FALCONBRIDGE LIMITED

GEOLOGICAL, GEOCHEMICAL AND GEOPHYSICAL ASSESSMENT REPORT ON THE JASPER GROUP CLAIMS

VICTORIA M.D.

NTS 92C 15E, LAT. 48° 51', LONG. 124° 35'

T. Chandler
K. Hudson

Report # 157-101-84
March, 1985

TABLE OF CONTENTS

FIGURES AND TABLES

A. INTRODUCTION

This report summarizes field work carried out on the Jasper Group Claims from August to October, 1984 by a two to four man person crew. Accomodation was a camper and tents on the property. The exploration program included geologic mapping of the roadcuts and several of the creeks, rock chip sampling of mineralized areas, geochemical soil sampling and a small VLF-EM 16 geophysical survey. All work was done within the Jasper 1 claim boundaries. Topography and on-going logging operations limited further geological mapping at this time.

The lithologic units strike in a northwesterly direction and dip variably to the southwest. The prominent rock types are a series of mafic to intermediate flows and pyroclastics with minor felsic volcanics. Sedimentary units include lahar, hematized mudstone and stratified tuff within the volcanics. The contacts between volcanics are often marked by a breccia. Faulting displaces these units in a dominantly north-east southwest direction ; shearing and fracturing are common to the property. Localized areas of argillic alteration, pyritization and silicification overprint the chloritization and epidotization of the entire map area. Massive to semi-massive blocks and wedges of pyrite with associated chalcopyrite, sphalerite and galena are related to shears situated centrally on the property. They do not appear to be of volcanogenic origin but rather an epigenetic emplacement.

Several anomalous copper, zinc, lead and gold values were discovered in geochemical soil samples. Further work is planned in 1985 to evaluate the extent and source of these anomalies.

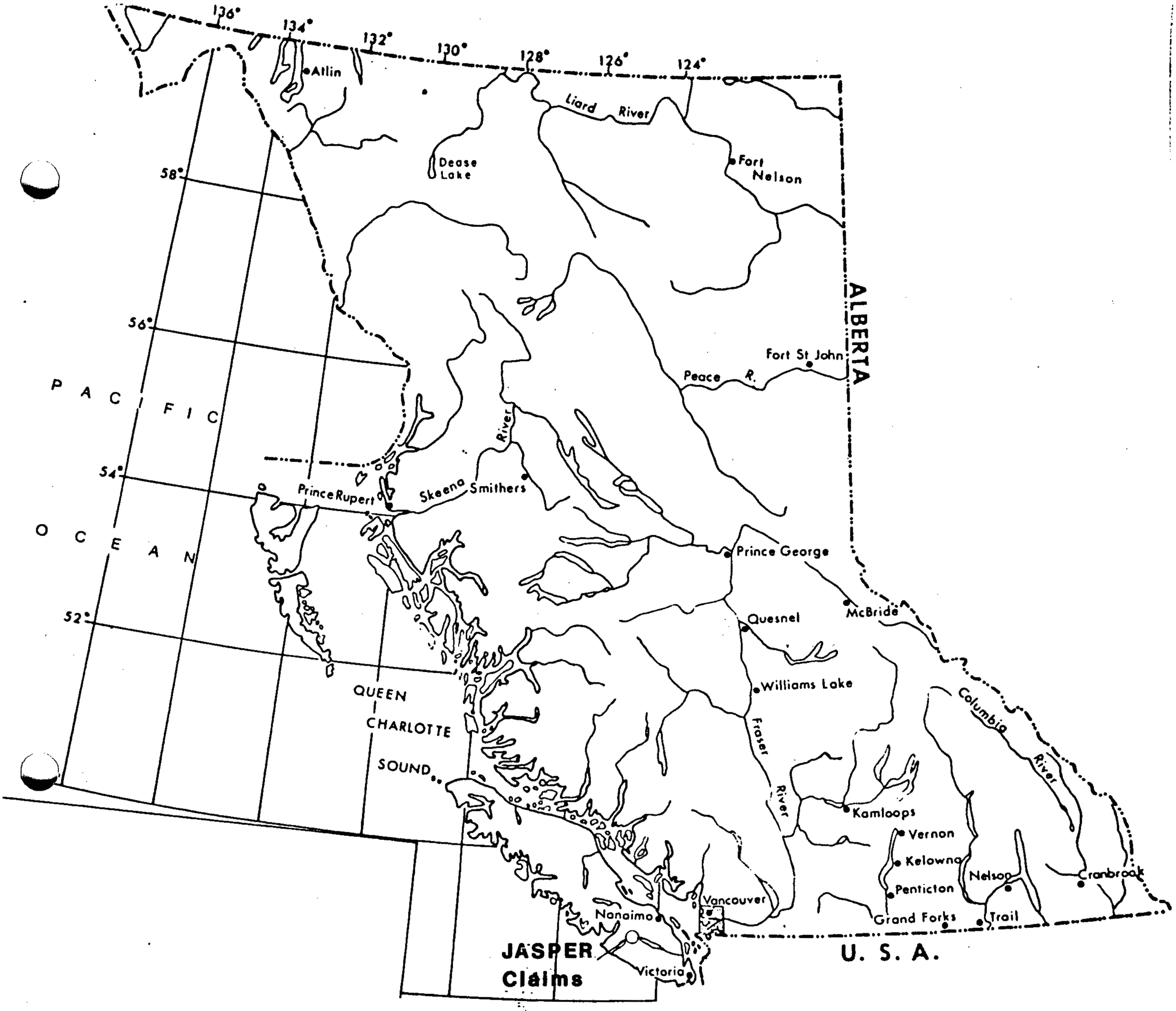
B. LOCATION AND ACCESS

The Jasper Claims are situated between Caycuse Creek and Jasper Creek, 7 km NE of the north end of Nitinat Lake and within the Victoria Mining Division. The property is easily reached by the public access road from Cowichan Lake to the east or from Port Alberni to the northwest. Subsidiary road systems provide excellent access within the claim area (Figure 1).

C. CLAIM STATUS

The Jasper Claim Group consists of four modified grid located claims - Jasper 1,2,3 and 4 totalling 40 units. Jasper #1 is under option from Ron Bilquist and Les Allen per agreement dated July 1, 1984. Jasper 2 - 4 were staked by Falconbridge Ltd. during the 1984 field season.

Claim Name	Record No.	Units	Expiry Date
JASPER #1	915	16	May 3, 1985
JASPER 2	1363	6	Sept. 5, 1985
JASPER 3	1364	6	Sept. 5, 1985
JASPER 4	1365	12	Sept. 5, 1985



INDEX MAP

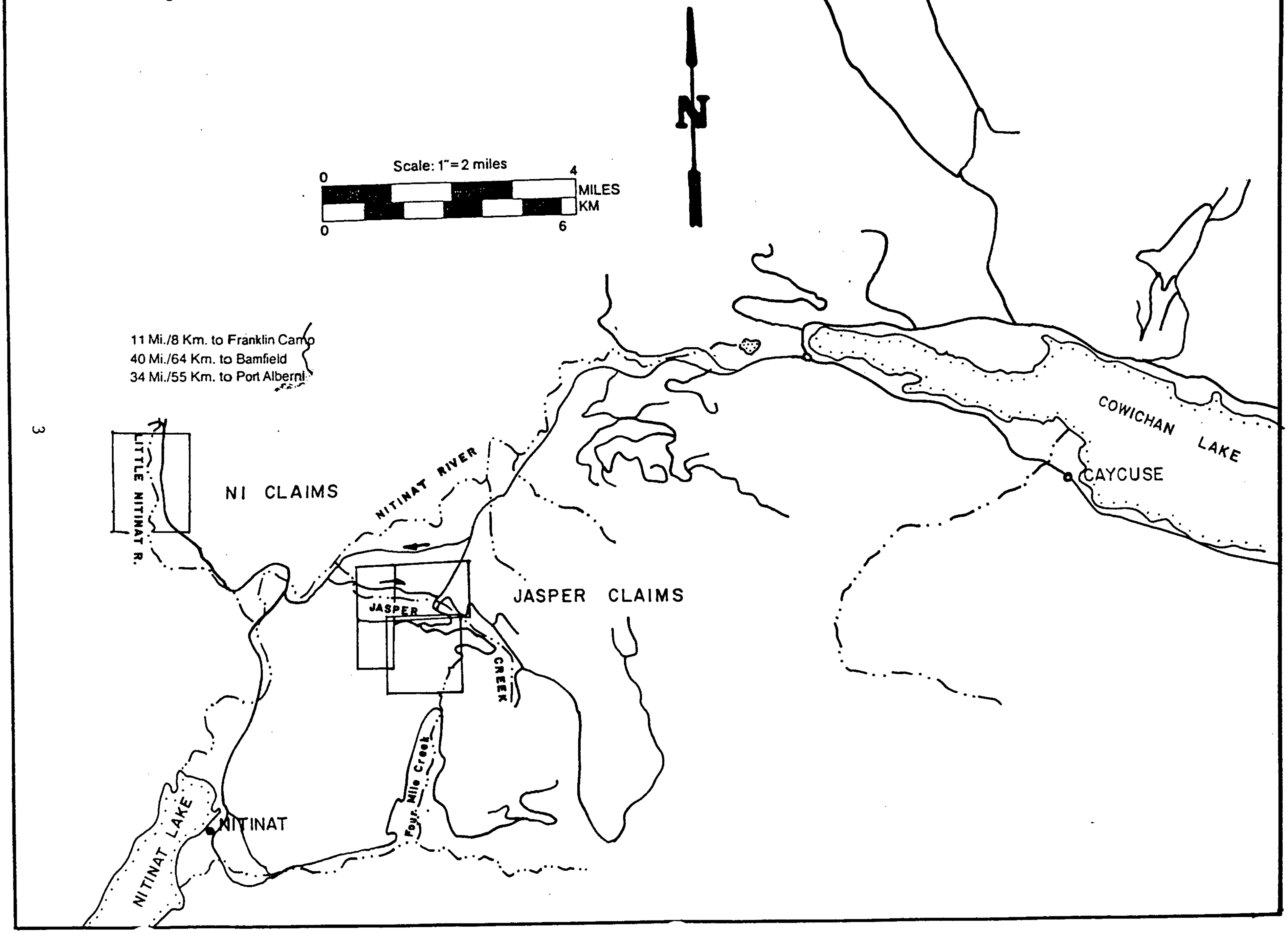
BRITISH COLUMBIA

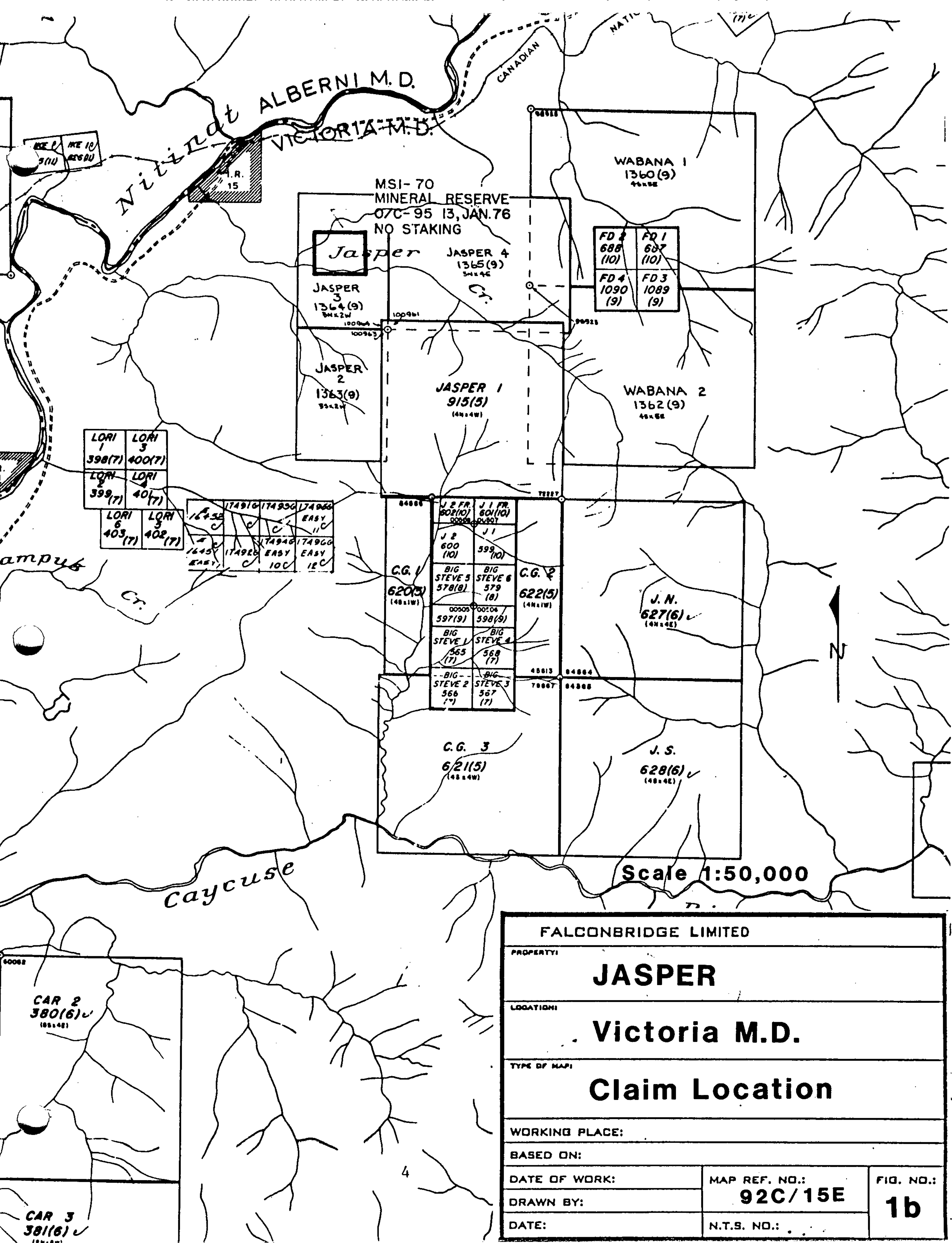
150 0 150 300 450 Km.

SCALE 1: 7·500·000

Fig. 1

Figure 1a LOCATION MAP





FALCONBRIDGE LIMITED

PROPERTY:

JASPER

LOCATION:

Victoria M.D.

TYPE OF MAP:

Claim Location

WORKING PLACE:		
BASED ON:		
DATE OF WORK:	MAP REF. NO.: 92C/15E	FIG. NO.: 1b
DRAWN BY:		
DATE:	N.T.S. NO.:	

D. REGIONAL GEOLOGY

Table 1 and Figure 2 (Muller, 1981) summarize the regional stratigraphy of Vancouver Island.

The oldest rocks are the Paleozoic Sicker Group consisting of a lower volcanic and an upper sedimentary unit. The Sicker Group averages 4,400 m. in thickness; the lower 3000 m. consists of pillowed and agglomerate basalts, pyroclastics, argillite and chert. The upper 1400 m. of sediments includes some limestone. Folding and metamorphosis has produced chlorite-actinolite and chlorite-sericite schists. Structures are mainly overturned and isoclinally folded indicating two or more phases of tectonism (Muller, 1980).

The Vancouver Group of late to middle Triassic age dominates the island's lithologies and averages 6,100 m. in thickness (Muller, 1980). The group is composed of Karmutsen Formation volcanics, capped by Quatsino Formation limestones and Parson Bay Formation calcareous sediments.

The Karmutsen Formation consists of tholeiitic ocean floor pillow lavas, massive flows, breccias and tuffs with minor layers of limestone and other sediments in the upper 1,100 m. In central Vancouver Island this formation reaches a thickness of 6000 m. while in the southwest region the estimated thickness is between 1000 and 2000 metres (Muller, 1980). Large scale northerly and westerly block faulting is common. Burial metamorphism has reached prehnite-pumpellyite grade (Kuniyoshi, 1971).

Quatsino Formation overlies the Karmutsen and consists of mainly massive, fairly pure, flat lying limestone of upper Triassic age.

The Bonanza Group (Muller, 1979) is described as having a varied and heterogeneous lithology. The lavas range in composition from basaltic andesites which are commonly amygdaloidal, to rhyodacites. Interbedded with these flows are maroon and green coloured tuff breccias and several intercalated marine sediments. Regional metamorphism has reached zeolite grade.

Island intrusions form NW trending regions in the southwest part of Vancouver Island. These intrusions are mainly quartz diorite and granodiorite which postdate the Bonanza volcanics.

E. PROPERTY GEOLOGY

(a) Lithology

The Jasper claim group is underlain by lower Jurassic Bonanza volcanics (Muller, 1977). Mafic pyroclastics and flows dominate the property and are interbedded with intermediate volcanics. The contacts of these units are often marked by breccias.
Felsic volcanics occur in contact with intermediate volcanics.

Two sedimentary units; a lahar and a hematized mudstone lens, are

FIG. 2. INDEX OF GEOLOGICAL MAPPING ON VANCOUVER ISLAND

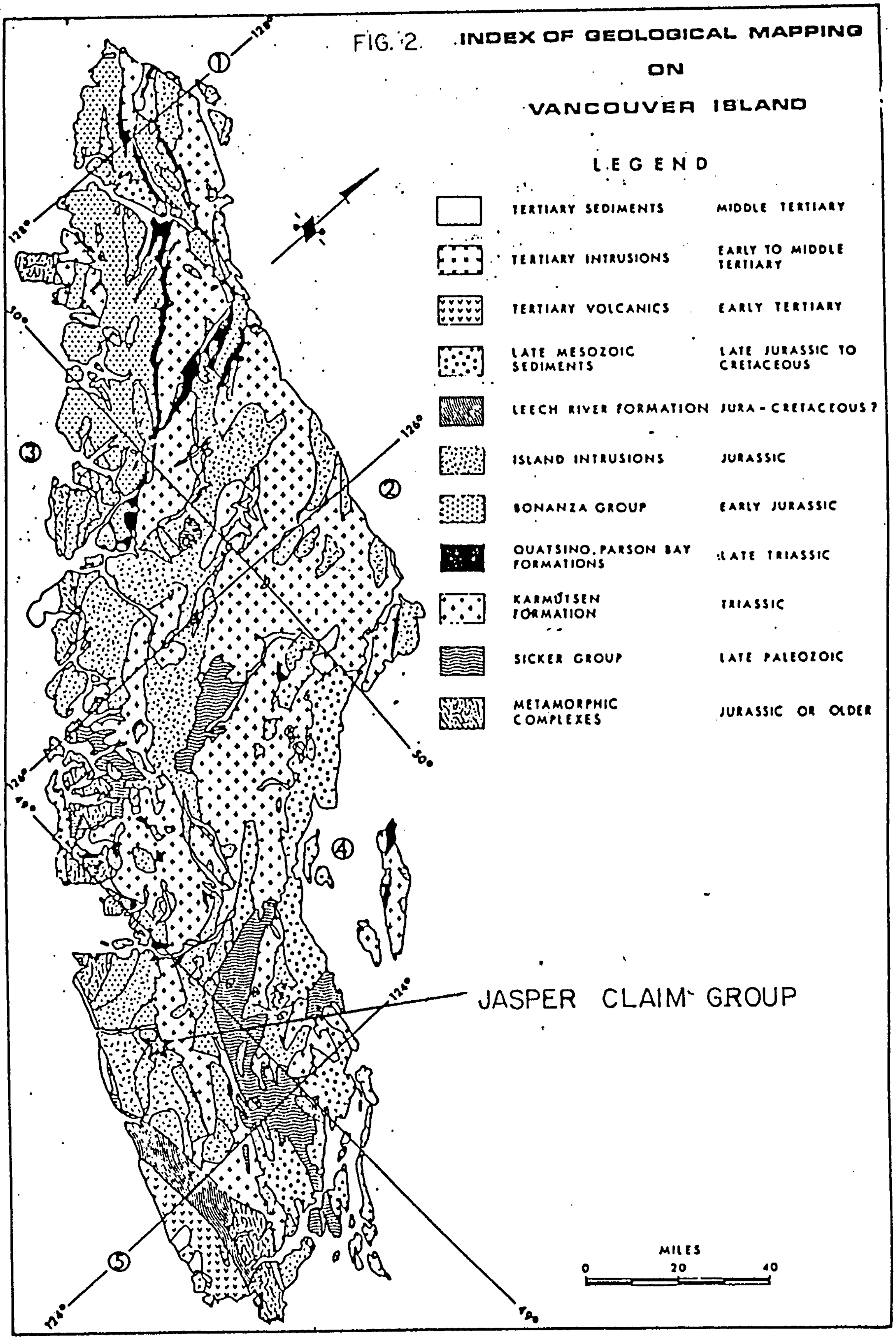


TABLE I: TABLE OF FORMATIONS OF VANCOUVER ISLAND

SEQUENTIAL LAYERED ROCKS

	PERIOD		STAGE	GROUP	FORMATION	SYMBOL	AVE. THICK. in m	LITHOLOGY
CENOZOIC					late Tert. volc's of Port McNeill	Tvs		
CENOZOIC			EOCENE to OLIGOCENE		SOOKE BAY	mpTSB		conglomerate, sandstone, shale
CENOZOIC			EOCENE to OLIGOCENE		CARMANAH	eoTC	1,200	sandstone, siltstone, coglomerate
CENOZOIC			EOCENE to OLIGOCENE		ESCALANTE	eTE	300	conglomerate, sandstone
CENOZOIC			early EOCENE		METCHOSIN	eTM	3,000	basaltic lava, pillow lava, breccia, tuff
MESOZOIC		LATE	MAESTRICHTIAN	NANAIMO	GABRIOLA	uKGA	350	sandstone, conglomerate
MESOZOIC		LATE	MAESTRICHTIAN	NANAIMO	SPRAY	uKS	200	shale, siltstone
MESOZOIC		LATE	CAMPANIAN	NANAIMO	GEOFFREY	uKG	150	conglomerate, sandstone
MESOZOIC		LATE	CAMPANIAN	NANAIMO	NORTHUMBERLAND	uKN	250	siltstone, shale, sandstone
MESOZOIC		LATE	CAMPANIAN	NANAIMO	DE COURCY	uKDC	350	conglomerate, sandstone
MESOZOIC		LATE	CAMPANIAN	NANAIMO	CEDAR DISTRICT	uKCD	300	shale, siltstone, sandstone
MESOZOIC		LATE	CAMPANIAN	NANAIMO	EXTENSION - PROTECTION	uKEP	300	conglomerate, sandstone, shale, coal
MESOZOIC		LATE	SANTONIAN	NANAIMO	HASLAM	uKH	200	shale, siltstone, sandstone
MESOZOIC		LATE	SANTONIAN	NANAIMO	COMOX	uKC	350	sandstone, conglomerate, shale, coal
MESOZOIC		EARLY	CENOMANIAN ALBIAN APTIAN?	QUEEN CHARLOTTE	Conglomerate Unit	lKqc	900	conglomerate, greywacke
MESOZOIC		EARLY	CENOMANIAN ALBIAN APTIAN?	QUEEN CHARLOTTE	Siltstone Shale Unit	lKqp	50	siltstone, shale
MESOZOIC		EARLY	VALANGINIAN BARREMIAN		LONGARM	lKL	250	greywacke, conglomerate, siltstone
MESOZOIC	JURASSIC	MID to LATE	TITHONIAN CALLOVIAN		Upper Jurassic Sediment Unit*	uJs	500	siltstone, argillite, conglomerate
MESOZOIC	JURASSIC	EARLY	TOARCIAN?	BONANZA	Volcanics	lJB	1,500	basaltic to rhyolitic lava, tuff, breccia, minor argillite, greywacke
MESOZOIC	JURASSIC	EARLY	PLIENSBACHIAN SINEMURIAN	BONANZA	HARBLEDOWN	lJH		argillite, greywacke, tuff
MESOZOIC	TRIASSIC	LATE	NORIAN	VANCOUVER	PARSON BAY	uTrPB	450	calcareous siltstone, greywacke, silty-limestone, minor conglomerate, breccia
MESOZOIC	TRIASSIC	LATE	KARNIAN	VANCOUVER	QUATSINO	uTrQ	400	limestone
MESOZOIC	TRIASSIC	LATE	KARNIAN	VANCOUVER	KARMUTSEN	muTrK	4,500	basalic lava, pillow lava, breccia, tuff
MESOZOIC	TRIASSIC	MID	LADINIAN	VANCOUVER	Sediment - Sill Unit	T ds	750	metasiltstone, diabase, limestone
PALEOZOIC	PENN. and ? PERM.			SICKER	BUTTLE LAKE	CPBL	300	limestone, chert
PALEOZOIC	PENN. and ? PERM.			SICKER	Sediments	CPss	600	metagreywacke, argillite, schist, marble
PALEOZOIC	PENN. and ? PERM.			SICKER	Volcanics	CPsv	2,000	basaltic to rhyolitic metavolcanic flows, tuff, agglomerate
PALEOZOIC	DEV. or EARLIER							

