TUFF 4A Fine to medium grained, medium to light grey-green dacitic ash tuff. Occasional, up to 3%, &lt;2mm quartz phenocrysts. Weak sericitic/chloritic matrix with weak brownish, wispy biotite development. Trace to 3% fine disseminated/fracture controlled pyrite. Pyrite along fractures (micro-fractures) is often discontinuous and resembles pyritic wisps. Moderate to well developed foliation.</p> <p>MINERALIZATION &amp; ALTERATION: 97.6-102.75m: Weak pervasive sericitization. 97.6-102.75m: Weak fracture controlled carbonatization.</p>														
102.75	110.30	<p>STRUCTURE Foliation: 98.0m: 68 degrees CAB.</p> <p>INTERMEDIATE ASH TUFF 3A Fine grained, medium green-grey andesitic ash tuff with minor intercalated argillaceous component, tending to be concentrated in local darker bands. Up to 4%, &lt;2cm strongly stretched quartz and/or quartz-carbonate clots (fragments?), and local less than 1.5cm, dark green chloritic fragments (fiamme?). Trace to 3% fine disseminated pyrite from 107.2-107.6m. Moderately chloritic - weakly sericitic fine grained matrix. Moderate to well developed foliation.</p> <p>MINERALIZATION &amp; ALTERATION: 107.2-110.3m: up to 20% fine grained pyrite within a quartz-carbonate-chlorite altered</p>	VA14638 VA14639 VA14640	107.00 107.80 109.00	107.80 109.00 110.30	0.80 1.20 1.30	114 67 49	607 461 156	269 682 220	560 890 1200	4.2 1.5 1	207 56 65	166 40 36	4 5 5	31.40 8.95 18.22	

















Sample	From (M)	To (M)	Length (M)	SiO2 wt%	TiO2 wt%	Al2O3 wt%	Fe2O3 wt%	MgO wt%	CaO wt%	Na2O wt%	K2O wt%	P2O5 wt%	MnO wt%	Rb ppm	Sr ppm	Y ppm	Zr ppm	Ni ppm	Ba ppm	Cu ppm	Zn ppm	LOI wt%	Cu/Zn Ratio	Zn/Mn Ratio	ISHIKI A.I.	ALUM A.I.	ACNK A.I.
VB09676	19.00	22.00	3.00	63.77	0.44	14.37	8.39	5.16	0.62	0.01	2.32	0.06	0.15	56.0	31	21	85	20	890	145	534	4.82	145	534.0	92	487	3.9
VB09677	27.00	30.00	3.00	70.32	0.41	14.04	5.64	2.34	0.38	0.02	2.91	0.04	0.09	79.0	39	20	78	20	1257	172	376	3.67	172	188.0	93	424	3.6
VB09678	36.60	38.50	1.90	65.75	0.43	14.79	7.33	4.17	0.39	0.01	2.72	0.05	0.15	76.0	33	20	92	20	1120	105	427	4.30	105	427.0	95	474	4.0
VB09679	38.50	41.50	3.00	66.62	0.46	15.49	6.03	3.73	0.61	0.09	3.08	0.05	0.13	88.0	46	20	85	20	1175	61	806	3.96	61	89.6	91	410	3.4
VB09680	55.00	58.00	3.00	62.27	0.50	16.29	6.30	4.66	2.41	0.13	3.25	0.06	0.29	90.0	58	26	66	20	1230	40	683	3.98	40	52.5	76	281	2.0
VB09681	67.00	70.00	3.00	55.81	0.44	14.66	9.64	4.66	3.72	0.09	3.18	0.06	0.26	77.0	65	20	71	20	1250	54	1030	6.30	54	114.4	67	210	1.4
VB09682	84.50	87.50	3.00	55.35	0.61	18.29	6.70	8.55	1.15	0.07	2.94	0.08	0.12	78.0	60	20	95	20	1333	27	204	6.40	27	29.1	90	440	3.4
VB09683	91.00	94.00	3.00	58.77	0.52	16.31	7.29	5.66	1.78	0.08	3.25	0.08	0.11	80.0	64	20	90	20	1251	23	121	5.78	23	15.1	83	319	2.4
VB09684	98.00	101.00	3.00	64.43	0.41	15.58	5.43	4.50	3.74	0.14	3.11	0.05	0.15	77.0	100	20	94	20	1139	23	164	2.59	23	11.7	66	223	1.5
VB09685	104.00	107.00	3.00	64.12	0.41	15.17	5.54	4.07	3.14	1.96	2.30	0.05	0.15	53.0	95	20	92	20	1118	69	260	3.22	69	1.3	56	205	1.3
VB09686	118.00	121.00	3.00	65.18	0.38	15.28	4.87	3.62	2.90	2.69	2.09	0.05	0.09	61.0	99	20	105	20	942	24	100	3.10	24	0.4	51	199	1.3
VB09687	138.00	141.00	3.00	61.01	0.42	15.61	5.54	3.10	4.51	2.62	2.82	0.05	0.11	75.0	130	20	82	20	961	37	48	4.17	37	0.2	45	157	1.0
VB09688	160.70	163.70	3.00	58.06	0.42	15.01	5.53	2.85	6.16	1.08	2.56	0.05	0.09	66.0	143	20	89	20	751	63	52	7.75	63	0.5	43	153	1.0
VB09689	182.00	184.00	2.00	53.97	0.43	15.45	4.98	2.85	6.34	0.01	2.13	0.06	0.10	59.0	139	20	81	20	334	28	32	13.35	20	32.0	44	182	1.1
VB09690	191.00	194.00	3.00	59.68	0.42	15.39	5.45	2.62	5.66	1.16	3.47	0.05	0.08	96.0	164	20	97	20	522	56	39	5.61	56	0.3	47	150	1.0
VB09691	203.00	206.00	3.00	60.42	0.42	15.49	5.20	2.63	4.79	1.52	2.54	0.06	0.07	66.0	136	20	88	20	581	20	42	6.83	20	0.3	45	175	1.1
VB09692	220.00	223.00	3.00	60.23	0.40	15.31	5.51	2.91	5.24	0.96	2.71	0.05	0.09	68.0	123	20	91	20	539	20	41	8.39	20	0.4	48	172	1.1
VB09693	226.00	229.00	3.00	62.94	0.47	15.39	5.84	3.61	2.58	0.64	1.76	0.06	0.08	79.0	109	20	93	20	814	21	40	5.13	21	0.6	63	309	2.0

FALCOMBRIDGE LTD  
DIAMOND DRILL LOG  
Property : BIRK CREEK (1990)

Hole # : BC-90-03      Zone # : CENTRAL      Contractor : BURWASH ENTERPRISES      Date started :10/10/1990  
Township: KAMLOOPS      Range:      Claim # :BET 1      Date completed:10/12/1990  
Lot :      Section: 220+05N      Location :  
Level : SURFACE      Collar coordinate :      Line : 220+05 N      Latitude: 5690730.00 M      Azimuth: 55° 0' 0"  
Reference frame :      Station: 402+75 E      Departure: 296680.00 E      Dip : -55° 0' 0"  
Elevation: 1175.00      Length : 203.30 M

Surveyed by: SPERRY-SUN

Deviation tests :

Depth	Dip	Azimuth
93.50 M	-57°30' 0"	53° 0' 0"
137.16 M	-62° 0' 0"	48° 0' 0"
203.30 M	-67°30' 0"	44° 0' 0"

Remarks :

Water flow :  
Cimented :

Plugged:  
Core size: NA

Logged by : A. D. MCLAUGHLIN

Date logged:10/12/1990

Hole # : BC-90-03





FROM (M)	TO (M)	DESCRIPTION	Sampl.	FROM	TO	Leng. (M)	CU PPM	PB PPM	ZN PPM	BA PPM	AG PPM	AU PPB	AS PPM	NJ PPM	Cu/Zn RATIO
17.00	20.42	<p>flakes 0.25mm in sericitic-siliceous felsic matrix, argillite most common in unit centre. 14.43-14.49m: Cherty Tuff</p> <p>Mineralization &amp; Alteration: Local zones of weathered rock/increasing fractured broken core. Minor pyrite, increases to 2% in lower 50cm, 5% quartz veins in lower 50cm with minor galena and sphalerite.</p> <p>Structure: CAB Cherty tuff bed 61' @ 14.43m CAB - foliation 62' @ 14.80m CAB - foliation 66' @ 16.70m CAB Lower contact 61'</p> <p>QUARTZ PHYRIC FELSIC ASH TUFF 4AA Light gray to white, fine grained. Massive to strongly foliated. 5-20% broken, angular quartz crystals &lt;0.25mm generally, in sugary siliceous groundmass. 15% dark grey argillite to argillaceous felsic tuff bands and stringers &lt;1cm</p> <p>Mineralization &amp; Alteration: 2% pyrite as stringers and along fractures. Weak sericite along foliation with minor chlorite. 18.78-19.03m: 4% pyrite, 1% sphalerite, 0.5% galena, minor calcopyrite in strong chloritized moderately siliceous wallrock. Quartz vein near base.</p> <p>Structure: Moderate cataclastic texture with local fragments, contorted foliation. CAB foliation 50' @ 18.1m. CAB foliation 62' @ 20.0m. CAB Lower contact 60', thin gouge.</p> <p>20.10- 20.29 SEMI-MASSIVE SULPHIDES Occur in Quartz Phyric Ash tuff as above except strong chloritization.</p>	VA14451 VA14452	18.57 20.07	20.07 20.42	1.50 0.35	207 6800	2064 17800	4575 50300	490 160	4.4 36.6	52 326	90 284	20 30	4.33 11.91



FROM (M)	TO (M)	DESCRIPTION	Sampl.	FROM	TO	Leng. (M)	CU PPM	PB PPM	ZN PPM	BA PPM	AG PPM	AU PPB	AS PPM	NI PPM	Cu/Zn RATIO	
38.89	44.65	<p>Structure:            CAB - foliation 60° @ 26.2m            CAB - foliation 59° @ 33.5m</p> <p>Broken core common with limonite.</p> <p>QUARTZ PHYRIC FELSIC ASH TUFF 4AA            Light grey to brown-green. Massive bedded, strong foliation.            5-20% round-elongate, quartz eyes &lt;1mm, rarely 4mm, in fine grained-aphantic sericitic-siliceous matrix.            41.35-41.43m Cherty Tuff</p> <p>Mineralization &amp; Alteration:            Strong pervasive limonite alteration with chlorite wisps, stringers and after fragments, approximately 80% of unit.</p> <p>Structure:            Strong cataclastic texture with up to 40% fragments in fine grained groundmass.            CAB-foliation 55° @ 43.2m.            CAB-foliation 67° @ 44.3m.            Broken core, minor gouge commonly with limonite and chlorite altered zones.</p>														
44.65	52.83	<p>ARGILLITE 5IM            Dark grey, strongly foliated.            40% light grey siliceous felsic dust-ash tuff round-elongate and angular fragments to 2cm wide, in argillite groundmass, rare band of felsic tuff to 30cm.</p> <p>Mineralization &amp; Alteration:            Minor pyrrhotite, pyrite, strongly graphitic, 1% quartz veins and pods, weak sericite after larger felsic fragments.            50.66-50.84m: Semi-massive pyrrhotite with quartz veins, siliceous wallrock.</p> <p>Structure:            Strongly sheared.</p>	VA14454 VA14455 VA14456 VA14366	44.65 46.65 48.65 50.65	46.65 48.65 50.65 52.83	2.00 2.00 2.00 2.18	140 87 72 294	132 57 30 141	370 230 179 333	1100 850 990 740	0.9 0.6 0.4 1.3	8 7 3 13	3 14 27 309	42 45 50 60	27.45 27.44 28.69 46.89	

FROM (M)	TO (M)	DESCRIPTION	Sempl.	FROM	TO	Length (M)	CU PPM	PB PPM	ZN PPM	BA PPM	AG PPM	AU PPB	AS PPM	NI PPM	Cu/Zn RATIO
52.83	68.15	INTERMEDIATE ASH LAPILLI TUFF 3A Medium green, coarse grained, massive bedded. Strongly foliated, 5-20% elongate chlorite aggregates <4mm locally to 10mm, 1% quartz eyes <1mm in aphanitic to fine grained sericitic to weak siliceous matrix.  Mineralization & Alteration: Minor massive sulphide bands with sphalerite, chalcopyrite and galena to 2cm parallel foliation, 3% pyrrhotite, minor pyrite. Moderately sericitic, 10% disseminated ankerite. 52.85m: 2cm massive sulphides with silicified and bleached white hangingwall, silicified footwall. 53.19m: 1cm massive sulphides off set by fracture @ CAB 20'. 57.0-57.68m: weak chlorite spotted hornfels. 62.05m: calcopyrite, pyrrhotite, along fracture 63.67-68.15m: increased pyrite to 7% with depth as irregular bands <1cm, weakly silicified and moderately sericitized, minor sphalerite and calcopyrite @ 66.17m in pyrite band, 68.09m: calcopyrite stringer.  Structure: Fractures with pyrrhotite @ CAB 10-20'. CAB-pyrite band 64' @ 66.17m. CAB-foliation 63' @ 62.9m. CAB-micro isoclinal fold 50' @ 66.06m. 65.65-66.95m: contorted foliation and local gouge, possible fold. CAB- Lower contact 65', fractured.  CAB Pyrite band 64' @ 66.17m.  56.20- 57.00 FAULT ZONE Gouge, strong limonitic alteration and in hangingwall for 1.5m with fractures.	VA14367 VA14368	52.83 55.00	55.00 57.00	2.17 2.00	439 121	682 85	1691 1129	940 780	3.7 0.7	30 21	18 28	6 7	20.61 9.68
			VA14369 VA14370	57.00 59.00	59.00 61.00	2.00 2.00	142 85	140 113	526 357	880 970	0.7 0.9	23 26	37 36	6 6	21.26 19.23



FROM (M)	TO (M)	DESCRIPTION	Sampl.	FROM	TO	Length (M)	CU PPM	PB PPM	ZN PPM	BA PPM	AG PPM	AU PPB	AS PPM	NI PPM	Cu/Zn RATIO
72.43	92.05	<p>CAB-foliation 72'@ 70.2m.            CAB-55-70' quartz stringers.            CAB-sulphide bands 90'@ 66.2m, 52'@ 69.1m,            67'@ 72.42m            CAB-fractures with chalcopyrite stringers 40 to            50' and 20'</p> <p>FELSIC LAPILLI TUFF 4B            Medium grey, massive bedded, strongly            foliated. 20% chloritic elongate to wispy lapilli            fragments typically 20x1mm rarely to 30x5mm, 0-3%            quartz crystals &lt;1mm, 5% possible feldspar            aggregates in sericitic to weakly chloritic            matrix. Very light grey felsic fragments similar            to above unit in upper 84cm and 5cm brecciated            layer at 78.56m. Weakly developed normal graded            bedding.</p> <p>Mineralization &amp; Alteration:            7% pyrite generally recrystallized as aggregates            or wisps and stringers around lapillia fragments,            minor sphalerite, calcopyrite in upper 30cm and            with thin quartz veins. 74.18-74.3m Silicified            wallrock with minor sphalerite and chalcopyrite.            Weak limonite with chlorite alteration zones up            to 10cm often occurring with fractured or sheared            interval. Weak sericite and chlorite along            fractures.            79.00-87.91m: 3-5% pyrite.</p> <p>Structure            CAB-foliation 78'@ 74.60m            CAB-foliation 75'@ 78.7m.            79.15-79.85m: fractured zone, local thin gouge at            gouge at 20-30', moderate limonite and chlorite            alteration.            80.8-82.9m: intermittent fracture zones mainly @            70-80', 0-20', limonite and weak chlorite.            CAB Chert Bed 69' @ 91.45m</p> <p>88.39- 88.76            CHERY TUFF            Medium grey-green, massive            bedded, strongly foliated. 1%            quartz crystals and fragments in</p>	VA14374 VA14375 VA14376	72.43 75.00 77.00	75.00 77.00 79.00	2.57 2.00 2.00	971 348 220	491 188 46	1992 307 256	710 740 790	3.5 1.7 0.8	50 37 33	108 71 84	6 6 6	32.77 53.13 46.22







