ARIS SUMMARY SHEET

District Geologist, Smithers Off Confidential: 94.10.27

ASSESSMENT REPORT 23227 MINING DIVISION: Omineca

PROPERTY: Sping
LOCATION: LAT 56 14 00 LONG 127 10 30
UTM 09 6233333 613131
NTS 094D03E
CLAIM(S): Sping 1
OPERATOR(S): Inco Ex. and Tech.
AUTHOR(S): Ryznar, G.
REPORT YEAR: 1994, 34 Pages
COMMODITIES
SEARCHED FOR: Copper,Silver
KEYWORDS: Jurassic,Hazelton Group,Volcanics,Sediments,Pyrite,Chalcopyrite
Disseminated
WORK
DONE: Geological,Geochemical
PETR 9 sample(s)
SAMP 9 sample(s) ;ME
MINFILE: 094D

GEOLOGICAL REPORT
SPING PROPERTY

OMINECA MINING DIVISION
NTS 94-D-3/E

Lat: 56 15' N
Long: 127 10' 30" W

Report by
G. Ryznar, PEng.
Jan. 10, 1994

Operator:
Inco Exploration &
Technical Services Inc.

Owner:
G. Ryznar, PEng.

GEOLOGICAL REPORT - SPING PROPERTY, B.C.

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GEOLOGICAL REPORT - SPING PROPERTY, NORTH CENTRAL B.C.

Introduction

On the Sping property, Jurassic Hazelton sediments and volcanics are host to a drill indicated reserve of 5 million tons grading .5% copper and .35 oz. Ag per ton. During 1993, geologists from Inco Exploration and Technical Services Inc. carried out petrographic studies and collected and analysed samples from the mineralized area on the Sping claim. Results indicated copper values from a low of 324 p.p.m. to a high of greater than 1% copper, with an average of .54% copper. Silver ranged from .8 p.p.m. to 87 p.p.m. However, only one sample showed anomalous amounts of gold (55 ppb). These results confirm previous assays and also indicate the potential for more mineralization since two of the mineralized samples were collected 600 feet south of the most southerly located drill hole. Petrographic results indicate a possible volcanogenic source for the copper mineralization

Property, Location and Access

The Sping property, owned by G. Ryznar, PEng., consists of the following six unit mineral claim, located in the Omineca Mining Division of B.C..

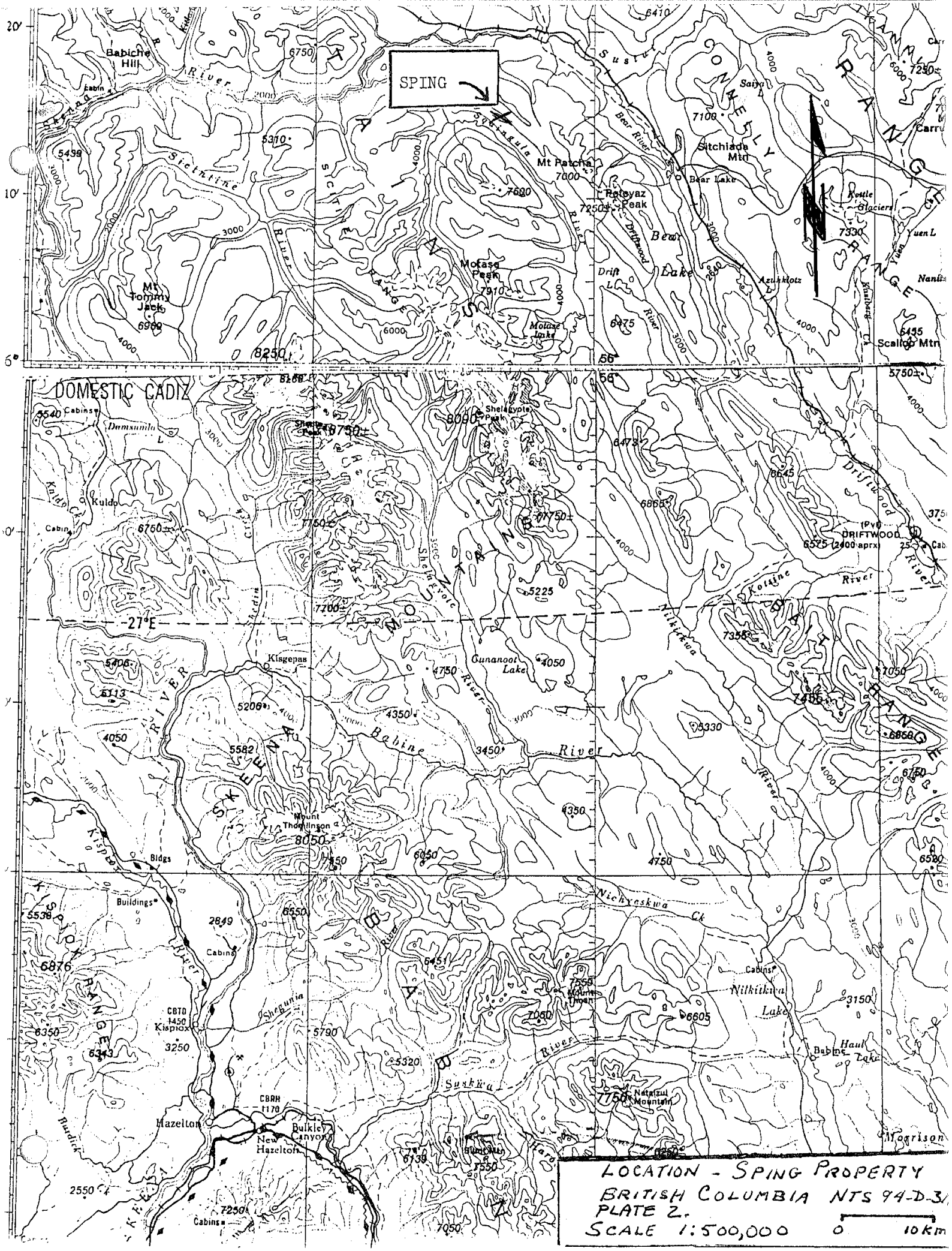
SPING 1. Record No. 7375 N.T.S. 94-D-3/E

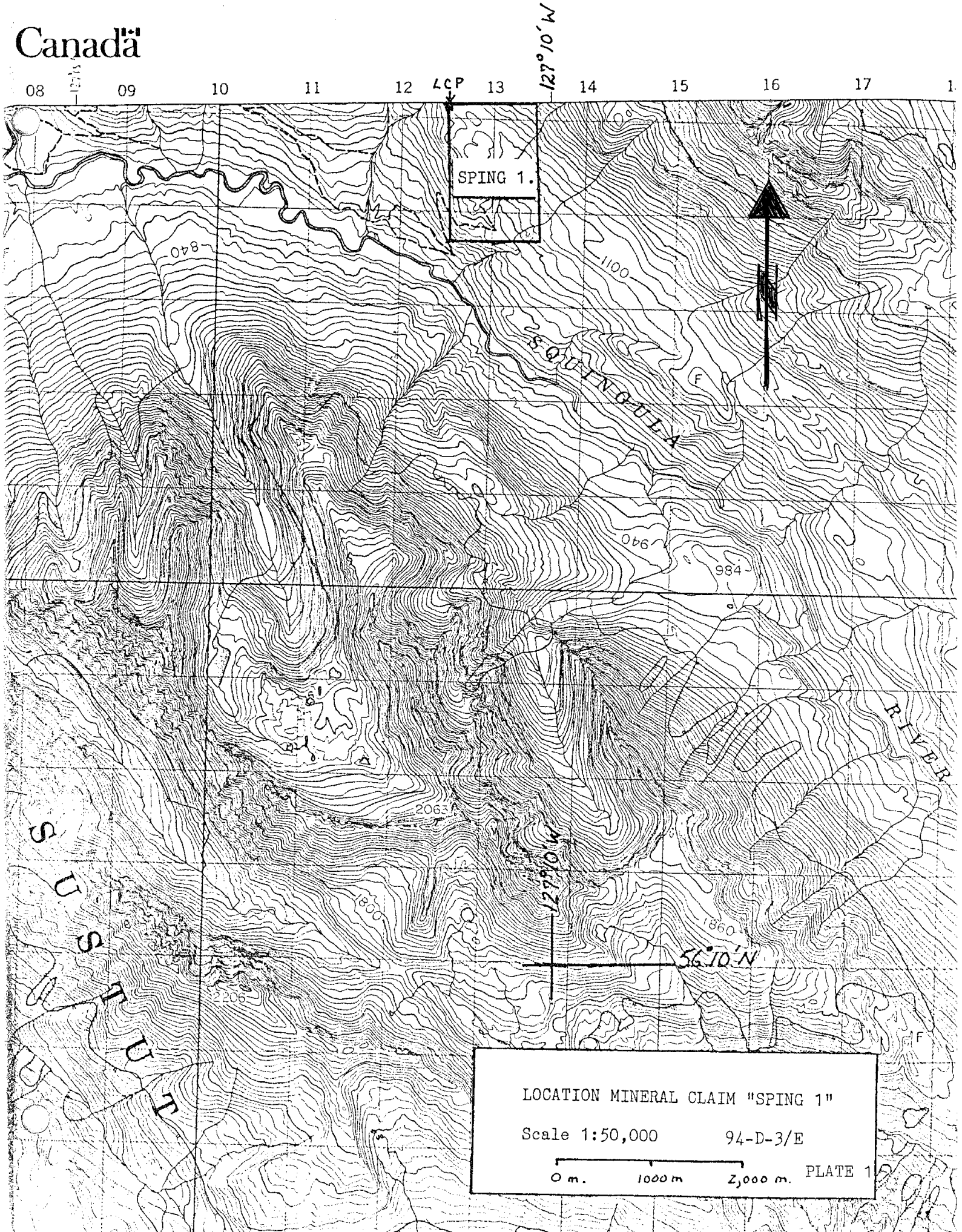
Latitude 56° 15' N; Longitude 127° 10' 30" W

At the present time access to the property is by helicopter from Smithers or Hazelton, B.C. However, logging roads do reach as far as 40 km. north of Hazelton and another logging road, still in the proposal stage, will reach within 6 km. of the Sping property some time in the near future.