CRYSTALLINE ROCKS, COMPLEXES OF POORLY DEFINED AGE

NAME	SYMBOL	ISOTOPIC AGE Pb/U	ISOTOPIC AGE K/Ar	LITHOLOGY
SOOKE INTRUSIONS - silicic	Tg		32–59	quartzdiorite, trondhjemite, agmatite, porphyry
SOOKE INTRUSIONS - basic	Tgb		31–49	gabbro, anorthosite, agmatite
METCHOSIN SCHIST, GNEISS	Tmn		47	chlorite schist, gneissic amphibolite
LEECH RIVER FM.	JKL		38–41	phyllite, mica schist, greywacke, argillite, chert
PACIFIC RIM COMPLEX	JKP			greywacke, argillite, chert, basic volcanics, limestone
ISLAND INTRUSIONS	Jg		141–181	granodiorite, quartzdiorite, granite, quartz monzonite
WESTCOAST COMPLEX silicic	PMns	264	163–192	quartz-feldspargneiss, metaquartzite, marble
WESTCOAST COMPLEX basic	PMnb			hornblende-plagioclase gneiss, quartz diorite, agmatite, amphibolite
diabase sills	PTrb			
metavolcanic rocks	PMmv			metavolcanic rocks, minor metasediments; limestone, marble
TYEE INTRUSIONS	Pg	>390		metagranodiorite, metaquartzdiorite, metaquartz porphyry
COLQUITZ GNEISS	Pns	>390		quartz feldspar gneiss
WARK DIORITE GNEISS	Pnb	>200	163–182	hornblende-plagioclase gneiss quartz diorite, amphibolite

exposed in the east central and east regions of the property. A stratified intermediate tuff forms a narrow bed within an intermediate breccia unit. Banding displays a northeast trend which is contrary to the trend of the other units. This is possibly a local variation caused by paleotopography. Several fine grained and porphyritic dykes of felsic, intermediate and mafic composition occur along contacts or parallel to fracture patterns throughout the property (Figure 3).

Unit 2m - Mafic Tuffs and Flows

The mafic volcanic units appear forest green on the weathered surface. Locally, alteration of the porphyritic feldspars and sometimes disseminated pyrite gives the surface a chalky orange appearance. The hematized mafic volcanics have a deep maroon weathered surface. Manganese staining occurs locally.

Mafic volcanics exhibit varying textures from massive to porphyritic, with amygdular and/or hematized varieties. The massive volcanics are fine and even grained. The porphyritic flows contain feldspar phenocrysts up to 3mm long. Partial to complete replacement of the feldspars by epidote has been observed. The porphyritic texture may indicate the central areas of thick flows which cooled more slowly.

A gradational contact exists between the porphyritic and hematized mafic volcanics. Hematization of the volcanics is generally pervasive but was also observed to have a more patchy character. Veinlets and sheared surface coatings of a red hematite rich material also occur proximal to hematized mafic volcanics. Work done by Tipper and Richards (1976) in the Hazelton trough suggests that hematized volcanics are an indicator of a subaerial environment.

The amygdular mafic volcanics contain epidote and calcite, epidote and quartz, and quartz and pyrite infillings up to 2mm across. Locally the original vesicles have hematite rims.

Veinlets of calcite and quartz are common in the mafic volcanics, sometimes grading into brecciated fragments surrounded by quartz or calcite cement. Milky white quartz veinlets are up to 3cm wide. Slickensides and associated serpentinization commonly occur as well as calcite and epidote along shear surfaces. The reddish to green color and vesicular and porphyritic character of the mafic volcanic unit suggest it is analogous to the basaltic andesite described by Muller (1974). Chlorite rich dacites are also included in this unit.

Unit 2i - Intermediate Tuffs and Flows

The intermediate volcanics have a grey to light green weathered surface which is locally limonite and manganese stained. It is dominantly porphyritic with well formed feldspar and crude quartz phenocrysts visible in hand specimen. Quartz and epidote rinds suggest a more amygdaloidal character in some areas. A vuggy texture was also observed. This intermediate unit may correspond to the porphyritic greenish grey dacites of the Bonanza Subgroup (Muller, 1974).

Unit 2ibx - Intermediate Breccia

There is a gradational change from the intermediate volcanic unit to breccia. Mafic breccia in gradational contact with mafic volcanics also occurs. It is in sharp undulatory contact with intermediate volcanics in many cases. In both instances the clasts are subrounded to angular fragments of porphyritic mafic volcanics up to 15 cm across which are moderately packed in a fine grained matrix. Locally the breccia has a vesicular texture and is intensely epidotized at higher elevations.

Unit 2f - Felsic Volcanic Flows

The felsic volcanics have a pale grey weathered and fresh surface. Phenocrysts of quartz and white feldspar occur in a very fine grained matrix. The rocks are massive with a local vugginess. Minor disseminated pyrite occurs throughout. The felsic volcanics are possibly rhyodacite in composition.

Unit 2t - Bedded Tuff

A narrow stratified tuff unit occurs within intermediate volcanic breccias. The weathered surface is a cream colour while the fresh rock is a light green. Differential weathering enhances the layered character of alternate quartz and feldspar rich bands which are less than 1mm thick.

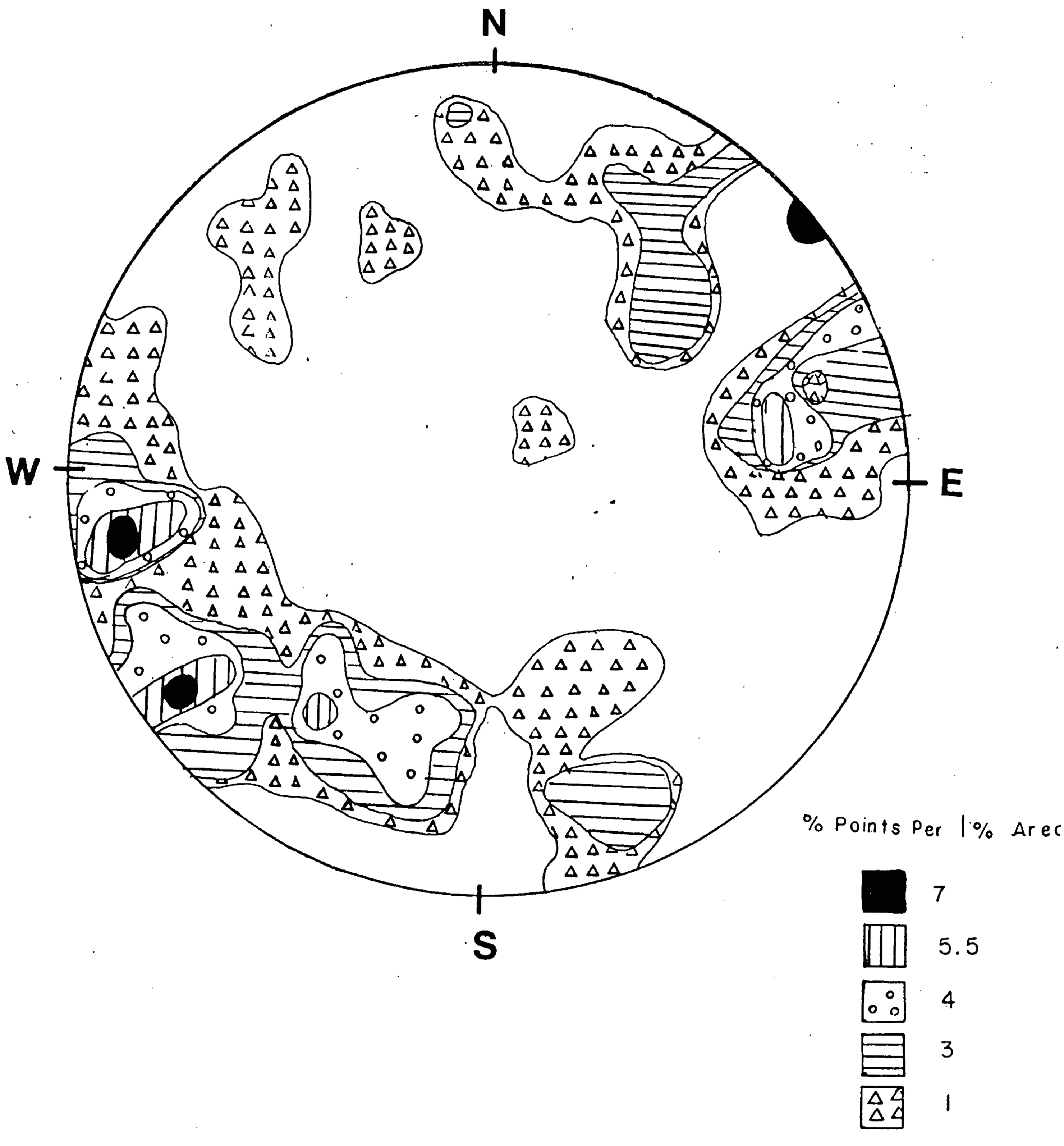
Unit 3l - Hematized Lahar

The hematized lahar occurs in gradational contact with hematized intermediate breccia stratigraphically above and below and in undulatory contact with hematized mafic volcanics laterally. Rounded and chaotic porphyritic mafic and intermediate volcanic clasts occur well packed in a friable hematite rich mudstone. The clasts range from 5cm to 1m across.

<u>(b)</u> <u>Structure</u>

The interbedded intermediate and mafic volcanics contacts display a general northwest trend. The stratified tuff and breccias as well as the trend of hematization also support a northwest orientation of the units. Units in the southwest map region dip between 60 degrees and 80 degrees to the southwest while on the northeast side of the property field observations indicate a more gentle dip of 14 to 40 degrees SW (Figure 3).

FIG.4 : JASPER CLAIM GROUP: CONTOURED DENSITY PLOT OF SHEARS AND FRACTURES



Total of 72 Points

Fractures and shears occur over the entire property with the extreme east and west regions of the claim displaying lower density fracturing while the central region commonly is fractured in four directions and is more frequently sheared. Seventy-two shear and fracture orientation measurements were taken from the volcanics and contoured on an equal area plot to give four dominant orientations; 144/84E, 167/82E, 122/78NE and 171/69W (Figure 4). The most common fracture and shear orientation of 144/84E is also the approximate orientation of shears related to the main showing massive sulphides. The angle between any two of the dominant fracture and shear directions does not suggest conjugate planes but rather the result of several stress fields.

Faults were noted when they caused an offset in a dyke. It is also possible that several shears were also faults but the thickness of the volcanics made it impossible to recognize movement directions. Three of the faults were between 034 and 050 degrees with a dip that varies between 55 degrees and vertical. Two described faults trended 140 and 175 degrees and dipped 40 degrees and 78 degrees E. Air photos indicate three subparallel lineations with a 048 degree trend and a very steep dip which extends some 400 metres. Also, minor lineations with a 138 degree trend exist in the southwest. These orientations agree well with the trend of minor faulting observed in the field.

(c) Alteration

Epidotization and chloritization of the volcanics is pervasive, increasing in intensity towards the south and west regions of the claim group. Chloritization is also associated with some shears.

Three regions within the map area have undergone intense argillic alteration and bleaching often accompanied by extreme pyritization (Figure 3). These zones display a northwest trend, traceable for up to 250m, and associated with intense shears and fractures. The regions are readily recognized by the chalky appearance of the bleached grey to white rock and a yellow and rust coloured staining.

At the higher elevations, silicification of the porphyritic and amygdular mafic volcanics and intermediate volcanics has occurred forming a siliceous ridge top.

(d) Mineralization

Two styles of mineralization, massive and disseminated, occur in six different settings within the claim boundaries:

1) Massive to semi-massive sulphide zones bounded by sheared planes form the main showing of the property as well as a minor zone low on the north facing slope.

The minor massive sulphide zone is 0.5 metres wide and in shear contact with mafic porphyritic volcanics. Phenocrysts of pyrite up to 1cm across are locally stained by a copper oxide and occur with goethite masses and sphalerite (Appendix 2).

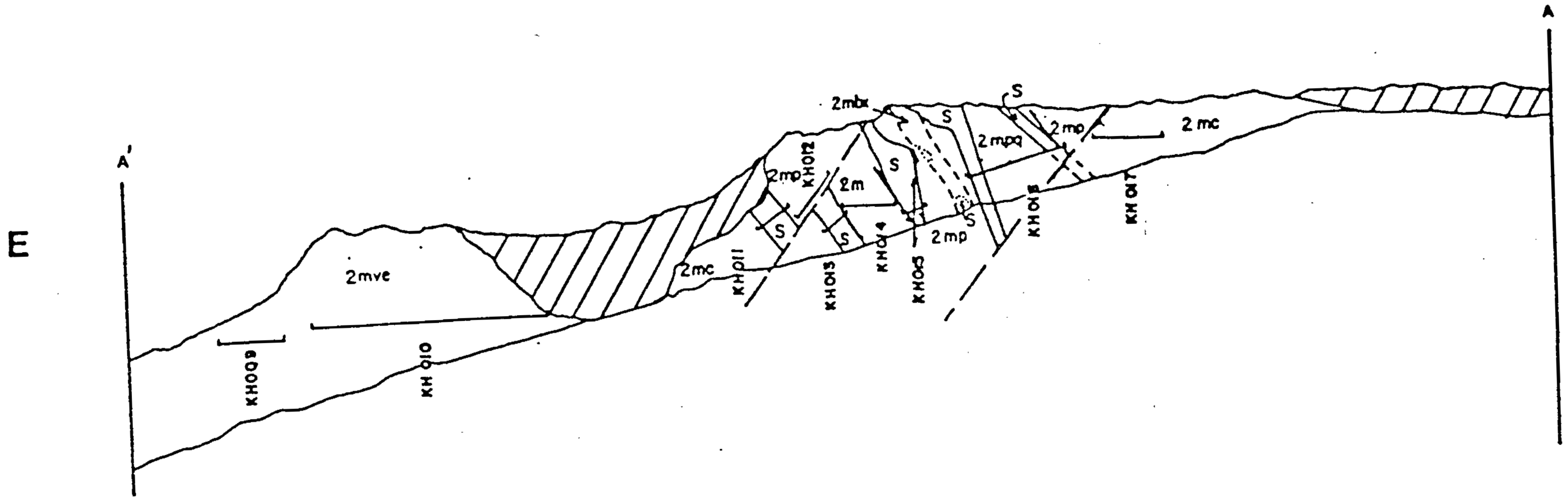
The main massive sulphide showing consists of a series of wedge and block shaped zones of pyrite with accompanying chalcopyrite, sphalerite and minor galena across a 28 metre roadcut section (Figure 5). The sulphides occur in a fine grained swirled and banded pattern in some sections and as medium to coarse grained brecciate sulphides elsewhere (Appendix 2). The massive sulphides are in shear contact with porphyritic and silicified mafic volcanics which often contain minor disseminated pyrite. This host rock to the massive and semi-massive zone grades from an amygdaloidal mafic volcanic on the east side of the exposure to a chlorite rich porphyritic dacite. The vesicular infillings are epidote and quartz. The porphyritic dacite contains feldspar phenocrysts up to 15mm long in a medium to fine grained matrix and has been highly sericitized and chloritized. Local silicification of the volcanics occurs. The country rock is locally brecciated with a quartz cement. Volcanic breccia fragments also occur within the sulphide zones.

From the above textural observations, the following genetic model is put forward for this zone. An initial quartz rich pulse of fluid moved through the already sheared avenues in the volcanics, precipitating around breccia fragments and possibly forming a seal. A second more sulphide rich fluid evolved and moved through the volcanics in association with a further shearing event. The precipitation of sulphides was possibly triggered by the release of pressure when the quartz was broken by renewed shearing. The common 130-140 degree attitude of sulphide rich shears possibly represents subparallel dilatory fractures which were filled with the sulphide bearing fluids. The precipitated massive sulphides formed blocks and wedges which were subsequently faulted.

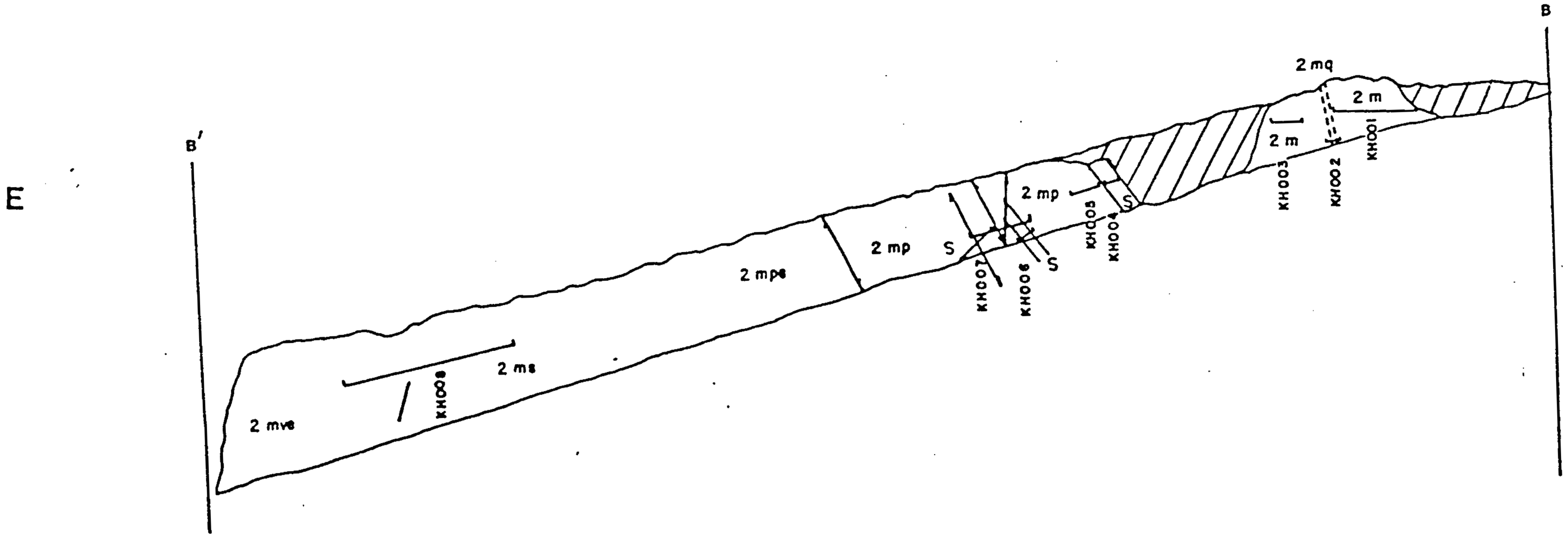
From the lithogeochemistry the massive sulfide samples were found to contain the highest gold and silver values of the entire property (ranging from 83 to 725 ppb Au and 2.1 to 14.6 ppm Ag). Some gold enrichment of the hanging wall also exists. Copper values are as high as 2.3% and average 1.2% over the eight massive sulphide sections sampled. Hanging wall and footwall copper values are slightly enhanced. Zinc values of up to 2.4% are also associated with the sulphide zones. Elevated cadmium and antimony values correlate very well with the massive sulphide samples while barium appears depressed in the sulphide zones and enhanced in the wallrock. Arsenic values are consistently above zero but never greater than 37 ppm. Throughout the rest of the property zero arsenic values are common.

2) Sheared zones with associated disseminated pyrite and occasionally zinc and massive goethite occur in a wide north-south region centered on the property including the main showing zone.