FROM (M)	TO (M)	DESCRIPTION	Sampl.	FROM	TO	Leng. (M)	CU PPM	PB PPM	ZN PPM	BA PPM	AG PPM	AU PPB	AS PPM	NI PPM	Cu/Zn RATIO	
		<p>Weak sericite and chlorite, moderately limonitic and chloritic in fracture zones extending from fractures and foliation, local vuggy especially with quartz veins. Minor spotted chlorite hornfels zones.</p> <p>106.33-106.30m Silicified zone with stringer sphalerite, pyrite, 5mm sphalerite band at 106.56m.</p> <p>124.93-125.29m Felsic Intrusive band to 1cm folded with minor minor chalcopyrite, sphalerite</p> <p>123.40-130.10m Moderate spotted chlorite hornfels with increased shearing.</p> <p>Structure: Felsic intrusives wavy to folded and boudined, locally offset by fractures @ CAB 30-40' CAB-foliation 76' @ 106.33m CAB-foliation 70' @ 127.30m CAB-Lower contact 70'</p> <p>folded and boudined felsic intrusives. Common</p> <p>110.19- 110.40 FAULT ZONE Gouge parallel foliation @ 69'</p> <p>111.10- 111.50 FAULT ZONE Broken core and local gouge.</p> <p>120.10- 120.50 FAULT ZONE CAB-foliation 70' @ 127.30m</p>														
130.10	138.60	<p>FELSIC ASH TUFF/DUST TUFF 4AR Light grey, strongly foliated with clastic breccia, 0-5% chloritic wisps to 0.5mm, 1% quartz eyes to 1mm in sericitic to chloritic matrix.</p> <p>Mineralization &amp; Alteration: 6% disseminated to stringer pyrite, trace calcopyrite, sphalerite mainly with felsic intrusives. Minor quartz veins with sulphides. Spotted hornfels in upper 2.50m and lower 0.50m.</p>	<p>VA14384 VA14385 VA14386 VA14387</p>	<p>130.10 132.10 134.10 136.10</p>	<p>132.10 134.10 136.10 138.60</p>	<p>2.00 2.00 2.00 2.50</p>	<p>276 295 598 352</p>	<p>154 48 26 839</p>	<p>408 573 61 2664</p>	<p>710 720 910 800</p>	<p>1.8 1.4 1.4 3</p>	<p>37 49 67 36</p>	<p>56 45 47 52</p>	<p>53 28 37 40</p>	<p>40.35 33.99 90.74 11.67</p>	









SOLE NUMBER: BC-90-03

GEOCHEM. SHEET

DATE: 26-February-1991

Sample	From (M)	To (M)	Length (M)	SiO2 wt%	TiO2 wt%	Al2O3 wt%	Fe2O3 wt%	MgO wt%	CaO wt%	Na2O wt%	K2O wt%	P2O5 wt%	MnO wt%	Rb ppm	Sr ppm	Y ppm	Zr ppm	Ni ppm	Ba ppm	Cu ppm	Zn ppm	LOI wt%	Cu/Zn Ratio	Zn/Na Ratio	ISHIKA A.I.	ALUM A.I.	ACNK A.I.
VB09694	17.00	20.00	3.00	22.37	0.20	4.75	3.10	0.90	36.70	0.03	1.25	0.05	0.24	38.0	805	38	117	20	170	150	154	29.43	150	51.3	6	13	0.1
VB09695	29.00	32.00	3.00	52.63	0.44	13.76	6.08	4.23	6.17	1.35	1.83	0.06	0.12	56.0	154	20	80	20	739	20	68	12.92	20	0.5	45	147	0.9
VB09816	58.00	60.00	2.00	63.71	0.54	16.39	5.03	2.72	1.59	0.14	3.70	0.07	0.05	111.0	79	20	100	20	1248	54	120	5.51	54	8.6	79	302	2.3
VB09696	60.00	63.00	3.00	65.15	0.56	16.49	3.44	3.07	1.78	0.25	3.70	0.08	0.07	101.0	74	20	99	20	1219	23	158	5.57	23	6.3	77	285	2.2
VB09817	63.00	65.00	2.00	64.47	0.55	15.88	4.77	2.58	1.50	0.16	3.62	0.07	0.05	109.0	78	20	87	20	1178	86	599	5.35	86	37.4	79	301	2.3
VB09818	65.00	68.14	3.14	67.28	0.50	14.46	4.34	2.11	1.49	0.10	3.43	0.06	0.06	109.0	72	20	89	20	1142	560	514	5.03	560	51.4	78	288	2.2
VB09819	72.43	74.00	1.57	56.84	0.42	12.47	6.14	4.98	4.35	0.01	2.58	0.06	0.18	70.0	84	20	86	20	730	1080	11000	7.69	1080	*****	63	180	1.2
VB09820	74.00	76.00	2.00	62.47	0.49	14.04	7.12	4.66	1.55	0.01	2.55	0.06	0.07	74.0	58	20	82	20	735	211	307	5.88	211	307.0	82	362	2.5
VB09697	76.00	79.00	3.00	61.74	0.52	15.67	6.17	4.92	1.82	0.08	2.96	0.08	0.08	83.0	76	20	90	20	843	80	165	6.16	80	20.6	81	322	2.4
VB09821	79.00	81.00	2.00	59.74	0.55	15.91	7.64	5.33	1.03	0.01	2.79	0.08	0.08	83.0	50	20	99	20	810	174	179	5.64	174	179.0	89	415	3.2
VB09822	81.00	83.00	2.00	63.02	0.52	15.39	7.41	4.34	0.85	0.01	2.87	0.07	0.07	72.0	54	20	93	20	848	122	248	5.09	122	248.0	89	415	3.3
VB09698	95.00	98.00	3.00	63.88	0.50	14.57	6.24	6.78	0.52	0.02	2.32	0.07	0.09	64.0	42	20	77	20	711	74	123	5.20	74	61.5	94	509	4.2
VB09699	114.00	117.00	3.00	61.04	0.48	14.16	6.73	5.72	1.86	0.05	2.72	0.07	0.13	66.0	67	20	103	20	648	73	918	6.97	73	183.6	82	306	2.2
VB09700	132.00	135.00	3.00	69.76	0.49	9.64	8.42	1.36	1.11	0.07	2.44	0.07	0.08	68.0	53	25	180	21	644	390	869	6.61	390	124.1	76	266	2.0
VB09701	138.60	140.82	2.22	67.60	0.28	15.03	3.56	0.56	1.36	7.94	0.23	0.09	0.05	20.0	283	20	207	20	82	20	20	3.51	20	0.0	8	158	1.0
VB09702	148.00	151.00	3.00	60.22	0.43	15.79	4.36	2.46	3.36	1.97	3.21	0.05	0.09	96.0	98	20	93	20	1091	20	88	7.11	20	0.5	52	185	1.2
VB09703	153.00	156.00	3.00	58.33	0.42	15.05	5.14	5.79	2.18	0.75	2.86	0.05	0.12	90.0	82	20	77	20	867	63	340	9.58	63	4.5	75	260	1.8
VB09704	160.00	163.00	3.00	61.65	0.42	15.36	4.10	4.05	3.02	2.53	2.09	0.06	0.12	55.0	86	20	84	20	639	20	66	6.66	20	0.3	53	201	1.3
VB09705	168.00	171.00	3.00	60.97	0.47	15.36	5.05	6.69	1.24	1.19	2.08	0.06	0.07	62.0	67	23	86	20	557	28	171	6.93	28	1.4	78	341	2.4
VB09706	177.00	180.00	3.00	58.83	0.47	15.92	5.23	4.33	2.90	0.44	3.21	0.06	0.09	84.0	85	21	97	20	818	22	46	7.49	22	1.1	69	243	1.7
VB09707	191.00	194.00	3.00	55.60	0.37	13.98	5.20	3.31	5.99	2.09	1.92	0.04	0.08	54.0	137	20	88	20	473	32	34	11.34	32	0.2	39	140	0.9

SOLE NUMBER: BC-90-03

GEOCHEM. SHEET

PAGE: 1

FALCONBRIDGE LTD  
DIAMOND DRILL LOG  
Property : BIRK CREEK (1990)

Hole # : 8C-90-04      Zone # : CENTRAL      Contractor : BURWASH ENTERPRISES      Date started :10/13/1990  
Township: KAMLOOPS      Range:      Claim # :BET 2      Date completed:10/16/1990  
Lot :

Level : SURFACE      Section: 224+00W      Location :  
Collar coordinate :      Line : 224+00 W      Latitude: 5690610.00 N      Azimuth: 235° 0' 0"  
Reference frame :      Station: 394+64 E      Departure: 295770.00 E      Dip : -64° 0' 0"  
Elevation: 1200.00      Length : 213.06 M

Surveyed by: SPERRY-SUM

Deviation tests :

Depth	Dip	Azimuth
93.57 M	-71° 0' 0"	236° 0' 0"
148.40 M	-76° 0' 0"	218° 0' 0"
213.00 M	-79°30' 0"	208° 0' 0"

Remarks :

Water flow :  
Cimented :

Plugged:  
Core size: HQ

Logged by : M. VANDE GUCHTE

Date logged:10/17/1990

Hole # : 8C-90-04











FROM (M)	TO (M)	DESCRIPTION	Sampl.	FROM	TO	Length (M)	CU PPM	PB PPM	ZN PPM	BA PPM	AG PPM	AU PPM	AS PPM	NI PPM	CU/Zn RATIO
68.20	77.00	FELDSPAR PHYRIC INTERMEDIATE LAPILLI ASH TUFF 3B8 Medium to light green-grey, fine grained intermediate lapilli ash tuff. Up to 10%, <1.5mm feldspar phenocryst partially altered to sericite and occasional, <3%, 1-2mm quartz phenocryst. Lighter, grey, feldspar phyric felsic bands (lapilli fragments?) occur throughout approximately 15% of the unit. Fragment outlines are faint, discontinuous to continuous bands (possible interbedded felsic horizons?) ranging from <1cm to 10cm wide. Trace to 1% fine disseminated pyrite, and trace disseminated pyrrhotite. Fracture controlled pyrrhotite (1%) at 41.4m and fine disseminated to fracture controlled pyrrhotite/biotite over last metre. Moderately well foliated.  Structure: CAB - foliation 65° @ 72.3m.	VA14641	76.80	77.30	0.50	13	26	69	620	0.4	48	2000	5	15.85
77.00	81.30	SPOTTY HORNFELSED FELSIC ASH TUFF 6A Medium - light grey-green, spotty dacitic ash tuff. Up to 15%, 1-3mm pyrrhotite/biotite (spots) development with local up to 5%, 1-3mm chlorite spots. Locally magnetic. Fine to medium grained, weakly chloritic, mottled matrix. Poor to moderately well developed foliation, with overall more massive appearance. Minor quartz-carbonate veins/stringers. Trace to 1% fine disseminated pyrite with occasional <2mm pyrite cubes.  Mineralization & Alteration:  Spotty hornfelsing with spotty pyrrhotite. Weak to moderate biotite - chlorite development.  77.0-77.1m: 5% fracture controlled (quartz vein) arsenopyrite.													
81.30	88.20	QUARTZ - FELDSPAR PHYRIC FELSIC ASH TUFF 4AC Medium to light grey, fine grained "dacitic" ash tuff. Up to 10%, <3mm quartz phenocrysts and up to 7%, <1.5mm sericite altered feldspar phenocrysts. Fine to medium grained weakly	VA14642 VA14643	83.00 87.20	84.00 88.20	1.00 1.00	31 40	4 4	50 29	1500 2700	0.5 0.5	3 3	38 38	7 5	38.27 57.97

FROM (M)	TO (M)	DESCRIPTION	Sampl.	FROM	TO	Leng. (M)	CU PPM	PB PPM	ZN PPM	BA PPM	AG PPM	AU PPE	AS PPM	NI PPM	Cu/Zn RATIO	
		sericitic - chlorite matrix. Trace to 1% fine disseminated and fracture controlled pyrite and local, up to 1% disseminated/fracture controlled pyrrhotite. Trace fracture controlled (<0.5%) arsenopyrite at 83.54 metres. Bleached fine grained appearance from upper contact to 83.05m with local (<2%) biotite/pyrrhotite spots - locally magnetic. Local, intercalated argillaceous component over the last approximately 1.5 metres. Weak to moderately well developed foliation.  Mineralization & Alteration: 81.3-83.05m: Bleached, fine grained, weak pervasive sericite alteration. 83.05-88.2m: Weak spotty sericitization - centered on feldspars.  Structure: CAB - foliation 70° @ 84.5m. 82.3m: fault slip with gouge at 72° CAB.														
88.20	89.20	GRAPHITIC ARGILLITE SIM Black, graphitic argillite with intercalated to interbedded silty horizons. Minor quartz-carbonate stringers. 2-3% fine grained pyrite aggregates and along fractures. Sharp bedding contacts at +/-70 CAB  Structure: CAB - bedding 70° @ 88.2m CAB - bedding 71° @ 89.2m	VA14644	88.20	89.20	1.00	49	11	59	1900	0.6	10	33	43	45.37	
		88.35- 88.50 ARGILLACEOUS FELSIC TUFF Similar to previous, 3% disseminated pyrite.														
89.20	91.50	ARGILLACEOUS QUARTZ PHYRIC FELSIC TUFF 4A00 Medium to light grey, medium to fine grained felsic tuff with increasing sediment component and argillite fragments downhole. Up to 10%, 1-3mm (average 1.5mm) quartz phenocrysts. Local (<2%) argillite fragments (<2cm) towards the lower contact. Two, thin (<2cm) argillite beds	VA14645 VA14646	89.20 90.35	90.35 91.50	1.15 1.15	36 83	20 14	31 86	1700 2800	0.5 0.7	3 3	18 9	10 16	53.73 49.11	















FROM (M)	TO (M)	DESCRIPTION	Sampl.	FROM	TO	Length (M)	CU PPM	PB PPM	ZN PPM	BA PPM	AG PPM	AU PPM	AS PPM	NI PPM	Cu/Zn RATIO
		<p>Medium to light grey-greenish tinge, fine grained ash tuff. Fine grained, weakly chloritic matrix with up to 10%, &lt;1.5mm mottled feldspars crystals and occasional, &lt;1.5mm broken quartz crystals. Darker, fine grained chlorite(?) wisps occur throughout with weak chlorite development observed on fractures and on microfractures cross-cutting foliation. Trace to ZX fine disseminated pyrite and occasional, &lt;5mm fine grained pyrite aggregates. Moderately well foliated.</p> <p>Mineralization &amp; Alteration: Weak fracture controlled chlorite.</p> <p>Structure: CAB - foliation 60° @ 170.0m.</p>													
172.90	175.60	<p>FELSIC LAPILLI ASH TUFF 4B Medium to light grey-greenish tinge, fine grained dacitic lapilli tuff. Up to 15% (variable) elongated felsic lapilli fragments stretched parallel to foliation. Several, 2-3cm fine grained felsic bands (fragments?) from 173.4-173.9 metres oriented parallel to foliation (&lt;± 57° CAB). Fine grained, weakly sericitic/chloritic matrix with up to 8%, &lt;1.0mm mottled feldspar crystals and occasional, &lt;1.5mm broken quartz crystals. Trace to ZX fine disseminated pyrite and trace to 1% disseminated pyrrhotite. Moderately well foliated.</p> <p>Mineralization &amp; Alteration: Weak pervasive sericitization.</p> <p>Structure: CAB - foliation 58° @ 174.3m.</p>													
175.60	199.15	<p>FELSIC ASH TUFF 4A Medium to light grey, fine grained dacitic ash tuff. Overall, fine grained, weakly sericitic matrix with up to 7%, &lt;1mm mottled (unsericitized) feldspar crystals and</p>	VA14658	198.15	199.15	1.00	23	10	75	1500	0.1	3	7	5	23.47

