

## 1981 Geological Assessment Report

TITLE Steamboat Mountain Property  
CLAIMS Clum 1-5  
COMMODITY Pb, Zn  
LOCATION: five kilometres southwest of Brisco in  
southeastern British Columbia  
Latitude 50°48'N Longitude 116°20'W  
Golden Mining Division 82K/16W  
BY C.J. Hodgson  
FOR AMAX of Canada Limited  
WORK PERIOD October 2 - November , 1981

AMAX VANCOUVER OFFICE

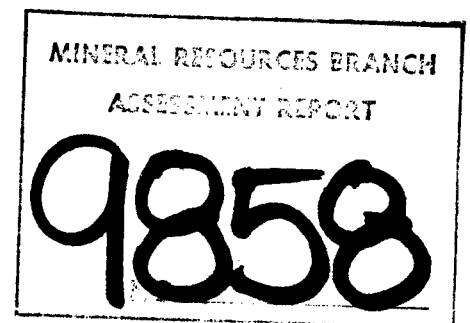


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SUMMARY

This report describes results of geological mapping conducted on the Steamboat Mountain property between October 2 and November 4, 1981. The property consists of Clum 1-5 claims (94 units) owned by AMAX of Canada Limited and located five kilometres southwest of Brisco in southeastern British Columbia. Access is by secondary road from Brisco.

The property is underlain along its western margin by Proterozoic carbonates and shallow water clastics of the Mount Nelson and Toby Formations and the Horsethief Creek Group, and in the central and eastern parts by predominantly carbonate strata of the Upper Cambrian to Lower Silurian Jubilee, McKay, Mount Wilson and Beaverfoot Formations. Proterozoic and Paleozoic strata are separated by the Mount Forster-Steamboat fault of regional extent. Paleozoic strata occur in a major syncline whose axial trace coincides with the north-northwest trending ridgecrest of Steamboat Mountain.

Mineral occurrences on the property consist of chalcopryrite at the southwest corner of Clum 4 (the former Jersey prospect); malachite and azurite in dolomitic McKay limestone on Clum 4 and disseminated galena in Beaverfoot dolomite on the boundary of Clum 3 and 4 claims.

A field cost of \$4,210.77 is to be applied as one year's assessment on each of Clum 1 and 2 claims.

## INTRODUCTION

This report describes geological mapping and prospecting on Clum 1-5 claims. The work was conducted intermittently between October 2 and November 4, 1981 by C.J. Hodgson, B.E. Goad, S.G. Enns and J. Candy.

### Location, Access and Topography (Figure 1)

The claims are located on and north of the summit of Steamboat Mountain, some five kilometres southwest of Brisco in southeastern British Columbia. Access is easily afforded to lower elevations on the property by means of numerous secondary roads from highway 95 at Brisco.