CROSS SECTION OF THE MAIN SHOWING UPPER ROAD CUT



CROSS SECTION OF THE MAIN SHOWING ACCESS ROAD CUT



LEGEND

Rock Types

- 2m - mafic volcanic
- 5 - massive to semi-massive sulphides (chalcopyrite, pyrite, sphalerite)

Textures

- p - porphyritic
- c - chloritized
- e - epidotized
- v - vesicular
- bx - brecciated
- q - silica enriched

- 52 — fracture
- 20 — shear
- 49 — fault
- diffuse contact
- approx. contact
- KH001 [chip sample interval
- /// overburden

CHIP ASSAY RESULTS IN PPM, AU IN PPB

SAMPLE	WIDTH (M)	CU	ZN	AG	AU	BA
KH001	9.8	135	313	0.8	7	83
KH002	0.25	194	176	1.0	12	49
KH003	1.0	741	2340	1.9	185	519
KH004	0.5	13000	13700	9.7	83	64
KH005	4.3	545	770	0.9	8	66
KH006	0.25	21900	14300	10.6	107	126
KH007	2.0	2600	9050	2.7	725	128
KH008	6.0	128	379	0.1	13	51
KH009	2.0	248	2170	0.6	45	591
KH010	8.0	100	544	0.6	27	845
KH011	1.5	1570	8070	2.4	410	111
KH012	1.25	264	1260	1.0	34	65
KH013	1.0	1420	3880	2.9	320	110
KH014	2.0	209	632	1.1	3	121
KH015	0.2	16100	24600	14.6	480	79
KH016	3.5	12600	11400	8.2	97	106
KH017	2.0	174	4100	0.2	16	99

0 1 5 10 m

SCALE: 1 : 200

FALCONBRIDGE LIMITED

PROPERTY: JASPER

LOCATION: VICTORIA MINING DIVISION

TYPE OF MAP: GEOLOGY and SAMPLE LOCATIONS

WORKING PLACE:

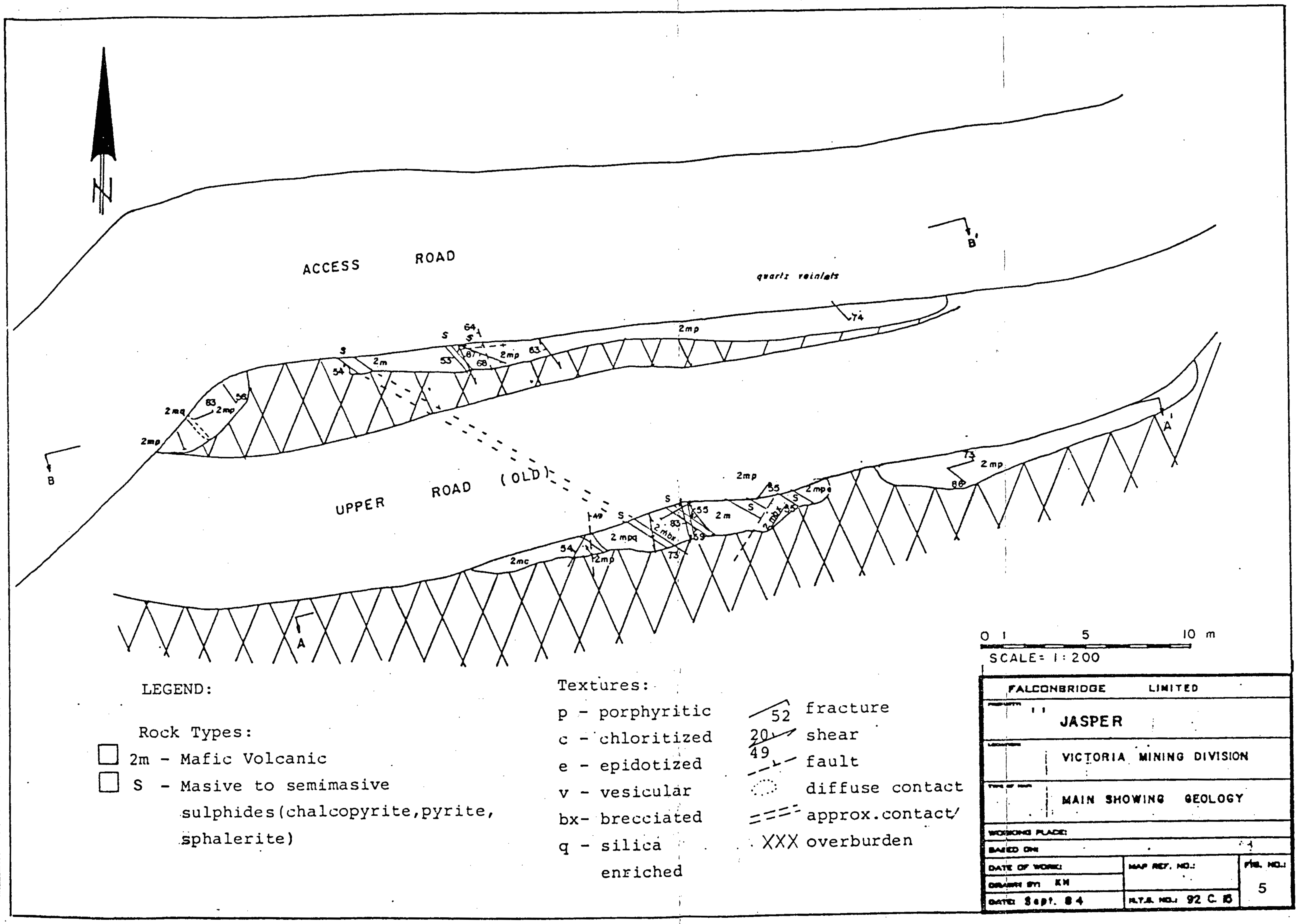
BASED ON:

DATE OF WORK:

DRAWN BY: KH

MAP REF. NO.:

FIG. NO. 6


ACCESS ROAD
UPPER ROAD (OLD)
quartz veinlets
2m
2mp
2mq
2mc
2mpq
2mbx
2mpe
S
B
B'
A
A'
0 1 5 10 m
SCALE= 1:200
LEGEND:
Rock Types:
2m - Mafic Volcanic
S - Masive to semimasive sulphides(chalcopyrite,pyrite, sphalerite)
Textures:
p - porphyritic
c - chloritized
e - epidotized
v - vesicular
bx- brecciated
q - silica enriched
52 fracture
20 shear
49 fault
diffuse contact
approx.contact
XXX overburden
FALCONBRIDGE LIMITED
JASPER
VICTORIA MINING DIVISION
MAIN SHOWING GEOLOGY
DRAWN BY: KH
DATE: Sept. 84
N.T.S. NO.: 92 C 15
FIG. NO.: 5

The mineralized shear zones are rich in disseminated pyrite which, in the Zinc Creek region, have sphalerite veinlets. Precious metal, copper and lead values, and trace elements are generally at low levels. Among the Zinc Creek samples anomalous mercury (1070 ppb), zinc (0.3%), and moderate gold values were obtained.

3) Intensely bleached, fractured and sheared porphyritic volcanics contain pervasively disseminated fine grained pyrite mineralization. These are associated with shears and extend up to 300 metres before they grade into porphyritic mafic or intermediate volcanics. These regions are recognizable by their chalky grey-blue color stained by yellow and rust limonite alteration, and their friable nature (Appendix 2). Generally, precious metal, base metal and trace elements are depressed in these zones. Barium values are higher than for other styles of mineralization. One sample from an argillic zone (33) was anomalous in base and precious metals and mercury content (Appendix 1).

4) Disseminated and amygdule-filling sulphides occur in dominantly mafic volcanics with no fracture relation. These rocks contained visible pyrite and chalcopyrite. Copper values showed great variability with a high value of 0.9% Cu. Several silver values were in the 2.0 ppm range but none were anomalous in gold. Generally these rocks produced persistently low trace element results. One sample, which was also silicified, contained anomalous zinc, lead, mercury and cadmium values (Appendix 1).

5) Narrow zones of silicification around fractures contain minor disseminated pyrite. Silicified zones occur in a variety of rock types and were both mineralized (with medium grained pyrite) and unmineralized. Sample 9 was anomalous in copper, silver and gold but there is no obvious metal association among the silicified samples.

6) Many of the more felsic dykes in the map area contain moderate fine grained disseminated pyrite. Pyritic dykes were not found to have a base or precious metal association. The trace elements showed no clear trends.

A quartz breccia was sampled as well as a grey quartz vein 3 cm wide. The breccia sample and quartz vein were not anomalous for any of the base or precious metals.

F. <u>GEOCHEMISTRY</u>

A total of 104 soil samples (Fig. 7) were collected along the main access road within the JASPER 1 claim. Samples were collected at 50 metre intervals. Care was taken to avoid contamination from road fill. Samples were analyzed for 26 element I.C.P. plus A.A. gold analysis. I.C.P. analysis were performed by MIN-EN Labs, North Vancouver, using acid digestion sample preparation. Gold was analyzed separately using acid digestion and AA finish. Results are reported in ppm for all 26 elements with gold in ppb. The field season ended before further sampling could be done. A more extensive program is planned in 1985 (see RECOMMENDATIONS).

Results

Anomalous gold values (>100 ppb) were reported for five samples (J13, J14, J17, J19, J20) in the southern area of the sampling program.

J13 and J14 occur in an area of intermediate volcanics adjoining an argillically altered and bleached zone.

J17 is located within intermediate volcanics close to the contact with mafic volcanics.

J19 and J20 are situated in an area of silicifed mafic volcanics in close proximity to the main showing. J19 also has co-incident high Cu and Zn values. J20 has high Zn and Pb values.

High Cu (> 100ppm) and Zinc (> 100ppm) values occur predominately within the northwestern section of the survey area. Geological mapping indicated an region of mafic volcanic flows and tuffs with epidote alteration and minor occurrences of felsic dykes. Anomalous Cu and Zn values were also noted in mafic and intermediate volcanics on a road cut immediately southeast of the northwest area decribed above. Taken together, these two zones form a northwest-southeast trending zone of anomalous values. This direction corresponds to the observed trend of fractures and shear zones.

G. GEOPHYSICS

Three (3) kilometers of closely spaced VLF-EM 16 survey lines in the vicinity of the main showing have disclosed three minor anomalies, one of which is over the showing. Any follow-up work should be on a larger grid located to the east and west of the showing. Readings should be taken at 25 metre intervals with 100 metre spacing between lines.

H. LITHOGEOCHEMISTRY

A series of 56 rock samples were collected from areas of interest; chiefly mineralized and altered zones (APPENDIX 1). Seventeen of these were taken as a sequence of chip samples across the Main Showing (Fig. 6). The remaining samples are plotted on Fig. 9 to 14. Rock samples were analyzed at MIN-EN Labs, North Vancouver for 26 element I.C.P. plus gold and mercury. Analysis techniques are described under "GEOCHEMISTRY".

Results

Due to the low number of samples, it is difficult to draw viable conclusions on the spatial distribution anomalous samples. However, a few trends can be observed.

The highest Cu values are not always co-incident with the highest Zn values. Several Cu values coincide with high Au values in the northwestern area and elsewhere. Cu values in the northwest portion of the survey area are also co-incident with anomalous zinc and lead values.

Anomalous lead values are associated with high zinc values at several scattered sample sites.

High mercury levels are not necessarily related to high gold values. Two mercury values >1000 ppm occur in samples with moderate to low gold values.

Cadmium appears to correlate directly with high copper-zinc values.

Mineralized zones are high in Cu, Zn, Au values with moderate Ag and occasional high Pb values. Barium is also anomalous in these zones. More samples are needed from hangingwall and footwall rocks to determine if any enrichment or depletion of indicator elements is present.

Argillically altered aones have moderately high zinc and barium values.

H. RECOMMENDATIONS

The main showing copper and zinc values with the associated moderate gold values are interesting enough that this property merits more work. Results from the rest of the property are generally low but inconclusive. Once the logging of the area has been completed, grid lines placed over the entire claim area for soil sampling and mapping would allow for a more systematic study of the geology which would more clearly represent the lithological and structural trends of the property. Soil geochemistry may delineate unexposed extensions to the main showing. A VLF and/or HLEM survey of the grid lines may locate any massive sulphide extensions to the main showing. However, the steep topography was suspected of causing false readings in the small VLF grid completed this season. Trenching of any extension to the showing delineated by the soil geochemistry results would then be recommended. Drilling decisions will be contingent on the results of this work.

STATEMENT OF EXPENDITURES

ASSAYS:	COST
1. Soil Geochemistry:	
MIN-EN Labs, North Vancouver Assayed for 26 element I.C.P. and gold.	
104 samples @ $14.85	$1544.40
2. Lithogeochemistry:	
MIN-EN Labs, North Vancouver Assayed for 26 element I.C.P. and gold ± mercury.	
28 samples @ $17.00	$ 476.00
28 samples @ $21.50	$ 602.00

PETROGRAPHIC REPORT:

Vancouver Petrographics Ltd., Langley Thin/Polished section study of rock samples.	$ 683.50

TRAVEL/BOARD/CAMP EXPENSES:		COST
Camp Equipment Rentals	Aug.15 – Oct 31	$ 55.00
Food and sundries	"	$ 710.59
Consumible camp supplies	"	$ 92.57
Travel expenses on project (meals)		$ 45.88
Communications:		
1) Mobile radio rental		$ 256.16
Travel expenses to/from project (includes mob/demob, ferries)		$ 131.59
Transportation:		
1) Fuel		$ 285.15
2) Vehicle rentals		$ 906.88
Map reproduction/drafting		$ 561.96
Field Supplies:		
1) General and geological		$ 152.02
	SUBTOTAL	$6,503.50

SALARIES

TITLE	WORK ACTIVITY	DAYS AT TASK	$RATE/DAY	COST
Project Geologist (TEC)	Field programme preparation; acquiring field supplies and base maps; hiring crews	3	$200.00	$ 600.00

TITLE	WORK ACTIVITY	DAYS AT TASK	$RATE/DAY	COST
(TEC) cont'd	Programme supervision and direction. Coordination of work crews. Logistics. Interpretation.	5	$200.00	$1,000.00
	Data collation and review. Supervision of map and report preparation.	4	$200.00	$ 800.00
Geologist (KH)	Prepare maps, field supplies. Mobilization. Camp setup.	8	$90.00	$ 720.00
	Geological mapping and sampling. Detailed mapping and sampling of mineral showings. Field drafting.	23	$90.00	$2.790.00
	Geochemical soil sampling. Sample prep and shipping. Field drafting.	11	$90.00	$ 990.00
	Expediting for camp. Purchasing and transporting supplies.	3	$90.00	$ 270.00
	Data collation and review. Interpretaion, map and report preparation.	7	$90.00	$ 630.00
Jr.Geologist (D.O.)	Prepare maps, field supplies. Mobilization and camp setup.	3	$85.00	$ 255.00
	Geological mapping and sampling. Field drafting.	16	$85.00	$1,360.00
	Soil geochemical sampling. Sample prep and shipping. Field drafting.	9	$85.00	$ 765.00
	VLF-EM 16 survey. Data reduction and plotting.	4	$85.00	$ 340.00
	Expediting for camp. Purchasing and transporting supplies.	5	$85.00	$ 425.00
Geotech #1 (A.M.)	Soil geochemical sampling.	4	$60.00	$ 240.00
	VLF-EM 16 survey. Data reduction and plotting	2	$60.00	$ 120.00
	SUBTOTAL (Salaries)			$11,305.00
	<u>TOTAL EXPENDITURES:</u>			$17,808.50

FALCONBRIDGE LIMITED
6415 - 64th Street, Delta, B.C., Canada V4K 4E2
Tel. (604) 946-0441
Telex 04-357583

Expl. 249/85
April 10, 1985

Chief Gold Commissioner
Ministry of Energy, Mines
and Petroleum Resources
Parliament Buildings
Victoria, B.C.
V8V 1X4

Dear Sir:

STATEMENT OF QUALIFICATIONS

This is to state that I have obtained a BSc (Honors) 1975 in Geology from Carleton University, Ottawa, Ontario, and have worked as a geologist for Falconbridge Limited since 1976.

Kim Hudson, project supervisor, worked under my supervision. She obtained a BSc in Geology from the University of British Columbia, 1983.

Yours truly,
FALCONBRIDGE LIMITED

T.E. Chandler
Project Geologist

TEC:mm

REFERENCES

Kuniyoshi S and J.G. Liou, 1976; Contact Metamorphism of the Karmutsen Volcanics, Vancouver Island, B.C., Journal of Petrology 17 pp 73-99.

Muller, J.E., K.E. Northcote, D. Carlisle, 1974; Geology and Mineral Deposits of Albert - Cape Scott Map Area, Vancouver Island, B.C. GSC Paper 74-8 pp 19-25.

Muller, J.E., 1979; Geology of Vancouver Island GSC Open File 463.

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Muller, J.E., 1981; Insular and Pacific Belts; Field Guides to Geology and Mineral Deposits, Calgary 81 GAC, MAC, CGU, 1981, Edited by R.I. Thompson and D.G. Cook, pp 316-334.

Tipper, H.W., T.A. Richards, 1976 Jurassic Stratigraphy and History of North Central, B.C. GSC Bulletin 270 pp 46.

APPENDIX 1

Results of Chip Samples

SAMPLE TYPE	SAMPLE	AU PPB	AG PPM	CU PPM	ZN PPM	PB PPM	HG PPB	BA PPM	AS PPM	SB PPM	CD PPM
MAIN SHOWING	KH001	7	.8	135	313	133		83	26	1	1.3
	KH002	12	1	194	176	128		49	33	3	1.2
HW	KH003	185	1.9	741	2340	65		519	35	3	21.9
S	KH004	83	9.7	13000	13700	312		64	0	11	116.2
FW	KH005	8	.9	545	770	20		66	14	0	4.4
S	KH006	107	10.6	21900	14300	68		126	1	36	83.7
S+HW+FW	KH007	725	2.7	2600	9050	321		128	18	0	55.4
	KL008	13	.1	128	379	140		51	21	0	3.6
	KH009	45	.6	248	2170	480		591	37	0	64.9
	KH010	27	.6	100	544	104		845	20	0	3
S	KH011	410	2.4	1570	8070	91		111	31	0	69.9
HW	KH012	34	1	264	1260	69		65	17	0	9.2
S	KH013	320	2.9	1420	3880	56		110	14	0	30.4
	KH014	3	1.1	209	632	32		121	1	0	2.8
S	KH015	480	14.6	1600	24600	445		79	8	24	173.5
S+HW	KH016	97	8.2	12600	11400	119		10.6	8	14	64.7
	KH017	16	.2	174	4100	9		99	5	0	15.8
S LOW ON N	5	43	16	23100	108	24		117	2	23	.1
HW FACING SLOPE:	5B	5	1.6	1020	135	7		167	16	0	.5
ARGILLIC ZONES	21A	6	1.2	104	312	2		144	0	0	0
	21B	22	1.8	91	345	34		305	10	0	1.8
	21C	19	1.7	55	188	29		259	18	0	.3
	12	14	1.4	67	81	3		413	0	0	0
	32	45	1.2	21	110	19	390	546	0	12	.9
	14	2	1.6	26	53	0		136	0	0	0
	33	100	3.2	5720	37000	132	23500	298	0	27	156.9
	111	10	.9	16	67	27	105	132	14	13	.5
	115	7	.4	20	51	7	45	432	32	4	.1
	117	12	1.3	60	139	16	110	109	0	5	.2
	207	25	.7	147	179	25	140	87	42	12	.9
	211	10	.8	49	26	4	210	111	0	3	.1
MINERALIZED SHEARS	34	10	.2	94	703	19	400	180	0	13	3.5
	36	17	.1	7	410	16	220	104	0	12	1
	104	6	.6	51	135	53	380	140	2	9	1.8
	114	10	.7	25	68	7	130	116	0	12	.5
	116	10	.9	47	95	0	50	239	0	9	0
	221	5	1	74	204	8	140	152	0	4	.2
ZINC CREEK {	271	195	2.1	120	45	139	275	55	124	0	14.4
	272	3	1.4	14	108	26	305	231	0	12	1.1
	273	10	1	4	3150	63	1070	313	0	1	.5
DISSM./AMYG.											
	206	10	.5	116	127	16	30	75	0	11	.9
	208	5	2.6	73	203	14	25	205	0	14	.6
	213	12	.8	176	1120	456	1400	113	0	13	25.8
	235	56	1.9	514	142	17	205	131	4	11	.9
	238	10	2.6	8830	119	9	300	184	0	11	.1
	240	25	2	1520	181	0	60	121	0	4	0
	270	2	1.4	33	202	28	310	57	0	0	2
SILICIFIED ZONES	9	460	3.7	2600	17	16		85	2	0	0
	107	20	.9	24	81	17	255	62	0	5	.2
	124	6	.9	6	160	40	755	441	0	2	1.1
DYKES	23	2	1	78	430	20		87	26	2	1.4
	110A	7	.3	1	74	11	20	59	11	7	.4
	118	12	1.4	66	164	0	50	67	0	5	0
	212	55	.7	176	23	7	60	188	0	1	25.8
BRECCIATED	101	14	.3	0	67	7	25	53	0	10	.5
QTZ. VEIN	6	3	1.1	110	90	7		39	12	0	.2

→ TEC

COMPANY: FALCONBRIDGE LTD. → Foster
PROJECT No: 30101-6[illegible]8-101
ATTENTION: K. HUDSON

MIN-EN LABS ICP REPORT
705 WEST 15th ST., NORTH VANCOUVER, B.C. V7M 1T2
(604)980-5814 OR (604)988-4524

FILE No: 4-819
TYPE SOIL GEOCHEM
DATE: AUGUST 23, 1984

(REPORT VALUES IN PPM)		AG	AL	AS	B	BI	CA	CD	CO	CU	FE	K	MG
20251	▲5	16.0	33700	2	37	340	2250	.1	99	23100	212000	1300	21400
20252	5b	1.6	44700	16	38	22	4350	.5	40	1020	105000	1440	26100
20253	6	1.1	20900	12	17	8	8190	.2	20	110	47900	161	13600
20254	9	3.7	5440	2	11	44	740	.0	30	2600	107000	2140	1560
20255	12	1.4	12200	0	14	5	1380	.0	24	67	82500	2410	3810
20256	14	1.6	20300	0	17	10	7860	.0	21	26	76600	829	11900
20257	21A	1.2	38600	0	34	9	1210	.0	26	104	95900	2060	13100
20258	21B	1.8	16700	10	16	4	1330	1.8	21	91	72400	2350	6710
20259	21C	1.7	13200	18	14	5	502	.3	20	55	68700	2740	4510
20260	22	1.6	20700	29	19	26	1560	34.2	17	1220	49900	1770	13400
20261	23	1.0	14400	26	12	5	1600	1.4	7	79	33100	1120	7860
20262	KH001	.8	20700	26	17	7	3200	1.3	16	135	42000	2060	10700
20263	002	1.0	7580	33	6	8	1580	1.2	8	194	17900	1100	3060
20264	003	1.9	15400	35	15	18	1930	21.9	17	741	47900	2240	9210
20265	004	9.7	24100	0	33	195	936	116.2	34	13000	235000	1100	14600
20266	005	.9	38300	14	33	16	4480	4.4	32	545	83500	1730	26000
20267	006	10.6	18900	1	25	351	1550	83.7	29	21900	151000	1910	11300
20268	007	2.7	29000	18	32	42	1670	55.4	37	2600	159000	1600	17200
20269	008	.1	20600	21	17	4	3840	3.6	14	128	35800	2080	10600
20270	009	.6	26000	37	23	9	2360	64.9	21	248	50900	2170	15100
20271	010	.6	23900	20	21	6	4420	3.0	18	100	46200	2480	12900
20272	011	2.4	24400	31	27	25	1500	69.9	28	1570	143000	1550	14300
20273	012	1.0	36000	17	31	9	6280	9.2	28	264	74600	2020	20800
20274	013	2.9	26300	14	30	25	1630	30.4	33	1420	161000	1510	15500
20275	014	1.1	36700	1	31	10	6900	2.8	29	209	80500	1490	21700
20276	015	14.6	21200	8	28	245	1090	173.5	29	16100	158000	1280	12900
20277	016	8.2	22400	8	27	189	1090	64.7	34	12600	149000	1590	13400
20278	017	.2	34700	5	30	5	2350	15.8	28	174	83300	2200	19200