FROM (M)	TO (M)	DESCRIPTION	Sampl.	FROM	TO	Length (M)	CU PPM	PB PPM	ZN PPM	BA PPM	AG PPM	AL PPM	AS PPM	NI PPM	Cu/Zn RATIO	
		<p>occasional, up to 2%, &lt;1mm quartz phenocrysts. Up to 3%, &lt;1cm elongated lithic (felsic) fragments scattered throughout the unit, but locally concentrated (20%) from 196.4-196.8m. Several thin finer grained ash tuff horizons over the first 8.0 metres from 175.7-175.82m, 176.0-176.4m, 176.45-176.5m, 178.15-178.2m, 180.7-180.85m, 183.4-183.45m, 183.6-183.66m. Sections of spotty "hornfelsing" throughout unit (see alteration) becoming more intense downhole. Spotty alteration characterized by up to 3mm dark green-brown spots of chlorite-calcite +/- pyrrhotite/pyrite. Spots are weakly to moderately calcareous. Weak intercalated argillaceous component over the last meter from 198.15-199.15m. Overall, trace to 2% fine disseminated pyrite with local up to 3mm pyrite aggregates. Trace to 1% disseminated pyrrhotite locally throughout. Poor to moderately well foliated. Massive quartz vein from 186.6-186.8m cross-cutting foliation at 25' CAB.</p> <p>Mineralization &amp; Alteration:            Weak pervasive sericitization.            175.7-179.3m: Weak spotty "hornfels" alteration.            180.0-180.65m: Weak spotty "hornfels" alteration.            190.05-192.12m: Strong spotty "hornfels" alteration.</p> <p>Structure:            CAB - foliation 62° @ 181.0m.            CAB - foliation 55° @ 185.5m.            CAB - foliation 65° @ 188.0m.            CAB - foliation 65° @ 193.5m.            CAB - foliation 55° @ 198.3m.</p> <p>196.85-196.95m: Fault with gouge at 82' CAB.            187.9m: Fault slip at 48' CAB.            198.9m: Fault slip with gouge at 48' CAB.</p>														
199.15	200.35	<p>ARGILLITE SIM            Dark grey-black intercalated silt and argillite with argillite component increasing downhole to lower contact. Weakly graphitic along fractures. 2% disseminated pyrite.</p>	VA14659	199.15	200.35	1.20	27	15	129	1000	0.2	3	11	7	17.31	





HOLE NUMBER: BC-90-04

## GEOCHEM. SHEET

DATE: 26-February-1991

Sample	From (M)	To (M)	Length (M)	SiO2 wt%	TiO2 wt%	Al2O3 wt%	Fe2O3 wt%	MgO wt%	CaO wt%	Mn2O wt	K2O wt%	P2O5 wt%	MnO wt%	Rb ppm	Sr ppm	Y ppm	Zr ppm	Ni ppm	Ba ppm	Cu ppm	Zn ppm	LOI wt%	Cu/Zn Ratio	Zn/Fe Ratio	ISHIKA A.I.	ALUM A.I.	ACMK A.I.
VB09709	18.00	21.00	3.00	59.46	0.48	17.20	5.64	2.96	1.89	8.32	0.33	0.06	0.08	21.0	222	20	83	20	359	20	63	3.81	20	0.1	24	163	1.0
VB09710	34.00	37.00	3.00	54.46	0.60	18.51	7.83	4.69	1.75	7.02	0.55	0.05	0.10	23.0	295	20	87	20	3034	40	63	4.64	40	0.1	37	199	1.2
VB09711	50.00	53.00	3.00	55.04	0.58	18.24	8.10	4.55	1.97	7.11	0.55	0.13	0.13	21.0	230	20	82	20	2297	22	88	3.68	22	0.1	36	189	1.2
VB09712	64.00	67.00	3.00	59.57	0.56	17.04	6.52	3.91	1.45	7.36	0.44	0.07	0.09	20.0	177	20	101	20	612	22	78	3.14	22	0.1	33	184	1.1
VB09713	73.00	76.00	3.00	59.83	0.54	17.48	5.56	2.96	1.73	8.04	0.33	0.08	0.09	20.0	191	20	102	20	578	20	66	3.12	20	0.1	25	173	1.0
VB09714	78.00	81.00	3.00	59.52	0.52	16.68	5.58	3.70	1.71	6.75	1.23	0.06	0.08	54.0	215	20	109	20	888	20	89	3.68	20	0.1	37	172	1.1
VB09715	81.30	83.05	1.75	56.53	0.66	15.79	5.46	2.08	4.42	4.30	2.25	0.26	0.12	67.0	437	20	155	20	1311	24	61	7.61	24	0.1	33	144	0.9
VB09716	84.00	87.00	3.00	54.69	0.44	14.95	5.46	1.49	6.39	5.25	1.74	0.06	0.15	49.0	274	20	84	20	1510	25	42	7.59	25	0.1	22	112	0.7
VB09717	108.00	111.00	3.00	54.80	0.55	16.95	4.54	1.50	5.73	4.06	3.17	0.08	0.13	101.0	246	23	164	20	2134	24	45	7.83	24	0.1	32	131	0.8
VB09718	125.00	128.00	3.00	65.03	0.44	14.44	4.73	1.79	2.21	1.24	3.93	0.09	0.10	163.0	101	37	228	20	1644	24	55	4.92	24	0.4	62	196	1.4
VB09719	144.00	147.00	3.00	63.62	0.47	14.32	4.36	1.68	3.23	2.14	3.46	0.10	0.10	143.0	158	39	229	20	1662	21	57	5.37	21	0.3	49	162	1.1
VB09720	155.00	158.00	3.00	64.40	0.47	14.96	4.63	1.87	2.28	1.09	4.11	0.08	0.09	170.0	144	41	235	20	1945	20	48	5.15	20	0.4	64	200	1.4
VB09721	169.00	172.00	3.00	63.79	0.48	15.45	4.82	2.17	2.02	1.02	4.17	0.08	0.08	171.0	99	43	235	20	1674	30	49	5.00	30	0.5	68	214	1.6
VB09722	180.00	183.00	3.00	64.85	0.45	14.70	4.59	2.21	1.91	0.99	3.90	0.07	0.07	158.0	102	43	227	20	1651	26	57	5.63	26	0.6	68	216	1.6
VB09723	190.05	192.10	2.05	66.18	0.54	15.53	4.55	2.64	1.19	1.41	3.80	0.10	0.06	153.0	95	26	241	20	1614	27	90	3.76	27	0.6	71	243	1.8
VB09724	201.50	204.50	3.00	61.95	0.52	15.97	4.21	2.49	2.29	1.72	3.61	0.11	0.07	145.0	95	37	250	20	1558	24	44	6.37	24	0.3	60	210	1.5

HOLE NUMBER: BC-90-04

GEOCHEM. SHEET

PAGE: 1













FROM (M)	TO (M)	DESCRIPTION	Sampl.	FROM	TO	Length (M)	CU PPM	PS PPM	ZN PPM	BA PPM	AG PPM	AU PPB	AS PPM	NI PPM	Cu/Zn RATIO	
		<p>lithic lapilli tuff. Up to 15% (locally - over. 5-7%), &lt;4cm elongated felsic/intermediate lapilli. Medium to fine grained, weakly chloritic matrix with brown, spotty biotite and chlorite/biotite rimmed calcareous spots developing below approximately 63.6m. Trace - 1% fine disseminated to locally fracture controlled pyrite. Poorly developed foliation with minor paralleling and cross-cutting. Quartz-carbonate stringers (fracture filling).</p> <p>Mineralization &amp; Alteration: Weak-moderate spotty biotization. Weak fracture controlled carbonatization.</p>														
67.10	90.20	<p>SPOTTY HORNFELSED INTERMEDIATE/FELSIC VOLCANIC 3, Light to medium grey with green, green/brown spots throughout. Probable intermediate near contact becoming dacitic (felsic) towards the lower contact. Remnant fragmental texture is evident with up to 4cm Lapilli, lower majority of texture is obliterated by spotty alteration. Fine grained, banded quartz veined ash tuff (felsic) from 79.95-80.25m with no chloritic spots. Alteration consists of chloritic/biotitic/calcareous spotty alteration of subrounded to patchy-like spots which range in size from &lt;1mm to 8mm. Concentrations vary from 10-30% and show a decrease over the last 1.5 metres. Up to 2% disseminated/fracture controlled pyrite and up to 2% disseminated pyrrhotite above 79.95m to upper contact.</p> <p>Mineralization &amp; Alteration: Strong spotty chloritization (hornfelsing).</p>														
90.20	95.45	<p>QUARTZ PHYRIC FELSIC ASH TUFF 4AA Medium to grey, fine grained, pyritic dacitic ash tuff. Up to 5%, &lt;2mm quartz phenocrysts. Occasional, 2%, &lt;1cm elongated felsic fragments. Several, non-pyritic cherty tuffite horizons (&lt;3cm) at 91.58m, 91.71m, 91.75m, 91.88m, and 92.1m which parallel foliation at +/- 70° CAB. 7-10% fine grained disseminated and discontinuous fracture controlled pyrite. Moderately well</p>	<p>VA14672 VA14673 VA14674 VA14675</p>	<p>90.20 91.50 92.50 93.90 95.45</p>	<p>91.50 92.50 93.90 95.45</p>	<p>1.30 1.00 1.40 1.64</p>	<p>29 25 10 6</p>	<p>12 24 21 21</p>	<p>78 168 9 3</p>	<p>820 870 690 170</p>	<p>0.4 0.5 0.4 0.4</p>	<p>47 56 36 39</p>	<p>38 85 38 12</p>	<p>9 23 10 4</p>	<p>27.10 12.95 52.63 66.67</p>	

FROM (M)	TO (M)	DESCRIPTION	Sampl.	FROM	TO	Leng. (M)	CU PPM	PB PPM	ZN PPM	BA PPM	AG PPM	AU PPB	AS PPM	NI PPM	Cu/Zn RATIO
		foliated. Quartz vein from 93.5-94.95m with up to 20% quartz veining over 1.5m above 93.5m and over 1.0m below 94.95m.  Mineralization & Alteration: Moderate pervasive sericitization.  Structure: Foliation at: 91.0m - 68' CAB. 93.6m - 58' CAB.  Bedding at: 91.1m - 68' CAB. 91.58m - 70' CAB.													
95.45	99.54	QUARTZ PHYRIC FELSIC LAPILLI ASH TUFF 4BA Medium to light grey, medium grained decitic lapilli ash tuff. 6-7%, <1.5cm elongated felsic lapilli. 3-4%, <1.5mm quartz phenocrysts. 3-5% fine disseminated pyrite. Poor to moderately well developed foliation.	VA14676 VA14677 VA14678 VA14679	95.54 96.50 97.50 98.50	96.50 97.50 98.50 99.54	0.96 1.00 1.00 1.04	13 38 39 34	24 12 15 20	9 56 62 52	470 920 690 490	0.4 0.5 0.4 0.4	98 144 59 97	19 22 22 30	7 7 6 7	59.09 40.43 38.61 39.53
		Mineralization & Alteration: Weak pervasive sericitization.  Structure: Foliation at: 98.5m - 75' CAB.													
99.54	101.50	QUARTZ PHYRIC FELSIC ASH TUFF 4AA Medium to light grey, fine grained decitic ash. 5%, <1.0mm subrounded-elongated quartz phenocrysts. Local up to 3%, <1mm feldspar phenocrysts partially carbonate altered. 3-4% fine disseminated pyrite. Poor-moderately well developed foliation.  Mineralization & Alteration: Weak pervasive sericitization.  Structure: Foliation at: 100.7m - 68' CAB.	VA14680 VA14681	99.54 100.50	100.50 101.50	0.96 1.00	42 20	24 16	65 74	710 530	0.6 0.5	104 83	73 56	9 6	39.25 21.28











FROM (M)	TO (M)	DESCRIPTION	Sampl.	FROM	TO	Leng. (M)	CU PPM	PB PPM	ZN PPM	BA PPM	AG PPM	AU PPM	AS PPM	NI PPM	Cu/Zn RATIO
		locally/partially rimmed by chlorite in moderately altered zones. Up to 3-5% fine disseminated pyrite and local up to 6% fracture controlled pyrite. Poorly developed to non-foliated. Moderate pervasive biotite from 177.1-177.4 metres with weak biotite development occurring locally throughout the unit.  Mineralization & Alteration: 175.8-181.2m: Weak spotty carbonatization. 181.2-189.0m: Moderate spotty carbonatization and weak fracture controlled chloritization. 189.0-191.1m: Weak spotty carbonatization.  Structure: Foliation at: 176.58m - 80° CAB.													
191.10	203.55	FELSIC ASH TUFF 4A Medium to light grey, fine grained "dacitic" ash tuff. Up to 3%, <1.5mm stretched/subrounded quartz phenocrysts. Weakly, fine banded appearance-compositional variation. Occasional, 1-2%, <1cm, poorly outlined felsic fragments. 4-7% fine disseminated to locally fracture controlled pyrite. Poorly developed foliation with minor quartz-carbonate stringers and along microfractures.  Mineralization & Alteration: Weak pervasive sericite.	VA14682	202.50	203.55	1.05	42	26	76	820	0.6	60	53	7	35.59
203.55	224.64	FELSIC LAPILLI ASH TUFF 4B Medium-light grey, medium grained, pyritic dacite. Up to 7%, <3cm felsic lapilli elongated parallel to foliation. Fragment outlines are generally vague with overall, discontinuous banded (weak) nature suggesting fragmental unit or reworked tuff. Medium grained, weakly sericitic matrix with local finer grained ash intervals, generally thin horizons. Up to 7% fine disseminated pyrite. Moderately well developed foliation with minor quartz-carbonate stringers.	VA14683 VA14684 VA14685 VA14686 VA14687 VA14688 VA14689 VA14690 VA14691 VA14692 VA14693 VA14694	203.55 205.00 205.50 207.00 208.50 210.00 211.50 213.00 214.20 215.40 217.00 218.50	205.00 205.50 207.00 208.50 210.00 211.50 213.00 214.20 215.40 217.00 218.50	1.45 0.50 1.50 1.50 1.50 1.50 1.50 1.20 1.20 1.60 1.50 1.50	44 33 30 29 42 72 21 19 35 48 101 105	11 8 11 12 13 14 66 240 170 129 98 174	46 33 23 34 67 79 40 104 141 140 152 134	810 880 880 870 820 830 1200 1200 1700 1200 1400 1500	0.4 0.3 0.4 0.3 0.3 0.4 0.5 0.7 0.6 0.6 0.6 0.9	49 32 28 6 6 24 52 31 32 57 91 100	81 55 60 51 54 88 51 37 59 65 75 94	6 5 4 5 4 5 7 11 11 12 8 12	48.89 50.00 56.60 46.03 38.53 47.68 34.43 15.45 19.89 25.53 39.92 43.93





FROM (M)	TO (M)	DESCRIPTION	Sampl.	FROM	TO	Leng. (M)	CU PPM	PB PPM	ZN PPM	SA PPM	AG PPM	AU PPB	AS PPM	NI PPM	Cu/Zn RATIO
246.85	261.50	<p>Alteration - unknown.</p> <p>Structure: Bedding at: 246.85m - 81' CAB.</p> <p>FELSIC ASH TUFF 4A Medium to light brownish-grey dacitic ash tuff becoming chlorite-biotite altered below 252.4 metres. Mottled, weak (fine) banded appearance with vague, probable fragment outlines. Up to 3%, &lt;2cm elongated felsic fragments over the first 2.0 metres occurring sporadically (&lt;1%) below this point. 2-3%, &lt;1mm, mottled, subrounded quartz crystals. Weakly chloritic, fine to medium grained matrix. Weak, fine grained, pervasive biotite development throughout the unit and rimming &lt;1mm calcareous crystals (?) below 260.0 metres. 2-3% fine disseminated pyrite and local up to 0.5cm pyrite aggregates (cubes). Poorly developed foliation with minor quartz and/or carbonate stringers.</p> <p>252.15-252.4m : fine grained, muddy felsic tuffaceous sediments similar to previous from 244.8-246.85 metres. Weakly brecciated and quartz veined below lower contact (15cm). Gradational upper contact, over about 5m (tops up?).</p> <p>Mineralization &amp; Alteration 246.85-252.40m : Weak pervasive biotite 252.40-261.50m : Weak to moderate spotty/pervasive biotite 252.40-261.50m : Weak to moderate pervasive chlorite</p> <p>Structure: Bedding at: 252.15m: 68' CAB</p> <p>Faults at: 261.0m - fault slip at 39' CAB 261.5m - fault slip at 58' CAB 261.8m - fault slip at 30' CAB</p>	VA14715	246.85	268.00	1.15	15	17	113	840	0.4	15	133	4	11.72

