History

The mineral deposit on the Sping claim was first discovered by Canadian Superior Exploration Ltd. in 1972. Subsequent exploration by Canadian Superior included geological, geochemical and geophysical surveys as well as 2,972 feet of drill testing. This work resulted in the partial delineation of a 5.0 million ton copper/silver deposit grading .5% copper and .35 oz. silver per ton. City Services Mineral Corp. drilled three more holes totalling 1,156 feet in 1976. Windflower Mining Ltd carried out maintenance work on the property from 1983 until 1992. At the present time the Sping 1. mineral claim is owned by G. Ryznar, PEng.


SPING
DOMESTIC CADIZ
LOCATION - SPING PROPERTY
BRITISH COLUMBIA NTS 94-D-3
PLATE 2.
SCALE 1:500,000
0 10 km



LOCATION MINERAL CLAIM "SPING 1"

Scale 1:50,000 94-D-3/E

0 m. 1000 m 2,000 m. PLATE 1

Geology and Mineralization

The Sping property is underlain by Lower to Middle Jurassic volcanics and sediments belonging to the Hazelton group of rocks. The property covers a portion of a volcanic belt, probably an island arc assemblage, which strikes southeast and lies adjacent to the younger Bowser basin to the west.

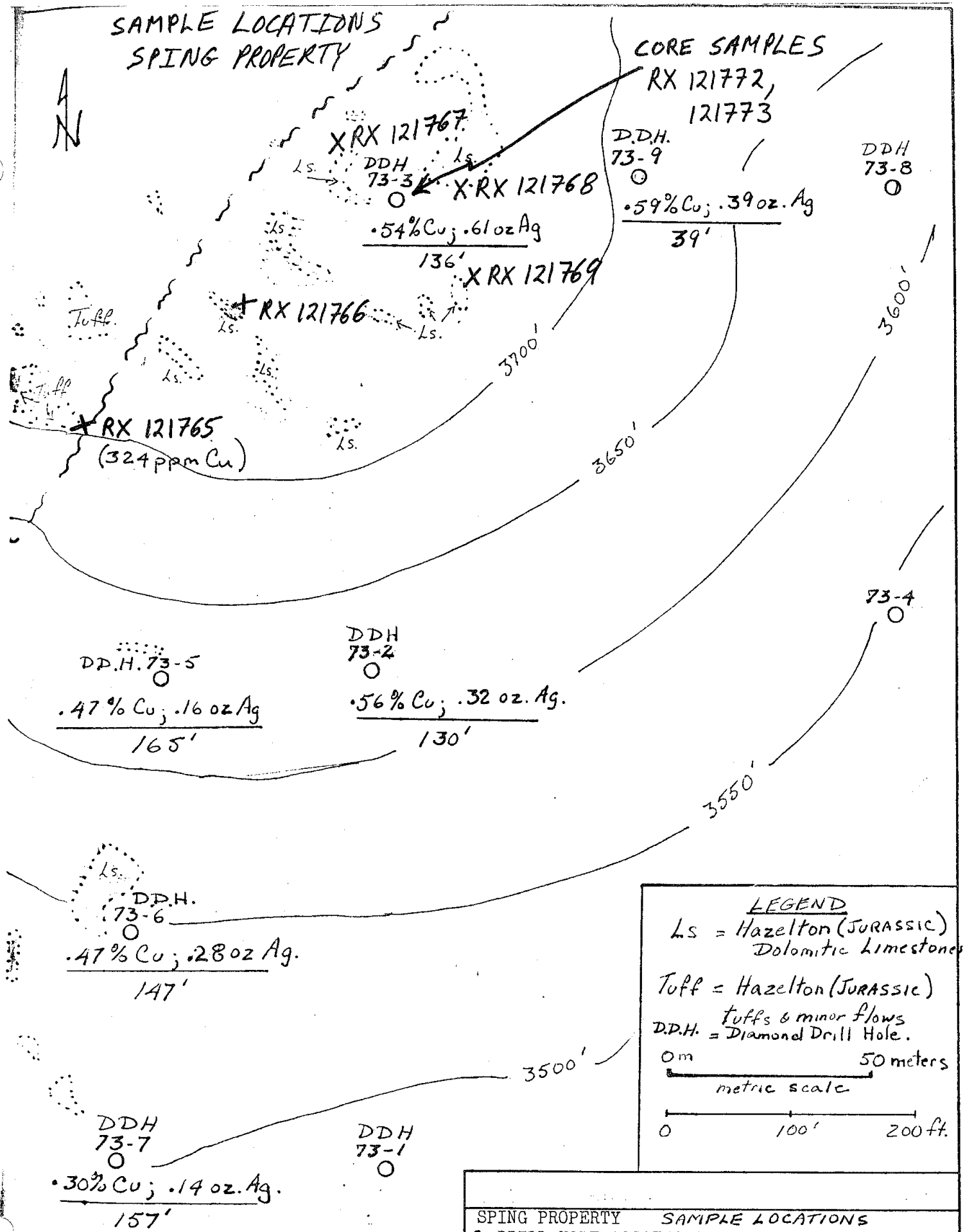
Of economic interest is a dolomitic limestone unit with thicknesses as great as 238 feet. This limestone unit was found to carry significant amounts of copper, silver, and gold mineralization. Diamond drilling in 1973 delineated approximately 5 million tons grading .5% copper and .3 oz. silver per ton. A metallurgical report in 1990 indicated low but significant gold values of 8 grams per tonne in copper concentrates.

The mineralized limestone is part of a larger sequence of intravolcanic sediments deposited in a small basin to the south west of the more predominantly volcanic terrain. A dioritic intrusive located approximately 2 km. from the mineralized deposit is believed to be a volcanic centre, probably the source for much of the volcaniclastics found in the local area. A summary of the mineralization encountered in the 1973 drilling is as follows:

Drill Hole	Interval	Length	%Cu	oz. Ag./ton
73-2	10' - 140'	130'	.56	.32
73-3	6' - 142'	136'	.54	.61
73-5	5' - 170'	165'	.47	.16
73-6	3' - 150'	147'	.47	.28
73-7	3' - 160	157'	.30	.14
73-9	11' - 50'	39'	.59	.39

The nature of the mineralization occurring on the Sping property is still rather controversial. It has been suggested that it may fit into the volcanic redbed classification, as a deposit hosted by sedimentary interbeds within the larger volcanic sequence. It also appears to fit the Kupfershiefer model with similarities to the Lubin district of southwest Poland where copper/silver ore is found to occur in the Late Permian sedimentary units above the basal Kupfershiefer shale, particularly within the Zechstein limestone (E. Craig Jowett, 1986, Canadian J. Earth Sciences, Vol 24.)

Recent petrographic work by Inco geologist, B.C. Jago (Appendix B), indicates that there might be some correlation of copper grades with a quartz feldspar phyric volcanic unit found as clasts within the carbonate. This may be a suggestion of a volcanogenic source. Other studies showing low gold values associated with the mineralization may fit this model best. However only with further field and laboratory studies will these problems be resolved.



Ls. = limestone.

SPING PROPERTY SAMPLE LOCATIONS & DRILL HOLE LOCATIONS - Plan View		
SCALE 1" = 100'	LOCATION 94-D-3/E	DATE JAN/94
SURVEY BY	DRAWN BY	NO. PLATE 3

Sampling and Assay Results

Nine rock samples were collected on August 8/93 by Inco geologists, D. Bohme and J. Morin and subsequently analyzed by I.C.P. methods for 32 elements. All samples were analysed for gold using fire assay methods with a AA finish. The following is a list of assay values for copper, silver, and gold from samples collected during 1993. Values of other elements analysed for are included in Appendix

Sample #	Cu (ppm)	Ag (ppm)	Au (ppb)
Rx121765	324	.8	5
Rx121766	5,310	33	5
Rx121767	10,000	87	5
Rx121768	1,355	1.4	5
Rx121769	9,880	1.4	55
Rx121770	3,750	1.0	5
Rx121771	5,400	3.6	5
Rx121772	4,310	8.4	5
Rx121773	8,500	43	5