PROJECT No: 30101-608-101 705 WEST 15th ST., NORTH VANCOUVER, B.C. V7M 1T2 FILE No: 4-818
ATTENTION: K. HUDSON (604)980-5814 OR (604)988-4524 *TYPE SOIL GEOCHEM* DATE: AUGUST 23, 1984

(REPORT VALUES IN PPM)	MN	MO	NA	NI	P	PB	SB	SR	TH	U	V	ZN
20251	1230	14	19	19	949	24	23	53	7	0	73.3	108
20252	1780	8	19	21	576	7	0	71	4	0	89.0	135
20253	996	5	35	14	379	7	0	81	0	0	53.9	90
20254	66	31	22	5	506	16	0	14	6	0	12.1	17
20255	486	4	67	7	662	3	0	17	0	0	39.6	81
20256	839	2	395	5	668	0	0	60	0	0	46.8	53
20257	1370	4	106	10	859	2	0	49	0	0	97.6	312
20258	925	4	104	13	608	34	0	25	3	0	41.5	343
20259	598	5	68	10	778	29	0	23	4	0	35.9	188
20260	2290	7	158	10	737	35	6	30	2	1	38.2	10000
20261	695	3	354	4	135	20	2	19	1	13	7.0	430
20262	1370	5	159	9	571	133	1	34	1	3	30.6	313
20263	673	5	93	6	165	128	3	14	0	16	11.9	176
20264	1150	21	83	11	565	65	3	28	3	1	32.4	2340
20265	3020	15	41	20	384	312	11	39	12	0	48.1	13700
20266	2520	5	97	16	769	20	0	51	2	0	130.7	770
20267	1530	12	67	15	950	68	36	33	7	0	29.6	14300
20268	2410	19	56	17	460	321	0	39	9	0	57.0	9050
20269	949	3	210	9	605	140	0	35	1	0	35.7	379
20270	1300	14	124	13	496	480	0	40	2	0	66.8	2170
20271	1690	4	211	10	715	104	0	52	1	0	45.4	544
20272	2630	21	73	16	337	91	0	34	9	0	48.7	8070
20273	1660	5	242	11	916	69	0	61	1	0	130.6	1260
20274	3230	16	57	22	348	56	0	39	11	0	57.5	3880
20275	1790	4	261	11	902	32	0	65	0	0	141.1	632
20276	1750	24	32	17	622	445	24	37	8	0	39.0	24600
20277	1330	17	43	17	507	119	14	32	7	0	51.7	11400
20278	2730	5	146	18	601	9	0	40	3	0	96.3	4100

COMPANY: FALCONBRIDGE LTD. MIN-EN LABS ICP REPORT (ACT:SE03B) PAGE 3 OF 3
PROJECT No: 30101-608-101 705 WEST 15th ST., NORTH VANCOUVER, B.C. V7M 1T2 FILE No: 4-818
ATTENTION: K. HUDSON (604)980-5814 OR (604)988-4524 *TYPE SOIL GEOCHEM* DATE: AUGUST 23, 1984

(REPORT VALUES IN PPM)	BA	SE	AU-PB
20251	117	0	43
20252	167	0	5
20253	39	0	3
20254	85	0	460
20255	413	0	14
20256	136	0	2
20257	144	0	6
20258	305	0	22
20259	259	0	19
20260	144	0	3
20261	87	0	2
20262	83	0	7
20263	49	0	12
20264	519	0	185
20265	64	0	83
20266	66	0	8
20267	126	0	107
20268	128	0	725
20269	51	0	13
20270	591	0	45
20271	845	0	27
20272	111	0	410
20273	65	0	34
20274	110	0	320
20275	121	0	3
20276	79	0	480
20277	106	0	97
20278	99	0	15

PANY: FALCONBRIDGE LTD. MIN-EN LABS ICP REPORT (ACT:GEO3B)

JECT No: 30301-608-101 705 15th ST., NORTH VANCOUVER, B.C. V7M 1T2 FILE No: 4-937R

ENTION: T. CHANDLER/K.HUDSON (604)980-5814 OR (604)988-4524 *TYPE ROCK GEOCHEM* DATE: SEPTEMBER 7, 1984

PORT VALUES IN PPM)	AG	AL	AS	B	BI	CA	CD	CO	CU	FE	K	MG
32	1.2	27800	0	28	10	5860	.9	25	21	58100	3030	15300
33	3.2	46500	0	51	93	2310	156.9	28	5720	92700	2950	28500
[illegible]	.2	31500	0	29	9	1740	3.5	19	94	54000	2590	20100
36A	.1	39900	0	49	15	3330	.6	66	0	209000	2990	25700
36B	.3	35100	0	36	9	2350	1.0	26	7	61000	4850	21300
36C	.2	39800	0	36	12	4900	2.1	27	43	64500	1960	26800
224	.0	37100	0	42	7	669	1.6	18	22	78500	4300	12900
221	1.0	29100	0	27	19	8460	.2	26	74	64300	1710	15700
208	.2	33900	0	30	10	3450	.6	21	73	56200	1760	23200
206	.5	30000	0	27	12	4580	.9	28	116	50000	2040	17600
238	2.6	23300	0	25	144	8310	.1	35	8830	111000	1820	14000
228	1.5	15200	37	16	7	1640	2.7	11	227	38600	3400	8260
235	1.9	22400	4	25	15	2500	.9	33	514	63000	2550	15900
240	2.0	33800	0	35	43	6040	.0	43	1520	124000	1920	20400
207	.7	22600	42	23	9	1180	.9	30	147	53700	3750	10500
211	.8	19000	0	20	14	4420	.1	26	49	65100	3640	10100
110A	.3	19700	11	17	7	2410	.4	9	1	32400	2190	9850
101	.3	32500	0	33	11	1940	.5	29	0	71000	2870	24500
111	.9	22400	14	25	7	1210	.5	14	16	65000	2340	7520
107	.9	27200	0	26	16	5970	.2	25	24	66400	1950	18200
110B	1.4	45800	0	43	22	11200	.0	47	12	101000	1610	31600
114	.7	41300	0	38	16	11000	.5	42	25	89400	1520	27900
115	.4	13100	32	10	8	4810	.1	11	20	20600	2080	3940
116	.9	52800	0	48	20	9480	.0	38	47	102000	2510	30500
117	1.3	33000	0	32	22	2730	.2	30	60	91100	3040	20700
17	.5	35100	0	34	10	4140	1.3	30	31	65400	2250	24000
118	1.4	35200	0	33	22	10500	.0	38	66	92700	1850	21000
[illegible]	.7	11100	22	13	10	1510	.1	17	0	62400	3000	3330
[illegible]	.8	32300	0	30	14	4680	25.8	28	176	61500	1650	23900

ORT VALUES IN PPM)	MN	MO	NA	NI	P	PB	SB	SR	TH	U	V	ZN
32	1480	2	123	1	895	19	12	46	3	2	52.8	110
33	3850	13	31	0	921	132	27	50	2	0	111.5	37000
34	1980	1	118	4	772	19	13	32	3	2	86.1	703
[illegible]A	3310	62	31	0	488	16	12	49	12	3	90.4	410
36B	2090	11	42	2	587	18	13	41	2	2	77.0	250
36C	3540	3	118	4	692	14	16	63	1	4	111.7	388
224	969	2	181	0	1510	18	15	33	8	1	105.0	102
221	1990	1	393	0	1350	8	4	46	0	3	83.5	204
208	2480	2	244	0	952	14	14	36	1	2	68.3	203
206	963	3	158	5	766	16	11	44	1	2	70.8	127
238	1290	0	398	0	1060	9	11	51	2	3	89.7	119
228	1750	2	95	0	945	36	7	16	5	1	19.2	232
235	756	2	160	7	686	17	11	24	6	0	67.8	142
240	2430	0	152	0	366	0	4	57	0	3	117.9	181
207	880	7	33	1	863	25	12	21	6	2	39.6	179
211	384	0	334	0	682	4	3	20	2	3	41.4	26
110A	782	0	647	0	642	11	7	19	1	3	14.1	74
101	1830	0	376	0	649	7	10	29	1	1	155.7	67
111	627	1	270	0	1700	27	13	24	6	5	50.7	67
107	963	0	463	0	780	17	5	38	0	2	100.0	81
110B	1610	0	607	0	854	3	7	55	0	4	254.6	108
114	1470	0	542	0	842	7	12	156	0	5	196.7	68
115	669	0	346	9	293	7	4	38	1	3	16.6	51
116	2110	0	1370	0	892	0	9	96	0	3	231.7	95
117	1650	1	128	0	903	16	5	39	0	3	134.5	139
17	1320	0	522	0	997	16	16	35	4	4	154.9	115
118	2090	0	195	0	830	0	5	82	0	5	140.1	164
212	126	3	206	0	838	7	1	12	3	1	21.1	23
[illegible]3	1770	2	353	2	789	456	13	50	0	3	116.2	1120

No: 30301-608-101 705 [illegible] 15th ST., NORTH VANCOUVER, B.C. V7M 1T2 FILE No: 4-937R
[illegible]ION: T. CHANDLER/K.HUDSON (604)980-5814 OR (604)988-4524 *TYPE ROCK GEOCHEM* DATE: SEPTEMBER 7, 1984

[illegible]ORT VALUES IN PPM)	BA	SE	AU-PPB	HG-PPB
32	546	1	45	390
33	298	1	100	23500
34	180	1	10	400
[illegible]A	104	0	35	220
[illegible]6B	375	1	17	90
36C	321	1	5	70
224	107	1	5	210
221	152	0	5	140
208	205	1	5	25
206	75	0	10	30
238	184	0	10	300
228	181	0	20	75
235	131	1	56	205
240	121	0	25	60
207	87	1	25	140
211	111	0	10	210
110A	59	0	7	20
101	53	0	14	25
111	132	1	10	105
107	62	0	20	255
110B	158	0	10	70
114	116	1	10	130
115	432	0	7	45
116	239	0	10	50
117	109	0	12	110
17	203	1	10	30
118	67	0	12	50
212	188	0	55	60
213	113	1	12	1400

APPENDIX 1b

Complete results of geochemical soil sampling

COMPANY: FALCONBRIDGE LTD. MIN-EN LABS ICP REPORT (ACT:6E03B) PAGE 1 OF 3
PROJECT No: 30301-608-101 705 WEST 15th ST., NORTH VANCOUVER, B.C. V7M 1T2 FILE No: 4-1197S/P1+2
ATTENTION: K. HUDSON (604)980-5814 OR (604)988-4524 *TYPE SOIL GEOCHEM* DATE: OCTOBER 19, 1984

(REPORT VALUES IN PPM)	AG	AL	AS	B	BI	CA	CD	CO	CU	FE	K	MG
J 1	1.3	53000	0	36	21	2750	1.0	26	66	91600	600	10400
J 2 40M	1.4	43500	0	30	20	3730	.0	20	18	87800	487	5180
J 3	1.3	69700	0	44	29	25300	3.0	80	298	65800	1350	8320
J 4	1.2	61700	0	40	22	3420	.6	20	47	90700	547	3920
J 5	2.0	54400	0	38	30	6510	.6	23	42	90700	547	5330
J 6	.9	71300	0	47	22	2330	2.0	23	82	106000	833	7590
J 7	.4	32600	0	21	13	2370	.1	10	17	54000	427	2710
J 8	.0	41300	0	27	6	1420	1.1	11	21	74900	417	3040
J 9 40M	.1	52400	0	35	9	1350	1.2	18	30	85200	898	4700
J 10	.5	49000	0	34	10	1840	1.2	17	50	94800	1130	5510
J 11	.6	70500	0	44	9	2000	1.9	20	95	61000	800	4110
J 12	.5	63000	0	40	11	1370	.6	13	14	92700	975	3000
J 13	.3	75000	0	46	9	1240	1.4	12	90	72100	488	3440
J 14 40M	.4	24300	12	20	12	3200	.0	23	21	122000	2750	6920
J 15 40M	.1	40900	28	28	7	810	.6	11	23	87600	801	2530
J 16 40M	.1	46200	0	31	8	1650	1.2	13	50	99400	737	4610
J 17	.4	43000	1	29	9	1550	.0	11	34	81400	636	2920
J 18 40M	.7	54200	0	37	11	1710	1.4	15	140	93600	780	5380
J 19	.6	41700	2	29	15	2880	.9	20	184	84300	1290	10600
J 20	.4	74300	0	48	9	1680	2.3	15	49	87900	830	6890
J 21	.6	47700	0	33	12	931	.3	18	32	99600	470	4470
J 22	.5	56800	0	37	10	1130	.6	17	20	83100	317	3980
J 23	.9	33200	31	46	16	3650	1.7	23	300	70800	1500	11800
J 24	.5	51600	0	34	10	1360	1.1	20	62	85800	595	4470
J 25	1.2	66000	0	44	23	2360	1.6	29	673	88400	1090	9440
J 26	.7	53700	0	38	15	2310	3.5	37	280	78000	1020	8470
J 27	.7	35600	5	24	12	2510	.7	14	83	55000	913	4900
J 28	.9	92900	0	62	18	1270	2.2	25	421	116000	739	7500
J 29	2.1	53000	51	39	26	2320	2.2	164	594	102000	1980	12500
J 30	2.0	77600	0	52	17	1800	1.3	27	242	104000	853	6820
J 31	.9	102000	0	64	14	619	1.8	16	46	86400	403	2430
J 32	1.1	77800	0	52	13	1420	1.2	22	40	95300	869	4200
J 33	.9	55900	0	38	14	2990	.8	21	39	98700	877	4360
J 34	.9	71100	0	46	16	24800	7.4	27	91	63200	1590	8490
J 35 40M	.7	67900	0	50	11	3170	2.4	32	66	77300	2480	6510
J 36	1.3	60700	0	47	13	13000	2.0	23	59	68000	3810	5070
J 37	.4	71300	0	46	6	916	1.1	18	19	78300	676	5030

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COMPANY: FALCONBRIDGE LTD. MIN-EN LABS ICP REPORT (ACT:GE03B)
PROJECT No: 30301-608-101 70_ _EST 15th ST., NORTH VANCOUVER, B.C. V7M 1T2 FILE No: 4-1197S/P1+2
ATTENTION: K. HUDSON (604)980-5814 OR (604)988-4524 *TYPE SOIL GEOCHEM* DATE: OCTOBER 19, 1984

(REPORT VALUES IN PPM)	MN	MO	NA	NI	P	PB	SB	SR	TH	U	V	ZN
J 1	645	3	77	15	916	36	0	68	0	1	159.6	86
J 2 40M	457	2	98	8	587	33	0	68	1	2	224.4	31
J 3	4860	5	116	12	1300	32	0	176	0	3	115.1	223
J 4	531	2	72	6	676	31	0	77	0	1	210.9	25
J 5	807	1	87	4	1100	22	0	88	0	1	209.0	23
J 6	709	4	85	10	1350	44	0	80	2	1	203.2	49
J 7	210	5	57	3	636	34	0	46	1	2	154.5	18
J 8	321	4	54	4	841	33	0	41	0	0	147.3	36
J 9 40M	632	10	53	6	1160	53	0	46	0	1	93.6	158
J 10	476	5	59	6	749	45	0	48	0	0	127.7	115
J 11	709	7	73	9	910	37	0	63	0	1	80.0	180
J 12	135	1	63	2	704	35	0	55	0	0	135.7	5
J 13	223	5	58	6	840	39	0	65	0	0	114.1	105
J 14 40M	1090	0	91	4	2120	72	0	32	0	1	71.9	104
J 15 40M	263	3	50	6	1870	41	2	37	3	1	108.2	17
J 16 40M	325	3	42	7	785	71	0	46	1	1	172.8	77
J 17	281	3	41	5	859	67	0	43	0	1	165.5	20
J 18 40M	489	4	46	8	684	46	0	52	0	1	138.9	72
J 19	1210	4	50	10	808	63	0	49	0	1	128.2	254
J 20	515	4	51	8	628	137	0	69	3	1	172.6	108
J 21	370	1	62	10	638	28	0	42	0	0	251.0	31
J 22	250	2	64	8	591	25	0	51	0	1	171.1	19
J 23	1680	11	89	10	840	64	0	46	1	1	142.3	316
J 24	615	4	44	7	806	33	0	50	1	1	208.5	48
J 25	905	3	80	16	840	99	0	68	0	1	177.6	362
J 26	1610	4	68	12	951	56	0	57	0	1	126.4	400
J 27	578	2	39	6	551	21	0	39	0	1	122.9	50
J 28	942	8	47	13	993	161	1	81	1	2	180.5	589
J 29	6490	79	28	16	1590	79	0	48	0	3	141.0	148
J 30	1080	2	61	11	726	53	0	77	0	1	235.0	172
J 31	290	3	53	6	1070	19	0	79	0	1	165.7	7
J 32	344	5	76	10	512	29	0	70	0	1	195.8	18
J 33	490	0	102	9	421	27	0	56	0	1	239.2	20
J 34	3260	1	192	13	564	36	1	129	0	3	102.9	61
J 35 40M	1540	2	99	14	561	44	5	61	2	2	171.8	66
J 36	1630	1	109	12	908	31	0	77	0	3	103.7	46
J 37	383	2	71	8	343	38	3	64	2	1	166.0	32

PROJECT No: 30301-608-101 70_ WEST 15th ST., NORTH VANCOUVER, B.C. V7M 1T2 FILE No: 4-1197S/P1+2
ATTENTION: K. HUDSON (604)980-5814 OR (604)988-4524 *TYPE SOIL GEOCHEM* DATE: OCTOBER 19, 1984

(REPORT VALUES IN PPM)	BA	SE	AU-PPB
J 1	57	0	5
J 2 40M	70	0	5
J 3	273	0	4
J 4	65	0	15
J 5	57	0	5
J 6	80	0	2
J 7	61	0	1
J 8	47	0	1
J 9 40M	146	0	24
J 10	108	0	22
J 11	168	0	20
J 12	66	0	3
J 13	55	0	290
J 14 40M	310	0	295
J 15 40M	85	0	16
J 16 40M	51	0	12
J 17	64	0	255
J 18 40M	65	0	56
J 19	178	0	250
J 20	79	0	162
J 21	38	0	1
J 22	34	0	12
J 23	192	0	16
J 24	59	0	43
J 25	70	0	5
J 26	118	0	1
J 27	82	0	3
J 28	76	0	13
J 29	443	0	71
J 30	59	0	42
J 31	35	0	1
J 32	75	0	1
J 33	72	0	2
J 34	346	0	25
J 35 40M	332	0	4
J 36	487	0	2
J 37	115	0	5

(REPORT VALUES IN PPM)		AG	AL	AS	B	BI	CA	CD	CO	CU	FE	K	MG
J38	40M	.6	32000	37	23	13	6820	2.2	25	247	59400	1440	11200
J39		.2	66500	0	43	9	1900	1.5	24	71	83600	712	6030
J40		.4	50400	2	34	11	4970	1.0	22	30	79000	951	6980
J41		.9	67700	0	45	13	1550	1.5	25	21	85200	631	4950
J42		1.2	72800	0	48	18	16100	1.2	26	131	82400	924	7910
J43		1.0	71600	0	47	14	2580	.8	25	53	88100	749	5620
J44		.5	62300	0	43	16	7330	.7	30	43	85800	1100	7520
J45	40M	1.0	55500	0	39	15	4550	1.0	30	40	94600	855	8340
J46		.7	64700	0	42	12	2750	.8	25	38	82100	615	5160
J47		1.1	55900	0	39	14	5550	1.4	26	70	79200	980	6970
J48		1.1	50000	5	36	15	10500	.9	27	70	72100	1180	8840
J49		1.5	73300	0	50	21	13700	1.7	32	472	78600	1420	6780
J50	40M	.5	56900	0	38	11	2020	1.3	24	26	78300	698	5960
J51		1.1	63500	0	41	14	18700	.8	21	32	67300	910	5690
J52	40M	.8	60100	0	43	13	23100	.8	24	33	72100	546	6140
J53	20M	.3	49500	0	32	9	21300	1.0	19	8	49800	553	6830
J54		.9	49600	2	34	16	5200	.4	32	67	87400	963	8590
J55		1.0	53100	3	38	10	3810	1.1	23	65	68000	1930	7100
J56	40M	.5	56900	0	36	10	19900	.8	18	22	46600	1240	7330
J57		.5	35800	28	27	11	4880	.9	20	38	64200	2410	7810
J58		1.2	62000	0	43	14	2240	1.5	27	44	80400	1040	7190
J59		.9	61300	0	41	14	3410	1.0	26	64	76900	1280	7470
J60		2.2	102000	0	65	20	10700	2.1	31	73	98500	482	6530
J61	40M	1.9	54500	0	37	21	11100	.1	26	60	104000	505	7300
J62		1.2	53700	0	37	17	5200	2.2	31	132	75700	2010	10500
J63		1.2	66100	0	45	16	3160	1.8	44	100	86200	1170	7720
J64		1.3	97300	0	63	16	1290	2.9	37	105	82800	832	4870
J65		.9	73900	0	48	14	1720	1.9	35	92	89300	532	3210
J66	40M	.9	66400	0	43	14	1870	1.2	26	103	77100	596	5380
J67	40M	.6	58200	5	38	16	2200	1.6	41	133	77800	836	8310
J68		.3	45500	12	55	12	1430	.9	19	180	51500	582	3380
J69		1.0	46300	11	34	20	2080	1.3	44	394	82200	1070	5880
J70	40M	1.2	50600	2	38	19	5900	1.3	32	199	75400	1220	9860
J71		1.7	78600	0	53	20	2950	2.8	38	251	91000	1060	6350
J72	40M	.8	56200	0	38	17	5190	2.4	30	184	66000	1790	9930
J73		1.3	78900	0	54	23	17200	4.8	33	501	68700	2760	7680
J74	40M	.7	61600	0	41	16	5420	1.4	26	127	69200	1120	7570
J75		1.1	70900	0	45	15	4070	1.6	36	87	67300	581	3350
J76	40M	.8	36200	13	25	17	6310	3.3	30	201	61300	1770	6770
J77	40M	1.3	46800	2	33	22	13900	7.0	39	214	76800	2170	10500
J78	20M	1.1	39400	38	27	18	6500	1.0	31	137	78500	1760	9880
J79		1.2	69300	0	46	19	2920	1.6	32	150	85000	1050	7950
J80		1.5	61300	0	40	16	1680	1.4	21	71	85800	803	4840
J81		1.0	60900	0	40	15	924	1.1	40	66	83600	796	3250
J82		1.0	41600	15	29	19	7300	3.5	28	172	66600	1220	9370
J83	40M	.7	54100	0	39	19	9470	2.2	35	73	70800	2480	9030
J84	20M	.6	40200	16	30	17	6820	2.1	29	115	65300	2720	13800
J85		.7	59000	3	41	15	1510	3.9	40	142	68000	1950	5090
J86		.7	57600	0	38	18	3930	2.5	38	153	69900	1420	5980
J87		1.1	71300	0	46	26	2380	3.4	69	448	80700	1670	10400
J88		.8	52100	0	37	22	8410	3.8	58	327	74900	2400	11700
J89		.7	55000	0	36	16	7130	2.1	42	180	67300	1810	7550
J90		1.2	55300	0	38	17	7680	.5	26	78	81000	911	7160
J91		1.3	50500	29	37	30	6090	2.9	59	696	96800	2210	9350
J92		1.7	60100	0	41	19	5100	1.7	36	163	85800	1240	8540
J93		1.1	51800	18	36	20	2120	1.5	42	337	84100	1320	4960
J94	40M	1.6	67100	9	49	31	1760	2.3	38	844	74500	1600	8680
J95		1.0	74400	0	51	20	5720	2.1	31	331	73200	1570	8650
J96		1.1	58800	0	38	16	3040	1.1	23	120	73300	549	5290
J97		.8	56200	1	38	16	3390	1.3	25	70	69000	927	6710