HOLE NUMBER: BC-90-05

GEOCHEM. SHEET

DATE: 26-February-1991

Sample	From (M)	To (M)	Length (M)	SiO2 wt%	TiO2 wt%	Al2O3 wt%	Fe2O3 wt%	MgO wt%	CaO wt%	Na2O wt	K2O wt%	P2O5 wt%	MnO wt%	Rb ppm	Sr ppm	Y ppm	Zr ppm	Ni ppm	Ba ppm	Cu ppm	Zn ppm	LOI wt%	Cu/Zn Ratio	Zn/We Ratio	ISHKA A.I.	ALUM A.I.	ACMK A.I.
VB09726	7.00	10.00	3.00	56.86	0.54	15.71	5.42	3.53	5.44	3.20	2.72	0.07	0.07	76.0	168	20	112	20	888	25	69	6.30	25	0.2	42	158	0.9
VB09727	23.00	26.00	3.00	55.05	0.51	15.35	7.44	4.77	4.94	2.39	1.89	0.07	0.10	45.0	131	20	85	20	678	24	77	7.39	24	0.3	48	166	1.0
VB09728	37.00	40.00	3.00	57.13	0.43	14.57	4.44	1.44	8.27	0.65	3.40	0.06	0.11	72.0	159	20	84	20	664	20	31	8.72	20	0.5	35	118	0.7
VB09729	50.00	53.00	3.00	60.68	0.47	15.52	5.87	4.38	3.92	2.55	1.72	0.07	0.07	32.0	101	20	88	20	401	29	46	5.09	29	0.2	49	190	1.2
VB09730	63.00	66.00	3.00	59.54	0.49	16.31	6.11	4.58	3.86	2.58	2.02	0.06	0.10	49.0	114	20	72	20	642	20	56	4.48	20	0.2	51	193	1.2
VB09731	72.00	75.00	3.00	57.12	0.54	17.92	7.12	5.04	2.38	3.90	1.90	0.07	0.09	45.0	146	20	105	20	632	28	82	4.08	28	0.2	53	219	1.4
VB09732	91.50	94.50	3.00	61.52	0.52	17.87	6.92	0.54	0.72	3.75	3.18	0.05	0.02	72.0	152	20	107	20	914	22	106	5.23	22	0.3	45	234	1.6
VB09733	99.50	101.50	2.00	53.03	0.56	18.61	6.67	3.03	3.90	3.52	3.17	0.05	0.08	65.0	170	20	103	20	662	21	59	6.36	21	0.2	46	176	1.1
VB09734	109.00	112.00	3.00	57.93	0.51	16.66	6.17	4.91	2.82	2.44	2.42	0.07	0.10	38.0	100	20	83	20	808	24	125	5.73	24	0.5	58	217	1.4
VB09735	121.00	124.00	3.00	57.38	0.52	17.79	5.86	4.29	2.33	5.31	1.27	0.08	0.09	35.0	164	27	138	20	443	20	71	5.29	20	0.1	42	200	1.2
VB09736	135.00	138.00	3.00	58.58	0.57	17.71	5.52	4.14	3.60	3.19	1.78	0.09	0.07	40.0	157	20	124	20	713	20	35	4.58	20	0.1	47	207	1.3
VB09737	150.00	153.00	3.00	58.85	0.54	16.69	6.58	5.35	4.79	1.79	1.07	0.08	0.08	22.0	258	21	109	20	401	20	55	4.21	20	0.3	49	218	1.3
VB09738	168.00	171.00	3.00	58.44	0.55	17.04	5.11	3.51	5.68	1.76	1.96	0.08	0.06	57.0	267	20	89	20	655	32	42	5.17	32	0.2	42	181	1.1
VB09739	182.00	185.00	3.00	56.33	0.51	17.08	6.44	3.93	6.56	1.78	1.81	0.07	0.08	47.0	235	20	105	20	667	39	62	5.61	39	0.4	41	168	1.0
VB09740	196.00	199.00	3.00	58.63	0.52	19.26	6.78	1.64	1.94	0.97	3.81	0.06	0.04	94.0	168	20	99	20	1281	33	83	6.19	33	0.9	65	287	2.1
VB09741	207.00	210.00	3.00	61.04	0.50	15.15	6.22	2.91	4.00	0.30	3.82	0.07	0.11	97.0	145	20	93	20	916	32	49	5.29	32	1.6	61	187	1.3
VB09742	232.50	235.50	3.00	45.30	0.64	20.32	15.21	1.54	0.58	0.44	5.37	0.07	0.04	143.0	100	20	84	20	1759	1250	104	10.47	1250	2.4	87	318	2.7
VB09743	248.00	251.00	3.00	57.40	0.65	16.99	6.44	6.86	2.65	0.27	3.60	0.09	0.15	96.0	116	20	109	20	918	20	80	5.11	20	3.0	78	261	1.9
VB09744	256.00	259.00	3.00	57.40	0.58	16.40	6.27	5.19	5.59	0.74	2.90	0.09	0.12	85.0	172	20	102	20	663	27	74	4.33	27	1.0	56	178	1.1
VB09745	267.00	270.00	3.00	57.42	0.63	16.78	7.47	4.19	3.09	0.73	3.28	0.08	0.11	82.0	176	20	98	20	872	28	124	6.15	28	1.7	66	236	1.6
VB09746	284.00	286.25	2.25	56.69	0.58	15.42	6.11	3.32	6.49	1.62	2.41	0.08	0.11	59.0	161	20	111	20	565	22	46	5.82	22	0.3	41	147	0.9
VB09747	295.00	297.50	2.50	55.42	0.56	15.47	4.86	3.27	6.56	0.70	3.33	0.07	0.16	80.0	144	20	108	20	722	20	38	8.41	20	0.5	48	149	1.0
VB09748	309.00	312.00	3.00	59.20	0.52	15.38	7.02	3.84	3.32	0.33	3.57	0.07	0.10	90.0	92	20	91	20	923	58	589	5.80	58	17.9	67	213	1.5
VB09749	326.00	329.00	3.00	61.10	0.40	15.18	6.30	2.62	2.69	0.11	4.07	0.05	0.18	97.0	88	20	103	20	1189	65	536	6.33	65	48.7	71	221	1.6
VB09750	337.00	340.00	3.00	60.68	0.44	15.79	5.86	3.95	3.00	0.33	3.73	0.05	0.10	92.0	118	20	79	20	1051	41	155	4.92	41	4.1	70	224	1.6
VB09751	350.50	352.50	2.00	61.39	0.42	16.12	3.66	2.75	4.73	2.04	3.54	0.05	0.06	84.0	198	20	94	20	947	20	25	4.87	20	0.1	48	156	1.0
VB09752	367.00	370.00	3.00	58.79	0.47	16.77	4.89	2.50	5.01	1.85	3.82	0.06	0.09	98.0	144	20	85	20	884	31	43	5.44	31	0.2	48	157	1.0
VB09753	382.00	385.00	3.00	61.91	0.41	15.18	4.55	2.65	6.24	1.34	2.62	0.05	0.10	65.0	217	20	96	20	391	20	94	4.94	20	0.7	41	149	0.9
VB09754	393.00	396.00	3.00	60.72	0.40	14.48	5.25	3.58	8.32	1.20	2.40	0.05	0.11	64.0	227	20	90	20	261	20	34	5.08	20	0.3	44	146	0.9
VB09755	407.00	410.00	3.00	52.21	0.45	16.14	5.83	4.09	7.82	1.02	3.62	0.05	0.16	96.0	192	20	72	20	403	20	34	8.38	20	0.3	47	130	0.8
VB09756	418.00	421.00	3.00	57.22	0.39	14.83	5.44	3.55	6.92	0.23	3.77	0.05	0.11	107.0	200	20	88	20	505	20	30	7.44	20	1.3	51	136	0.9

HOLE NUMBER: BC-90-05

GEOCHEM. SHEET

PAGE: 1

FALCONBRIDGE LTD  
DIAMOND DRILL LOG  
Property : BIRK CREEK (1990)

Hole # : BC-90-06      Zone # : UKE      Contractor : BURMASH ENTERPRISES      Date started :10/22/1990  
Township: KANLOOPS      Range:      Claim # :BLUFF 4      Date completed:10/25/1990  
Lot :      Level : SURFACE      Section: 213+70N      Location :  
Collar coordinate :      Line : 213+70 M      Latitude: 5690640.00 N      Azimuth: 55° 0' 0"  
Reference frame :      Station: 410+75 E      Departure: 297700.00 E      Dip : -65° 0' 0"  
Elevation: 902.00      Length : 345.05 M

Surveyed by: SPERRY-SUM

Deviation tests :

Depth	Dip	Azimuth
93.57 M	-67° 0' 0"	49°30' 0"
154.53 M	-67° 0' 0"	54°30' 0"
218.54 M	-67° 0' 0"	54° 0' 0"
345.00 M	-68° 0' 0"	59° 0' 0"

Remarks :

Water flow :  
Cimented :

Plugged:  
Core size: NO







FROM (M)	TO (M)	DESCRIPTION	Sampl.	FROM	TO	Leng. (M)	CU PPM	PB PPM	ZN PPM	BA PPM	AG PPM	AU PPB	AS PPM	NI PPM	Cu/Zn RATIO
		57.5m - 75' CAB. 66.0m - 78' CAB. Bedding at: 10.2m - 82' CAB. Faults: 5.8-5.83m: Fault w/gouge at 65' CAB. 8.3-8.5m: Blocky core with gouge. 26.8-27.2m: Broken, blocky core. 29.28-29.3m: Fault w/gouge at 79' CAB. 44.15-44.65m: Broken, highly fractured core. 70.9-72.24m: Broken, highly fracture core.													
63.20	73.40	INTERMEDIATE ASH TUFF 3A Medium green-grey, fine grained, chloritic ash tuff. Occasional, up to 3%, <2mm subrounded quartz crystals. Fine grained weakly chloritic-sericitic matrix. Trace to 0.5% fine grained disseminated pyrite and local, up to 1.5cm fine grained pyrite aggregates or cubes. Moderately well, locally contorted foliation. Mineralization & Alteration Weak fracture controlled carbonatization Structure: Foliation at: 66.0m : 78' CAB Faults: 70.90-72.24m : Broken,Blocky highly fractured core	VA14730 VA14731	63.30 72.50	64.30 73.40	1.00 0.90	7 29	20 1	158 73	120 350	0.6 0.1	6 3	32 22	11 13	4.24 28.43
73.40	90.20	GRAPHITIC ARGILLITE 51M Carbonatized intercalated to inter laminated argillite & siltstone (or tuffaceous sediments). Black to light grey, contorted, disrupted banded appearance with fracture controlled to pervasive (moderate-strong) carbonate alteration and minor quartz veins throughout. Trace 2% pyrite with occasional, up to 1.0cm fine grained pyrite cubes. 1-2%, up to 1.5cm fine grained pyrrhotite aggregates (angular shapes). Mineralization & Alteration:	VA14732 VA14733 VA14734 VA14735 VA14736 VA14737 VA14738	73.40 74.00 75.50 77.00 78.50 88.50 89.50	74.00 75.50 77.00 78.50 80.00 89.50	0.60 1.50 1.50 1.50 1.50 1.00 0.70	62 57 49 37 43 56 56	10 11 14 7 9 11 14	92 68 76 75 61 37 63	560 420 340 370 360 460 470	0.1 0.1 0.1 0.1 0.1 0.1 0.1	3 3 3 3 3 3 3	16 16 7 8 8 22 29	41 34 28 26 25 34 32	40.26 45.60 39.20 33.04 41.35 60.22 47.06

FROM (M)	TO (M)	DESCRIPTION	Sampl.	FROM	TO	Leng. (M)	CU PPM	PB PPM	ZN PPM	BA PPM	AG PPM	AU PPB	AS PPM	NI PPM	Cu/Zn RATIO
		Moderate - strong pervasive carbonate. Structure: Foliation at: 75.2m - 78' CAB. 87.0m - 78' CAB. Faults: 76.4-77.4m: Fault zone approximate orientation 80' CAB. 79.0-79.7m: Fault zone - 78' CAB.													
90.20	96.15	FELSIC ASH TUFF 4A Medium to light grey, fine grained, weakly argillaceous dacitic ash tuff. Strongly quartz veined (80%) from 91.3-93.7m with quartz stringers above and below this interval. Light brown, hard mineral (alteration?) within the felsic tuff accompanies intensely quartz veined sections. Trace 1% disseminated pyrite with up to 1% fracture controlled pyrrhotite. Gradational lower contact over about 20cm. Mineralization & Alteration: Weak pervasive carbonatization. Strong fracture controlled silicification. Structure: Foliation at: 95.5m - 73' CAB.	VA14739 VA14740 VA14741 VA14742 VA14743 VA14744	90.20 91.05 91.05 92.00 92.00 93.50 94.50 96.00	91.05 92.00 92.00 93.50 94.50 96.00	0.85 0.95 1.50 1.00 1.50 0.50	114 97 53 48 114 75	42 64 57 100 32 13	69 50 14 40 53 45	700 30 10 330 640 500	0.2 0.9 0.5 0.9 0.1 0.1	3 3 3 3 3 3	24 9 7 18 28 30	40 29 37 37 42 33	62.30 65.99 79.10 54.55 68.26 62.50
96.15	158.40	GRAPHITIC ARGILLITE 51M Similar to previous from 73.4-90.2 metres. Carbonatized intercalated to finely interbedded argillite and siltstone (or tuffaceous sediments). Weak to moderately graphitic on fractures. Black to light grey, contorted, disrupted banded appearance with local up to 3cm "cataclastic" fragments. Moderate to strong fracture controlled to pervasive carbonate alteration. Local quartz-carbonate veins/stringers throughout with strongly quartz veined sections from 135.17-135.48m, 137.5-138.0m, 140.2-140.55m, 143.4-144.2m, and 145.36-145.6m. Trace 2% fine disseminated/	VA14745 VA14746 VA14747 VA14748 VA14749 VA14750 VA14301 VA14302 VA14303 VA14304 VA14305 VA14306 VA14307 VA14308	96.50 97.50 99.00 100.50 100.50 135.00 136.50 137.50 138.50 139.80 140.80 141.60 141.84 143.40 144.20 145.20	97.50 99.00 100.50 102.00 136.50 137.50 138.50 139.80 140.80 141.60 141.84 143.40 144.20 145.20	1.00 1.50 1.50 1.50 1.50 1.00 1.00 1.30 1.00 0.80 0.24 1.56 0.80 1.00	48 60 78 48 14 53 36 57 39 70 70 149 240 107	12 6 5 7 10 7 10 9 5 7 8 11 3 13	35 153 70 64 37 88 22 47 20 23 100 580 49 26	320 300 480 370 140 430 340 520 320 440 100 580 10 590	0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1	3 3 3 3 3 3 3 3 3 3 3 3 3 3	16 7 9 6 3 7 39 16 11 28 18 33 23 21	25 34 41 33 11 40 23 37 23 46 547 69 248 40	57.83 28.17 52.70 42.86 27.45 37.59 62.07 54.81 66.10 75.27 34.15 78.84 83.04 80.45