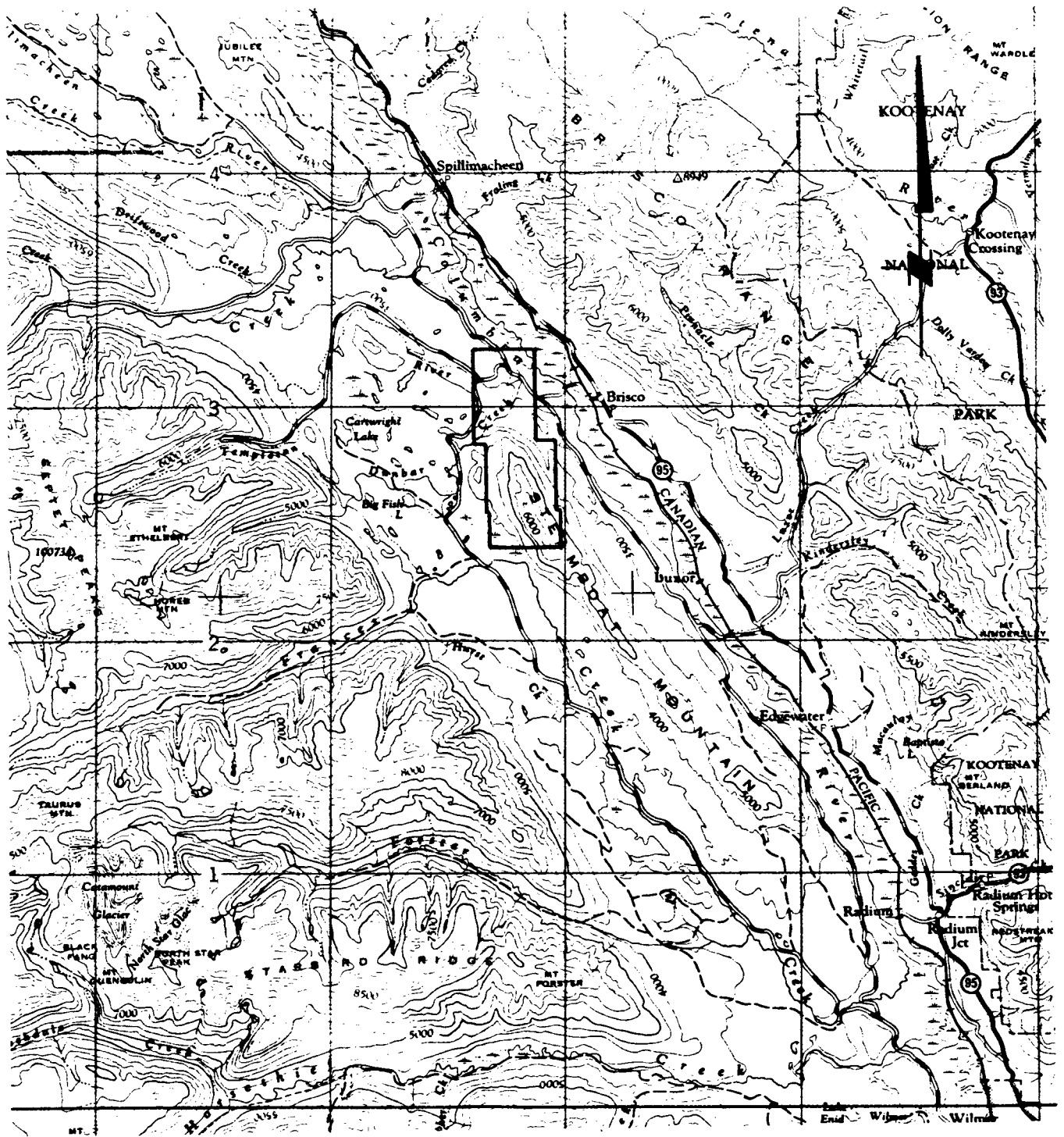
Elevation on the claims ranges from 760 metres (2,500 feet) at the north end to 1,900 metres (6,150 feet) at the summit of Steamboat Mountain.

### Claims Data (Figure 2)

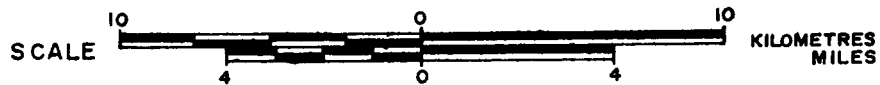
The property consists of Clum 1-5 claims totalling 94 units, wholly owned by AMAX of Canada Limited. Pertinent claims data is as follows:

<u>Claim</u>	<u>Unit</u>	<u>Record No.</u>	<u>Loc. Date</u>	<u>Record Date</u>	<u>Expiry Date</u>
Clum 1	20	873	Dec. 8/80	Dec. 16/80	*Dec. 16/82
2	20	874	Dec. 8/80	Dec. 16/80	*Dec. 16/82
3	18	933	Aug. 13-14/81	Sept. 11/81	Sept. 11/82
4	18	934	Aug. 13-14/81	Sept. 11/81	Sept. 11/82
5	18	971	Oct. 2/81	Oct. 20/81	Oct. 20/82

\* After approval and application of the assessment work described in this report.