OMPANY: FALCONBRIDGE LTD. MIN-EN LABS ICP REPORT (ACT:GEO3B) PAGE 2 OF 3
ROJECT No: 30301-608-101 70 ST 15th ST., NORTH VANCOUVER, B.C. V7M 1T2 FILE No: 4-1197S/P3+4
TTENTION: K. HUDSON (604)980-5814 OR (604)988-4524 *TYPE SOIL GEOCHEM* DATE: OCTOBER 19, 1984

REPORT VALUES IN PPM)		MN	MO	NA	NI	P	PB	SB	SR	TH	U	V	ZN
J38	40M	5940	2	78	13	869	72	4	40	2	4	100.1	88
J39		545	2	81	13	377	41	0	62	3	1	169.8	57
J40		1020	2	101	9	760	36	0	53	2	1	158.7	52
J41		1020	2	85	7	1050	29	0	60	0	1	165.3	24
J42		1310	1	76	7	932	19	0	122	0	2	124.4	48
J43		532	1	97	12	503	22	0	67	0	1	184.6	22
J44		5240	1	106	9	1440	30	0	78	0	2	173.0	88
J45	40M	1150	1	104	13	699	23	0	67	0	1	215.6	48
J46		764	1	79	11	847	24	0	62	0	1	168.0	18
J47		1250	1	112	14	860	32	0	63	1	2	164.8	56
J48		1490	1	95	9	735	32	0	73	0	2	145.8	55
J49		1140	3	113	9	1000	33	0	113	0	2	124.6	60
J50	40M	822	2	78	11	676	30	0	54	1	1	164.9	35
J51		785	1	86	8	494	20	0	116	0	2	112.1	19
J52	40M	1780	2	124	9	658	24	1	114	1	2	144.7	34
J53	20M	1010	2	103	6	663	27	0	85	1	1	100.4	31
J54		1090	1	115	15	898	26	0	61	0	1	184.8	44
J55		1230	2	84	10	807	41	0	54	2	1	133.1	62
J56	40M	1180	1	65	8	629	28	0	107	3	2	69.5	39
J57		1620	1	84	7	640	37	0	39	2	1	142.9	47
J58		875	2	83	14	733	31	0	61	2	1	174.6	44
J59		1430	2	92	14	910	35	0	63	1	1	162.0	37
J60		1320	2	86	18	621	26	0	134	0	2	244.2	7
J61	40M	942	0	109	9	493	26	0	70	0	1	312.2	17
J62		1830	1	99	21	985	38	0	62	2	2	154.9	298
J63		2380	5	81	15	1150	38	0	71	2	2	170.7	132
J64		1670	5	53	13	1500	49	5	84	4	2	126.9	99
J65		1250	5	48	9	950	35	3	66	3	1	173.1	60
J66	40M	1090	5	47	12	725	47	5	63	4	2	168.8	78
J67	40M	2610	4	51	14	812	46	3	63	3	2	150.9	182
J68		992	3	49	7	1000	31	0	40	1	0	119.4	87
J69		1770	4	48	11	1010	76	0	52	1	1	136.4	125
J70	40M	1230	2	107	24	1300	38	0	64	1	2	149.1	366
J71		1120	2	86	15	689	35	0	80	0	1	195.2	593
J72	40M	1470	1	81	16	694	34	0	78	0	2	107.2	848
J73		2440	2	105	11	920	46	0	148	0	2	93.2	1170
J74	40M	1570	1	93	15	508	46	0	80	1	1	159.6	147
J75		1980	4	57	9	806	89	2	74	1	2	125.9	475
J76	40M	2610	2	51	7	967	213	0	54	0	2	78.7	931
J77	40M	3960	2	55	10	576	106	0	101	0	3	104.6	1180
J78	20M	2120	5	42	8	1080	45	0	84	1	2	86.2	361
J79		1590	2	57	14	492	66	0	79	0	1	176.3	509
J80		653	3	58	13	1250	40	2	58	2	1	168.0	228
J81		1130	1	53	8	820	37	0	56	0	1	157.4	134
J82		2290	2	71	17	883	58	2	58	1	2	136.5	1010
J83	40M	3890	2	72	15	662	38	0	75	0	2	132.7	283
J84	20M	3310	1	96	19	486	43	1	71	2	2	127.4	216
J85		3480	4	59	15	1140	51	4	55	2	2	106.8	1070
J86		1960	2	58	13	961	42	0	65	1	2	124.0	479
J87		5110	3	61	21	1030	110	1	76	1	3	150.8	1040
J88		3760	2	84	13	919	86	0	95	1	2	133.1	483
J89		2400	2	68	14	804	35	1	98	1	2	141.5	106
J90		799	1	159	15	609	30	0	70	0	1	178.8	62
J91		2950	13	59	20	853	75	4	78	2	2	152.0	632
J92		1300	3	88	19	1130	38	0	72	1	2	181.7	331
J93		1510	9	60	11	1270	45	4	54	2	2	151.4	183
J94	40M	2610	9	49	19	1010	74	10	67	3	2	167.1	292
J95		1480	5	60	20	1920	42	4	83	2	2	141.9	134
J96		818	2	70	11	993	33	1	62	1	1	166.9	69
J97		1020	2	95	16	837	37	1	63	2	1	169.6	45

(REPORT VALUES IN PPM)	BA	SE	AU-PPB
J38 40M	1020	0	1
J39	161	0	1
J40	180	0	2
J41	171	0	1
J42	119	0	1
J43	143	0	1
J44	239	0	3
J45 40M	83	0	1
J46	123	0	2
J47	341	0	4
J48	241	0	3
J49	150	0	2
J50 40M	124	0	2
J51	115	0	3
J52 40M	150	0	1
J53 20M	139	0	3
J54	166	0	3
J55	275	0	7
J56 40M	374	0	2
J57	306	0	47
J58	107	0	4
J59	145	0	5
J60	116	0	2
J61 40M	72	0	17
J62	194	0	6
J63	144	0	8
J64	88	0	30
J65	73	0	22
J66 40M	75	0	4
J67 40M	88	0	6
J68	53	0	4
J69	805	0	31
J70 40M	216	0	2
J71	161	0	17
J72 40M	201	0	1
J73	313	0	1
J74 40M	139	0	2
J75	98	0	1
J76 40M	171	0	8
J77 40M	286	0	2
J78 20M	104	0	6
J79	119	0	78
J80	132	0	7
J81	77	0	3
J82	276	0	1
J83 40M	389	0	2
J84 20M	242	0	1
J85	194	0	3
J86	149	0	1
J87	449	0	2
J88	484	0	4
J89	228	0	1
J90	109	0	2
J91	217	0	63
J92	116	0	1
J93	95	0	2
J94 40M	107	0	29
J95	86	0	1
J96	48	0	1
J97	97	0	1

COMPANY: FALCONBRIDGE LTD. MIN-EN LABS ICP REPORT (ACT:GEO3B) PAGE 1 OF 3

PROJECT No: 30301-608-101 705 WEST 15th ST., NORTH VANCOUVER, B.C. V7M 1T2 FILE No: 4-1197S/P5

ATTENTION: K. HUDSON (604)980-5814 OR (604)988-4524 *TYPE SOIL GEOCHEM* DATE: OCTOBER 19, 1984

(REPORT VALUES IN PPM)	AG	AL	AS	B	BI	CA	CD	CO	CU	FE	K	MG
J98	1.0	61400	0	39	16	10700	1.9	28	124	57500	1210	9560
J99 40M	1.0	53300	0	34	12	2650	.5	16	58	55000	823	6060
J100	1.2	49100	0	33	18	6590	1.9	28	138	63900	1340	12000
J101 40M	2.2	46700	12	31	16	1110	2.4	18	201	66500	509	7950
J102	.9	61500	0	40	15	871	1.2	16	37	78500	441	4310
J103	.8	46700	0	31	11	1650	.4	15	30	60100	797	6220
J104	1.1	60400	0	40	14	1700	1.5	18	33	66100	622	5580

V.C.

PROJECT No: 30301-608-101 70 ST 15th ST., NORTH VANCOUVER, B.C. V7M 1T2 FILE No: 4-1177S/P5
ATTENTION: K. HUDSON (604)980-5814 OR (604)988-4524 *TYPE .L GEOCHEM* DATE: OCTOBER 19, 1984

(REPORT VALUES IN PPM)	MN	MO	NA	NI	P	PB	SB	SR	TH	U	V	ZN
J98	2110	2	70	14	958	34	0	85	1	1	110.0	130
J99 40M	729	0	58	5	600	25	0	58	0	0	87.5	114
J100	1750	1	84	17	580	48	0	69	1	1	127.4	279
J101 40M	1060	3	45	17	461	56	7	46	4	0	169.6	257
J102	273	3	52	10	628	29	2	53	3	0	201.1	25
J103	486	3	61	10	496	33	2	45	2	0	142.3	31
J104	408	2	68	12	664	28	0	55	2	0	136.8	23

COMPANY: FALCONBRIDGE LTD. MIN-EN LABS ICP REPORT (ACT:GEO3B)
PROJECT No: 30301-608-101 7 EST 15th ST., NORTH VANCOUVER, B.C. V7M 1T2 FILE No: 4-1197S/P5
ATTENTION: K. HUDSON (604)980-5814 OR (604)988-4524 *TYPE SOIL GEOCHEM* DATE: OCTOBER 19, 1984

(REPORT VALUES IN PPM)	BA	SE	AU-PPB
J98	149	0	2
J99 40M	75	0	1
J100	150	0	3
J101 40M	37	0	3
J102	34	0	4
J103	50	0	1
J104	42	0	1

APPENDIX 2

Vancouver Petrographics Report

VP

Vancouver Petrographics Ltd.

JAMES VINNELL, Manager
JOHN G. PAYNE, Ph. D. Geologist

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8887 NASH STREET
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Invoice 4827

Report for: T.E. Chandler/K. Hudson,
Falconbridge Limited,
6415 - 64th Street,
Delta, B.C.,
V4K 4E2.

October 11, 1984

Samples: 281, 324, 229, 259b, 262, 266, 250, 135, 316b, 327.

Project 32001-000-100

Summary:

Apart from two samples (259b, 316b) the rocks are volcanic or subvolcanic rocks (dacites) consisting of an intergrowth of plagioclase and quartz; plagioclase phenocrysts occur in several. Sample 262 is a dacite tuff. Mafic minerals are lacking except in 281 and 327 where chlorite is present and has probabaly formed during low greenschist facies regional metamorphism.

Pervasive argillic alteration has affected all of the rocks, some quite intensely. Phenocrysts tend to be more altered than groundmass plagioclase. Sericite and kaolinite, along with pyrite, have formed within the plagioclase. Traces of tourmaline occur in two samples. Sphalerite and chalcopyrite formed after or at the same time as the pyrite in some samples. In the mafic dacites (327, 281) the chalcopyrite and sphlerite are associated with epidote. Pervasive calcite alteration has been superimposed upon the sericite and clay alteration.

Sample 259b consists of an intergrowth of quartz and sericite. It is either a chert or a highly silicified dacite.

Sample 316b is a basaltic tuff which has been thoroughly altered with calcite, chlorite and hematite.

A. L. Littlejohn

A. L. Littlejohn, M.Sc.

135: ALTERED DACITE.

This sample is a medium grained inequigranular volcanic/subvolcanic rock originally consisting of an intergrowth of quartz and plagioclase. Small plagioclase phenocrysts are present. All the plagioclase has been altered to fine kaolinite and sericite (kaolinite slightly dominant). Pyrite and sphalerite are disseminated throughout the rock. The pyrite contains rare inclusions of tetrahedrite(?) which could be Ag-bearing. The sphalerite contains many chalcopyrite inclusions and several galena inclusions which also could be Ag-bearing. No other potential Ag-bearing minerals were seen. A fine network of fractures occurs and limonitic stain has developed in these. Minerals are:

sericite + kaolinite	60%	
quartz	32	
montmorillonite	3	
pyrite	3	(rare tetrahedrite inclusions)
sphalerite	2	(minor chalcopyrite, galena inclusions)
Fe-Ti oxide	minor	
apatite	trace	
molybdenite	trace	

About half of the original plagiclase formed rounded grains about 0.2mm in size which were intergrown with rounded quartz grains 0.1 to 0.3mm in size. Plagioclase phenocrysts are subhedral and up to 1.0mm in size occuring amongst the rounded quartz and plagioclase grains. All the plagioclase has been altered to a mixture of very fine kaolinite and sericite. Kaolinite is dominant but there are many patches where sericite is concentrated. Flakes of sericite up to 0.1mm in length occur in small clusters and aggregates between the quartz grains. The quartz is speckled with extremely fine sericite. In some of the kaolinite-sericite areas there are small patches of a fine brownish clay which is probabaly montmorillonite. This commonly occurs in the altered phenocrysts. Very fine ragged Fe-Ti oxide grains are scattered within the sericite and kaolinite. It often occurs in small clusters and aggregates, some of which are tabular in shape and up to 0.2mm in size. Small prismatic apatite grains up to 0.2mm in length occasionally occur within the altered plagioclase.

Pyrite forms cubic grains 0.05 to 0.3mm in size which are disseminated throughout the rock within the altered plagioclase. Small clusters are common. There is also a thin stringer of cubic pyrite grains cutting through the rock. The pyrites are often fractured and are slightly altered to goethite around their edges and in the fractures. Rarely within the pyrite there are rounded inclusions of a tetrahedrite group mineral about 0.02mm in size. Sphalerite forms irregularly shaped grains 0.2 to 0.5mm in size occuring in the altered plagioclase. It sometimes partly encloses pyrite. All the grains contain fine chalcopyrite inclusions less than 0.01mm in size and some are quite crowded. Rounded galena inclusions up to 0.05mm in size are quite common. A trace of molybdenite is present within an altered plagioclase grain. It forms fine flakes about 0.3mm in length occuring in a cluster.

229: PORPHYRITIC DACITE.

This sample originally consisted of plagioclase phenocrysts set within a fine grained plagioclase groundmass. Quartz grains and small aggregates are also scattered about the groundmass. The phenocrysts have been almost completely altered to sericite and calcite. Extremely fine sericite is disseminated within the groundmass. Pyrite is disseminated throughout the groundmass and is associated with the sericitisation. The carbonate formed after the pyrite. Minerals are:

plagioclase phenocrysts	28	(95% altered to calcite, lesser sericite)
plagioclase groundmass	36	
quartz	17	
sericite	10	(exluding altered phenocrysts)
pyrite	5	
Fe-Ti oxide	1	
calcite	3	(excluding altered phenocrysts)
chlorite	minor	
apatite	minor	
illite (?)	trace	
chalcopyrite	trace	

Plagioclase phenocrysts form euhedral laths 0.4 to 1.2mm in size. Fine sericite occurs in all of them and most contain ragged patches of fine calcite. Many phenocrysts are almost completely replaced by calcite with small amounts of sericite. The calcite patches appear to be superimposed upon the masses of sericite. In some of the smaller phenocrysts with little calcite, alteration is to illite (?) rather than sericite.

Quartz forms rounded to subrounded grains 0.05 to 0.2mm in size which occur in aggregates of a few grains scattered throughout the groundmass. Single grains are also present, intergrown with the groundmass plagioclase, but most of the quartz occurs in the aggregates. The edges of the grains and aggregates are being replaced by fine sericite.

The groundmass of the rock consists of an intergrowth of shapeless plagioclase grains of variable size up to 0.2mm. Extremely fine sericite is disseminated throughout the groundmass. There are also ragged patches up to 1mm in size consisting of fine calcite. In some of these there are small patches of pale chlorite flakes intergrown with the calcite. This tends to occur where calcite is enclosing the pyrite. Also present in these intergrowths are rounded to tabular cloudy apatite grains up to 0.3mm in size. They commonly occur adjacent to the pyrite and appear to be part of the alteration assemblage rather than primary. Ragged grains of Fe-Ti oxide, less than 0.05mm in size, are disseminated throughout the groundmass. They often occur in small clusters and aggregates some of which have a tabular outline and may have been plagioclase grains. The Fe-Ti oxides are also intergrown with some of the calcite patches.

(continued)

229 (cont.)

Pyrite forms rounded grains 0.1 to 0.4mm in size and more irregularly shaped grains up to 1.5mm in size. The larger ones are more common and often occur in small aggregates. They enclose small patches of the altered groundmass and are crowded with fine rounded silicate inclusions. Fe-Ti oxide inclusions are present in some. Chaclopyrite forms angular grains about 0.05mm in size which occur in the altered groundmass around the pyrite grains.

250: ALTERED DACITE.

This sample originally consisted of a medium grained granular integrowth of plagioclase and quartz. The plagioclase has been completely altered to a very fine grained mixture of kaolinite and sericite. Pyrite is scattered throughout the rock within the clays and sometimes is intergrown with quartz. Minerals are:

kaolinite + sericite	65%	(kaolinite dominant)
quartz	30	
pyrite	4	
illite (?)	1	
Fe-Ti oxide	minor	(including trace of rutile)

Quartz forms rounded to irregularly shaped grains 0.05 to 0.2mm in size which are set within an extremely fine grained mixture of kaolinite and sericite. This forms a structureless mass between the quartz grains. There are a few small quartz aggregates and the clays have developed between the grains in these and may partly replace them. Kaolinite is dominant and the sericite tends to occur in small ragged patches within it. There are also places in which another clay has formed. This forms small masses of fine platey grains within the kaolinite and tends to occur around some of the pyrite. There are also a few lath-like aggregates of this material which are probabaly altered plagioclase phenocrysts. Fine ragged Fe-Ti oxide grains less than 0.02mm in size are disseminated about the mass of clay and sericite. Small aggregates are quite common and in some of these there are fine grains of rutile.

Pyrite forms rounded to subcubic grains most of which are 0.05 to 0.5mm in size, averaging about 0.2mm, which are scattered throughout the rock within the kaolinite and sericite. There are also several grains up to 1mm in size and these tend to occur in clusters of a few grains. These are often intergrown with quartz grain up to 0.5mm in size. These quartz grains could be phenocrysts or perhaps patches of silicification associated with the pyrite mineralization. The pyrite grains are full of small rounded silicate inclusions and many are cloudy with extremely fine material.

259b: SERICITIC CHERT (SILICIFIED VOLCANIC ??)

This sample is a fine grained massive rock consisting mainly of quartz with fine sericite disseminated between the grains throughout the rock. A few discontinuous quartz veinlets are present. Pyrite is disseminated throughout the rock and have sometimes weathered out leaving limonite lining small cavities. Small cavities are sometimes lines with quartz and sericite. I supect that this is a thoroughly silicified volcanic rock and the sericite has been derived from feldspars. There are a few small tabular patches of sericite which may have been feldspar grains. Minerals are:

quartz	82%
sericite	16
pyrite	2
Fe-Ti oxide	trace

Quartz forms rounded grains 0.05 to 0.1mm in size. Grain size distribution is uneven. Very fine sericite forms an intergranular film around the quartz grains. In places the sericite forms a network within which the quartz grains are scattered. There are a few small patches without sericite. The sericite sometimes coarsens to thin flakes up to 0.1mm in length which occur in clusters scattered about the rock. Tabular aggregates of fine sericite, up to 1.0mm in size, are sometimes present among the quartz grains. These may be altered feldspar (??). Very fine ragged Fe-Ti oxide grains occur within the sericite.

Quartz also occurs in a few veinlets up to 0.5mm wide. Contacts with the rest of the rock are indistinct in places. In the veinlets the quartz forms subidiomorphic to shapeless grains of variable size up to 0.4mm. Small vugs are sometimes present in the veinlets and also in the sericite-free patches.

Pyrite forms cubic to irregularly shaped grains 0.3 to 1.0mm in size which are scattered throughout the rock amongst the quartz grains. Some of the larger more irregularly shaped grains are intergrown with quartz. There are also smaller rounded pyrite grains. Acicular grains of Fe-Ti oxide up to 0.1mm in length are sometimes present in the larger grains. Small quartz and sericite inclusions are sometimes present. Some pyrite occurs in the quartz veinlets. The pyrite is altering to limonite in places.

262: DACITE TUFF.