FROM (M)	TO (M)	DESCRIPTION	Sampl.	FROM	TO	Length (M)	CU PPM	PB PPM	ZN PPM	BA PPM	AG PPM	AU PPM	AS PPM	N1 PPM	Cu/Zn RATIO
		fracture controlled pyrite and 5%, up to 1cm fine grained pyrite cubes or aggregates. 1-2% fracture controlled pyrrhotite and 3-5%, up to 1cm fine grained pyrrhotite aggregates throughout unit.	VA14309	145.20	146.70	1.50	59	6	43	420	0.1	3	18	32	57.84
			VA14310	146.70	148.20	1.50	49	9	54	460	0.1	3	15	31	47.57
			VA14311	148.20	149.80	1.60	66	6	72	420	0.1	3	16	36	47.83
			VA14312	149.80	151.30	1.50	39	28	41	210	0.1	3	9	12	48.75
			VA14313	151.30	152.95	1.65	64	32	55	460	0.1	3	3	34	53.78
			VA14314	152.95	154.62	1.67	26	7	121	30	0.1	3	13	148	17.69
		150.05-151.7m: dominately silty horizon with intercalated argillite.	VA14315	154.62	155.62	1.00	108	9	92	780	0.1	3	17	75	54.00
		154.6-157.58m: up to 15%, <3cm, light grey, elongated silty tuffaceous fragments.	VA14316	155.62	157.00	1.38	65	5	61	700	0.1	3	11	42	51.59
		152.95-154.64m: silty - tuffaceous sediments, medium to light green-grey.	VA14317	157.00	158.25	1.25	61	3	43	700	0.1	3	10	67	58.65
			VA14318	158.25	159.20	0.95	59	3	54	670	0.1	3	11	49	52.21
		Mineralization & Alteration: Moderate-strong pervasive carbonate.													
		Structure: Foliation at: 104.0m - 68° CAB. 109.0m - 78° CAB. 115.5m - 80° CAB. 123.6m - 68° CAB. 128.0m - 75° CAB. 133.5m - 65° CAB. 142.0m - 78° CAB. 151.0m - 75° CAB. 158.0m - 70° CAB.													
		Faults: 101.4-101.8m: Broken, highly fractured core. 108.4-108.7m: Broken, highly fractured core, graphitic, approximate orientation at 75° CAB. 119.1-120.1m: Broken, highly fracture core, graphitic, approximate orientation at 78° CAB. 126.0-126.1m: Graphitic shear at 50° CAB. 130.7-130.8m: Fault with gouge, graphitic at 60° CAB. 137.4-137.5m: Fault with gouge graphitic, at -65° CAB.													
158.40	163.95	ARGILLACEOUS FELSIC TUFFACEOUS SEDIMENTS. 400 Medium green-grey/brown, fine grained, fragmental tuffaceous sediments. Up to 7%, <2cm elongated	VA14319	159.20	160.20	1.00	67	1	46	600	0.1	3	8	26	59.29
			VA14320	160.20	161.27	1.07	50	3	101	750	0.1	3	9	36	33.11
			VA14321	161.27	162.20	0.93	148	84	41	660	1.9	3	12	41	78.31

FROM (M)	TO (M)	DESCRIPTION	Samp.	FROM	TO	Leng. (M)	CU PPM	PB PPM	ZN PPM	BA PPM	AG PPM	AU PPB	AS PPM	NI PPM	Cu/Zn RATIO
		siliceous/cherty/sericitic felsic fragments. Fine grained, weakly argillaceous matrix increasing below 162.4m to lower contact. Moderately well foliated with local streaky discontinuous banded appearance. 1-2% pyrite and/or pyrrhotite cubes.  159.2-159.6m: Fine grained, quartz-phyrlic felsic dyke. Massive, nonfoliated, uneven contacts. Up to 6%, <2mm subrounded quartz phenocrysts. 161.1-161.27m: Fine grained, felsic dyke similar to previous. 161.27-161.6m: Quartz veined (80%) with light brown mineral (sphalerite?), 2-3% fracture controlled pyrite/pyrrhotite. 162.2-162.38m: Quartz carbonate veined argillaceous horizon.  Mineralization & Alteration: Weak pervasive sericitization.  Structure: Foliation at: 160.0m - 70' CAB. 162.75m - 73' CAB.	VA14322	162.20	163.95	1.75	67	9	61	660	0.1	3	42	36	52.34
163.95	173.30	GRAPHITIC ARGILLITE 51M Weak to moderately carbonatized, black-medium grey intercalated to finely interbedded argillite/siltstone (tuffaceous sediments?). Similar to previous argillite zones. Discontinuous, streaky, contorted banded appearance. Moderately well foliated. Up to 3% fracture controlled pyrrhotite/pyrite with up to 4%, <1.5cm fine grained pyrrhotite aggregates.  Mineralization & Alteration: Weak - moderate fracture controlled carbonatization.  Structure: Faults: 170.72-170.75m: Fault zone at 80' CAB. 171.0-171.05m: Fault zone at 85' CAB.	VA14323 VA14324	163.95 172.30	165.00 173.30	1.05 1.00	51 128	9 26	110 143	710 770	0.1 0.1	3 3	36 39	37 39	31.68 47.23

FROM (M)	TO (M)	DESCRIPTION	Sampl.	FROM	TO	Length (M)	CU PPM	PB PPM	ZN PPM	BA PPM	AG PPM	AU PPB	AS PPM	NI PPM	Cu/Zn RATIO
173.30	179.10	ARGILLACEOUS INTERMEDIATE LAPILLI ASH TUFF 360 Medium to dark grey, medium grained "dacitic" tuff or reworked tuffaceous sediments (?). 8-12% <3cm elongated cherty fragments. Intercalated argillite (15%) increasing below 176.8m to lower contact. 3-4% fracture controlled pyrrhotite, 3% disseminated and fracture controlled pyrite, trace chalcocopyrite at 175.4m. Moderately well foliated, with about 5% boudinaged quartz-carbonate veins/stringers. Gradational contacts over approximately 20cm. Discontinuous streaky banded appearance.  Mineralization & Alteration: Weak fracture controlled carbonate.  Structure: Foliation at: 175.8m - 76' CAB.  Fault at:  176.95-178.15m: Fault zone with fault gouge at 75' CAB.	VA14325	173.30	174.30	1.00	127	20	112	780	0.1	3	201	38	53.14
			VA14326	174.30	175.30	1.00	213	8	109	760	0.1	3	441	37	66.15
			VA14327	175.30	176.20	0.90	275	9	127	850	0.1	3	150	44	68.41
			VA14328	176.20	177.20	1.00	346	12	115	770	0.1	3	58	31	75.05
			VA14329	177.20	178.20	1.00	76	5	101	830	0.1	3	18	42	42.94
			VA14330	178.20	179.10	0.90	332	3	106	570	0.1	3	10	29	75.80
179.10	195.58	INTERMEDIATE ASH TUFF 3A Medium green, fine grained ash tuff. Weak to moderately chloritic, fine grained matrix with thin, <2-3mm chlorite stringers (?). Variable, up to 10% fracture controlled pyrite/pyrrhotite with local, trace to 0.5% chalcocopyrite at 180.5m, 180.8m, 182.25m, 184.3m, 184.7m, and between 186.5-186.95m. Moderately well developed foliation, minor quartz carbonate veins/stringers with pyrrhotite/pyrite. Several fine grained, unfoliated-massive, <10cm intermediate/mafic dykes over the first 2.0 metres.  Mineralization & Alteration: Weak to moderate fracture controlled chloritization.  Structure: Foliation at:	VA14331	179.10	180.10	1.00	894	7	97	400	0.3	3	9	20	90.21
			VA14332	180.10	181.10	1.00	708	9	92	750	0.3	3	14	35	88.50
			VA14333	181.10	182.10	1.00	307	1	90	1000	0.1	3	17	56	77.33
			VA14334	182.10	182.50	0.40	1696	137	97	420	2	3	52	93	94.59
			VA14335	182.50	183.50	1.00	150	2	74	1400	0.1	3	11	43	66.96
			VA14336	186.10	187.10	1.00	12800	100	400	860	7.3	93	24	75	96.97

FROM (M)	TO (M)	DESCRIPTION	Sampl.	FROM	TO	Length (M)	CU PPM	PB PPM	ZN PPM	BA PPM	AG PPM	AU PPM	AS PPM	NI PPM	CU/Zn RATIO	
195.58	206.25	181.7m - 77' CAB. 190.5m - 75' CAB.  INTERMEDIATE LAPILLI ASH TUFF 38 Medium green-grey, medium grained lapilli-ash tuff with local finer grained ash horizons. Up to 10%, <2cm elongated siliceous felsic fragments decreasing downhole with fine-medium grained ash (occasional fragments) over the last meter. Gradational lower and upper contacts. Moderately well foliated. 2% fine disseminated/fracture controlled pyrite/pyrrhotite.  200.3-200.65m: Fine grained mafic dyke, massive, nonfoliated.  Mineralization & Alteration: Weak fracture controlled carbonatization.  Structure: Foliation at: 197.0m - 65' CAB. 204.5m - 60' CAB.  Fault at: 199.8-199.9m: Fault zone 50' CAB.														
206.25	217.80	ARGILLACEOUS INTERMEDIATE ASH TUFF 3A0 Medium green, fine grained ash with weak intercalated argillaceous component darkening the unit to a local, streaky dark green. Occasional, up to 2% (locally), <2cm elongated intermediate/felsic fragments. 2-3% fracture controlled-disseminated pyrite/pyrrhotite with traces to 0.5% chalcopyrite at 207.1m, 207.5m, 208.0m, 209.05m, 210.2m, 210.4m, 210.6m, 210.7m, and 212.4m. Moderately well foliated.  210.65-212.27m: Quartz Pyritic Intermediate Ash Tuff, 3-5%, 1-4mm subrounded quartz phenocrysts.  Mineralization & Alteration: Weak fracture controlled carbonatization.	VA14337 VA14338 VA14339 VA14340 VA14341 VA14342	207.00 208.00 209.00 210.00 211.00 212.00	208.00 209.00 210.00 211.00 212.00 213.00	1.00 1.00 1.00 1.00 1.00 1.00	1382 400 548 2910 301 2487	1 3 1 19 28 8	51 49 62 145 56 68	1500 1700 1400 650 1500 630	0.4 0.1 0.1 2.3 0.3 1.9	3 3 3 31 3 6	14 13 16 80 37 69	45 47 71 63 5 19	96.44 89.09 89.84 95.25 84.31 97.34	



FROM (M)	TO (M)	DESCRIPTION	Sampl.	FROM	TO	Leng. (M)	CU PPM	PB PPM	ZN PPM	SA PPM	AG PPM	AU PPB	AS PPM	NI PPM	CU/Zn RATIO	
217.80	221.30	<p>Structure: Foliation at: 207.4m - 62' CAB. 215.0m - 73' CAB.</p> <p>INTERMEDIATE ASH TUFF 3A Medium green, fine grained ash or possible intermediate/mafic intrusion (?). Fine grained, poorly foliated to massive. 1-2% disseminated/fracture controlled pyrite with traces chalcopyrite at 218.7m. Minor quartz-carbonate veins/stringers.</p> <p>Mineralization &amp; Alteration: Weak fracture controlled carbonatization.</p>														
221.30	230.85	<p>Structure: Foliation at: 219.0m - 78' CAB.</p> <p>INTERMEDIATE LAPILLI ASH TUFF 3B Medium green, medium grained lapilli ash tuff with local finer grained sections. Gradational contacts with sharp upper contact-marked by lapilli fragments. Up to 10%, &lt;4cm (average 1cm) elongated siliceous felsic fragments. Fine to medium grained chloritic matrix. Traces 1% disseminated/fracture controlled pyrite. Weak to moderately well foliated, with minor (2-3%) quartz carbonate veins/stringers.</p> <p>Mineralization &amp; Alteration: Weak fracture controlled carbonatization.</p>														
230.85	245.75	<p>Structure: Foliation at: 224.0m - 64' CAB. 229.8m - 71' CAB.</p> <p>ARGILLACEOUS INTERMEDIATE ASH TUFF 3B0 Medium to dark green, fine grained intermediate ash tuff with local lapilli fragments below 239.0-243.0 metres. Fine grained, chloritic</p>	VA14343 VA14344	243.60 244.70	244.70 245.70	1.10 1.00	1065 362	19 4	112 161	60 100	1.1 0.1	37 3	182 55	88 196	90.48 69.22	

FROM (M)	TO (M)	DESCRIPTION	Sampl.	FROM	TO	Length (M)	CU PPM	PB PPM	ZN PPM	BA PPM	AG PPM	ALU PPM	AS PPM	NI PPM	Cu/Zn RATIO	
		<p>matrix with 10-15% intercalated argillaceous component. 3-5%, &lt;3cm (avg. 1.5cm) elongated siliceous felsic fragments between 239.0 and 243.0m. Weak to moderately well foliated with minor (boudinaged) quartz veins/stringers. Trace to 2% disseminated pyrite with local pyritic sections.</p> <p>Mineralization &amp; Alteration:  232.6m: 2cm pyritic (50%) stringer.  236.8-237.0m: 40% pyrite, traces chalcopyrite associated with quartz stringers.  238.3m: 3cm pyritic (20%) stringer.  243.6-245.75m: Local up to 7% fracture controlled disseminated pyrite/pyrrhotite, trace chalcopyrite, local pyrite (35%) "stringer" mineralization with quartz veining.</p> <p>Structure:  Foliation at:  232.0m - 80° CAB.  239.0m - 84° CAB.  245.0m - 85° CAB.</p>														
245.75	246.35	<p>FELDSPAR PHYRIC FELSIC INTRUSION 9RB  Medium to light grey/brown. Massive, nonfoliated. Up to 30%, 1-3mm, white, subrounded feldspars. 2-3% carbonate stringers (fracture-filling). Sharp upper &amp; lower contacts at 65' &amp; 75' CAB.</p> <p>Mineralization &amp; Alteration:  Weak fracture controlled carbonatization.</p>														
246.35	255.60	<p>ARGILLACEOUS INTERMEDIATE ASH TUFF 3AO  Similar to previous from 230.85-245.75m. Medium to dark green, fine grained weakly argillaceous intermediate ash tuff. Fine grained, weak to moderate chloritic matrix with fine intercalated argillaceous component (&lt;10%) imparting a streaky dark green colour. Occasional, &lt;2cm elongated siliceous felsic fragments towards the lower contact. 2-3% disseminated/fracture controlled</p>	VA14345 VA14346 VA14347	248.93 249.70 250.20	249.70 250.20 251.00	0.77 0.50 0.80	461 1586 440	15 16 6	178 242 353	120 80 120	0.3 1.9 0.3	3 51 3	61 219 86	53 52 49	72.14 86.76 55.49	















HOLE NUMBER: 8C-90-06

GEOCHEM. SHEET

DATE: 26-February-1991

Sample	From (M)	To (M)	Length (M)	SiO2 wt%	TiO2 wt%	Al2O3 wt%	Fe2O3 wt%	MgO wt%	CaO wt%	Na2O wt	K2O wt%	P2O5 wt%	MnO wt%	Rb ppm	Sr ppm	Y ppm	Zr ppm	Ni ppm	Ba ppm	Cu ppm	Zn ppm	LOI wt%	Cu/Zn Ratio	Zn/Ma Ratio	ISRIKA A.I.	ALUM A.I.	ACKK A.I.
VB09757	12.00	15.00	3.00	65.69	0.39	13.79	4.48	7.32	0.87	0.81	1.85	0.07	0.13	53.0	66	27	199	20	611	20	28	4.90	20	0.4	85	391	2.8
VB09758	35.00	38.00	3.00	68.44	0.39	14.07	3.95	5.01	0.78	2.01	1.83	0.08	0.08	54.0	58	33	226	20	502	20	23	3.73	20	0.1	71	305	2.1
VB09759	54.00	57.00	3.00	68.15	0.41	14.65	4.23	3.90	0.68	2.43	2.06	0.08	0.08	73.0	70	31	218	20	449	40	46	3.36	40	0.2	66	283	2.0
VB09760	67.00	70.00	3.00	53.24	0.87	15.12	8.68	7.13	4.31	2.78	0.60	0.19	0.13	20.0	139	20	138	20	303	20	57	7.31	20	0.2	52	197	1.2
VB09761	158.50	161.50	3.00	53.97	0.69	16.00	5.85	3.40	5.87	0.01	4.31	0.09	0.16	146.0	222	23	173	39	831	62	49	7.87	62	49.0	57	157	1.0
VB09762	188.00	191.00	3.00	51.79	3.86	13.61	14.28	4.17	3.35	2.89	0.60	0.65	0.22	26.0	140	30	295	133	720	272	71	3.86	272	0.3	43	199	1.2
VB09763	200.50	203.50	3.00	41.29	2.67	9.66	13.41	8.58	10.09	0.01	0.01	0.52	0.27	20.0	229	25	249	201	63	185	129	8.50	185	129.0	46	96	0.5
VB09764	212.00	215.00	3.00	50.47	2.62	16.94	11.98	4.94	2.75	3.99	0.82	1.19	0.15	25.0	141	32	387	20	604	249	49	3.86	249	0.1	46	224	1.4
VB09765	218.00	221.00	3.00	50.67	1.10	14.87	14.61	6.56	3.14	2.03	0.42	0.27	0.18	20.0	113	20	97	20	404	348	51	5.21	348	0.3	57	266	1.6
VB09766	234.00	237.00	3.00	40.66	4.08	16.51	16.00	10.51	2.61	0.92	0.52	1.04	0.22	20.0	93	37	326	89	567	218	82	6.62	218	0.9	76	408	2.4
VB09767	245.75	246.35	0.60	64.49	0.34	16.21	3.37	0.94	3.34	1.75	2.76	0.10	0.08	89.0	349	20	260	20	1458	20	48	6.04	20	0.3	42	207	1.4
VB09768	251.00	254.00	3.00	43.78	2.98	13.12	14.27	8.18	4.90	0.83	0.58	0.69	0.26	20.0	150	23	257	71	680	312	151	8.58	312	1.8	60	208	1.2
VB09769	266.00	269.00	3.00	37.55	2.28	12.35	11.90	8.04	8.27	0.51	0.67	0.49	0.25	27.0	177	20	149	142	1023	216	157	15.40	216	3.1	50	131	0.7
VB09770	277.50	280.50	3.00	36.88	2.89	12.81	10.48	6.41	9.39	3.30	0.64	0.74	0.24	37.0	337	30	291	47	160	44	80	13.79	44	0.2	34	96	0.6
VB09771	302.00	305.00	3.00	37.40	2.91	11.74	11.41	8.54	9.25	1.54	0.19	0.54	0.26	20.0	241	20	224	81	96	105	163	14.67	105	1.1	45	107	0.6
VB09772	325.50	327.50	2.00	36.43	3.02	12.27	12.92	8.60	7.34	0.32	0.69	0.60	0.28	20.0	194	27	246	76	616	107	159	13.35	107	5.0	55	147	0.8
VB09773	337.00	340.00	3.00	41.61	3.52	14.58	11.28	6.75	7.90	2.81	0.19	0.84	0.26	20.0	228	32	369	47	212	42	40	8.78	42	0.1	39	134	0.8