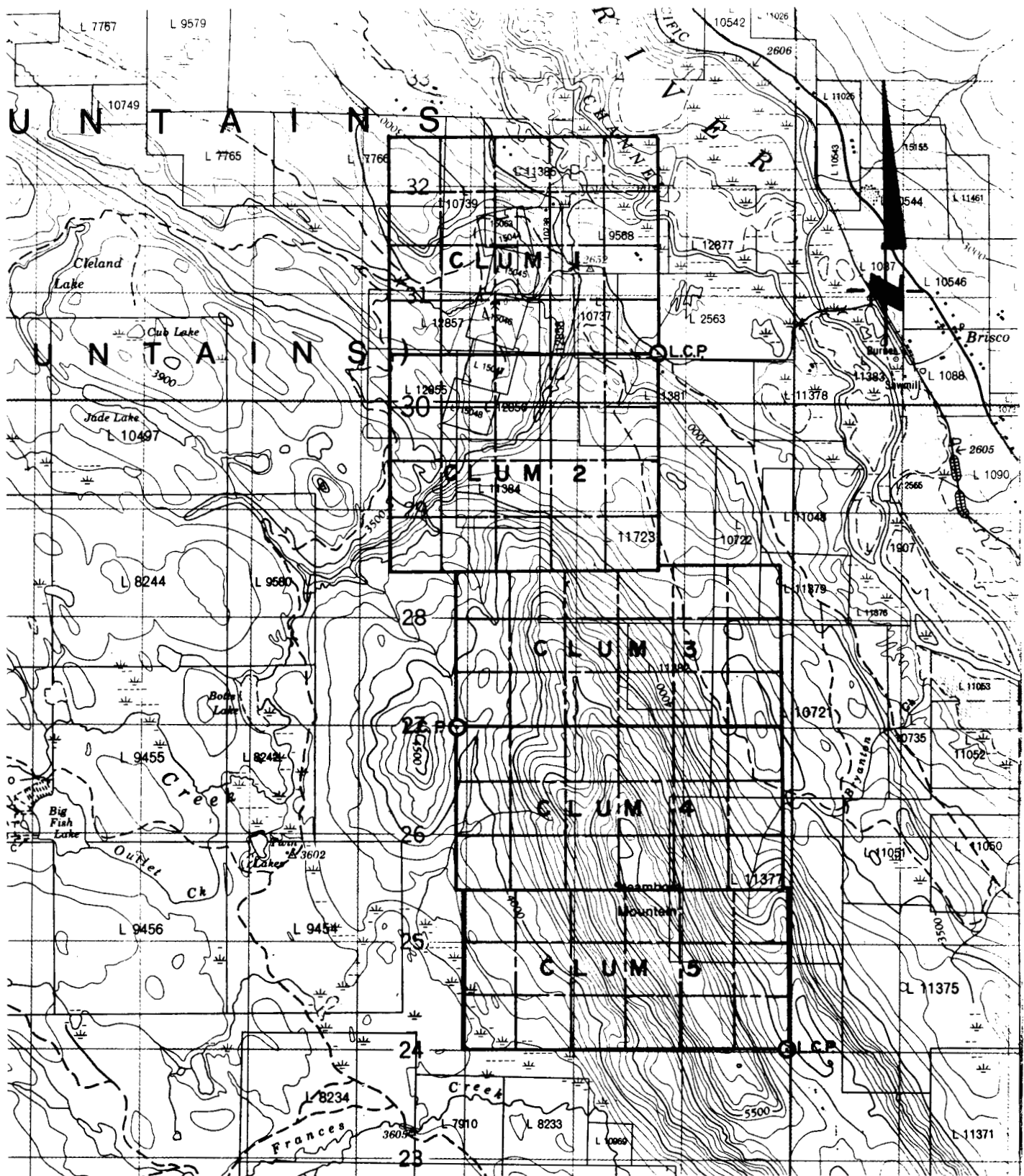
AMAX OF CANADA LIMITED  
**STEAMBOAT MOUNTAIN PROPERTY**  
**CLUM CLAIMS**  
 GOLDEN MINING DIVISION - BRITISH COLUMBIA  
**LOCATION MAP**