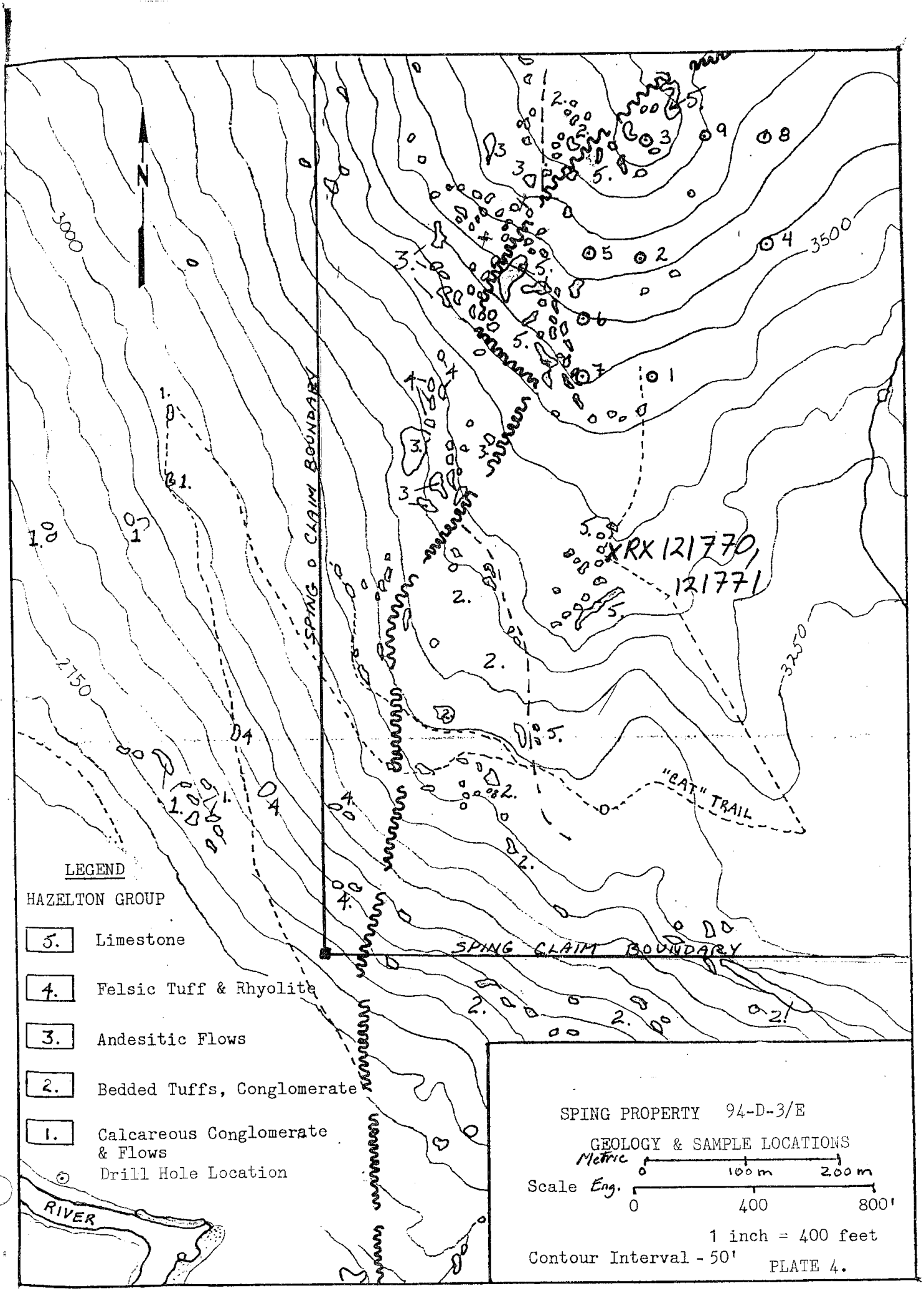
Petrographic Study

A petrographic study on samples from the Sping property was carried out by Inco geologist, J.B. Jago. This work was significant in that it pointed to the possibility of a volcanogenic source for the copper on the Sping property. This was based on his observations of copper bearing volcanic clasts, possibly primary mineralization, in the predominantly carbonate host rock. Jacob's report is included in Appendix

Conclusions and Recommendations

Assay averages for copper (.54%) are consistent with previous findings (this report page 2.). It appears that the mineralization is fault-bounded on the west since sample Rx121765, collected west of the fault returned only low copper values (plate 3). For samples collected east of the fault, the average value is .6% copper. It is worth noting that samples Rx121770 &71 which returned assays of .37% Cu and .54% Cu respectively, were collected at a location approximately 200 meters to the south of the most southerly drill hole (Plate 4). This is a very positive indication with respect to the increase of reserves to the south. Except for one higher gold assay of 55 ppb, th gold values returned from the samples appear to be insignificant. Observations by J.B. Jago in his petrographic study (Appendix). indicates some correlation of copper grade to the presence of volcanic clasts in the carbonate unit. If this copper is primary it may be an indication of a volcanogenic source for the copper mineralization, and this theory may well be useful in carrying out further exploration on the Sping claim.

S. Lyman, P.Eng.


N
3000
3500
3250
2750
SPING CLAIM BOUNDARY
SPING CLAIM BOUNDARY
XRX 121770,
121771
"BAT" TRAIL
RIVER
LEGEND
HAZELTON GROUP
5. Limestone
4. Felsic Tuff & Rhyolite
3. Andesitic Flows
2. Bedded Tuffs, Conglomerate
1. Calcareous Conglomerate & Flows
Drill Hole Location
SPING PROPERTY 94-D-3/E
GEOLOGY & SAMPLE LOCATIONS
Metric 0 100 m 200 m
Scale Eng. 0 400 800'
1 inch = 400 feet
Contour Interval - 50'
PLATE 4.

STATEMENT OF EXPENDITURES

Sping 1, Property
Omineca Mining Division
NTS 94D/3E

Professional Services:

Sample collection		
Geologist - D. Bohme - August 21/93		
1 day @ $350/day	$ 350	
Geologist - J. Morin - August 21/93		
1 day @ $400/day	$ 400	
Petrographic Report		
Geologist - J.B. Jago - June 14-16/93		
3 days @ $400/day	$1200	
		$1,950
Geochemical Charges - Chemex Labs Ltd.		
9 rock samples for 32 element ICP		
@$16.78/sample		$ 151
Transportation		
Canadian Helicopters - Aug. 21/93		
Invoice 0003573 - 1.8 hours		$1,398
Subsistence		
Accommodation		
Hudson's Bay Lodge - [illegible]		
2 people/ one night	$ 140	
meals	$ 65	
		$ 205
Miscellaneous		
Sample shipment, etc		$ 56
Total this Statement		$3,760

G. Ryznar, PEng.
Jan. 6/93

AUTHOR'S QUALIFICATIONS

I, Gerald Ryznar, PEng., do hereby certify:

1) That I am a graduate of the University of Alberta, Edmonton. from which I obtained a BSc, and MSc. in Geology in 1964 and 1965 respectively.
2) That I have practised my profession as a mining exploration geologist during the past twenty-nine years throughout most provinces and territories in Canada, as well as in the U.S.A. Australia and New Zealand.
3) That I am a member of The Association of Professional Engineers and Geoscientists of the Province of British Columbia.

G. Ryznar, PEng.

Dated in Vancouver, B.C.
January 7, 1994

APPENDIX A

SPING PROPERTY

ASSAYS

IETS

TRAVERSE NUMBER:
N.T.S: 93D/3E

PROJECT: Sping 1 Property (owner: G. Ryznar)
AREA: 118 km north of Hazelton, B.C. (Squingula River area)

GEOLOGIST(S): D.Bohme, J.Morin
DATE: August 21, 1993

SAMPLE NUMBER	SAMPLE TYPE: RX Rock Core	SAMPLE TYPE: Grab, Chip, Channel	SAMPLE LENGTH, WIDTH, AREA	LATITUDE LONGITUDE and/or U.T.M.	SAMPLE DESCRIPTION: Rock type, lithology, character of soil, stream silt, etc. Formation Mineralization, etc.	RESULTS (ppm / % / g/t): ppm Cu	Pb	Zn	ppm Ag	As	Sb
RX121765	rock	grab	1m	56 deg. 8 min & 126 deg. 19 min.	On top of knob along the contact between limestone and sediments. Sample taken over the contact. Maroon coloured, calcareous, volcanic tuff with fine py–cpy bearing fractures. Some weak brecciation evident (calcite–healed fractures).	324			.8		
RX121766	rock	chip	0.5m	56 deg. 8 min & 126 deg. 19 min.	Gray limestone unit with malachite staining. Finely disseminated cpy noted. Some irregular, white calcite veinlets. Weakly brecciated.	5310			33		
RX121767	rock	grab	0.4m	56 deg. 8 min & 126 deg. 19 min.	Malachite stained limestone; taken by J. Morin near the top of the knob. Weakly brecciated.	>10,000			87		
RX121768	rock	grab	0.3m	as above	Malachite stained limestone; taken by J. Morin near the top of the knob.	1,355			1.4		
RX121769	rock	grab	0.4m	as above	Malachite stained limestone; taken by J. Morin near the top of the knob.	9880			1.4		
RX121770	rock	grab	0.5m	as above	Along lower part of road; gray limestone with very fine–grained chalcopyrite and pyrite.	3750			1.0		
RX121771	rock	grab	0.5m	as above	Adjacent to the above sample; calcareous volcaniclastic with malachite staining. Some fine–grained chalcopyrite noted.	5400			3.6		
RX121772	core	grab	0.2m	as above	BQ core sample from DH 73–3 at 139 feet; limonitic, fractured, limestone unit just above fault contact with tuff unit. Some vuggy cavities (open–space); brecciation evident.	4310			8.4		
RX121773	core	grab	0.2m	as above	BQ core sample from DH 73–3 at 59 feet; dark gray to black, carbonaceous limestone that is well fractured and brecciated (wackestone). Very fine–grained chalcopyrite disseminated thr't.	8500			43.0		

Chemex Labs Ltd.

Analytical Chemists * Geochemists * Registered Assayers
212 Brooksbank Ave., North Vancouver
British Columbia, Canada V7J 2C1
PHONE: 604-984-0221