HOLE NUMBER: 8C-90-06

GEOCHEM. SHEET

PAGE: 1

FALCONBRIDGE LTD  
 DIAMOND DRILL LOG  
 Property : BIRK CREEK (1990)

Hole # : BC-90-07      Zone # : BIRK CK.      Contractor : BURWASH ENTERPRISES      Date started :10/25/1990  
 Township: KAMLDOPS      Range:      Claim # :BET 5      Date completed:10/28/1990

Level : SURFACE      Section: 201\*82N      Location :  
 Collar coordinate :      Line : 201\*82 N      Latitude: 5688350.00 N      Azimuth: 0° 0' 0"  
 Station: 387\*00 E      Departure: 296390.00 E      Dip : -90° 0' 0"  
 Reference frame :      Elevation: 725.00      Length : 349.61 M

Surveyed by: SPERRY-SUM

Deviation tests :

Depth	Dip	Azimuth
96.62 M	-89° 0' 0"	102° 0' 0"
168.25 M	-85° 0' 0"	102° 0' 0"
230.73 M	-87° 0' 0"	92° 0' 0"
288.65 M	-87° 0' 0"	82° 0' 0"
346.56 M	-86°30' 0"	72° 0' 0"

Remarks :

Water flow :  
 Cemented :

Plugged:  
 Core size: NA

Logged by : C. RUSSELL

Date logged:10/29/1990

Hole # : BC-90-07





FROM (M)	TO (M)	DESCRIPTION	Sampl.	FROM	TO	Leng. (M)	CU PPM	PB PPM	ZN PPM	BA PPM	AG PPM	ALU PPB	AS PPM	NI PPM	Cu/Zn RATIO
		veins to 0.5cm parallel to foliation. Structure: Foliation at: 83.05m - 85' CAB. 83.3m - 70' CAB. 86.1m - 60' CAB.													
87.20	93.57	QUARTZ FELDSPAR FELSIC ASH TUFF 4AC Light to medium grey, fine grained to aphanitic, well foliated. 5% quartz eyes to 2mm, up to 4% feldspar phenocrysts to 2mm all within a light grey sericitic matrix.  Mineralization & Alteration: 2-3% fine grained disseminated to stringer pyrite. Weakly siliceous locally. Weak to moderate sericite.  Structure: Foliation at; 87.8m - 55' CAB.													
93.57	134.70	QUARTZ PHYRIC FELSIC ASH TUFF 4AA Medium grey, fine grained to aphanitic, well foliated and crenulated, 5% quartz eyes to 1-2mm, 2-3% 1-2mm feldspar phenocrysts all within a sericitic matrix. 110.0m: Quartz eyes increase to 3-4mm.  Mineralization & Alteration: 5-10% fine grained pyrite, disseminated and along foliation planes to 0.5-1cm locally. Average 4-5% pyrite. Moderate to strongly siliceous locally. 108.38m: 3cm quartz vein 30' CAB. 116.72m: 1cm quartz vein 10' CAB.  Structure: 93.57 - 97.13m: Fault zone. Very crenulated, broken core, upper contact 80' CAB, lower contact 60' CAB. Foliation at: 99.5m - 50' CAB. 99.8m: 5cm shear, very gougey 75' CAB.	VA12431 VA12432 VA12433 VA12434 VA12435 VA12436 VA12395 VA12396 VA12397 VA12398 VA12399 VA12437 VA12438	99.20 100.70 102.20 103.20 111.00 112.50 114.00 115.00 117.50 119.00 120.50 122.50 124.00 125.50	100.70 102.20 103.20 112.50 114.00 116.00 117.50 119.00 120.50 122.50 124.00 125.50 127.50	1.50 1.50 1.00 1.50 1.50 2.00 2.50 1.50 1.50 2.00 1.50 1.50 2.00	51 36 38 43 35 36 26 23 25 34 43 47 45	50 66 86 89 64 44 41 27 21 7 8 14 53	164 57 91 172 251 164 64 40 52 124 108 63 78	670 600 600 520 500 510 500 500 520 410 470 470 510	1.3 1.2 1.6 0.7 0.6 0.6 0.4 0.4 0.4 0.4 0.4 0.4 0.5	90 77 95 60 82 48 42 34 37 18 24 34 47	481 203 212 132 109 68 55 48 48 32 40 85 111	4 5 3 5 4 5 5 5 5 4 4 4 5	23.72 38.71 29.46 20.00 12.24 18.00 27.27 36.51 32.47 21.52 28.48 42.73 36.59

FROM (M)	TO (M)	DESCRIPTION	Sampl.	FROM	TO	Length (M)	CU PPM	PB PPM	ZN PPM	BA PPM	AG PPM	AL PPB	AS PPM	NI PPM	Cu/Zn RATIO	
134.70	137.40	100.7m: Shear at 15' CAB. 102.7m: Foliation - 80' CAB. 102.84-103.0m: Fault zone. 110.72m: 0.5cm fault gouge 70' CAB. 128.5-129.27m: Fault zone. 130.15-130.3m: Fault zone. 132.68-134.7m: Fault zone.  QUARTZ PHYRIC FELSIC ASH TUFF 4AA Light to medium grey fine grained, well foliated. 5% quartz eyes to 2-3mm in a silver grey sericitic matrix. 1-2% pyrite, disseminated and along foliation planes.  Mineralization & Alteration: Moderate to strong sericite.  Structure: 136.94-137.4m: Fault zone. 1-2% disseminated fracture controlled pyrite. Quartz veining.														
137.40	146.93	QUARTZ PHYRIC FELSIC ASH TUFF 4AA Light to medium grey, fine grained, well foliated. 5% quartz eyes to 2mm in a silver/grey sericitic matrix. Vague outlines of possible lapillia (although poorly defined) towards bottom of unit.  Mineralization & Alteration: 2-4% pyrite, disseminated and along foliation planes. 5-10% locally, minor chalcopyrite, trace galena. Moderate sericite.  Structure 145.90 - 146.93m: Fault zone. Fault parallels core axis.	VA12439 VA12440 VA12441 VA12442 VA12443 VA12444 VA12445	137.40 138.90 140.40 141.90 143.40 144.90 146.40	138.90 140.40 141.90 143.40 144.90 146.40	1.50 1.50 1.50 1.50 1.50 1.50 1.50	19 23 88 84 75 44 87	33 66 660 222 445 234 272	37 147 1175 215 332 719 377	520 560 600 550 620 600 590	0.5 0.5 1.5 1 1.1 0.9 1	29 60 63 71 57 66 62	62 127 154 149 141 149 170	2 3 3 4 3 4 5	33.93 13.53 6.97 28.09 18.43 5.77 18.75	
146.93	156.77	ARGILLACEOUS FELSIC LAPILLI TUFF 4B0 Medium to dark grey, fine grained to aphanitic, well foliated matrix with up to 10% argillaceous material. 5-10% lapillia. Lapillia are strongly siliceous & may be as large as 6cm long by 1.5cm wide.	VA12446 VA12447 VA12448 VA12449 VA12450 VA12451	147.90 149.40 150.90 152.40 153.90 155.40	149.40 150.90 152.40 153.90 155.40 156.77	1.50 1.50 1.50 1.50 1.50 1.37	52 34 190 45 58 92	287 73 525 170 739 119	329 72 961 362 890 126	580 610 600 590 580 620	1 0.6 1.4 0.7 2.1 0.6	52 43 84 90 83 78	141 99 191 226 215 241	5 4 4 3 4 3	13.65 32.08 16.51 11.06 6.12 42.20	

FROM (M)	TO (M)	DESCRIPTION	Sampl.	FROM	TO	Length (M)	CU PPM	PB PPM	ZN PPM	BA PPM	AG PPM	AU PPB	AS PPM	NI PPM	Cu/Zn RATIO
156.77	157.55	<p>Mineralization &amp; Alteration: Up to 5-10% pyrite, disseminated and along foliation planes. Up to 0.5% chalcopyrite, minor galena. Weak to moderate sericite along fractures.</p> <p>Structure: Foliation at: 147.7m - 85-90' CAB.</p> <p>CHERT BRECCIA 4CP ss Very light grey to medium grey chert clasts within a silver/grey sericitic matrix. Clasts are angular, up to 5-6cm in size with somewhat fuzzy outlines.</p>	VA12452	156.77	157.55	0.78	270	2777	4992	260	6.2	222	360	4	5.13
157.55	159.00	<p>Mineralization &amp; Alteration: 10-15% disseminated and along foliation planes, locally semi-massive pyrite in matrix around clasts. Up to 0.5% chalcopyrite, 0.25% galena. Trace pyrite within clasts. Later white quartz veins intrude unit with trace pyrite.</p> <p>ARGILLACEOUS FELSIC LAPILLI TUFF 4B0 Medium to dark grey, fine grained to aphanitic, well foliated, with up to 10% argillaceous material. 5-10% lapillis, strongly siliceous.</p>	VA12453	157.55	159.00	1.50	31	201	283	590	0.8	80	211	4	9.87
159.00	178.10	<p>Mineralization &amp; Alteration: 5-10% pyrite, disseminated and along foliation planes, up to 0.5% chalcopyrite, minor galena.</p> <p>Structure: Foliation at: 158.5m - 90' CAB.</p> <p>QUARTZ PHYRIC FELSIC ASH TUFF 4AA Light grey, fine grained, well foliated. Up to 5% quartz eyes to 2mm, rare to 4mm within an attenuated sericitic matrix. Quartz eyes come and go.</p> <p>168.12-172.29m: Medium grey unit, less felsic than surrounding unit. Rare quartz eyes to 1mm in a weak sericitic matrix.</p> <p>173.4-177.3m: 1-2% poorly defined lapillis.</p>	VA12454 VA12455 VA12456 VA12457 VA12458 VA12459 VA12460 VA12461 VA12462	159.05 160.55 162.05 163.55 165.05 166.55 168.15 172.30 173.80 175.30	160.55 162.05 163.55 165.05 166.55 168.15 173.80 175.30 176.80	1.50 1.50 1.50 1.50 1.50 1.50 1.50 1.50 1.50 1.50	21 13 16 14 32 17 12 40 30	71 34 126 49 70 115 81 225 144	128 54 108 70 681 110 91 195 403	660 720 630 670 650 620 650 720 640	0.5 0.2 0.4 0.4 1.1 0.5 0.4 0.5 0.6	49 33 41 24 69 26 38 48 48	155 77 89 51 134 63 83 100 124	4 4 3 3 4 4 4 2 5	14.09 19.40 12.90 16.67 4.49 13.39 11.65 17.02 6.93

FROM (M)	TO (M)	DESCRIPTION	SAMPL.	FROM	TO	LENG. (M)	CU PPM	PB PPM	ZN PPM	BA PPM	AG PPM	AU PPB	AS PPM	N1 PPM	CU/ZN RATIO
		<p><b>Mineralization &amp; Alteration:</b> 1-2% pyrite, disseminated and along foliation planes, locally to 5%, trace chalcopyrite &amp; galena. Weak chlorite wisps. 168.12-172.29m: Up to 0.5% disseminated pyrite. 177.3-178.1m: Quartz veins. Up to 1% disseminated pyrite.</p> <p><b>Structure:</b> Foliation at: 63.0m - 70' CAB. 169.0m - 90' CAB. 176.0m - 60' CAB.</p>	VA12463	176.80	178.30	1.50	47	494	254	680	1.4	11	46	3	15.61
178.10	182.25	<p>FELSIC LAPILLI TUFF 4B Light to medium grey, fine grained, moderately foliated. 10% lapillis in a weak to moderate sericitic matrix. Lapillis are moderately to strongly siliceous.</p> <p><b>Mineralization &amp; Alteration:</b> Up to 3% pyrite, disseminated and along foliation planes, locally to 5%, trace galena.</p> <p><b>Structure:</b> Foliation at: 180.4m - 80' CAB.</p>	VA12464 VA12465 VA12466	178.30 179.80 181.30	179.80 181.30 182.80	1.50 1.50 1.50	34 112 21	123 632 73	320 1079 260	720 750 730	0.5 0.9 0.6	31 59 33	64 172 76	3 3 3	9.60 9.40 7.47
182.25	211.00	<p>QUARTZ PHYRIC FELSIC ASH TUFF 4AA Medium grey, fine grained, moderately foliated. 189.35m: 2cm band of semi-massive pyrite with 0.5% chalcopyrite, minor galena. Up to 5% quartz eyes to 2mm, rare to 4mm within an attenuated sericitic matrix.</p> <p><b>Mineralization &amp; Alteration:</b> Up to 1% disseminated pyrite, rarely along foliation planes to 2%, trace galena. 207.65m: 12cm quartz vein.</p> <p><b>Structure:</b> Foliation at: 199.1m - 90' CAB. 202.2m - 85' CAB.</p>	VA12467 VA12468	187.30 188.80	188.80 190.30	1.50 1.50	69 332	242 1366	543 2665	680 740	0.5 1.1	28 45	70 106	4 3	11.27 11.08



FROM (M)	TO (M)	DESCRIPTION	Sampl.	FROM	TO	Length (M)	CU PPM	PB PPM	ZN PPM	BA PPM	AG PPM	AU PPB	AS PPM	NI PPM	Cu/Zn RATIO
		207.77m - small shear.													
211.00	217.90	FELSIC LAPILLI TUFF 48A Medium grey, coarser grained than prior unit, moderately foliated. 1-2% quartz eyes to 2-3mm. 10-15% possible lapillis/clasts, very stretched from 2-4cm (average 2cm). Lapillis moderately to strongly siliceous.	VA12469 VA12470 VA12471	212.30 213.80 215.30	213.80 215.30 216.90	1.50 1.50 1.60	28 112 51	108 458 196	252 786 654	570 480 490	0.4 0.7 0.6	44 50 55	93 122 137	3 5 4	10.00 12.47 7.23
		Mineralization & Alteration: Up to 3% pyrite, disseminated and along foliation planes, rare locally to 5% with trace galena.													
		Structures: Foliation at: 80'-90' CAB													
217.90	236.36	QUARTZ PHYRIC FELSIC ASH TUFF 4AA Medium grey, fine grained, moderately foliated. 1-2% quartz eyes to 2mm within an attenuated sericitic matrix. Occasional (1%) possible very stretched lapillis/clasts.	VA12472 VA12473	233.20 234.70	234.70 236.36	1.50 1.66	10 12	1 29	113 126	470 490	0.3 0.2	3 3	12 39	3 3	8.13 8.70
		Mineralization & Alteration: Up to 2% pyrite, disseminated and along foliation planes, locally to 5%. Trace to minor galena occurs with these blasts of pyrite. 220.23-220.48m: Quartz vein. Top 50' CAB bottom 90' CAB.													
		Structures: 217.90 - 218.97m: Fault zone. Foliation at: 221.0m - 85' CAB.													
236.36	240.00	CHERT BRECCIA 4CP ss Very light grey to medium grey chert clasts all within a light grey sericitic matrix with up to 2% quartz eyes to 3-4mm. Clasts are subangular to subrounded with sharp outlines. 238.1-240.0m: Clasts decrease in size towards the bottom of the unit (top up?). Sharp upper contact, gradational lower contact showing swirled textures of black argillaceous material and chert, possible fault contact?	VA12474 VA12475 VA12476 VA12477	236.36 237.36 238.36 239.36	237.36 238.36 239.36 240.00	1.00 1.00 1.00 0.64	998 69 40 18	8086 805 203 1	9629 1751 683 115	330 490 710 820	5.4 1.3 0.5 0.4	154 107 40 18	266 199 95 58	4 2 3 4	9.39 3.79 5.53 13.53