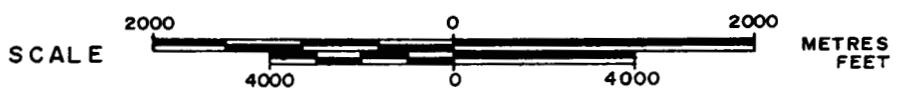
1 : 250,000

N.T.S. Ref. 82 K 16

FIG. 1



AMAX OF CANADA LIMITED  
**STEAMBOAT MOUNTAIN PROPERTY**  
**CLUM CLAIMS**  
 GOLDEN MINING DIVISION - BRITISH COLUMBIA  
**CLAIM MAP**



1 : 50,000

N.T.S Ref. B2 K 16  
**FIG 2**

## REGIONAL GEOLOGY

The claims lie immediately west of the Rocky Mountain Trench, a major, long active zone of structural weakness which, in general, separates unmetamorphosed Paleozoic carbonates and shales in the Rocky Mountains to the east from variably metamorphosed Proterozoic dolomites and clastic strata in the Purcell Mountains to the west (Reesor, G.S.C. Mem. 369). On a more local scale, however, the actual boundary between Paleozoic and Precambrian strata in the vicinity of the claims is not the Rocky Mountain Trench fault but the Mount Forster-Steamboat fault, a north trending fault of regional extent which appears to be a splay from the former.

Precambrian strata west of the property consist of dolomite and slate of the Purcell (Helikian) age Mount Nelson Formation and overlying conglomerate and shales of the Windermere (Hadrynian) age Toby Formation and Horsethief Creek Group.

Paleozoic strata in the region range from Lower Cambrian to Upper Devonian in age. These strata comprise quartzite and grits of the Lower Cambrian Cranbrook Formation; well bedded dolomites of the Upper Cambrian Jubilee Formation; argillaceous limestone and black shale of the Cambro-Ordovician McKay Formation; a thin quartzite marker in the Ordovician (Mount Wilson Quartzite); massive dolomite of the Ordovician and Lower Silurian Beaverfoot Formation; quartz sandstone, limestone and shale of the Mid-Devonian Cedared, Harrogate and Mount Forster Formations respectively; and limestone of the Upper Devonian Starbird Formation. Devonian strata are not widespread, occurring as minor erosional remnants at the core of synclines.

With the exception of minor hiatuses below and above the Mount Wilson Quartzite, sedimentation is believed to have

been continuous between Lower Cambrian (Cranbrook Formation) and Lower Silurian (Beaverfoot Formation). This stratigraphic section is some 2,200 metres thick at Steamboat Mountain, and considerably thicker (possibly twice as thick, although the base is not exposed) in the adjacent Brisco Range of the Rocky Mountains. The section has a minimum thickness of about 300 metres on Law Creek near Windermere Lake, some 30 kilometres south of Steamboat Mountain and thickens rapidly to the north, south and east of Law Creek. To account for this variation in thickness, Reesor (G.S.C. Mem. 369) has proposed the existence of an early to middle Paleozoic high (but not an emergent landmass) in the Windermere Lake area which he terms the "Windermere High".

A major regional Sub-Devonian unconformity separates Beaverfoot dolomite from overlying Middle Devonian strata. The interval between Lower Silurian and Middle Devonian is not represented in the stratigraphic column in southern British Columbia; this was a period of uplift and erosion or non-deposition.



## PROPERTY GEOLOGY

### Rock Types

The northerly trending Mount Forster-Steamboat fault separates Paleozoic strata in the central and eastern parts of the property from Proterozoic strata to the west (Figure 3).

Proterozoic strata strike generally northwesterly and dip gently to moderately to the northeast and southwest.

Mt. Nelson dolomites, the oldest rocks on the property, are massive, weakly rusty weathering, ferroan dolomites.