To: INCO EXPLORATION AND TECHNICAL SERVICES INC.
ATTN: JIM MORIN
2690 - 666 BURRARD ST.
VANCOUVER, BC
V6C 2X8

Project : 60501-80001
Comments: ATTN: JIM MORIN

Certificate Date: 14-SEP-93
Invoice No. : I9319963
P.O. Number :
Account :KPJ

*PLEASE NOTE

CERTIFICATE OF ANALYSIS A9319963

SAMPLE	PREP CODE		Au ppb FA+AA	Ag ppm	Al %	As ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	Ga ppm	K %	La ppm	Mg %	Mn ppm	Mo ppm
~~RX 121761~~	~~205~~	~~274~~	~~< 5~~	~~1.4~~	~~0.43~~	~~90~~	~~< 10~~	~~< 0.5~~	~~< 2~~	~~9.99~~	~~< 0.5~~	~~42~~	~~38~~	~~927~~	~~>15.00~~	~~20~~	~~< 0.01~~	~~30~~	~~0.05~~	~~2700~~	~~< 1~~
~~RX 121762~~	~~205~~	~~274~~	~~45~~	~~64.0~~	~~0.63~~	~~18~~	~~< 10~~	~~< 0.5~~	~~< 2~~	~~0.91~~	~~57.0~~	~~19~~	~~37~~	~~5290~~	~~12.60~~	~~< 10~~	~~0.05~~	~~< 10~~	~~0.03~~	~~>10000~~	~~2~~
~~RX 121763~~	~~205~~	~~274~~	~~25~~	~~25.0~~	~~1.52~~	~~26~~	~~20~~	~~< 0.5~~	~~< 2~~	~~3.13~~	~~10.5~~	~~19~~	~~70~~	~~2900~~	~~9.70~~	~~10~~	~~0.15~~	~~< 10~~	~~1.41~~	~~>10000~~	~~24~~
~~RX 121764~~	~~205~~	~~274~~	~~< 5~~	~~0.4~~	~~3.60~~	~~10~~	~~100~~	~~< 0.5~~	~~< 2~~	~~1.17~~	~~< 0.5~~	~~21~~	~~38~~	~~115~~	~~5.74~~	~~< 10~~	~~0.25~~	~~< 10~~	~~3.30~~	~~695~~	~~< 1~~
RX 121765	205	274	< 5	0.8	1.58	10	330	0.5	< 2	1.15	< 0.5	18	88	324	4.06	10	0.13	10	2.04	2840	< 1
RX 121766	205	274	< 5	33.0	0.02	180	120	< 0.5	< 2	>15.00	3.5	1	15	5310	0.16	< 10	< 0.01	< 10	0.06	4650	2
RX 121767	205	274	< 5	87.0	0.04	8	850	< 0.5	14	>15.00	< 0.5	1	11	>10000	0.21	< 10	0.02	< 10	0.06	4300	< 1
RX 121768	205	274	< 5	1.4	0.27	4	60	0.5	< 2	14.10	< 0.5	4	14	1355	2.30	< 10	0.09	10	0.27	3030	< 1
RX 121769	205	274	55	1.4	0.13	140	30	< 0.5	16	10.85	< 0.5	1	11	9880	1.94	< 10	0.12	< 10	0.01	1310	< 1
RX 121770	205	274	< 5	1.0	0.03	2	580	< 0.5	< 2	>15.00	< 0.5	1	11	3750	0.35	< 10	0.01	< 10	0.03	3480	< 1
RX 121771	205	274	< 5	3.6	0.08	8	180	< 0.5	< 2	10.15	1.0	6	14	5400	0.82	< 10	0.09	< 10	0.01	1520	1
RX 121772	205	274	< 5	8.4	0.07	1200	140	< 0.5	< 2	>15.00	6.5	4	24	4310	5.98	< 10	0.03	< 10	4.02	5120	< 1
RX 121773	205	274	< 5	43.0	0.02	4	100	< 0.5	10	>15.00	1.5	< 1	13	8500	0.15	< 10	0.01	< 10	0.06	4150	< 1

SPING PROPERTY

CERTIFICATION: Hart Bichler

*Hg IS NOT AVAILABLE ON HIGH GRADE SAMPLES

Chemex Labs Ltd.

Analytical Chemists * Geochemists * Registered Assayers
212 Brooksbank Ave., North Vancouver
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To: INCO EXPLORATION AND TECHNICAL SERVICES INC.
ATTN: JIM MORIN
2690 - 666 BURRARD ST.
VANCOUVER, BC
V6C 2X8

Project : 60501-80001
Comments: ATTN: JIM MORIN

Page Number :2-B
Total Pages :2
Certificate Date: 14-SEP-93
Invoice No: :I9319963
P.O. Number :
Account :KPJ

*PLEASE NOTE

CERTIFICATE OF ANALYSIS A9319963

SAMPLE	PREP CODE		Na %	Ni ppm	P ppm	Pb ppm	Sb ppm	Sc ppm	Sr ppm	Ti %	Tl ppm	U ppm	V ppm	W ppm	Zn ppm
~~RX 121761~~	~~205~~	~~274~~	~~0.02~~	~~7~~	~~190~~	~~18~~	~~2~~	~~1~~	~~3~~	~~< 0.01~~	~~< 10~~	~~< 10~~	~~49~~	~~310~~	~~158~~
~~RX 121762~~	~~205~~	~~274~~	~~< 0.01~~	~~15~~	~~130~~	~~60~~	~~< 2~~	~~6~~	~~5~~	~~0.01~~	~~< 10~~	~~< 10~~	~~441~~	~~80~~	~~>10000~~
~~RX 121763~~	~~205~~	~~274~~	~~0.07~~	~~13~~	~~220~~	~~30~~	~~< 2~~	~~9~~	~~63~~	~~0.04~~	~~< 10~~	~~< 10~~	~~477~~	~~70~~	~~1020~~
~~RX 121764~~	~~205~~	~~274~~	~~0.11~~	~~8~~	~~600~~	~~10~~	~~2~~	~~11~~	~~90~~	~~0.31~~	~~< 10~~	~~< 10~~	~~262~~	~~20~~	~~152~~
RX 121765	205	274	0.09	42	770	18	< 2	11	15	0.02	< 10	< 10	101	10	394
RX 121766	205	274	0.01	< 1	60	20	2	1	61	< 0.01	< 10	< 10	11	10	104
RX 121767	205	274	0.01	< 1	210	2	2	2	121	< 0.01	< 10	< 10	13	< 10	16
RX 121768	205	274	< 0.01	2	400	8	2	8	82	< 0.01	< 10	< 10	72	10	30
RX 121769	205	274	< 0.01	< 1	610	4	2	6	159	< 0.01	< 10	< 10	10	< 10	28
RX 121770	205	274	0.01	< 1	240	4	< 2	3	201	< 0.01	< 10	< 10	8	10	8
RX 121771	205	274	< 0.01	2	440	20	4	7	110	< 0.01	< 10	< 10	13	< 10	34
RX 121772	205	274	< 0.01	5	630	34	76	3	857	< 0.01	< 10	< 10	13	50	544
RX 121773	205	274	0.01	< 1	130	14	< 2	2	61	< 0.01	< 10	< 10	9	< 10	20

SPING

SPING PROPERTY

CERTIFICATION: Ian Bichler

*Hg IS NOT AVAILABLE ON HIGH GRADE SAMPLES

APPENDIX B
PETROGRAPHIC DESCRIPTIONS OF CORE AND GRAB SAMPLES, SPING CLAIMS, B. C.,
AND INTERPRETIVE COMMENTS

INCO EXPLORATION & TECHNICAL SERVICES, Inc. 21-JUN-1993
PETROGRAPHIC REPORT

C93-0323 C93-0323

Report To: J. MORIN Date Submitted: 23-FEB-1993
Investigator: B. JAGO

GR Project #: ME Property #:

---------- LOCATION ----------

Property: SPING - B.C. RECONNAISSANCE
Country: CANADA NTS: UTM:
Prov/Stat: BRITISH COLUMBIA Twp/Cnty:
Grid Name: Coord Code:
Grid: N/S E/W Elev Level:
Borehole: at Units: M

---------- TREATMENT ----------

Smpl Type: CORE
Field #: 1 TS:Y PS:Y PTS: HS: SEM: XRD: Other:
Sample #: RX 197537 WRA: BMs: PMs: XTr: NATr: REE: Other:

---------- PETROGRAPHY ----------

Rock Name: BRECCIATED LIMESTONE Abbreviation:

Alteratn: LATE CALCITE VEINS (3-4 MM) OVERPRINTING QTZ-CARBONATE-CARBON BRECCIA
Metam Grd: GREENSCHIST
Protolith: LIMESTONE

Major Minerals: CT
Mode:

Trace Minerals: QTZ CPY CARBON FELD

Description:
THE DRILL CORE SPECIMEN IS A FINE GRAINED, FINELY FOSSILIFEROUS LIMESTONE. IT IS CUT BY A NUMBER OF 3-4 MM WIDE BARREN CALCITE VEINS WHICH IN TURN CROSS-CUT DARK BROWN COLOURED ZONES OF MICRO-BRECCIA WHICH ARE COMPOSED OF VERY FINE GRAINED, STRONGLY INTERGROWN CALCITE, QUARTZ AND A BROWN MATERIAL INTERPRETED TO BE CARBON OR DIAGENETICALLY ALTERED PETROLEUM. THE HOST IS A FINE GRAINED, WEAKLY TO MODESTLY RECRYSTALLIZED LIMESTONE. TEXTURES SUCH AS CURVING GROUP OF FINE CALCITE IN A COARSE GRAIN MATRIX SUGGEST THAT RELIC FOSSILS ARE PRESENT. MINOR AMOUNTS OF DIAGENETIC QUARTZ IS PRESENT AND OCCURS AS RADIAL AGGREGATES IN INTERSTITIAL SITES AND APPARENTLY AS A PARTIAL REPLACEMENT OF PRE-EXISTING GRAINS. A TABULAR PHASE, ALSO WITH GREY INTERFERENCE COLOURES, ALSO OCCURS IN RADIAL AGGREGATES IN INTERSTITIAL SITES. GRAINS OF DETRITAL QUARTZ AND ALTERED FELDSPAR ALSO ARE PRESENT. CU MINERALIZATION OCCURS IN THE FORM OF FINELY DISSEMINATED CHALCOPYRITE. THE CHALCOPYRITE GRAINS ARE IRREGULAR IN SHAPE AND 1) OCCUPY THE INTERSTICES OF FINE TO COARSE CALCITE, 2) OCCUR AS VOIDS FILLINGS AND 3) FORM PARTIAL REPLACEMENTS OF CALICTE GRAINS OR POSSIBLY RELIC FOSSILS. CHALCOPYRITE MINERALIZATION IS SLIGHTLY MORE ABUNDANT IN THE CROSS-CUTTING BROWN-COLOURED MICROBRECCIA ZONES, BUT THESE ARE NOT OBVIOUSLY THE SOURCE OF CHALCOPYRITE IN THE HOST LIMESTONE. IN FACT, THE BORDER ZONE OF LIMESTONE FRAGMENTS CAN BE SOMEWHAT DEPLETED IN CHALCOPYRITE COMPARED TO THE FRAGMENT CORES. IT APPEARS THAT THE CHALCOPYRITE IN THE MICROBRECCIAS WAS DERIVED THROUGH

BRECCIATION OF THE HOST LIMESTONE AND THAT THE CHALCOPYRITE WAS SUBSEQUENTLY MOBILIZED INTO THE FINE MUSH OF FRAGMENTS THAT FORM THE MICROBRECCIA.