FROM (M)	TO (M)	DESCRIPTION	Sampl.	FROM	TO	Lens. (M)	CU PPM	PB PPM	ZN PPM	BA PPM	AG PPM	AU PPB	AS PPM	NI PPM	Cu/Zn RATIO
240.00	273.65	<p>Mineralization &amp; Alteration: Up to 15% pyrite, disseminated and along foliation planes around clasts with up to 0.5% chalcopyrite &amp; 0.25% galena. 1% disseminated pyrite within occasional clast.</p> <p>ARGILLACEOUS FELSIC ASH TUFF 4AAD Medium to dark grey, weakly laminated argillaceous material, intercalated with felsic ash tuff, well foliated. 2-3% quartz eyes/clasts to 3-4mm. 2-3% possible feldspar crystals to 1mm, often clustered. Sharp bottom contact.</p>	VA1247B	240.00	240.34	0.34	8	1	105	760	0.5	3	32	3	7.08
			VA12479	240.34	241.41	1.07	12	1	17	10	0.1	3	3	6	41.38
			VA12477	241.41	242.41	1.00	11	1	64	600	0.1	3	19	2	14.67
			VA12480	242.41	243.91	1.50	13	65	131	590	0.3	3	36	2	9.03
			VA12481	247.60	247.98	0.38	21	160	312	620	0.4	3	67	3	6.31
273.65	304.15	<p>Mineralization &amp; Alteration: Up to 1% pyrite, disseminated and along foliation planes, locally to 3%. 240.34-241.41m: Quartz vein. Top 90' CAB, bottom 80' CAB. No visible sulphides.</p> <p>Structure: 250.0m - 90' CAB. 248.38-248.92m: Fault zone. 1% disseminated pyrite.</p> <p>247.98- 248.18 FELSIC ASH TUFF 20 cm of massive pyrite.</p> <p>FELSIC ASH TUFF 4A0 Medium to dark grey laminated/banded fine grained. Rare to 1% quartz eyes to 2mm. Possible 1-2% lapillia towards bottom of unit, very attenuated.</p> <p>Mineralization &amp; Alteration: Up to 5% pyrite, disseminated and along foliation planes, 5% locally. 274.65-276.15m: Quartz vein. Trace galena. Top contact 50' CAB, bottom 75' CAB. Up to 1% quartz veins, less than 1cm wide throughout.</p> <p>Structure:</p>	VA12420	247.98	248.18	0.20	2115	6681	14971	90	7.8	106	244	5	12.38
			VA12421	248.18	249.68	1.50	26	157	130	570	0.4	3	35	3	16.67
			VA12422	249.68	251.18	1.50	50	215	370	570	0.3	3	13	3	11.90
			VA12482	273.65	274.65	1.00	44	201	252	790	0.8	27	103	7	14.86
			VA12483	274.65	276.15	1.50	21	1904	1102	130	2.3	3	120	6	1.87
			VA12484	276.15	277.65	1.50	103	174	486	860	1.1	38	285	6	17.49
			VA12485	277.65	279.15	1.50	138	259	762	800	1.2	49	92	5	15.33
			VA12486	279.15	280.65	1.50	120	136	331	830	1.2	54	110	6	26.61
			VA12487	280.65	282.15	1.50	52	554	1137	800	1.4	53	77	6	4.37
			VA12488	282.15	283.65	1.50	75	2126	3322	750	3.8	130	1026	5	2.21
			VA12489	283.65	285.15	1.50	31	526	548	690	2	65	539	5	5.35
			VA12490	285.15	286.65	1.50	21	88	202	640	1.2	41	139	4	9.42
			VA12491	286.65	288.15	1.50	12	1	63	630	1	40	69	4	16.00
			VA12492	288.15	289.65	1.50	20	1	49	620	2.1	135	1627	6	28.99
			VA12493	289.65	291.15	1.50	15	1	56	590	1.6	108	821	5	21.13
VA12494	291.15	292.65	1.50	19	1	68	520	1.6	53	1096	5	21.84			
VA12495	292.65	294.15	1.50	25	1	56	570	1.6	60	1851	5	30.86			





Sample	From (M)	To (M)	Length (M)	SiO2 wt%	TiO2 wt%	Al2O3 wt%	Fe2O3 wt%	MgO wt%	CaO wt%	Na2O wt	K2O wt%	P2O5 wt%	MnO wt%	Rb ppm	Sr ppm	Y ppm	Zr ppm	Ni ppm	Ba ppm	Cu ppm	Zn ppm	LOI wt%	Cu/Zn Ratio	Zn/Na Ratio	ISHIKAWA A.I.	ALUM A.I.	ACK A.I.
VB09774	13.00	16.00	3.00	65.37	0.38	15.71	4.64	0.29	3.43	1.20	2.17	0.06	0.01	69.0	251	20	112	20	785	20	84	4.90	20	0.7	35	231	1.5
VB09774	30.00	33.00	3.00	63.63	0.38	14.81	3.32	0.96	5.42	2.03	2.49	0.06	0.03	64.0	125	20	91	20	1095	20	36	6.13	20	0.2	32	149	0.9
VB09775	59.00	62.00	3.00	62.26	0.36	15.29	2.76	0.70	5.60	0.15	3.81	0.05	0.04	122.0	211	20	121	20	1270	20	86	7.19	20	5.7	44	160	1.1
VB09775	70.00	73.00	3.00	64.39	0.40	16.15	3.72	1.43	2.67	0.91	2.99	0.06	0.07	85.0	198	20	113	20	1005	20	47	6.64	20	0.5	55	246	1.7
VB09776	74.00	77.00	3.00	63.12	0.45	17.66	4.25	1.36	2.24	0.99	3.15	0.06	0.07	102.0	195	20	109	20	947	23	51	6.39	23	0.5	58	274	1.9
VB09777	79.00	82.00	3.00	64.69	0.41	15.84	4.85	1.38	2.16	0.73	3.10	0.05	0.08	89.0	151	20	103	20	803	20	40	5.81	20	0.6	61	264	1.9
VB09778	84.00	87.00	3.00	55.91	0.37	15.17	6.60	3.14	4.66	0.37	3.24	0.05	0.16	92.0	127	20	103	20	707	20	62	8.85	20	1.7	56	183	1.2
VB09779	88.00	91.00	3.00	56.53	0.36	14.36	6.39	3.38	4.67	0.30	3.21	0.05	0.16	98.0	116	20	94	20	680	24	59	9.27	24	2.0	57	176	1.2
VB09780	110.00	113.00	3.00	72.19	0.37	14.07	4.53	0.45	0.38	0.03	3.71	0.04	0.01	116.0	43	20	77	20	509	32	95	4.34	32	31.7	91	342	3.0
VB09781	134.70	137.40	2.70	67.18	0.35	14.59	4.19	1.20	1.74	0.01	3.97	0.05	0.07	129.0	60	20	88	20	522	20	41	5.45	20	41.0	75	255	2.0
VB09782	142.00	145.00	3.00	67.91	0.38	14.88	5.86	0.46	0.48	0.01	4.03	0.04	0.01	128.0	43	20	84	20	633	38	155	5.24	38	155.0	90	329	2.8
VB09783	149.00	152.00	3.00	68.97	0.41	15.69	4.44	0.52	0.34	0.01	4.16	0.06	0.01	137.0	50	20	94	20	655	31	58	4.55	31	58.0	93	348	3.1
VB09784	157.60	159.00	1.40	71.12	0.31	13.15	6.16	0.42	0.23	0.06	3.45	0.04	0.01	104.0	39	20	94	20	641	51	381	4.92	51	63.5	93	352	3.1
VB09785	161.00	164.00	3.00	68.31	0.35	14.50	4.94	1.54	1.25	0.02	3.60	0.04	0.07	111.0	59	20	76	20	719	20	54	4.96	20	27.0	80	298	2.3
VB09786	179.00	182.00	3.00	66.78	0.34	14.35	5.07	2.11	1.49	0.01	3.63	0.04	0.07	120.0	74	23	81	20	773	22	166	5.50	22	166.0	79	280	2.2
VB09787	203.00	206.00	3.00	62.80	0.36	14.39	5.23	5.47	2.17	0.01	2.70	0.06	0.16	81.0	52	20	70	20	506	25	106	6.38	25	106.0	79	295	2.1
VB09788	212.00	215.00	3.00	61.99	0.31	12.74	6.62	3.51	2.96	0.01	2.98	0.05	0.18	92.0	75	20	63	20	482	43	244	7.38	43	244.0	69	214	1.5
VB09789	228.00	231.00	3.00	64.57	0.37	14.92	5.63	3.16	1.62	0.01	3.36	0.05	0.08	114.0	80	20	73	20	542	46	71	5.70	46	71.0	80	299	2.3
VB09790	253.00	256.00	3.00	60.37	0.34	14.02	4.58	2.85	6.07	1.12	2.33	0.05	0.13	77.0	111	20	100	20	471	20	29	7.38	20	0.3	42	147	0.9
VB09791	286.00	289.00	3.00	60.83	0.43	14.94	4.31	2.08	4.05	0.06	3.87	0.06	0.18	101.0	97	20	102	20	608	20	57	6.25	20	9.5	59	187	1.3
VB09792	306.00	309.00	3.00	60.27	0.43	14.95	4.62	2.33	5.92	0.54	2.96	0.07	0.11	84.0	147	20	111	20	609	22	35	6.59	22	0.7	45	159	1.0
VB09793	310.94	313.47	2.53	61.43	0.44	15.20	4.84	2.01	5.01	0.44	3.14	0.06	0.09	84.0	145	20	98	20	681	20	46	5.56	20	1.1	49	177	1.2
VB09794	318.00	321.00	3.00	59.62	0.45	15.43	5.25	2.36	5.41	1.58	2.44	0.06	0.10	77.0	146	20	105	20	563	21	36	7.15	21	0.2	41	164	1.0
VB09795	325.00	328.00	3.00	63.16	0.42	15.04	4.80	2.01	4.19	0.63	3.09	0.06	0.09	86.0	139	20	91	20	681	27	53	6.01	27	0.8	51	190	1.3
VB09796	339.00	342.00	3.00	57.48	0.46	15.47	5.45	2.46	6.05	3.13	1.96	0.07	0.10	56.0	184	20	116	20	642	40	49	6.99	40	0.2	33	139	0.9

FALCONBRIDGE LTD  
 DIAMOND DRILL LOG  
 Property : BIRK CREEK (1990)

Hole # : BC-90-08      Zone # : BIRK CK.      Contractor : BURWASH ENTERPRISES      Date started :10/28/1990  
 Township: KAMLOOPS      Range:      Claim # :BET 3      Date completed:10/31/1990  
 Lot :

Level : SURFACE      Section: 207+07N      Location :  
 Collar coordinate :      Line : 207+07 N      Latitude: 5689780.00 N      Azimuth: 55° 0' 0"  
 Station: 404+40 E      Departure: 297540.00 E      Dip : -65° 0' 0"  
 Reference frame :      Elevation: 748.00      Length : 300.84 M

Surveyed by: SPERRY-SUM

Deviation tests :

Depth	Dip	Azimuth
87.50 M	-64° 0' 0"	54° 0' 0"
215.50 M	-68°30' 0"	59° 0' 0"
279.50 M	-70°15' 0"	59° 0' 0"

Remarks :

Water flow :  
 Cimented :

Plugged:  
 Core size: NO



FROM (M)	TO (M)	DESCRIPTION	Sampl.	FROM	TO	Leng. (M)	CU PPM	PB PPM	ZN PPM	BA PPM	AG PPM	AU PPB	AS PPM	NI PPM	Cu/Zn RATIO
		18.0m - 66' CAB. 21.4m - 52' CAB.													
22.47	23.62	MEDIUM GRAINED FELSIC INTRUSION 9S Medium to light grey/green, medium grained felsic intermediate "dacitic" intrusion. Traces fine disseminated pyrite. Sharp upper/lower contacts at 75' CAB. (broken, blocky lower contact over 5cm).													
23.62	34.15	INTERMEDIATE ASH TUFF 3A Medium green/grey, fine grained ash tuff. 2-3X, <1mm, light brown/white mottled feldspar crystals. Trace to 3X fracture controlled/disseminated pyrite with local, traces chalcopyrite (25.4m, 30.7m, 30.84m) and trace galena/chalcopyrite (quartz vein) at 30.62m. Fine grained, chloritic-weakly sericitic matrix. Moderately well developed foliation with 1-2X quartz veins/stringers.  Mineralization & Alteration: Weak pervasive sericitization.  Structure: Foliation at: 25.2m - 50' CAB. 32.5m - 65' CAB.  Faults at: 28.3m: Fault slip at 73' CAB.													
34.15	53.22	FELSIC ASH TUFF 4A Medium to light green/grey to locally light grey, sericitic/chloritic felsic ash tuff. Occasional up to 3X, <2mm subrounded quartz phenocrysts. Fine grained, chloritic - moderately sericitic matrix with local moderate to strongly sericitic zones from approximately 39.95-40.1m, 40.45-40.85m, 41.4-41.6m, 42.15-42.25m, 43.65-44.35m, and 44.75-46.0m. Trace 3X fine disseminated and fracture controlled pyrite with local, pyritic "stringers" (up to 20X pyrite) and trace 0.5X sphalerite from	VA14388 VA14389 VA14390 VA14391 VA14392 VA14393 VA14394 VA14395	39.95 41.00 42.00 42.80 43.80 44.80 45.80 46.80	41.00 42.00 42.80 43.80 44.80 45.80 46.80 47.60	1.05 1.00 0.80 1.00 1.00 1.00 1.00 0.80	469 297 670 133 1035 115 193 171	518 265 382 98 837 140 128 132	1267 707 701 197 1906 1100 229 236 344	860 800 880 1000 1100 1100 1000 980	2.7 1.2 1.7 0.8 7.6 1.1 1.1 1.1	34 33 39 36 60 41 36 35	52 106 67 63 166 105 73 67	4 4 5 5 4 5 4 5	27.02 29.58 48.87 40.30 35.19 33.43 44.99 33.20