Quartzite, conglomerate and purple spotted slate (with abundant, distinctive, one centimeter diameter, bleached spots) were separated on Figure 3 as the Toby Formation, but may well be a part of the Mt. Nelson since gradational contacts were noted in places.

Horsethief Creek Group strata comprise distinctive white chert pebble conglomerate, interbedded shale-slate and minor limestone.

Paleozoic strata form a prominent syncline, termed the Purcell Boundary syncline by Reesor, whose axial trace is along the north-northwest trending Steamboat Mountain ridge-crest. North of Dunbar Creek the syncline is truncated by the Mount Forster-Steamboat fault so that only part of eastern fold limb is preserved.

Jubilee Formation of Upper Cambrian age is present on the east side of the claim block and in the southwest corner of Clum 5. It consists of well-bedded grey dolomite thinly bedded in the lower half, thickly bedded in the upper

half. Total thickness is estimated at 700-1,000 metres.

McKay Formation underlies much of the central part of the claims. Interbedded limestone and limy argillite produce a distinctive weathering pattern of alternating resistant and recessive bands. Total thickness is about 600 metres.

Mt. Wilson Quartzite outcrops in the central and northern part of the claims as a thin, 1-20 metre marker horizon, but pinches out towards the south end of Clum 5 claim. It consists of clean vitreous orthoquartzite. It is massive weathering with little obvious internal structure.

Beaverfoot dolomite occupies the core of the syncline on Steamboat Mountain and extends to the north end of the claims. It is a massive, largely structureless, cliff-forming grey dolomite in which local bands of chert nodules provide the best measure of bedding attitude. A stratigraphic thickness of up to 400 metres of the formation is preserved.

Three types of breccia occur in minor amounts in the Beaverfoot Formation: 1) angular grey dolomite clasts (1-3 centimetres, 20%) in a grey dolomite matrix forms perhaps 10-20 percent of outcrop in the vicinity of the "Detail Grid Area" (Figure 3); 2) angular dark grey argillaceous dolomite fragments in cream coloured sparry dolomite matrix outcrops intermittently over a stratigraphic thickness of 50-100 metres above the Mount Wilson Quartzite in the southeastern part of Clum 4 claim; 3) a 1.5 metre wide band containing dark grey chert fragments in a grey dolomitic matrix was noted at the southern contact of the Beaverfoot Formation on Steamboat Mountain.

## Structure

The Purcell Boundary syncline on Steamboat Mountain is the most prominent structural feature on the property. At the south end of the claims the fold is upright with open limbs whereas further north it becomes tighter and overturned to the west as the Mount Forster-Steamboat fault is approached. Overturning may possibly be a result of overthrusting of Precambrian strata from the west along this fault.

Faults on the property consist of several relatively old northerly and northwesterly trending faults and one relatively young northeasterly trending cross fault. Belonging to the first category are the Mount Forster-Steamboat fault, the Rocky Mountain Trench fault, a north-south fault with which the Brisco barite deposit is associated and two minor unnamed faults on Steamboat Mountain.

The Mount Forster-Steamboat fault dips steeply west to vertical (Reesor) and displays vertical (west side up) and right lateral horizontal movements of several thousand metres each. It postdates the Purcell Boundary syncline, but predates the early to mid-Cretaceous Horsethief Creek batholith which outcrops 25 kilometres southwest of the claims.

The Rocky Mountain Trench fault is nowhere seen but is implied by contrasting structural and stratigraphic relations on either side of the Trench. It presumably dips westward (Reesor) as it brings rocks as old as Horsethief Creek Group opposite rocks as young as Beaverfoot Formation. Strike slip movement was possibly in the order of several kilometres at most, and probably took place over an extended geologic time span.

A northerly trending fault on Clum 1 and 2 is

associated with the Brisco barite deposit. Angular fragments of white barite float in a matrix of dark grey graphitic barite material over a width of 10-30 metres. The shear zone, traceable on surface for a distance of 800 metres, lies parallel to and 300 metres east of the Mount Forster-Steamboat fault. Prominent slickensides inclined at  $17^{\circ}$  to the south were noted in the area of the main mine workings.