INCO EXPLORATION & TECHNICAL SERVICES, Inc. 21-JUN-1993
PETROGRAPHIC REPORT

C93-0324 C93-0324

Report To: J. MORIN Date Submitted: 23-FEB-1993
Investigator: B. JAGO

GR Project #: ME Property #:

---------- LOCATION ----------

Property: SPING - B.C. RECONNAISSANCE
Country: CANADA NTS: UTM:
Prov/Stat: BRITISH COLUMBIA Twp/Cnty:
Grid Name: Coord Code:
Grid: N/S E/W Elev Level:
Borehole: at Units: M

---------- TREATMENT ----------

Smpl Type: CORE
Field #: 2 TS:Y PS:Y PTS: HS: SEM: XRD: Other:
Sample #: RX 197538 WRA: BMs: PMs: XTr: NATr: REE: Other:

---------- PETROGRAPHY ----------

Rock Name: BRECCIATED LIMESTONE Abbreviation:

Alteratn: LATE CALCITE VEINS OVERPRINTING EARLIER MICROBRECCIATION
Metam Grd: GREENSCHIST ??
Protolith: FOSSILIFEROUS LIMESTONE

Major Minerals: CT
Mode:

Trace Minerals: QTZ CPY CARBON FELD

Description:
THIS DRILL CORE SAMPLE IS GROSSLY SIMILAR TO RX197537/C93-0323 BUT CONTAINS COARSER GRAINED AND A GREATER PROPORTION OF BARREN, LATE CALCITE VEINS AND TABULAR ARAGONITE (?) CRYSTALS THAT FILL INTERSTITIAL VOIDS.

INCO EXPLORATION & TECHNICAL SERVICES, Inc. 21-JUN-1993
PETROGRAPHIC REPORT

C93-0325 C93-0325

Report To: J. MORIN Date Submitted: 23-FEB-1993
Investigator: B. JAGO

GR Project #: ME Property #:

---------- LOCATION ----------

Property: SPING - B.C. RECONNAISSANCE
Country: CANADA NTS: UTM:
Prov/Stat: BRITISH COLUMBIA Twp/Cnty:
Grid Name: Coord Code:
Grid: N/S E/W Elev Level:
Borehole: at Units: M

---------- TREATMENT ----------

Smpl Type: CORE
Field #: 3 TS:Y PS:Y PTS: HS: SEM: XRD: Other:
Sample #: RX 197539 WRA: BMs: PMs: XTr: NATr: REE: Other:

---------- PETROGRAPHY ----------

Rock Name: MICROBRECCIATED LIMESTONE Abbreviation:

Alteratn: MICROBRECCIATION
Metam Grd: GREENSCHIST ??
Protolith: FOSSILIFEROUS LIMESTONE

Major Minerals: CT
Mode:

Trace Minerals: QTZ CPY CARBON FELD CLAY

Description:
THIS DRILL CORE SPECIMEN HAS SAMPLED ONLY THE MICROBRECCIATED PORTION OF THE MEDIUM TO COARSE GRAINED LIMESTONE HOST DESCRIBED ABOVE (SEE RX197537/C93-0323). THE DRILL CORE SPECIMEN IS LIGHT TO MEDIUM BROWN COLOURED AND CONTAINS IRREGULAR TO SUBROUNDED FRAGMENTS OF THE WHITE COLOURED HOST ROCK. CHALCOPYRITE MINERALIZATION IS EVENLY DISPERSED THROUGHOUT THE SAMPLE. IN THIN SECTION, THE SAMPLE IS MODESTLY FOLIATED AND COMPOSED OF FINE TO MEDIUM GRAINED, STRONGLY INEQUIGRANULAR, ROUNDED TO ANGULAR FRAGMENTS CEMENTED BY A FINE INTERGROWTH OF EXTREMELY FINE GRAINED CARBONATE, TRACE AMOUNTS OF SERICITE OR RELATED CLAY MINERALS, A FINELY DISPERSED BROWN PHASE INTERPRETED TO BE DIAGENETICALLY ALTERED PETROLEUM AND DIAGENETIC (?) QUARTZ. DUE TO THE HIGH BIREFRINGENCE OF CALCITE, THE PROPORTION AND FORM OF SERICITE/CLAY CANNOT BE ACCURATELY DETERMINED. QUARTZ OCCURS AS APPARENTLY ROUNDED DETRITAL GRAINS INTERSTITIAL TO FINE GRAINED CALCITE AND AS VOID FILLINGS. TEXTURAL RELATIONSHIPS DO NOT SUGGEST THAT QUARTZ WAS INTRODUCED BY LATE VEINING OR SILICA FLOODING AS THERE IS NO EVIDENCE FOR REPLACEMENT OF CALCITE-RICH FRAGMENTS OR FOSSILS OR FOR FINE SWARMS OF QUARTZ VEINS. CHALCOPYRITE IS EVENLY DISSEMINATED THROUGHOUT THE SAMPLE AS IRREGULAR GRAINS THAT HAVE FORMED INTERSTITIAL TO CALCITE AND QUARTZ. CHALCOPYRITE APPARENTLY CRYSTALLIZED AT THE SAME TIME AS THE MICROBRECCIA MATRIX.

INCO EXPLORATION & TECHNICAL SERVICES, Inc. 21-JUN-1993
PETROGRAPHIC REPORT

C93-0326 C93-0326

Report To: J. MORIN Date Submitted: 23-FEB-1993
Investigator: B. JAGO

GR Project #: ME Property #:

---------- LOCATION ----------

Property: SPING - B.C. RECONNAISSANCE
Country: CANADA NTS: UTM:
Prov/Stat: BRITISH COLUMBIA Twp/Cnty:
Grid Name: Coord Code:
Grid: N/S E/W Elev Level:
Borehole: at Units: M

---------- TREATMENT ----------

Smpl Type: CORE
Field #: 73-9@32' TS:Y PS:Y PTS: HS: SEM: XRD: Other:
Sample #: RX 197540 WRA: BMs: PMs: XTr: NATr: REE: Other:

---------- PETROGRAPHY ----------

Rock Name: CARB.-RICH SILICEOUS GREYWACKE Abbreviation:

Alteratn: LATE CALCITE VEINING OVERPRINTING MICROBRECCIATION (?)
Metam Grd: GREENSCHIST (?)
Protolith: MICRITIC/SILICEOUS GREYWACKE

Major Minerals: CT QTZ FELD
Mode:

Trace Minerals: CPY CARBON CLAY

Description:
THE DRILL CORE SPECIMEN IS FROM THE CONTACT BETWEEN A SILICEOUS ROCK (FRAGMENT ??), DARK, FINE GRAINED MICROBRECCIA AND BRECCIATED/MICROBRECCIATED FOSSILIFEROUS LIMESTONE. A SWARM OF FINE, BARREN CALCITE VEINLETS CROSS-CUTS THE SAMPLE. IN THIN SECTION, THE SAMPLE APPEARS TO BE THE BRECCIATED OR FOLIATED/MICROBRECCIATED CONTACT BETWEEN A FINE GRAINED, WEAKLY MINERALIZED, CARBONATE-RICH AND CARBONACEOUS QUARTZ-RICH GREYWACKE/ARGILLITE AND A QUARTRZOSE, FOSSILIFEROUS LIMESTONE. THE MATRIX OF THE LIMESTONE CONTAINS NUMEROUS VERY FINE GRAINED ROCK FRAGMENTS AND FLUID INCLUSIONS SUGGESTING A SEDIMENTARY ORIGIN FOR THE SAMPLE RATHER THAN A IGENOUS ORIGIN FOR THE QUARTZ-RICH MATERIAL. QUARTZ GRAINS, WITH OPTICALLY CONTINUOUS OVERGROWTHS THAT EXTEND INTO THE MATRIX HAS PARTIALLY REPLACED SOME RELIC, CLAY-ALTERED FELDSPARS. THE QUARTZ-RICH LITHOLOGY IS APPRENTLY YOUNGER AS IT CONTAINS FRAGMENTS OF THE FOSSLIFEROUS LIMESTONE. THE QUARTZ-RICH LITHOLOGY IS POORLY SORTED AND CONTAINS ABUNDANT FINE GRAINED MATERIAL. CHALCOPYRITE IS THE DOMINANT CU MINERAL. MINOR SECONDARY MALACHITE OCCURS IN STRONGLY OXIDIZED PORTIONS OF THE SAMPLE AND IN DISCONTINUOUS CROSS-CUTTING VEINS WITH MINOR CALCITE. CHALCOPYRITE IS RELATIVELY EVENLY DISTRIBUTED THROUGHOUT TEH SAMPLE BUT MAY BE SLIGHTLY MORE ABUNDANT IN THE DARK COLOURED MICROBRECCIA.

INCO EXPLORATION & TECHNICAL SERVICES, Inc. 21-JUN-1993
PETROGRAPHIC REPORT

C93-0327 C93-0327

Report To: J. MORIN Date Submitted: 23-FEB-1993
Investigator: B. JAGO

GR Project #: ME Property #:

---------- LOCATION ----------

Property: SPING - B.C. RECONNAISSANCE
Country: CANADA NTS: UTM:
Prov/Stat: BRITISH COLUMBIA Twp/Cnty:
Grid Name: Coord Code:
Grid: N/S E/W Elev Level:
Borehole: at Units: M

---------- TREATMENT ----------

Smpl Type: CORE
Field #: TS:Y PS:Y PTS: HS: SEM: XRD: Other:
Sample #: RX 197541 WRA: BMs: PMs: XTr: NATr: REE: Other:

---------- PETROGRAPHY ----------

Rock Name: CARBONATE-RICH, QTZ GREYWACKE Abbreviation:

Alteratn: CARBONATE FLOODING ??, DIAGENETIC SILICA
Metam Grd: GREENSCHIST
Protolith: LIMY VOLCANICLASTIC GREYWACKE

Major Minerals: QTZ CARB FELD ?
Mode:

Trace Minerals: CPY PY CARBON

Description:
THE HANDSPECIMEN IS OF A BRECCIATED ZONE IN A COARSE GRAINED, CARBONATE-QUARTZ-RICH GREYWACKE. ANGULAR QUARTZ-RICH FRAGMENTS UP TO 1 CM ACROSS ARE COMMON AND OCCUR IN A POORLY SORTED POPULATION OF VOLCANICLASTIC FRAGMENTS AND A FINE GRAINED, LIMY MATRIX. A CONJUGATE SET OF BARREN, NARROW, LESS THAN 0.5 MM WIDE, CALCITE VEINLETS CROSS-CUTS ONE PORTION OF THE SAMPLE. SOME CHALCOPYRITE OCCURS AS BLEBS UP TO 3 MM LONG IN DISCONTINUOUS FRACTURES. THE MAJORITY OF CHALCOPYRITE OCCURS AS LESS THAN 1 MM INTERSTITIAL GRAINS IN THE SAMPLE MATRIX. IN THIN SECTION, THE ROCK IS A CHAOTIC, POORLY SORTED MIXTURE OF ANGULAR TO SUBROUNDED, QUARTZ-FELDSPAR-RICH AND CARBONATE CLASTS IN A FINE GRAINED, GRANULAR QUARTZ-CARBONATE MATRIX CEMENTED BY VERY FINE GRAINED CARBONATE. THE SAMPLE EITHER IS IN CONTACT WITH OR CONTAINS A LARGE FRAGMENT (5 X 1.5 CM) OF A LITHOLOGY THAT COULD BE INTERPRETED AS A FINE GRAINED, FELDSPAR-PHYRIC (?) VOLCANIC. THE EXACT RELATIONSHIP BETWEEN THE CLASTIC PORTION OF THIS SAMPLE AND THE FELDSPAR-PHYRIC ROCK TYPE IS UNCLEAR, IE, IS THIS A LITHOLOGICAL CONTACT. INTERESTINGLY, ALTHOUGH THE HANDSPECIMEN DEFINITELY HAS THE APPEARANCE OF A CLASTIC ROCK, IN THIN SECTION, THE SAMPLE COULD BE INTERPRETED AS A CARBONATED, MIROPORPHYRITIC, QUARTZ-FELDSPAR-PHYRIC DIKE ROCK. THIS PROBLEM IS WORSE FOR SAMPLE RX197542/C93-0328. THE PRINCIPAL OPAQUE MINERAL IN THIS SAMPLE IS FINE GRAINED (MAX. 1 MM), EVENLY DISPERSED, INTERSTITIAL CHALCOPYRITE. TRACE AMOUNTS OF PYRITE ALSO ARE PRESENT. MALACHITE OCCURS IN LATE

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PETROGRAPHIC REPORT

C93-0327 C93-0327

CROSS-CUTTING FRACTURES.

INCO EXPLORATION & TECHNICAL SERVICES, Inc. 21-JUN-1993
PETROGRAPHIC REPORT

C93-0328 C93-0328

Report To: J. MORIN Date Submitted: 23-FEB-1993
Investigator: B. JAGO

GR Project #: ME Property #:

---------- LOCATION ----------

Property: SPING - B.C. RECONNAISSANCE
Country: CANADA NTS: UTM:
Prov/Stat: BRITISH COLUMBIA Twp/Cnty:
Grid Name: Coord Code:
Grid: N/S E/W Elev Level:
Borehole: at Units: M

---------- TREATMENT ----------

Smpl Type: CORE
Field #: TS:Y PS:Y PTS: HS: SEM: XRD: Other:
Sample #: RX 197542 WRA: BMs: PMs: XTr: NATr: REE: Other:

---------- PETROGRAPHY ----------

Rock Name: CARBONATE-RICH QTZ GREYWACKE Abbreviation:

Alteratn: DIAGENETIC QUARTZ AND CARBONATE ??
Metam Grd: GREENSCHIST
Protolith: LIMY VOLCANICLASTIC GREYWACKE

Major Minerals: QTZ FELD CARB
Mode:

Trace Minerals: CPY PY GAL DELAFOSSIT CUPRITE ?

Description:
THE HANDSPECIMEN IS A CARBONATE-RICH ROCK WITH A MEDIUM GRAINED, GRANULAR TEXTURE. THE MAJORITY OF THE CARBONATE APPEARS TO BE INTERSTITIAL TO SUB-ROUNDED TO SUB-ANGULAR QUARTZ AND FELDSPAR GRAINS (?) OR QUARTZ-FELDSPAR-RICH CLASTS. IT IS UNCERTAIN IF THE ROCK IS A CARBONATE ARKOSIC SEDIMENT OR A CARBONATED, FINE GRAINED QUARTZ-FELDSPAR PORPHYRY. SOME FRAGMENTS OBVIOUSLY ARE OF MINERALIZED FELDSPAR- AND QUARTZ (?) -PHYRIC DACITE/RHYODACITE. IN THIN SECTION, THE ROCK IS COMPOSED OF ANGULAR TO SUB-ROUNDED QUARTZ AND WEAKLY TO STRONGLY CLAY ALTERED FELDSPAR. MOST GRAIN MARGINS ARE WEAKLY TO MODESTLY CORREDED AND INTERGROWN WITH OR REPLACED BY LATER CARBONATE AND QUARTZ (DIAGENETIC CARB AND SILICA ??). THE MATRIX IS COMPOSED OF FINE GRAINED CARBONATE, CARBON (DIAGENETICALLY ALTERED PETROLEUM), QUARTZ (SOME DIAGENETIC ?; SOME CLASTIC ?) AND FELDSPAR. SEVERAL LARGE, ROUNDED BUT IRREGULAR, SINGLE (?) GRAINS OF FINE GRAINED CARBONATE OCCUR IN THE SAMPLE. THESE COULD BE MICRITE CLASTS OR, IF A VOLCANIC ORIGIN IS ACCEPTED FOR THE SAMPLE, THESE COULD BE CALCITE-RICH VESICLE FILLINGS. THE ROCK IS INTERPRETED AS EITHER A CARBONATE-RICH QUARTZ-FELDSPAR-RICH ARKOSIC GREYWACKE OR A CARBONATE QUARTZ-FELDSPAR PORPHYRY. THE INTERPRETATION IS NOT CLEAR DUE TO THE CARBONATE-RICH NATURE OF THE SAMPLE MATRIX WHICH HAS OBSCURRED PRIMARY TEXTURAL RELATIONSHIPS. CHALCOPYRITE IS THE DOMINANT OPAQUE; TRACE AMOUNTS OF PYRITE, GALENA, CUPRITE AND DELASSITE, (CU,FE)O2, ALSO OCCUR. CHALCOYRITE AND PYRITE OCCUR AS IRREGULAR INTERSTITIAL GRAINS THAT ARE STRONGY INTERGROWN WITH

INCO EXPLORATION & TECHNICAL SERVICES, Inc. 21-JUN-1993
PETROGRAPHIC REPORT

C93-0328 C93-0328

THE FINE GRAINED QUARTZ AND CARBONATE MATRIX AND RATHER EVENLY DISPERSED THROUGHOUT THE SAMPLE. IN OXIDIZED PORTIONS OF THE SAMPLE, CHALCOPYRITE GRAINS ARE SURROUNDED BY AN EXTREMELY FINE GRAINED, DISCONTINUOUS RIM OF DELAFOSSITE CONTAINING TINY INCLUSIONS OF CUPRITE. MALACHITE OCCURS IN FRACTURE FILLINGS AND AS A VERY THIN COATING ON THE WEATHERED SURFACE OF CHALCOPYRITE-ENRICHED PORTIONS OF THE SAMPLE.

APPENDIX B

Memo to: J. Morin

From: B. C. Jago

June 16, 1993

BRITISH COLUMBIA/SPING CU PROSPECT:MINERALOGICAL AND TEXTURAL INTERPRETATION OF DISSEMINATED CU-MINERALIZATION IN QUARTZ-CARBONATE HOST ROCKS, 94 D/3.

Grab samples and drill core samples with low grade Cu mineralization from the Sping Claims, located 168 km north of Smithers, B. C., were examined with a view to determining if the mineralization was related to diagenesis and fluid flow within a basin environment or was fracture controlled and related to late regional faulting and localization of Cu-rich brines within fault breccia. The implication of the first model, compared to the second, is that there is a high potential for a large tonnage low grade deposit rather than for a small deposit comprising fractured-controlled veins and mineralized fault breccias. A brief description of the property is given in Appendix A.

Conclusions

Cu mineralization consists of disseminated chalcopyrite and secondary delafossite, $(Cu,Fe)O_2$, and malachite in carbonaceous, calcite-rich, fossiliferous limestone and carbonaceous, calcite-rich, siliceous greywacke. Discrete Ag minerals were not observed and it is concluded that Ag occurs in solid solution in chalcopyrite. Other base metals and Au are low or below detection limit.

Chalcopyrite occurs dominantly as irregular, interstitial grains (max. 1 mm across) and rarely as lensoidal blebs in fractures associated with zones of microbreccia. Cu grades are lowest in the fossiliferous limestone (0.42 to 0.53 wt. % Cu) and highest in the siliceous greywacke (0.66 to 0.93 wt. % Cu). Ag shows the opposite association and is highest in fossiliferous limestone (6.8 to 10.8 ppm Ag) versus siliceous greywacke (2.8 to 6.0 ppm Ag). The variation in Cu grade is attributed to a higher primary porosity in the siliceous greywacke compared to the fossiliferous limestone. There is no textural evidence to suggest that Cu mineralization is not associated with diagenesis and fluid movement through partially compacted, unlithified sediments. A sediment-hosted model seems appropriate for the mineralization unless it can be demonstrated in the field that the intensity of mineralization can be directly associated with late faults. A potential problem with the sediment-hosted model is the relatively abundant Cu-mineralization that occurs in several quartz-feldspar-phyric volcanic rock fragments. This mineralization appears to be primary although the evidence is not conclusive; field mapping and further sampling for petrographic study could resolve this issue.

The Sping Claims are recommended for a field visit to determine first hand the extent and nature of Cu-Ag mineralization. Further work is dependent on demonstrating in the field that Cu mineralization is not localized on late faults. The strong correlation of Cu grade with the rock forming elements strongly suggests that siliceous arenites are the best potential host rock for finding relatively high grade (< 0.5 wt. % Cu) mineralization as they are expected to have had the highest primary porosity prior to compaction and to retain that primary porosity for the longest time during fluid flow accompanying basin compaction and diagenesis.