This sample is a fine grained volcaniclastic rock consisting of a fine intergrowth of plagioclase, quartz and sericite. There are a few quartz and feldspar (altered) fragments scattered about the fine material. Fine calcite has altered the rock and occurs in thin streaky, indistinct layers. Minerals are:

plagioclase	45	
quartz	14	
sericite	30	
pyrite	3	
calcite	4	
Fe-Ti oxide	minor	
tourmaline	trace	
fragments	4	(mainly plagioclase, minor quartz)

The bulk of the rock consists of a mass of subrounded interlocking plagioclase grains less than 0.05mm in size. Fine quartz is intergrown with the plagioclase and tends to be concentrated in thin streaky patches. There is a slight variation in grain siae of the plagioclase in thin indistinct layers. Extremely fine sericite is disseminated between the plagioclase and quartz grains throughout the rock. Sericite is also concentrated in thin indistinct streaky patches. Fine ragged Fe-Ti oxide grains are scattered about the rock and sometimes occur in small clusters within the sericite concentrations. Rare thin prismatic tourmaline grains up to 0.1mm in length also occur within the sericite. In places the sericite coarsens to muscovite up to 0.6mm in length and tourmaline is often associated with this.

Pyrite forms cubic grains 0.1 to 0.4mm in size which are disseminated throughout the rock. Smaller rounded grains occur and there is a grain about 2mm in size. The larger grains contain small rounded silicate and Fe-Ti oxide inclusions and the very large grain contains a few fine pyrrhotite inclusions. Fine Fe-Ti oxides sometimes cluster around the pyrite. The pyrites are altering to goethite around the edges.

Fragments are mostly laths of plagioclase which may be up to 1mm in size. They tend to be concentrated in narrow layer-like patches. They have been mostly altered to sericite. Quartz fragments are uncommon but there is a cluster of irregularly shaped quartz grains about 0.4mm in size; the large pyrite grain has grown adjacent to this.

Calcite alteration has occured after the pyrite and sericite was formed. It forms very fine grains occuring in thin streaky patches within the mass of plagioclase grains and replacing the patches of sericite, both in the rock and the altered plagioclase fragments. The pyrite grains are often surrounded by calcite. This has probabaly initiated the oxidation of pyrite to goethite and limonitic staining has developed within the surrounding calcite and sericite.

266: ALTERED DACITE.

This is a medium grained massive volcanic/subvolcanic rock originally consisting of an intergrowth of plagioclase and quartz. Pyrite is disseminated throughout the rock and is associated with sericitisation of the plagioclase. Mn-oxides have formed within the altered parts and have stained the rock. They are intergrown with a fine flakey clay which is probabaly illite. Specific identification of the Mn-oxide is best done by X-ray diffraction or by chemical means; the material is probabaly a mixture. It is possible that this material contains Pb and Zn, either as a distinct mineral or absorbed within a Mn-oxide. Traces of sphalerite are present as well, accounting form some Zn. Minerals are:

plagioclase	25%	
quartz	20	
sericite	25	
Mn-oxides	15	(including minor limonite)
clay (illite?)	10	
pyrite	4	
rutile	1	(including minor Fe-Ti oxide)
sphalerite	trace	

Plagioclase forms rounded, and sometimes tabular, grains 0.1 to 0.2mm in size which are intergrown with some quartz of about the same size. Much of the quartz however forms subrounded to grains 0.1 to 0.4mm in size which occur in small aggregates within the mass of plagioclase. The plagioclase has been altered by very fine sericite occuring disseminated within the plagioclase grains and completely replacing them in patches. In places there are lath-like concentrations of sericite which were probably phenocrysts. The edges of the quartz grains are being replaced by sericite. Fine ragged grains of Fe-Ti oxide less than 0.02mm in size are scattered within the sericite. Rutile forms rounded to prismatic grains up to 0.1mm in size which occur in tabular aggregates and clusters about 0.5mm in size within the sericitic parts of the rock.

Pyrite forms rounded to cubic grains 0.1 to 0.6mm in size, averaging about 0.7mm, which occur scattered throughout the rock within the sericitic plagioclase. They contain small rounded silicate and Fe-Ti oxide inclusions. The pyrite is altering to goethite around the edges and in fractures within the grains. Traces of irregularly shaped sphalerite grains less than 0.1mm in size occur near some of the pyrites.

There is a closely spaced network of fine fractures within which the Mn-oxides have formed. Ragged interconnected patches have developed within the sericitic parts of the rock and the sericite has been stained brown with limonite. Massive and fine coloform patches occur. The patches may be 1.5mm in size and often consist of a mixture of clay (illite?) and the Mn-oxide. The clay has probabaly formed from the sericite. In places the clay forms broad flakes 0.3mm in size and may be a muscovite. Tabular patches sometimes occur which may have been plagioclase phenocrysts.

281: DACITE (QUARTZ-DIORITE).

This sample is a massive, medium grained, more or less equigranular, subvolcanic intrusive rock consisting mainly of an intergrowth of plagioclase laths and quartz. Pervasive calcite and sericite alteration has affected the plagioclase. Minor epidote alteration is associated with pyrite which is disseminated throughout the rock. Minerals are:

plagioclase	60%	(altered with calcite, sericite)
quartz	20	
chlorite	8	
calcite	4	
sericite (+ clay)	2	
epidote	3	
pyrite	3	
Fe-Ti oxide	trace	
chalcopyrite	trace	

Plagioclase forms euhedral laths 0.5 to 1.5mm in size, averaging about 1.0mm which are intergrown with shapeless to subrounded quartz grains about 0.5mm in size. The laths are crowded together and the quartz tends to occur between the laths in small patches of a few grains which may partly surround the plagioclase. In places small laths are included within the quartz.

Chlorite forms very fine flakes occuring in aggregates within the quartz patches or between the plagioclase laths. These are mostly less than 0.5mm in size but a few are up to 2mm in size. Rarely there is a suggestion in the tabular shape of the aggregate that these may be altered biotite. Fine ragged grains of Fe-Ti oxide less than 0.05mm in size occur within the chlorite. Tabular aggregates of these up to 0.2mm in size sometimes occur.

Pervasive calcite-sericite alteration has affected the plagioclase grains and they are speckled with these minerals. Ragged patches of fine calcite grains often occur and rarely a small grain is completely replaced. The sericite tends to occur around the calcite and where it is concentrated in small patches within the plagioclase, it is mixed with a fine clay (illite??). Fine sericite and calcite sometimes occur in small diffuse patches at the edges of the quartz grains. Calcite also occurs in small ragged patches within the chlorite aggregates. There is a veinlet of calcite about 0.1mm wide cutting through the rock. Carbonate alteration appears to be later than chlorite-pyrite-epidote mineralization; the veinlet cuts through chlorite patches and epidote aggregates.

Pyrite forms cubic to rounded grains 0.05 to 0.3mm in size which are disseminated throughout the rock between the plagioclase and quartz grains and commonly occur within the chlorite aggregates. Clusters of a few grains are common. They contain fine shapeless silicate inclusions and rare hematite and pyrrhotite inclusions. Epidote is associated with pyrite, commonly forming fine grains which occur in small aggregates within the chlorite, surrounding the pyrite. In places the larger aggregates consist of a mass of subprismatic grains up to 0.1mm in size. Rarely there are pyrite and epidote grains within the plagioclase. Fine shapeless to angular chalcopyrite grains mostly less than 0.05mm in size are somtimes intergrown with the epidote around the pyrite.

316b: ALTERED (CALCITE) BASALTIC TUFF.

This sample consists of a mass of extremely fine plagioclase laths intergrown with chlorite and hematite (after magnetite in places). Calcite veins and patches cut through it and pervasive calcite mineraliztion occurs throughout the plagioclase-chlorite-hematite intergrowth. Scattered throughout the fine grained intergrowth are small volcanic and quartz fragments which are being absorbed by the basaltic material. Excluding the veins minerals are:

plagioclase	45%	
calcite	20	
hematite	15	(minor magnetite)
chlorite	10	
fragments	10	(mainly quartz, minor volcanics)

Plagioclase forms a mass of thin laths about 0.05mm in length intimately intergrown with extremely fine chlorite and hematite occuring between the laths. The chlorite was probabaly formed during the calcite alteration from a glassy(?) material. Most of the hematite forms ragged grains less than 0.02mm in size which in places coalesce into small spherultic patches. Hematite also forms tabular grains 0.05 to 0.1mm in size which have altered from magnetite. The fine hematite may have also formed during the alteration since hematite is intergrown with calcite in the veins. Calcite forms ragged grains less than 0.01mm in size which occur between and within the plagioclase laths throughout the rock. Small diffuse patches, sometimes with hematite or chlorite are present.

Fragments are scattered throughout the rock and consist mainly of rounded quartz grains and aggregates 0.05 to 0.2mm in size. The edges are being replaced by the surrounding material. There are clusters of these grains which appear to be larger fragments which have been pervaded by the basaltic material.

Volcanic fragments are consist of an aggregate of broad plagioclase laths about 0.4mm in size with the basaltic material penetrating between them. Isolated plagioclase grains are more common than the aggregates, one of which is 2mm in size. The plagioclase has been altered by calcite.

Calcite veins are up to several millimeters in width and the wider ones contain pieces of the basaltic tuff which are highly altered with calcite and chlorite. Fine chlorite occurs intergrown with the calcite at the edges of the veins. At the vein contact and also adjacent to the enclosed material there are thin lensoid zones in which the calcite is intergrown with irregularly shaped quartz grains of variable size up to 0.2mm. Fine ragged hematite is intergrown with the calcite in places and is concentrated in narrow zones close to and parallel to the contact.

324: ALTERED DACITE.

This sample originally consisted of a medium grained granular intergrowth of plagioclase and quartz. A few plagioclase and quartz phenocrysts were present. It has been highly altered with the complete replacement of the plagioclase by a mixture of sericite and kaolinite (in about equal proportions). Pyrite is scattered within the mass of sericite and kaolinite and is sometimes intergrown with quartz. Carbonate mineralization occured after the main alteration. Minerals are:

sericite + kaolinite	53%	(after plagioclase)
quartz	35	
pyrite	3	
calcite	8	
rutile (+ Fe-Ti oxide)	1	
tourmaline	minor	
apatite	minor	

Quartz forms subrounded grains 0.1 to 0.3mm in size which are set within a mass of extremely fine sericite and kaolinite. Small aggregates are common and the sericite/kaolinite has formed a fine intergranular film between the grains and may partly replace them as well. There are several aggregates consisting of quartz grains up to 0.6mm in size; these may have been phenocrysts (?) or perhaps patches of silicification associated with pyrite which is sometimes intergrown with the quartz. The quartz in these aggregates is highly strained.

Much of the sericite/kaolinite mixture forms a structureless mass of extremely fine grains which tends to be patchy with small sericite or kaolinite concentrations. In places there are lath-like concentrations of one or the other of these which appear to be pseudomorphs after plagioclase. These are about 0.2mm in size. There are also a few lath-like patches up to 1.5mm in size which are probabaly altered plagioclase phenocrysts. Apatite occurs within the mass of altered plagioclase, forming rounded grains about 0.1mm in size which have been broken up and partly replaced. Very fine ragged Fe-Ti oxide grains are scattered within the mass of sericite and kaolinite, tending to be concentrated in the sericitic patches. Rutile is associated with these and forms rounded grains 0.05 to 0.1mm in size occuring in clusters of several grains. These sometimes occur around pyrite and may be intergrown with it. Within some of the sericite/kaolinite patches there are small patches of tourmaline. This forms very fine acicular grains occuring in radiating spherultic aggregates up to 0.2mm in size.

Pyrite is the only sulphide in the rock and has formed during the alteration. It forms rounded to irregularly shaped grains 0.1 to 0.4mm in size which are scattered within the mass of sericite and kaolinite. Small clusters are common. Larger grains are intergrown with relatively coarse quartz. They are all full of fine rounded silicate inclusions and some are quite crowded with extremely fine dusty material (sericite? clay?). Some of the pyrite in altering to limonite.

(continued)

324 (cont.)

Carbonate has formed after the main alteration. It forms extremely fine grains occuring in small patches scattered within the mass of sericite and clays. It often forms a partial rim around the pyrite and in the pyrite-quartz intergrowths it fills in thin fractures in the pyrite or spaces between pyrite or quartz grains.

327: PORPHYRITIC DACITE.

This sample is a medium to fine grained porphyritic subvolcanic (or volcanic) rock consisting mainly of plagioclase phenocryts in a plagioclase-quartz groundmass. Pervasive alteration has resulted in development of chlorite and epidote in the groundmass and sericite-clay (illite?) in the phenocrysts. Some chlorite has formed from biotite phenocrysts. Sulphides (pyrite, sphalerite, chalcopyrite) are associated with epidote. Minerals are:

plagioclase phenocrysts	35%	(98% altered to sericite-clay)
plagioclase groundmass	30	
chlorite	15	
quartz	10	
epidote	10	
limonite	minor	(after magnetite)
Fe-Ti oxide	minor	
sphalerite	minor	
pyrite	minor	
chalcopyrite	trace	

Plagioclase phenocrysts form euhedral laths 0.5 to 1.5mm in size, averaging about 1.0mm. They are almost completely altered to a mass of fine sericite mixed with a clay which could be illite (?); sericite is dominant. The phenocrysts are crowded within a groundmass consisting of a mass of fine plagioclase laths up to 0.1mm in length which are intimately intergrown with very fine chlorite. The chlorite tends to be concentrated in indistinct patches up to 0.5mm in size. Incipient sericite alteration occurs throughout the groundmass and there are also ragged Fe-Ti oxide grains less than 0.05mm in size disseminated throughout the groundmass and the phenocrysts.

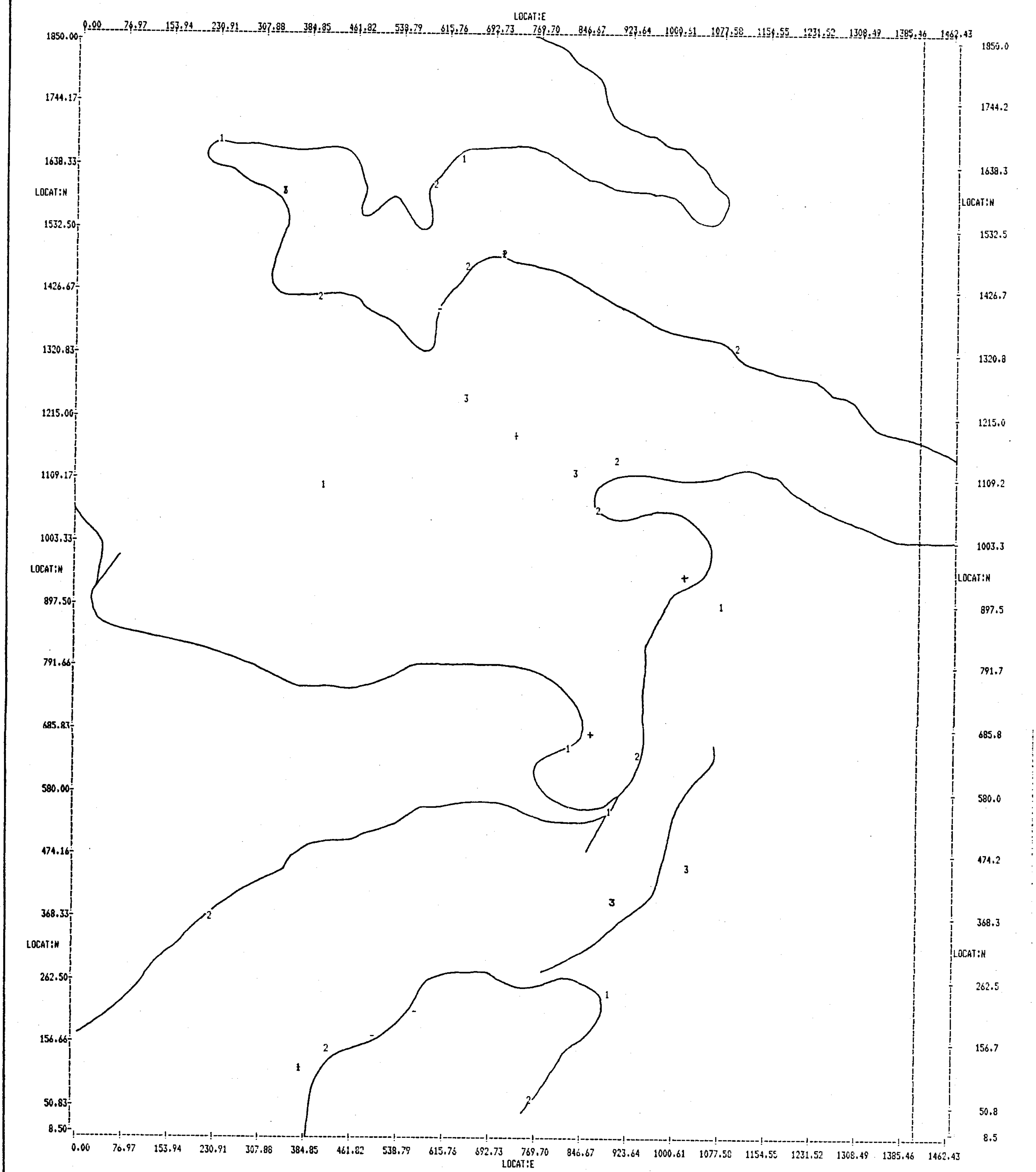
Quartz forms rounded to subrounded grains 0.05 to 0.3mm in size which are scattered throughout the groundmass. They sometimes occur in small clusters and aggregates and these are often intergrown with chlorite. About 15% of the chlorite forms broad plates up to 1.5mm in size which are probably altered biotite; quartz is usually associated with these. Associated with the chlorite plates are subcubic masses of fine limonite, about 0.4mm inm size, which appear to be altered magnetite which was partly intergrown with the biotite. A few of these altered magnetites are scattered within the plagioclase groundmass.

Epidote forms very fine grains occuring in diffuse patches 0.1 to 0.5mm in size replacing the plagioclase-chlorite groundmass. The patches tend to occur adjacent to plagioclase phenocrysts. There is also a somewhat sinuous veinlet about 0.4mm wide cutting through the rock. The epidote is associated with sulphides which occur in the veinlet and the patches, and also elsewhere in the rock. The dominant sulphides are sphalerite and pyrite. The pyrite has formed first, often being surrounded by the sphalerite.

(continued)

327 (cont.)

Most of the pyrite forms subcubic grains less than 0.05mm in size scattered throughout the rock. There are shapeless aggregates up to 0.5mm in size occuring in altered plagioclase phenocrysts and in the epidote veinlet. In the veinlet the pyrite is surrounded by sphalerite. Much of the sphalerite forms irregularly shaped grains up to 0.5mm in size occuring in the epidote patches. The sphalerite is usually intergrown with small amounts of chalcopyrite. Chalcopyrite also forms shapeless to angular grains up to 0.2mm in size scattered throughout the groundmass. These sometimes have a thin partial rim of sphalerite.



SYMBOL MAP FOR:	PB		
STRIP 1 OF 1			
LOWER BOUND	UPPER BOUND	SYMBOL	FREQUENCY
BELOW	0.000	-	4
0.000	10.000	1	10
10.000	20.000	2	11
20.000	50.000	3	6
ABOVE	50.000	+	4

VALUES THAT FALL ON A CLASS BOUND ARE ASSIGNED TO THE LOWER CLASS

PLOT ERROR FOR EACH PLOT CHARACTER :
WIDTH = 0.061 INCHES OR 7.70 COORDINATE UNITS
HEIGHT = 0.083 INCHES OR 10.58 COORDINATE UNITS
SCALE: 1: 5000. IF COORDINATE UNITS ARE METERS

N

FALCONBRIDGE LIMITED

PROPERTY: JASPER CLAIMS

LOCATION: VICTORIA M.D.

TYPE OF MAP: Lithogeochemistry - Pb in ppm

WORKING PLACE:

BASED ON: K.H., D.O.