Of the two faults on Steamboat Mountain, one northwesterly trending fault produces an 800 metre right lateral offset in Mount Wilson Quartzite on Clum 4 claim. The second fault is inferred on the basis of a prominent air photo lineament to extend parallel to and immediately east of the summit of the ridge.

A northeasterly cross fault on Clum 3 produces a 300 metre offset on Mount Wilson Quartzite and on Mount Forster-Steamboat fault.

#### Mineral Occurrences

Mineral occurrences on the property consist of chalcopyrite at the southwest corner of Clum 4 (the former Jersey prospect); malachite and azurite in dolomitic McKay limestone on Clum 4; and disseminated galena in Beaverfoot dolomite on the boundary of Clum 3 and 4 claims.

The former Jersey prospect consists of chalcopyrite on fractures in Mount Nelson dolomite exposed over a distance of 50 metres in an old trench. It was drilled previously by Cominco in the mid-1960's. A grab of the well mineralized material (81MCT 106) ran 1.03% Cu, 0.2 ppm Ag, 54 ppm Zn, 12 ppm Pb.

Minor malachite and azurite occur in dolomitic McKay limestone immediately beneath Mount Milson quartzite on Clum 4.

These minerals occur in a five centimetre wide vertical fracture traced over 1-2 metres. A grab sample of this material (81MET 135) ran .03% Cu, 7.5 ppm Ag, 0.41% Zn, 0.11% Pb.

Minor disseminated galena occurs sporadically in Beaverfoot dolomite and dolomite breccia in the "Detail Grid" area on Clum 4. Fifteen rock chip samples ranged up to 0.4% Pb, with negligible Zn.

CJ Hodges

APPENDIX I

STATEMENT OF COSTS

Appendix I - Statement of Costs

Summary and Period of Work

Geological Survey - October 2-5, 1981  
October 31 - November 4, 1981

Personnel Employed

C.J. Hodgson-601 - 535 Thurlow Street, Vancouver, B.C. Staff Geologist; 4 days @ 220.00/day	\$880.00
S.G. Enns-601 - 535 Thurlow Street, Vancouver, B.C. Staff Geologist; 3 days @ 158.40/day	475.20
B.E. Goad-601 - 535 Thurlow Street, Vancouver, B.C. Staff Geologist; 3 days @ 123.36	370.08
J.R. Candy-2426 Lawson Avenue, Vancouver, B.C. Prospector; 8 days @ 72.98	583.84

Transportation

Okanagan Helicopters - October 3, 1981 (set out on Steamboat Mountain)	611.65
Four-wheel drive vehicle 9 days @ \$40.00	360.00

Accommodation

18 man-days @ \$35.00/day	630.00
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Report Writing and Preparation

	<u>300.00</u>
	\$4,210.77
	=====

Application

One year each Clum 1, 2

*C.J.H.*

APPENDIX II

STATEMENT OF QUALIFICATIONS



STATEMENT OF QUALIFICATIONS

NAME S.G. Enns

ADDRESS 601-535 Thurlow Street  
Vancouver, B.C.

EDUCATION 4 year BSc (Honours Geology) 1967  
University of Manitoba  
MSc (Ec. Geology) 1971  
University of Manitoba

EXPERIENCE Geol. Assistant Manitoba Mines Branch 1964(field season)  
Geol. Assistant Sherritt Gordon Mines 1965 "  
Geol. Assistant AMAX Exploration 1966-1970 "  
Staff Geologist Cerro Mining of Can. 1971  
Staff Geologist Hudson's Bay Oil & Gas 1972  
Staff Geologist BP Minerals of Canada 1973-1975  
Staff Geologist BP Alaska Exploration 1975-1979  
Staff Geologist AMAX of Canada 1979-

STATEMENT OF QUALIFICATIONS

NAME	B.E. Goad
EDUCATION	BSc(Hon) - 1976 - Geology University of Western Ontario, London, Ontario
EXPERIENCE	Geologist - Centre for Precambrian Studies University of Manitoba 1976-1979  Geologist - Dupont of Canada Ltd. - 1979  Geologist - AMAX of Canada Limited 1980 - Present