Petrology

Detailed petrographic descriptions of the six rock samples (RX197537/C93-0323 to RX197542/C93-0328) are given in Appendix B. The sample suite essentially consists of two end-member groups including 1) a carbonaceous, calcite-rich, weakly fossiliferous limestone containing several percent of quartz and altered

feldspar (RX197537/C93-0323 to RX197539/C93-0326), and **2)** a carbonaceous (?), calcite-rich, siliceous greywacke dominated by quartz and feldspar mineral grains and quartz +/- feldspar-phyric and non-porphyritic, volcanic rock fragments (RX197540/C93-0327 to RX197542/C93-0328). Several of these rock fragments are strongly mineralized with disseminated chalcopyrite (10 % Cpy) and it is difficult to determine whether that mineralization is primary or secondary and inherited from the matrix. Trace amounts of clay minerals, Fe-Ti-oxides and barite occur in the most siliceous lithologies. Both groups of samples are weakly to moderately foliated and cross-cut by barren calcite veins up to 4 mm across; the first group differs in containing zones of dark coloured, carbonaceous (?) microbreccia.

Chalcopyrite is the dominant sulphide in all samples; trace amounts of pyrite also are present and galena occurs only in RX197542/C93-0328. Oxidation during weathering has formed a thin rim of delafossite, $(Cu,Fe)O_2$, on chalcopyrite in sample RX197542/C93-0328. Malachite occurs on most weathered surfaces and rarely on late fractures. Chalcopyrite and pyrite occur predominantly at interstitial sites in all samples with few exceptions. In microbreccia zones in **Group 1** samples, chalcopyrite is slightly more abundant and coarser grained than in the host carbonate and can also occur as lensoidal grains in discontinuous fractures that appear to be related to microbrecciation. In **Group 2** samples, chalcopyrite is coarser grained and more abundant in suspected quartz-feldspar-phyric volcanic rock fragments and in the most siliceous portions of the samples. In fact, carbonate deposited during diagenesis has largely obscured the clastic nature of the samples and **Group 2** samples could also be interpreted in thin section as carbonate-altered, quartz-feldspar-phyric volcanic flows rather than as carbonate-bearing volcaniclastic rocks as suggested by field mapping. Careful study of field relationships between the sedimentary and volcanic rocks in this environment is strongly recommended to confirm the parentage of these rock types and to clearly separate them on field maps. As show below, Cu grades are much higher in samples containing the highest proportion of volcaniclastic debris.

Geochemistry

Geochemical analysis for six rock samples including four pieces of drill core (RX197537/C93-0323 to RX197540/C93-0326) and two grab samples (RX197541/C93-0327 and RX197542/C93-0328) are given in Table 1. The rock samples are anomalous only in Cu (0.42 to 0.93 wt. % Cu) and Ag (2.8 to 10.8 ppm); all Au values are less than the detection limit of 5 ppb which is at variance with previous sampling (see attachment). The highest Cu grades occur in rock samples with the greatest proportion of volcaniclastic or terrigenous sediment, the opposite of that found for Ag. This is suggested by the strong positive correlation between Cu and Al, K, Ba, Cr, Ti, Sc and V and a negative correlation with Ag, Zn, Cd, Pb, Co, As, Mn, Ca, P, and Sr. Si is assumed to be relatively high as quartz and feldspar were observed in thin section.

The strong correlation of Cu grade with the rock forming elements strongly suggests that the siliceous arenites are the best potential host rock for finding further mineralization as they are expected to have had the highest primary porosity prior to compaction and to retain that primary porosity for the longest time during fluid flow accompanying basin compaction and diagenesis.

xc P. J. Rush
R. A. Alcock
J. Cuthill

Attachments

Table 1: Geochemical Analysis of Grab Samples and Drill Core Samples from the Sping Cu Prospect B. C., NTS 94 D/3

		RX197537	RX197538	RX197539	RX197540	RX197541	RX197542
Au	(ppb)	- 5	- 5	- 5	- 5	- 5	-5
Ag	(ppm)	8.4	6.8	10.8	6.0	4.4	2.8
Cu	(wt. %)	0.53	0.42	0.53	0.93	0.66	0.82
Pb	(ppm)	40	26	36	6	6	4
Zn	(ppm)	62	106	90	70	28	28
Ni	(ppm)	3	2	3	2	- 1	- 1
Co	(ppm)	22	20	38	4	2	2
Cr	(ppm)	16	20	20	57	39	47
Sc	(ppm)	6	4	8	12	7	10
V	(ppm)	8	6	13	65	25	41
Mo	(ppm)	1	1	2	- 1	- 1	- 1
As	(ppm)	12	12	32	- 2	2	- 2
Bi	(ppm)	- 2	- 2	2	- 2	- 2	- 2
Cd	(ppm)	1.5	4.0	3.0	- 0.5	- 0.5	- 0.5
Sb	(ppm)	8	8	6	6	6	6
SiO_2	(wt. %)			Not reported			
TiO_2	(wt. %)	- 0.02	- 0.02	- 0.02	0.37	0.02	0.02
Al_2O_3	(wt. %)	0.40	0.28	0.36	0.62	0.66	0.79
FeO	(wt. %)	1.30	1.05	1.48	1.48	0.94	1.12
MgO	(wt. %)	0.05	0.03	0.05	0.15	0.03	0.03
MnO	(wt. %)	0.39	0.33	0.35	0.25	0.13	0.11
CaO	(wt. %)	+ 21	+ 21	+ 21	20.7	10.6	10.7
Na_2O	(wt. %)	0.03	0.03	0.03	0.03	0.03	0.03
K_2O	(wt. %)	0.13	0.11	0.17	0.20	0.30	0.35
P	(ppm)	1680	1260	2200	710	340	390
Ba	(ppm)	740	910	760	4150	4650	4690
Sr	(ppm)	190	508	217	280	276	276

APPENDIX B

APPENDIX C

STRATIGRAPHIC STUDY

(Formerly AR 225B6)

T.K.

APPENDIX C

STRATIGRAPHIC STUDY OF THE SPING PROPERTY

Introduction

The "Sping" property is located 117 km. (72 miles) north of Hazelton, British Columbia, near the confluence of the Sustut and Skeena rivers. The Sping claim is underlain by Early to Middle Jurassic volcanics and sediments belonging to the Hazelton Group.

A dolomitic limestone unit, centrally located on the property carries disseminated chalcopyrite with associated gold and silver mineralization. Results of a 1973 drill program showed drill indicated reserves of over 5,000,000 tons grading .5% copper and .35 oz. silver per ton with additional potential to the south and northeast. More recent metallurgical testing indicated gold values in copper concentrates ranging from 5 to 14 grams per ton of concentrate.

Because these metallurgical studies have shown that the copper concentrates from the "Sping" deposit carry significant quantities of gold, the origin of the metallogenic event responsible for this deposit has been reconsidered and its syngenetic genesis questioned.

The deposit's physical location on the eastern periphery of the Bowser Basin and the age of the hosting volcanic and sedimentary strata suggest some comparisons could be made to the geological environment of the rich precious metal deposits of the Eskay Creek area of north eastern B.C.

Property, Location and Access

The Sping property, now owned by Gerald Ryznar, consists of the following six unit mineral claim, located in the Omineca Mining Division of B.C.

SPING 1. Record No. 7375 N.T.S. 94-D-3/E

Location: Latitude 56° 15' N; Longitude: 127° 10' 30" W

At the present time access to the property is by helicopter from Smithers or Hazelton, B.C. However, logging roads presently reach as far as 40 km. north of Hazelton and roads now in the proposal stage may reach within 6 km. of the Sping property in the future.

Stratigraphy

Because the associated gold values encountered with mineralization on the Sping appear to be inconsistent with theories on sediment hosted copper deposits, other sources for the gold mineralization were examined. A point of obvious interest is the thick , 117 foot intersection of volcanics, predominantly felsic, encountered in drill hole 73-3 (See plate). The deposit's physical location on the eastern periphery of the Bowser Basin and the age of the hosting volcanic and sedimentary strata suggest some comparisons could be made to the geological environment of the rich precious metal deposits of the Eskay Creek area of north eastern British Columbia.

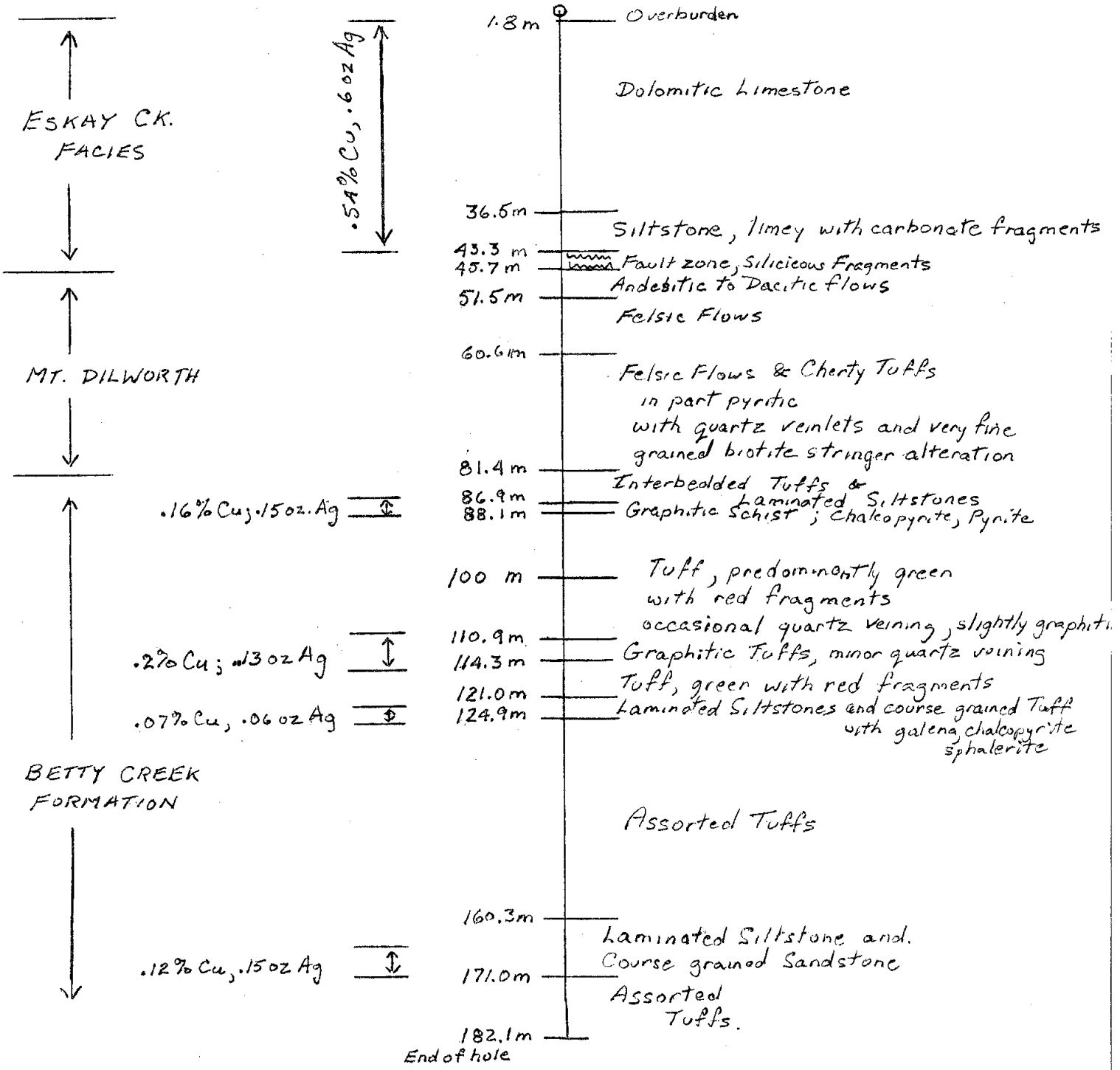
It has been recognized by Anderson et al (G.S.C.) [1] that the Early to Middle Jurassic rocks of the Hazelton Group partly encircling the Bowser Basin is "the metalloctect for important base and precious metal mineral deposits", hence the term, "Golden Horseshoe". In this respect, the Eskay Creek deposits lie on the western periphery of the Bowser Basin while the Sping deposit lies on the eastern periphery within similar stratigraphy as indicated in the following discussion.