DATE OF WORK: AUG.84

MAP REF. NO.: 92C/15E

FIG. NO.: 12

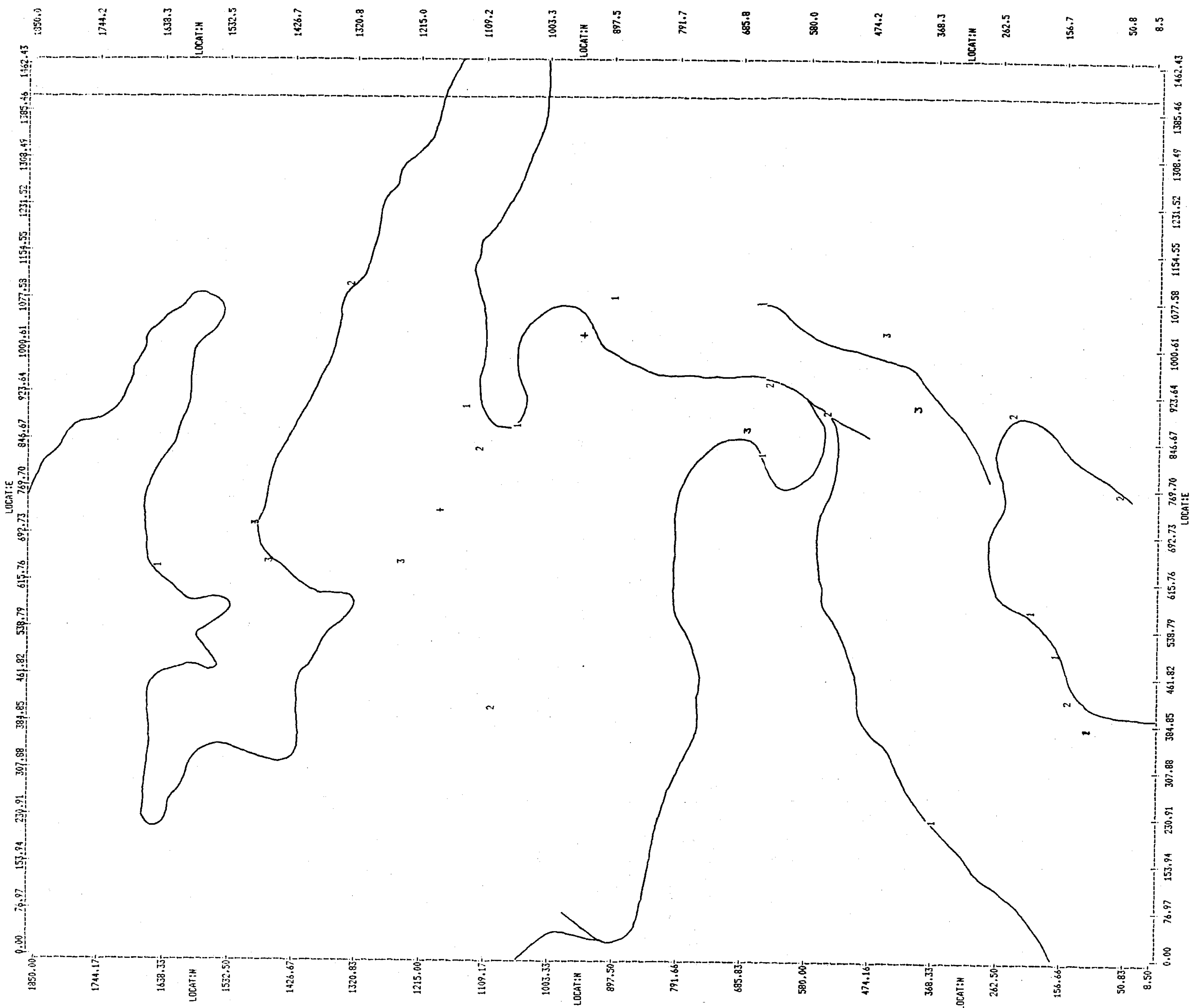
DRAWN BY:

DATE:

N.T.S. NO.:

GEOLOGICAL BRANCH
ASSESSMENT REPORT

13,916



SYMBOL MAP FOR: HG

STRIP 1 OF 1

LOWER BOUND	UPPER BOUND	SYMBOL	FREQUENCY
BELOW	0.000	-	0
0.000	100.000	1	10
100.000	300.000	2	9
300.000	1000.000	3	6
ABOVE	1000.000	+	3

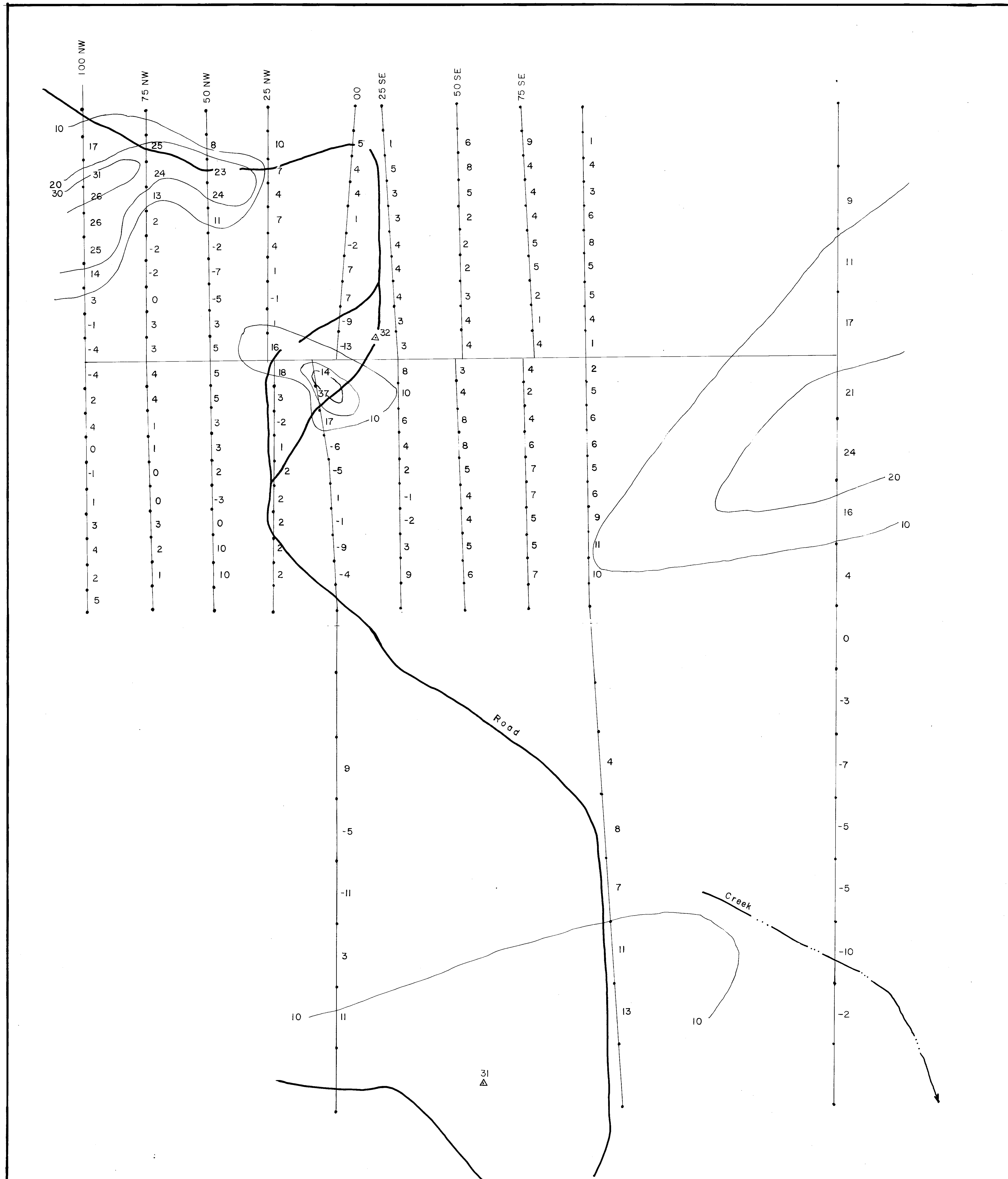
VALUES THAT FALL ON A CLASS BOUND ARE ASSIGNED TO THE LOWER CLASS

PLOT ERROR FOR EACH PLOT CHARACTER :
WIDTH = 0.061 INCHES OR 7.70 COORDINATE UNITS
HEIGHT = 0.093 INCHES OR 10.58 COORDINATE UNITS
SCALE:
1: 5000. IF COORDINATE UNITS ARE METERS

GEOLOGICAL BRANCH
ASSESSMENT REPORT

13,916

FALCONBRIDGE LIMITED		
PROPERTY: JASPER CLAIMS		
LOCATION: VICTORIA M.D.		
TYPE OF MAP: Lithogeochemistry - Hg in ppm		
WORKING PLACE:		
BASED ON: K.H., D.O.		
DATE OF WORK: AUG. 84	MAP REF. NO.: 92C/15E	FIG. NO.: 14
DRAWN BY:		
DATE:	N.T.S. NO.:	



LEGEND:

Contour Intervals in 10's.

GEOLOGICAL BRANCH
ASSESSMENT REPORT

13,916

SCALE: 1: 1000

FALCONBRIDGE NICKEL MINES LIMITED

PROPERTY: Jasper Claim 101

LOCATION: Victoria M.D.

TYPE OF MAP: VLF Frazer Filter

WORKING PLACE:

BASED ON:

DATE OF WORK:

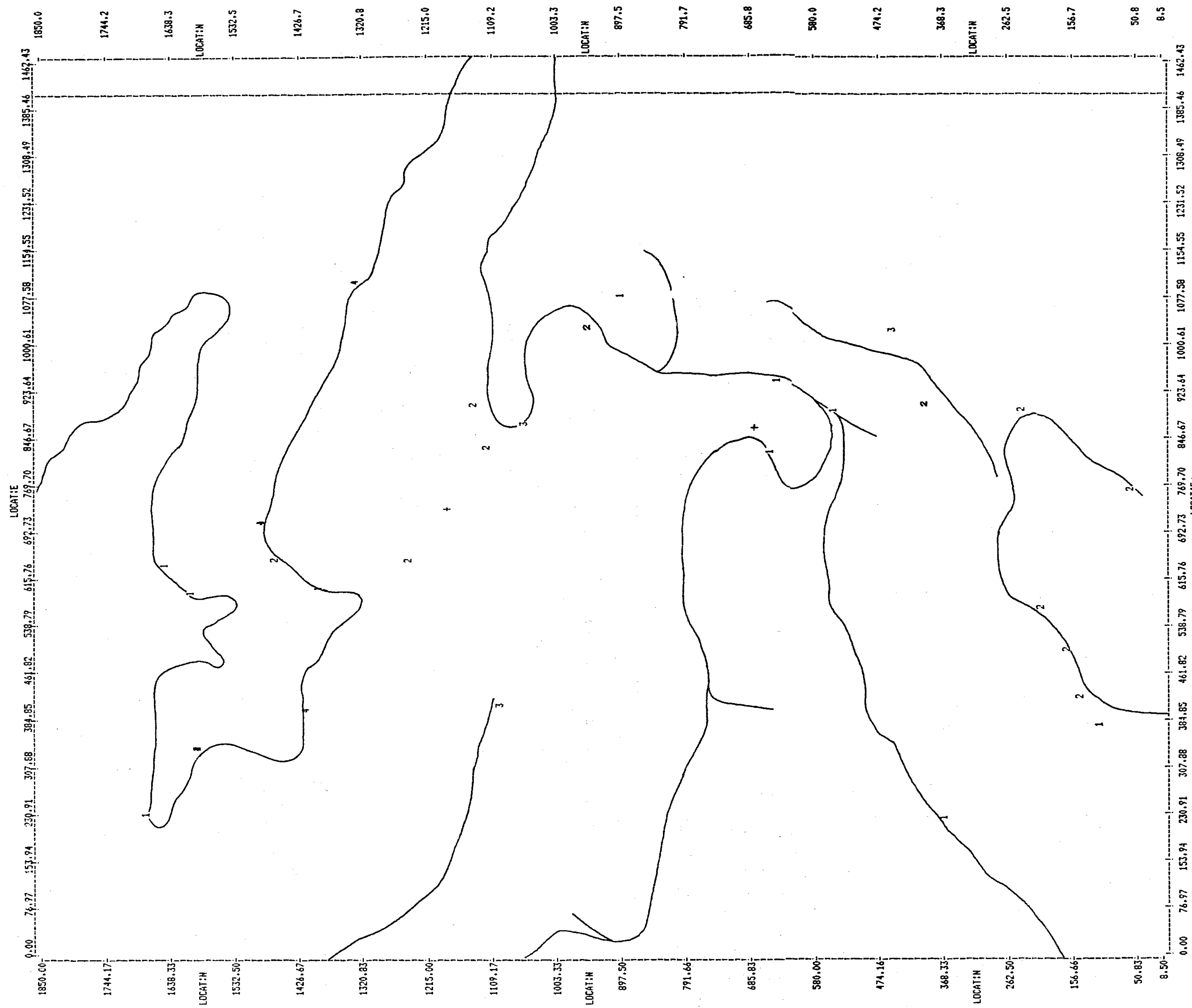
MAP REF. NO.:

FIG. NO.: 15

DRAWN BY: I.T.

DATE: Nov. 84

N.T.S. NO.: 92C/15E



SYMBOL MAP FOR:	ZN		
STRIP 1 OF 1			
LOWER BOUND	UPPER BOUND	SYMBOL	FREQUENCY
BELOW	0.000	-	0
0.000	100.000	1	12
100.000	200.000	2	12
200.000	300.000	3	3
300.000	1000.000	4	5
ABOVE	1000.000	+	3

VALUES THAT FALL ON A CLASS BOUND ARE ASSIGNED TO THE LOWER CLASS

PLOT ERROR FOR EACH PLOT CHARACTER :
WIDTH = 0.061 INCHES OR 7.70 COORDINATE UNITS
HEIGHT = 0.093 INCHES OR 10.58 COORDINATE UNITS
SCALE:
1: 5000. IF COORDINATE UNITS ARE METERS

GEOLOGICAL BRANCH
ASSESSMENT REPORT

13,916

FALCONBRIDGE LIMITED

PROPERTY: JASPER CLAIMS

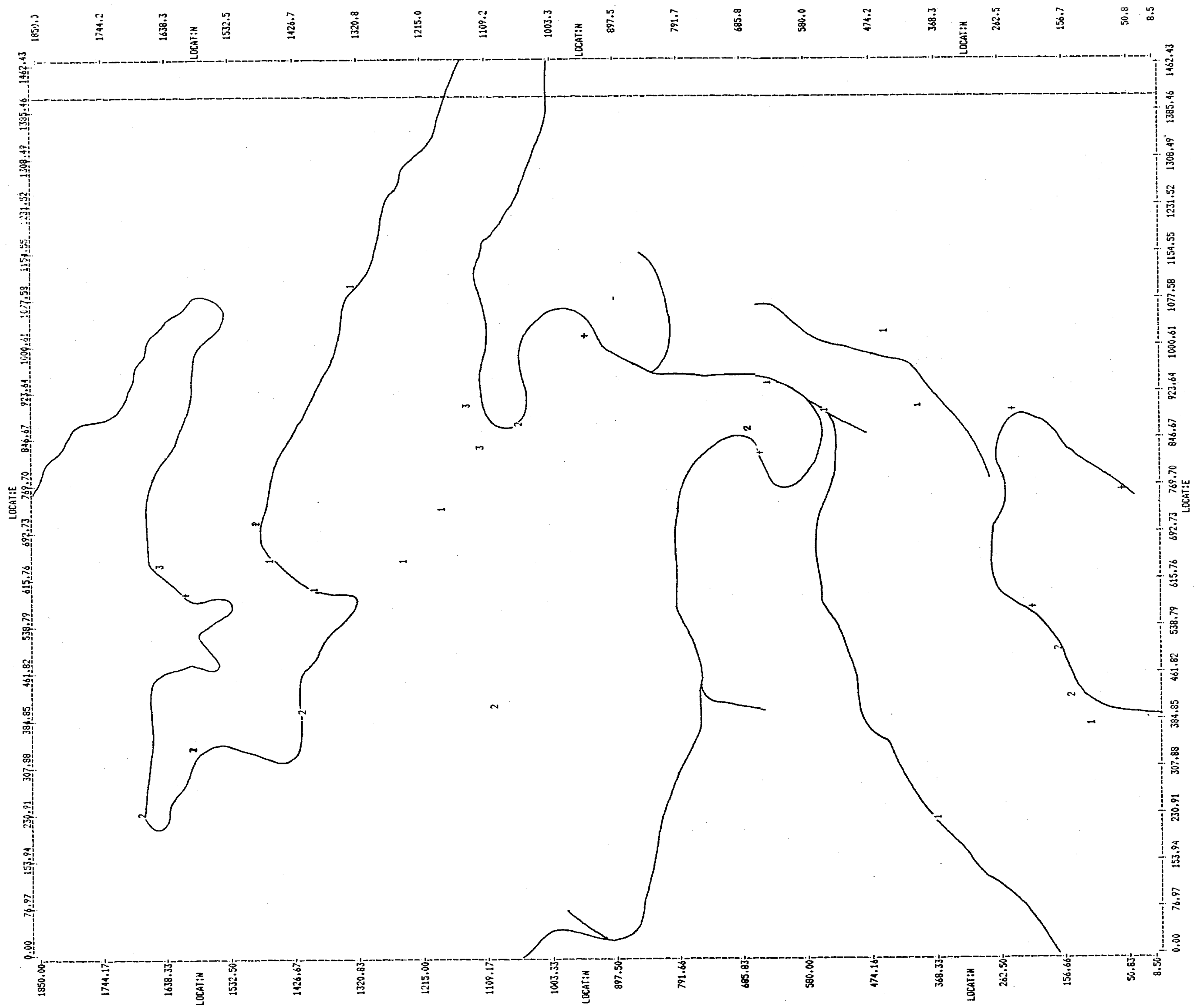
LOCATION: VICTORIA M.D.

TYPE OF MAP: Lithogeochemistry - Zn in ppm

WORKING PLACE:

BASED ON: K.H. D.O.

DATE OF WORK: AUG. 84	MAP REF. NO.: 92C/15E	FIG. NO.: 10
DRAWN BY:		
DATE:	N.T.S. NO.:	



SYMBOL MAP FOR: CU

STRIP 1 OF 1

LOWER BOUND	UPPER BOUND	SYMBOL	FREQUENCY
BELOW	0.000	-	1
0.000	50.000	1	13
50.000	100.000	2	10
100.000	150.000	3	4
ABOVE	150.000	+	7

VALUES THAT FALL ON A CLASS BOUND ARE ASSIGNED TO THE LOWER CLASS

PLOT ERROR FOR EACH PLOT CHARACTER :
WIDTH = 0.061 INCHES OR 7.70 COORDINATE UNITS
HEIGHT = 0.083 INCHES OR 10.58 COORDINATE UNITS
SCALE:
1: 5000. IF COORDINATE UNITS ARE METERS

GEOLOGICAL BRANCH ASSESSMENT REPORT

13,916

FALCONBRIDGE LIMITED

PROPERTY: JASPER CLAIMS

LOCATION: VICTORIA M.D.

TYPE OF MAP: Lithogeochemistry - Cu in ppm

WORKING PLACE:

BASED ON: K.H., D.C.

DATE OF WORK: AUG. 84

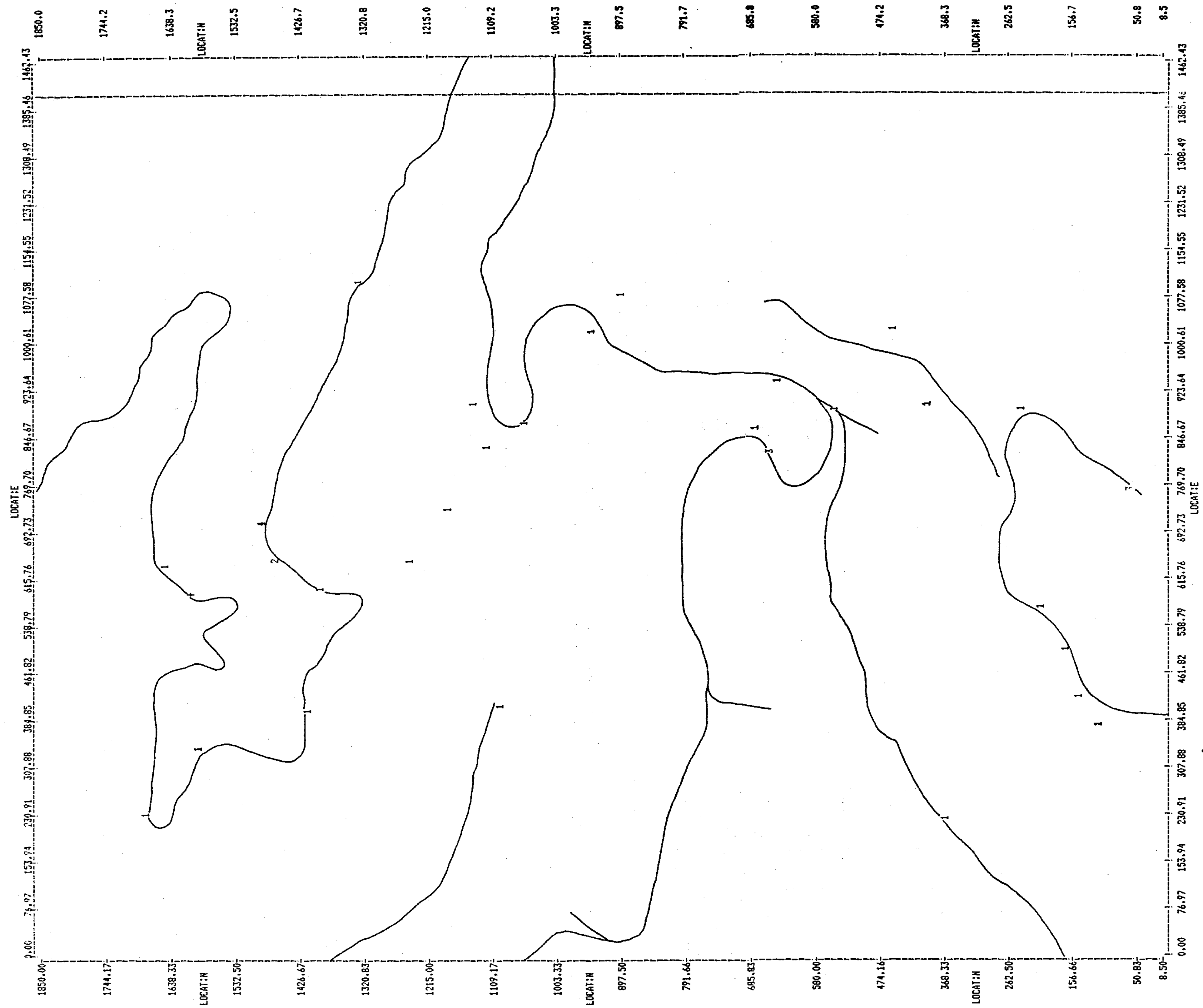
MAP REF. NO.: 92C/15E

FIG. NO.: 11

DRAWN BY:

DATE:

N.T.S. NO.:



SYMBOL MAP FOR: AU

STRIP 1 OF 1

LOWER BOUND	UPPER BOUND	SYMBOL	FREQUENCY
BELOW	0.000	-	0
0.000	25.000	1	30
25.000	50.000	2	1
50.000	75.000	3	2
75.000	100.000	4	1
ABOVE	100.000	+	1

VALUES THAT FALL ON A CLASS BOUND ARE ASSIGNED TO THE LOWER CLASS

PLOT ERROR FOR EACH PLOT CHARACTER :
WIDTH = 0.061 INCHES OR 7.70 COORDINATE UNITS
HEIGHT = 0.083 INCHES OR 10.58 COORDINATE UNITS
SCALE:
1: 5000. IF COORDINATE UNITS ARE METERS

FALCONBRIDGE LIMITED

PROPERTY: JASPER CLAIMS

LOCATION: VICTORIA M.D.