FROM (M)	TO (M)	DESCRIPTION	Sampl.	FROM	TO	Leng. (M)	CU PPM	PB PPM	ZN PPM	BA PPM	AG PPM	AU PPB	AS PPM	NI PPM	Cu/Zn RATIO
		41.4-47.4 metres. Well developed foliation with minor quartz veins/stringers towards the lower contact.  Mineralization & Alteration: Moderate to strongly sericitic.  Trace to 0.5% sphalerite with pyritic stringers particularly between 41.4m and 47.4m.  Structure: Foliation at: 38.2m - 65' CAB. 41.0m - 76' CAB. 45.0m - 72' CAB. 48.5m - 75' CAB.													
53.22	61.20	FELDSPAR PHYRIC INTERMEDIATE ASH TUFF 3AB Medium green/grey, fine grained ash tuff. Up to 4%, <2mm, mottled, light brown/white subrounded-rounded feldspar phenocrysts. Fine grained weak to moderately chloritic/sericitic matrix. Trace to 3% fine disseminated/fracture controlled pyrite with 3-5cm local pyritic "stringers" (50% pyrite) at 58.2m, 58.4m, 58.9m, 59.8m, and 60.4m containing traces chalcocopyrite. Moderately well developed foliation with 25% quartz veins over the last metre.  Mineralization & Alteration: Weak to moderate pervasive sericitization.  Structure: Foliation at: 54.0m - 68' CAB. 59.0m - 62' CAB.	VA14396 VA14397 VA14398 VA14399 VA14400	56.00 57.00 58.00 59.00 60.00	57.00 58.00 59.00 60.00 61.00	1.00 1.00 1.00 1.00 1.00	479 207 107 275 243	161 23 28 40 38	539 224 179 261 229	650 660 750 740 640	1.5 0.5 0.6 0.7 0.7	43 19 11 35 40	101 45 50 60 78	4 4 4 5 6	47.05 48.03 37.41 51.31 51.48
61.20	72.32	FELSIC ASH TUFF 4A Medium to light grey/green, fine grained "dacitic" ash tuff. Fine grained, moderately sericitic matrix (sericite content increasing slightly downhole). 2-5% fine fracture controlled pyrite (increasing below 66.0m) with local, 1-2cm pyritic "stringers" (20-30% pyrite) below 66.0m with traces chalcocopyrite/sphalerite.	VA14401 VA14402 VA14403 VA14404 VA14405 VA14406 VA14407	65.80 66.30 67.00 68.00 69.19 70.30 71.30	66.30 67.00 68.00 69.19 70.30 71.30 72.32	0.50 0.70 1.00 1.19 1.11 1.00 1.02	317 125 160 180 148 224 142	47 40 38 55 30 82 34	118 214 288 317 203 309 117	1200 910 900 1000 1000 1100 1200	0.8 0.7 0.6 0.7 0.5 0.9 0.5	46 27 27 3 12 38 29	143 71 81 81 29 84 98	5 4 5 5 5 4 5	72.87 36.87 35.71 36.22 42.17 42.03 54.83



FROM (M)	TO (M)	DESCRIPTION	Sampl.	FROM	TO	Leng. (M)	CU PPM	PB PPM	ZN PPM	BA PPM	AG PPM	AJ PPM	AS PPM	NI PPM	Cu/Zn RATIO
80.46	93.85	72.8-72.9m: Broken, blocky core with fault gouge. Approximate orientation at 75' CAB.  FELSIC ASH TUFF 4A Medium to light grey, fine grained dacitic ash tuff. Fine grained, weak to moderately sericitic matrix. Occasional up to 3%, <1.5mm quartz phenocrysts. Up to 5% fracture controlled/disseminated pyrite to approximately 82.8m with traces sphalerite/galena from 81.1-81.4m and traces sphalerite from 82.2-82.8m. Trace 2% pyrite below 82.8m with up to 3% pyrite cubes from 93.2m to lower contact. Sphalerite stringer (1mm) at 92.6m.  Mineralization & Alteration: Weak to moderate pervasive sericitization.  Structure: Foliation at: 81.6m - 80' CAB. 86.1m - 72' CAB. 90.5m - 72' CAB. 93.6m - 75' CAB.	VA14419 VA14420 VA14421 VA14422 VA14423	81.00 81.50 82.20 82.80 93.50	81.50 82.20 83.80 94.20	0.50 0.70 0.60 1.00 0.70	2424 185 2075 88 157	4937 283 1121 108 200	5950 858 4578 337 1033	1100 1300 1300 1300 640	4.6 1.1 4.8 0.6 1.6	94 75 91 27 24	247 206 197 62 73	6 6 5 5 27	28.95 17.74 31.19 20.71 13.19
93.85	99.45	DRAPHITIC ARGILLITE 51M Medium dark grey/black. Intercalated to finely interbedded argillite/siltstone with up to 30%, 1-4cm (avg. 2cm) siliceous/cherty and siltstone fragments and lesser argillite fragments. 3-5%, up to 1cm fine grained pyrite aggregates (cubes). Moderate to well foliated, reworked (?), with foliations parallel to bedding.  Mineralization & Alteration: Unknown.  Structure: Bedding at: 96.3m - 71' CAB. 98.0m - 78' CAB.  Faults at: 99.4m: Fault slip at 75' CAB.	VA14424 VA14425 VA14426 VA14427 VA14428	94.20 95.20 96.20 97.20 98.20	95.20 96.20 97.20 98.20 99.45	1.00 1.00 1.00 1.00 1.25	43 69 65 68 72	22 16 22 15 12	73 105 107 145 151	410 710 540 670 600	0.5 0.4 0.6 0.5 0.4	9 3 3 3 6	31 31 51 46 64	21 33 29 49 77	37.07 39.66 37.79 31.92 32.29



FROM (M)	TO (M)	DESCRIPTION	Sampl.	FROM	TO	Leng. (M)	CU PPM	PB PPM	ZN PPM	BA PPM	AG PPM	AU PPB	AS PPM	NI PPM	Cu/Zn RATIO
131.20	175.83	<p>tuff. Fine grained weakly chloritic/sericitic matrix. Trace to 1% fine disseminated pyrite with local &lt;0.5cm pyrite aggregates. Moderate to well developed foliation.</p> <p>131.1-131.2m: Brecciated, angular to subangular cherty/siliceous fragments marking lower contact, no faulting.</p> <p>Mineralization &amp; Alteration: Unknown.</p> <p>Structure: Foliation at: 117.0m - 70° CAB. 120.0m - 65° CAB. 124.5m - 65° CAB. 130.5m - 69° CAB.</p> <p>INTERMEDIATE ASH TUFF 3A Medium to light green/grey, fine grained intermediate (andesitic to dacitic) ash tuff. Fine grained, variable chloritic (weak to moderate) matrix, gradational between andesitic-dacitic compositions. Increasingly dacitic towards the lower contact. Traces to 1% fine disseminated pyrite. Moderately well foliated.</p> <p>137.15-137.95m: Strong quartz-carbonate alteration zone. Trace 0.25% sphalerite, traces chalcopyrite with pyrite.</p> <p>Mineralization &amp; Alteration: Weak fracture controlled carbonate overall. 152.3-152.64m: Strong carbonate alteration. 153.3-153.55m: Strong carbonate alteration. 156.6-156.7m: Strong carbonate alteration. 166.45-166.87m: Strong carbonate alteration.</p> <p>Structure: Foliations at: 136.15m - 66° CAB. 140.0m - 71° CAB. 146.2m - 73° CAB.</p>	VA14430	137.15	137.95	0.80	1108	335	3224	10	2.2	64	25	3	25.58





FROM (M)	TO (M)	DESCRIPTION	Sampl.	FROM	TO	Leng. (M)	CU PPM	PB PPM	ZN PPM	BA PPM	AG PPM	AU PPM	AS PPM	NI PPM	Cu/Zn RATIO
246.00	255.85	ARGILLACEOUS FELSIC ASH TUFF 4A0 Medium to dark grey, fine grained argillaceous ash tuff. Occasional, 1-2%, <1mm quartz crystals. Gradational upper contact with increasing argillaceous component downhole. Local up to 5%, <2cm felsic/tuffaceous sediment fragments. Traces 2% disseminated pyrite with up to 2%, <1cm pyrite aggregates throughout. Moderately well developed, locally contorted foliation. Minor quartz carbonate stringers.  Mineralization & Alteration: Unknown.  Structure: Foliations at: 249.0m - 78' CAB. 252.5m - 67' CAB.  Faults at: 255.85-256.05m: Graphitic, quartz veined. Shear zone at 55' CAB.	VA14431	255.00	255.85	0.85	41	10	138	540	1	11	24	7	22.91
255.85	263.06	GRAPHITIC ARGILLITE 51M Black, graphitic, fine wavy-contorted laminations. Faulted upper and lower contact (graphitic shears over 20-30cm) paralleling foliation at +/- 75' CAB. Broken, highly fracture core from 256.9-257.17m.  Mineralization & Alteration: Weak fracture-controlled carbonatization.  Structure: Foliation at: 258.3m - 73' CAB.  Faults at: 255.85-256.05m: Graphitic fault +/- 75' CAB. 262.8-263.06m: Graphitic fault +/- 75' CAB.	VA14432 VA14433 VA14434 VA14435 VA14436	255.85 257.00 258.50 260.00 261.50	257.00 258.50 260.00 261.50	1.15 1.50 1.50 1.50 1.56	64 61 57 48 47	40 50 17 35 96	257 1056 197 290 225	390 500 500 480 320	1.3 2.1 1.4 1.8 2.3	3 20 3 28 28	30 30 36 66 51	76 108 65 86 86	19.94 5.46 22.44 14.20 17.28
263.06	267.16	ARGILLACEOUS FELSIC ASH TUFF 4A0 Medium to light grey, fine grained "dacitic" ash tuff. Strongly quartz veined, particularly between 263.5-264.6m. Fine grained, weak to	VA14437	263.06	263.80	0.74	19	11	85	550	0.6	8	14	9	18.27



FROM (M)	TO (M)	DESCRIPTION	Sampl.	FROM	TO	Leng. (M)	CU PPM	PB PPM	ZN PPM	BA PPM	AG PPM	AU PPB	AS PPM	NI PPM	Cu/Zn RATIO
		locally moderate argillaceous matrix. Trace 1% pyrite. Poorly foliated with local "cataclastic-fragmental" texture.													
		Mineralization & Alteration: Moderate fracture controlled silicification.													
		Structure: Faults at: 263.96-264.05m: Fault, orientation unknown.													
267.16	277.22	GRAPHITIC ARGILLITE SIM Black, graphitic argillite with numerous, broken-blocky highly fractured sections. Contorted, wavy, finely laminated. 2-3%, up to low pyrite aggregates/fracture controlled. Strongly quartz veined between 274.86-276.3m (highly fractured). Sharp lower contact at 65' CAB.	VA14438 VA14439 VA14440 VA14441	272.00 273.50 274.86 276.30	273.50 274.86 276.30 277.22	1.50 1.36 1.44 0.92	51 53 22 38	54 67 132 30	433 347 308 285	380 400 140 340	1.3 1.6 1 1	3 3 3 3	44 47 32 55	87 80 40 73	10.54 13.25 6.67 11.76
		Mineralization & Alteration: Weak fracture controlled carbonatization.													
		Structure: Faults at: 267.16-267.7m: Broken, blocky highly fractured core. 269.14-269.7m: Broken, blocky highly fractured core. 270.1-270.3m: Broken, blocky highly fractured core. 272.4-270.8m: Fault zone at 68' CAB. 274.86-276.3m: Broken, highly fracture core, numerous faults ranging from 30-70' CAB.													
277.22	293.50	ARGILLACEOUS FELDSPAR PHYRIC FELSIC ASH TUFF 4AB0 Medium gray, medium to fine grained "decitic" tuff. Variable, up to 8%, 1-2mm mottled feldspar phenocrysts. Medium to fine grained, sericitic matrix with variable argillaceous component from <5% to 20%. Rare siliceous/cherty fragments with several argillite fragments over the last 1.5m. 2-3% fine grained fractured controlled pyrite with up to 30% disseminated/fracture controlled pyrite from 277.7-277.95m. Well foliated with minor, boudinaged quartz (carbonate)	VA14442 VA14443 VA14444 VA14445	277.22 277.70 277.95 292.50	277.70 277.95 278.95 293.50	0.48 0.25 1.00 1.00	32 42 15 32	10 46 15 14	148 63 56 156	410 280 510 320	0.7 2.5 0.6 0.7	3 3 3 63	23 91 13 14	9 8 4 6	17.78 40.00 21.13 17.02



Sample	From (M)	To (M)	Length (M)	SiO2 wt%	TiO2 wt%	Al2O3 wt%	Fe2O3 wt%	MgO wt%	CaO wt%	Na2O wt	K2O wt%	P2O5 wt%	MnO wt%	Rb ppm	Sr ppm	Y ppm	Zr ppm	Ni ppm	Ba ppm	Cu ppm	Zn ppm	LOI wt%	Cu/Zn Ratio	Zn/Ni Ratio	ISHIKA A.I.	ALUM A.I.	ACNK A.I.
V809798	18.00	21.00	3.00	55.04	0.52	17.23	8.39	7.22	0.47	1.82	2.80	0.07	0.11	99.0	70	20	110	20	590	697	338	6.57	697	1.9	81	339	2.5
V809799	28.00	31.00	3.00	59.83	0.51	14.75	8.92	6.82	0.38	0.61	2.23	0.08	0.08	63.0	40	20	86	20	643	206	164	6.20	206	2.7	90	458	3.6
V809800	43.50	46.50	3.00	67.46	0.51	15.27	4.57	2.26	1.00	0.07	3.83	0.06	0.05	121.0	72	20	67	20	1171	133	302	4.67	133	43.1	85	312	2.5
V809801	55.00	58.00	3.00	62.28	0.52	15.50	7.65	6.26	0.33	0.15	2.50	0.07	0.11	76.0	41	20	87	20	750	125	127	5.11	125	9.8	95	524	4.4
V809802	64.00	67.00	3.00	63.15	0.46	13.76	7.84	4.07	1.26	0.22	2.65	0.07	0.11	79.0	64	20	89	20	920	262	1620	5.88	262	73.6	82	333	2.5
V809803	75.00	78.00	3.00	61.21	0.63	14.77	8.71	5.57	1.23	0.18	2.07	0.13	0.13	63.0	65	20	118	34	779	167	113	5.51	167	6.3	84	424	3.1
V809804	87.00	90.00	3.00	58.65	0.51	15.22	5.27	3.91	3.87	1.52	2.68	0.07	0.15	81.0	104	20	94	20	881	20	42	7.56	20	0.3	55	189	1.2
V809805	104.00	107.00	3.00	54.81	0.79	16.21	7.28	6.14	3.24	0.07	2.99	0.17	0.15	77.0	87	20	123	20	1051	22	55	6.59	22	7.9	73	257	1.8
V809806	121.00	124.00	3.00	55.00	0.52	17.02	8.77	8.68	2.21	2.75	1.34	0.08	0.06	31.0	84	20	97	20	584	20	23	5.98	20	0.1	67	270	1.7
V809807	140.00	143.00	3.00	58.01	0.46	15.09	6.12	6.35	3.58	1.95	1.94	0.07	0.07	54.0	122	20	98	20	1097	37	23	6.03	37	0.1	60	202	1.3
V809808	163.00	166.00	3.00	60.61	0.47	15.72	4.82	5.30	2.47	1.70	3.15	0.07	0.05	86.0	108	20	100	20	1525	20	20	5.54	20	0.1	67	215	1.5
V809809	179.50	182.50	3.00	68.90	0.23	15.19	2.18	0.62	2.31	4.29	2.71	0.07	0.05	127.0	525	20	132	20	1329	20	20	3.21	20	0.1	34	163	1.1
V809810	193.00	196.00	3.00	58.28	0.47	16.14	5.76	3.71	4.07	3.00	2.22	0.06	0.06	75.0	143	20	98	20	684	20	31	5.81	20	0.1	46	174	1.1
V809811	212.00	215.00	3.00	59.37	0.44	15.05	5.66	3.12	5.12	1.92	2.33	0.06	0.09	58.0	146	20	102	20	556	20	28	6.41	20	0.2	44	161	1.0
V809812	220.00	223.00	3.00	56.81	0.44	15.30	5.67	3.03	5.92	0.97	3.03	0.06	0.10	76.0	154	20	88	20	704	20	32	7.69	20	0.3	47	154	1.0
V809813	237.00	240.00	3.00	57.74	0.62	14.36	6.08	2.49	6.56	1.02	2.63	0.06	0.09	71.0	157	20	77	20	301	20	20	6.35	20	0.2	40	141	0.9
V809814	251.00	254.00	3.00	58.74	0.43	14.49	5.84	4.80	3.91	0.52	2.51	0.06	0.07	72.0	116	20	91	20	457	20	34	7.88	20	0.7	62	209	1.4
V809815	279.50	282.50	3.00	54.56	0.62	16.62	5.90	8.38	1.64	0.56	1.90	0.07	0.09	64.0	111	20	110	20	344	20	20	7.23	20	0.4	82	405	2.8