Recent studies have shown that most of the mineralization of the Eskay Creek deposits appears to be stratabound within silicieous to limy sediments belonging to the Eskay Creek facies of the Salmon River Formation, all part of the Hazelton Group.[2] This facies is underlain by extrusive volcanic rocks of the Mt Dillworth formation and an epiclastic unit of variable composition, the Betty Creek formation. Volcanic conglomerates and breccias of the Betty Creek formation commonly exhibit matrix supported green and purple andesitic fragments. The finer grained rocks of the Betty Creek appear to be reworked crystal and lithic tuffs.

1. Anderson R.G. & Evenchick C.A., Geological Survey of Canada
   Mining Review Nov.-Dec. 1990
2. Anderson R.G. & Thorkelson D.J. ; Mesozoic stratigraphy and setting for some mineral deposits in Iskut River map area, Northwestern British Columbia.
   Current Research, Part E, Geological Survey of Canada, Paper 90-1F, 1990

STRATIGRAPHIC SECTION - SPING PROPERTY, B.C.

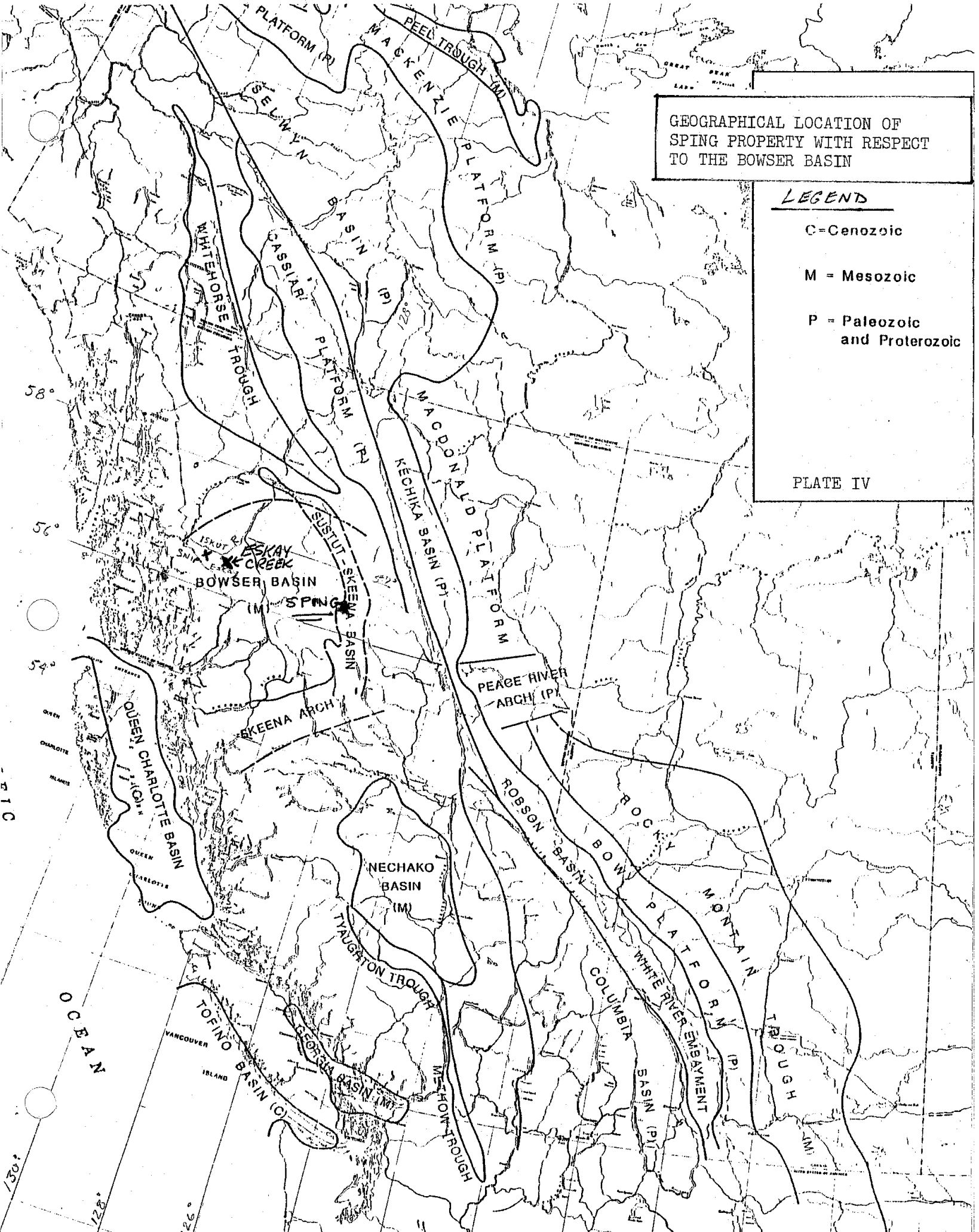
DRILL HOLE 73-3 NTS 94-D-3/E



VERTICAL SCALE
1:1,000

20 m

PLATE 3.


GEOGRAPHICAL LOCATION OF SPING PROPERTY WITH RESPECT TO THE BOWSER BASIN
LEGEND
C=Cenozoic
M = Mesozoic
P = Paleozoic and Proterozoic
PLATE IV
PLATFORM (P)
PEEL TROUGH (M)
MACKENZIE PLATFORM (P)
SELWYN BASIN (P)
WHITEHORSE TROUGH
CASSIAR PLATFORM (P)
MACDONALD PLATFORM
KECHIKA BASIN (P)
SUSTUT-SKEENA BASIN
ESKAY CREEK
BOWSER BASIN (M)
SPING
PEACE RIVER ARCH (P)
SKEENA ARCH
QUEEN CHARLOTTE BASIN (C)
NECHAKO BASIN (M)
ROBSON BASIN
ROCKY MOUNTAIN TROUGH (M)
TYAUGHTON TROUGH
METHOW TROUGH
COLUMBIA BASIN (P)
WHITE RIVER EMBAYMENT (P)
TOFINO BASIN (C)
GEORGIA BASIN (M)
OCEAN
58°
56°
54°
130°
128°

Stratigraphy (continued)

Stratigraphic Comparison

Lower and Middle Jurassic Hazelton Group	Eskay Creek Area	Sping Area
Eskay Creek Facies Salmon River Formation	limestone, limy or cherty siltstone & shale; Eskay Creek deposit in this unit	Cherty limestone, siltstone siliceous siltstone; Sping deposit in this unit Drill hole 3, thickness 150'
Mt. Dilworth	Felsic tuff, Tuff breccias, dust tuff Dacite to rhyolite comp.	Felsic flows, Cherty tuffs Minor andesitic flows Drill hole thickness, 117 ft.
Betty Creek formation	Volcanic conglomerates, and breccias Reworked crystal tuffs	Tuffs and fragmental tuffs Thickness, Hole 3, 300 ft.+

Other features of geological significance within the Sping area are as follows:

1.) The upper sedimentary limestone unit (Eskay Ck. equivalent) hosts disseminated chalcopyrite, chalcocite & bornite mineralization.

2.) The siltstone unit below the limestone also carries chalcocite, chalcopyrite & pyrite mineralization in vugs. This unit is also included in the Eskay Ck equivalent.

3.) In the felsic unit, (Mt. Dilworth equivalent), the felsic cherty tuffs are pyritic in part and exhibit quartz veinlets and fine grained biotite stringer alteration which may be an indication of proximity to major mineralizing event.

4.) Tuffs below the felsic unit commonly exhibit andesitic fragments similar to the Betty Creek formation.

Conclusions and Recommendations

The stratigraphic comparison between the Exkay Creek area and the Sping area appears to fit well with the premise by Henry Marsden and D. J. Thorkelson [3] that the Hazelton volcanism was generated by concurrent subduction of two oceanic plates beneath the Hazelton trough of Stikinia. This could explain the similarities in volcanic sequences within the Hazelton over such widespread areas. In consideration of this, the western periphery of the Bowser Basin and in particular the Sping area, should be a good target for both base and precious metal deposits.

3. Marsden H., & Thorkelson, D.J. - Geology of the Hazelton Volcanic Belt in British Columbia, Implications for the Early to Middle Jurassic Evolution of Stikinia; unpublished thesis Carlton University, Ottawa, Ontario.

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