TYPE OF MAP: Lithogeochemistry - Au in ppb

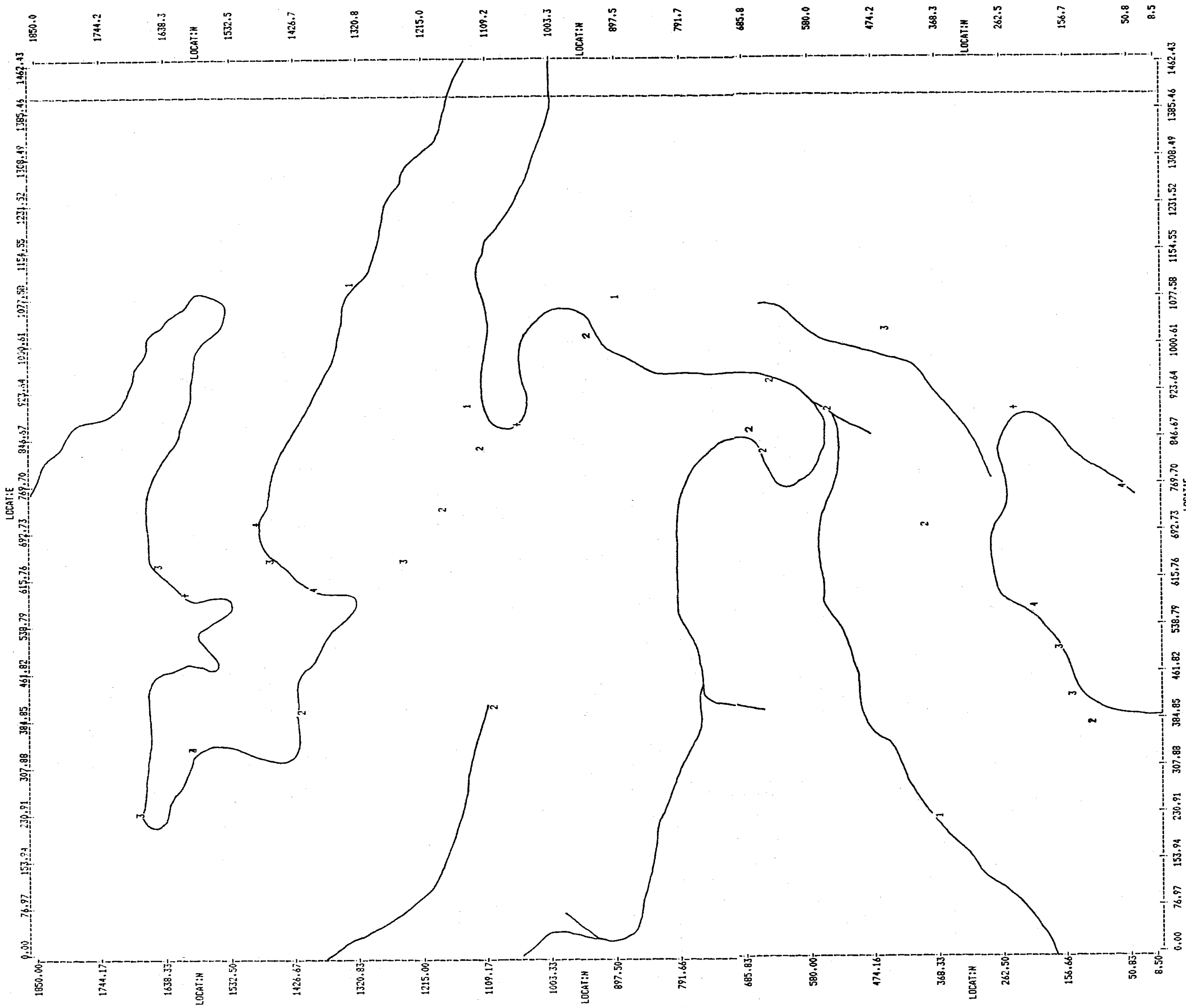
WORKING PLACE:

BASED ON: K.H., D.O.

DATE OF WORK: AUG. 84 | MAP REF. NO.: 92C/15E | FIG. NO.: 13

DRAWN BY:

DATE: | N.T.S. NO.:



SYMBOL MAP FOR: AG

STRIP 1 OF 1

LOWER BOUND	UPPER BOUND	SYMBOL	FREQUENCY
BELOW	0.000	-	0
0.000	0.500	1	6
0.500	1.000	2	12
1.000	1.500	3	8
1.500	2.000	4	5
2.000	2.500	5	0
ABOVE	2.500	+	4

VALUES THAT FALL ON A CLASS BOUND ARE ASSIGNED TO THE LOWER CLASS

PLOT ERROR FOR EACH PLOT CHARACTER :
WIDTH = 0.061 INCHES OR 7.70 COORDINATE UNITS
HEIGHT = 0.083 INCHES OR 10.58 COORDINATE UNITS
SCALE:
1: 5000. IF COORDINATE UNITS ARE METERS

FALCONBRIDGE LIMITED

PROPERTY: JASPER CLAIMS

LOCATION: VICTORIA M.D.

TYPE OF MAP: Lithogeochemistry - Ag in ppm

WORKING PLACE:

BASED ON: K.H, D.O.

DATE OF WORK: AUG. 84

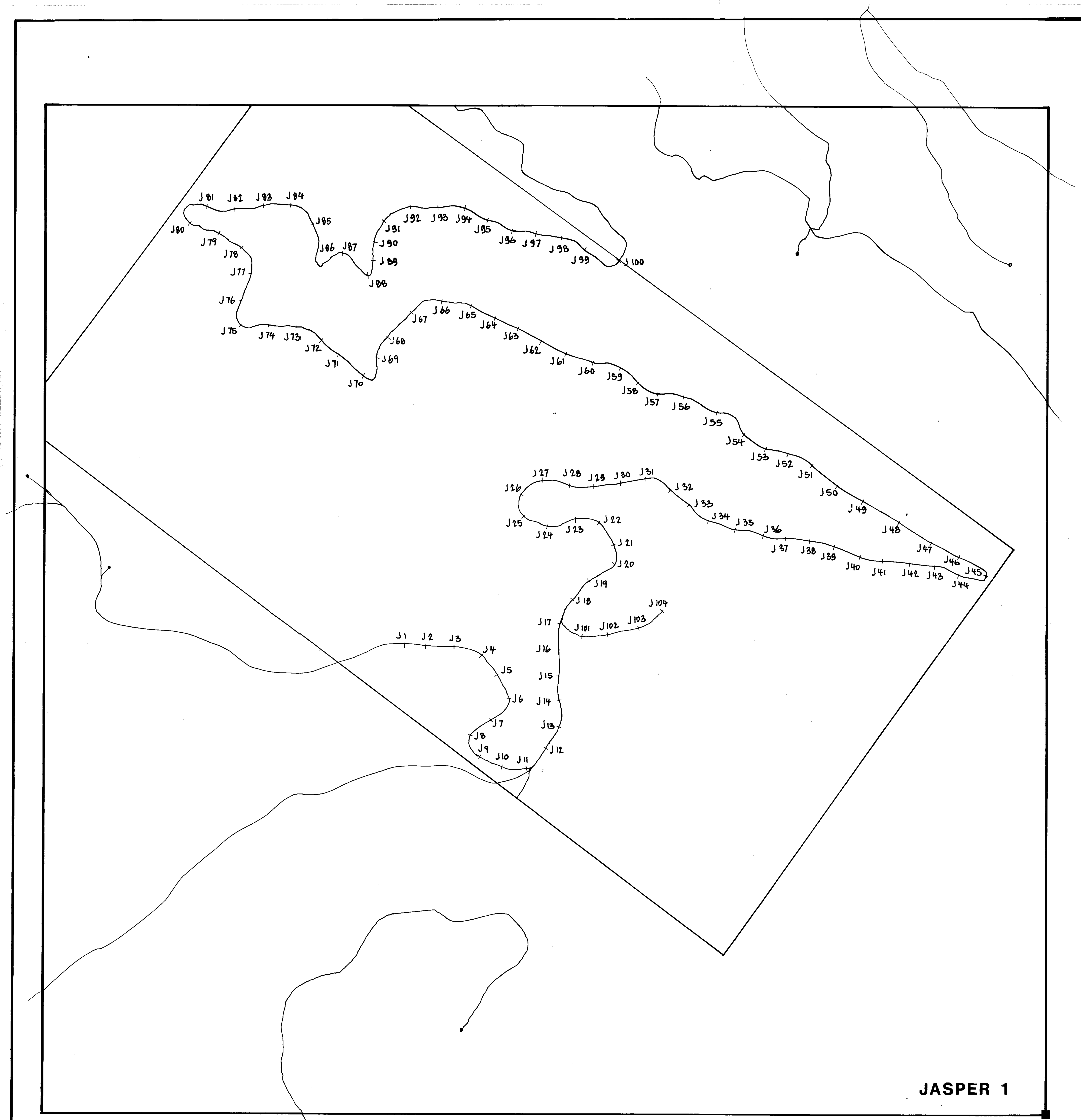
DRAWN BY:

DATE:

MAP REF. NO.: 92C/15E

N.T.S. NO.:

FIG. NO.: 9



GEOLOGICAL BRANCH ASSESSMENT REPORT

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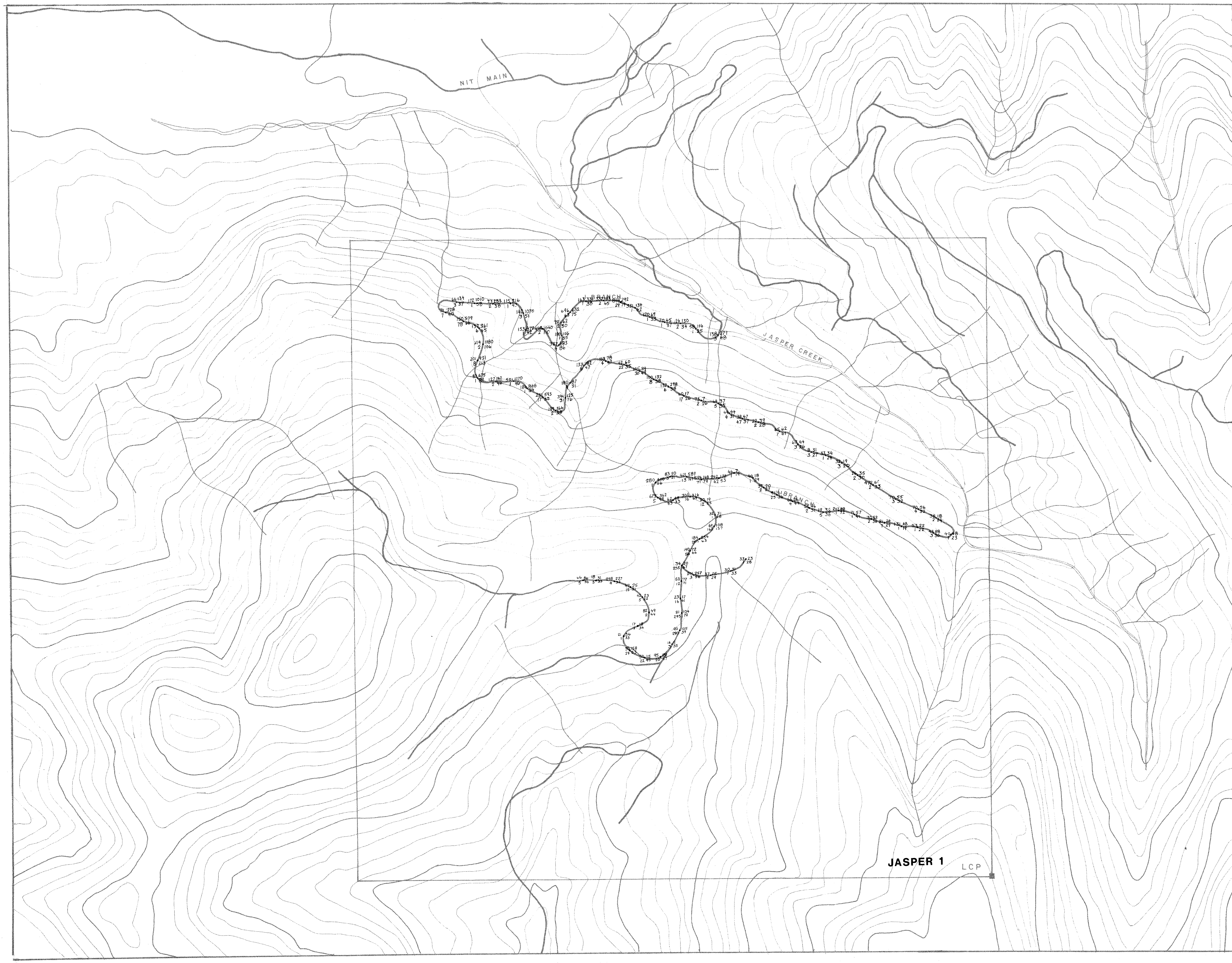
100 0 100 200 300m

SCALE: 1 : 5 000

FALCONBRIDGE LIMITED		
PROPERTY: Jasper Claims		
LOCATION: Victoria M.D.		
TYPE OF MAP: Soil sample locations		
WORKING PLACE:		
BASED ON:		
DATE OF WORK:	MAP REF. NO.: 92C/15E	FIG. NO.: 7
DRAWN BY: I.T.		
DATE: Nov. 84	N.T.S. NO.:	



LEGEND

Anomaly Threshold Levels

Cu - 100 ppm

Zn - 100 ppm

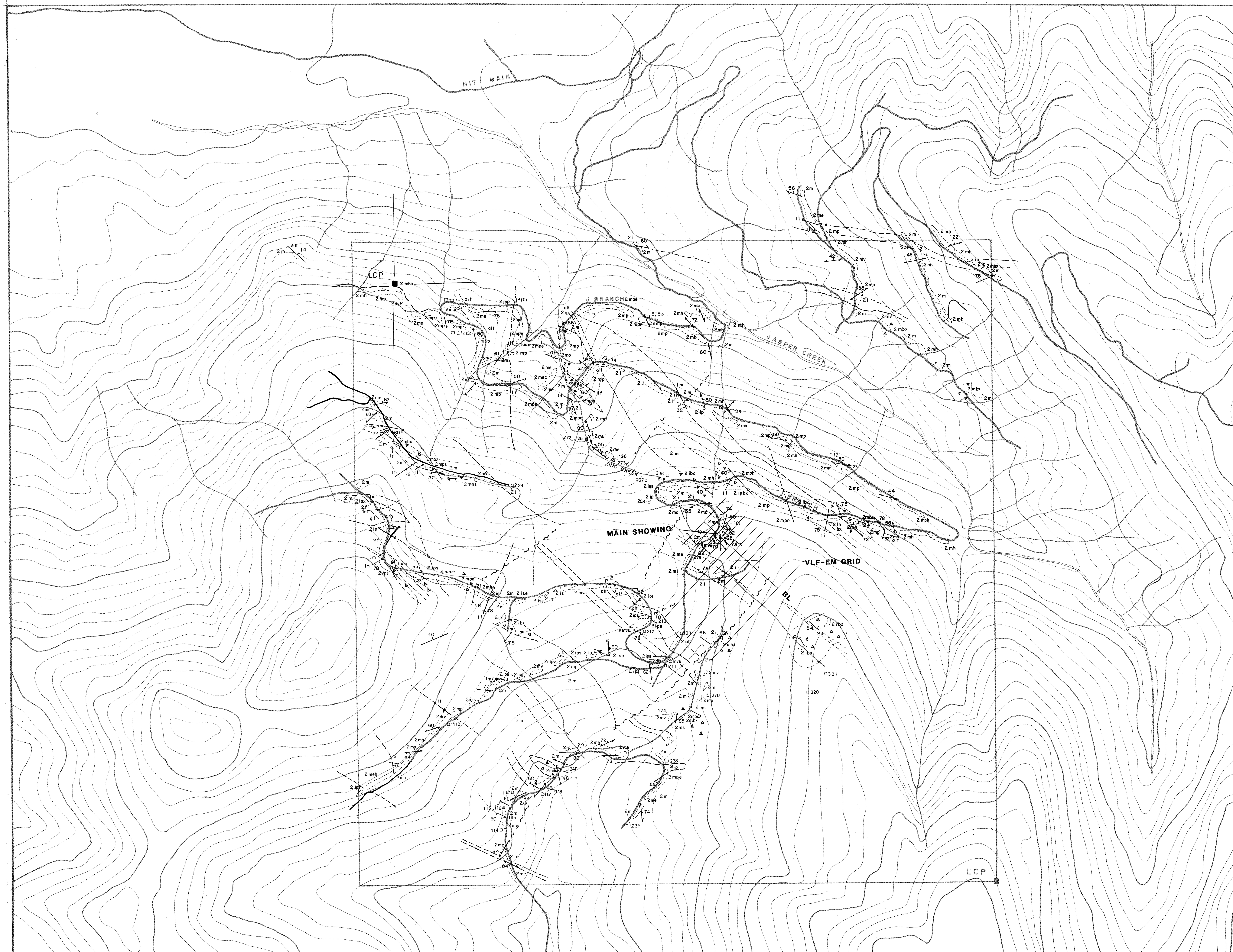
Pb - 60 ppm

Au - 50 ppb

100 0 100 200 300

SCALE: 1: 5000

FALCONBRIDGE LIMITED	
PROPERTY: Jasper Claim	
LOCATION: Victoria, M.D.	
TYPE OF MAP: SOIL GEOCHEMISTRY Cu, Zn, Pb in ppm Au in ppb	Cu . Zn Au Pb
WORKING PLACE:	
BASED ON:	
DATE OF WORK:	MAP REF. NO.: 92C/15E
DRAWN BY: Ines Tomecek	FIG. NO.: 8
DATE: OCTOBER, 1984	N.T.S. NO.: 92 C/15



LEGEND

UNITS

- mafic tuffs and flows (2m)
- mafic alloclastic breccia (2mbx)
- intermediate tuffs and flows (2i)
- intermediate alloclastic breccia (2ibx)
- felsic volcanic flow (2f)
- bedded tuff (2t)
- hematized lahar (3l)
- hematized mudstone (3h)
- felsic intrusive dyke (1f)
- mafic intrusive dyke (1m)
- massive to semi-massive chalcopyrite, pyrite and sphalerite
- argillically altered and bleached zones

SYMBOLS

- hematized
- brecciated
- fault
- shear
- fracture
- bedding
- approx. contact
- approx. dyke trace
- 17 □ rock sample location

p - porphyritic
c - chloritized
e - epidotized
v - vesicular
bx- brecciated
s - silica enriched
h - hematized

GEOLOGICAL BRANCH
ASSESSMENT REPORT

13,916

100 0 100 200 300

SCALE: 1: 5000

FALCONBRIDGE LIMITED

PROPERTY: Jasper Claim PN 100

LOCATION: Victoria, M.D.

TYPE OF MAP: GEOLOGY MAP

WORKING PLACE: Vancouver Island B.C.

BASED ON: FIELDWORK BY K.HUDSON

DATE OF WORK: AUG. 84	MAP REF. NO.:	FIG. NO.: 3
DRAWN BY: Ines Tomecek		
DATE: OCTOBER, 1984	N.T.S. NO.: 92 C/15	

JASPER CLAIMS - FALCONBRIDGE LIMITED
VLF-EM 16 UNFILTERED DATA
STATION USED : SEATTLE
READINGS TAKEN FACING NW

LINE NO	STATION	INPHASE READING
100 NW	100 S	-26
	90 S	-25
	80 S	-26
	70 S	-27
	60 S	-28
	50 S	-28
	40 S	-28
	30 S	-27
	20 S	-29
	10 S	-30
	BL	-28
	10 N	-27
	20 N	-27
	30 N	-27
	40 N	-30
	50 N	-38
	70 N	-44
	90 N	-58
	100 N	-58
075 NW	100 S	-28
	90 S	-29
	80 S	-29
	70 S	-29
	60 S	-31
	50 S	-30
	40 S	-30
	30 S	-31
	20 S	-30
	10 S	-32
	BL	-33
	10 N	-33
	20 N	-35
	30 N	-34
	40 N	-34
	50 N	-33
	60 N	-33
	70 N	-36
	80 N	-43
	90 N	-50
	100 N	-54
050 NW	100 S	-26
	90 S	-27
	80 S	-29
	70 S	-34
	60 S	-32

VLF-EM unfiltered.

050 NW	50 S	-31
	40 S	-32
	30 S	-33
	20 S	-33
	10 S	-35
	BL	-36
	10 N	-37
	20 N	-39
	30 N	-37
	40 N	-34
	50 N	-33
	60 N	-36
	70 N	-42
	80 N	-51
	90 N	-50
	100 N	-51
025 NW	100 S	-26
	90 S	-26
	80 S	-27
	70 S	-27
	60 S	-28
	50 S	-28
	40 S	-29
	30 S	-29
	20 S	-29
	10 S	-27
	BL	-34
	10 N	-40
	20 N	-37
	30 N	-38
	40 N	-38
	50 N	-38
	60 N	-42
	70 N	-41
	80 N	-43
	90 N	-47
	100 N	-47
000 NW	300 S	-8
	275 S	-8
	250 S	-12
	225 S	-15
	200 S	-8
	175 S	-10
	150 S	-10
	125 S	-15
	100 S	-26
	90 S	-30
	80 S	-28
	70 S	-24
	60 S	-25
	50 S	-26
	40 S	-24

000 NW	30 S	-22
	20 S	-22
	10 S	-41
	BL	-40
	10 N	-37
	20 N	-31
	30 N	-37
	40 N	-38
	50 N	-37
	60 N	-36
	70 N	-38
	80 N	-39
	90 N	-39
	100 N	-43
025 SE	100 S	-18
	90 S	-19
	80 S	-23
	70 S	-23
	60 S	-22
	50 S	-22
	40 S	-22
	30 S	-24
	20 S	-24
	10 S	-28
	BL	-30
	10 N	-30
	20 N	-31
	30 N	-32
	40 N	-33
	50 N	-34
	60 N	-35
	70 N	-35
	80 N	-37
	90 N	-38
	100 N	-35
050 NE	100 S	-15
	90 S	-16
	80 S	-18
	70 S	-19
	60 S	-21
	50 S	-21
	40 S	-22
	30 S	-24
	20 S	-27
	10 S	-27
	BL	-28
	10 N	-29
	20 N	-30
	30 N	-31
	40 N	-31
	50 N	-32
	60 N	-32

050 NE	70 N	-33
	80 N	-36
	90 N	-37
	100 N	-38
075 SE	100 S	-11
	90 S	-13
	80 S	-15
	70 S	-16
	60 S	-17
	50 S	-19
	40 S	-21
	30 S	-33
	20 S	-24
	10 S	-23
	BL	-25
	10 N	-26
	20 N	-26
	30 N	-26
	40 N	-28
	50 N	-29
	60 N	-30
	70 N	-31
	80 N	-32
	90 N	-33
	100 N	-34
100 SE	300 S	+10
	275 S	+10
	250 S	+5
	225 S	+2
	200 S	+2
	175 S	-2
	150 S	-2
	125 S	-2
	100 S	-6
	90 S	-6
	80 S	-10
	70 S	-12
	60 S	-15
	50 S	-16
	40 S	-17
	30 S	-19
	20 S	-20
	10 S	-22
	BL	-22
	10 N	-22
	20 N	-23
	30 N	-25
	40 N	-25
	50 N	-28
	60 N	-30
	70 N	-29
	80 N	-32

100 SE		
	90 N	-31
	100 N	-31
150 SE	250 S	-2
	225 S	+2
	200 S	+2
	175 S	+3
	150 S	+6
	125 S	+6
	100 S	+6
	075 S	+6
	050 S	+2
	025 S	-6
	BL	-10
	025 N	-15
	050 N	-18
	100 N	-24