STATEMENT OF QUALIFICATIONS

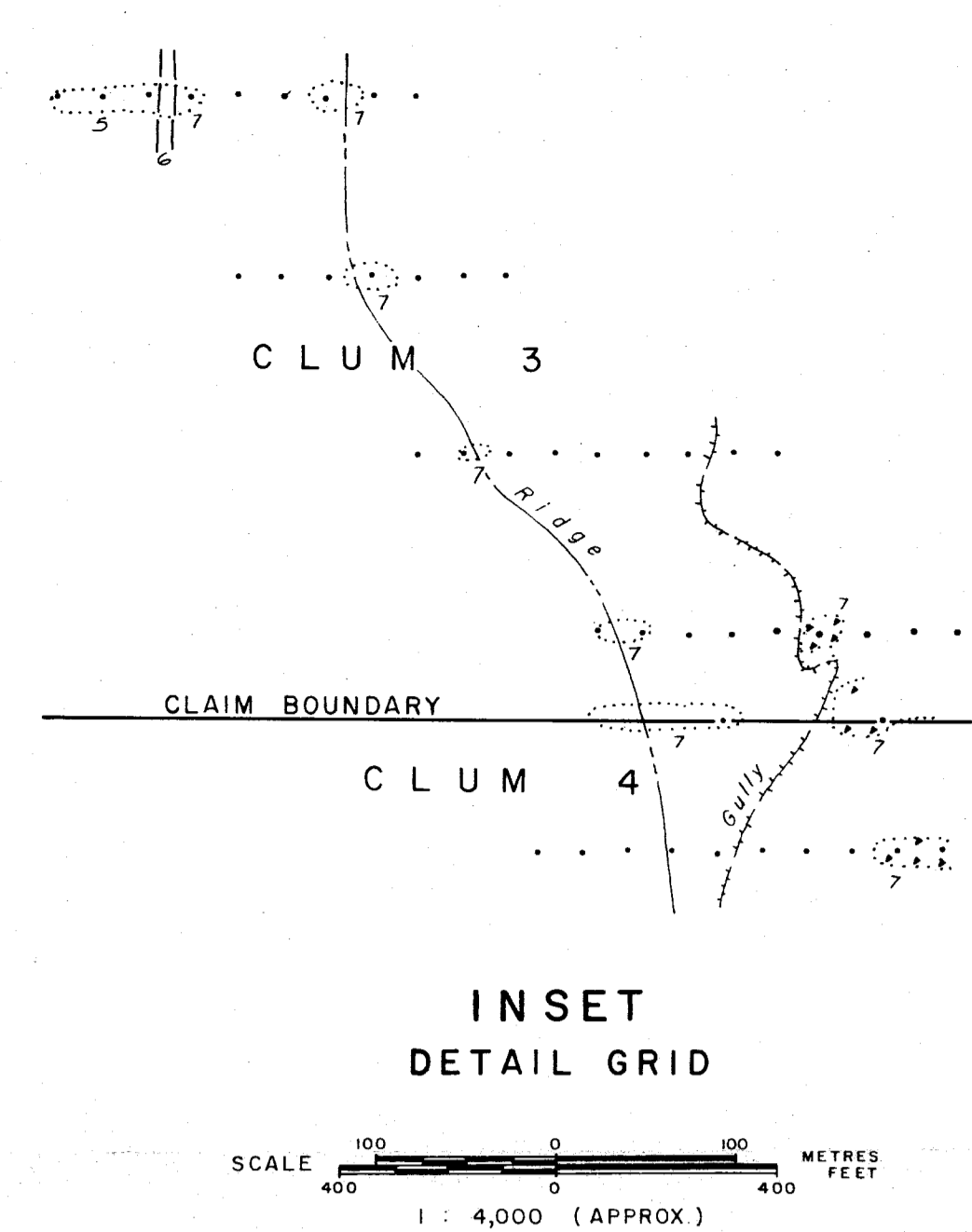
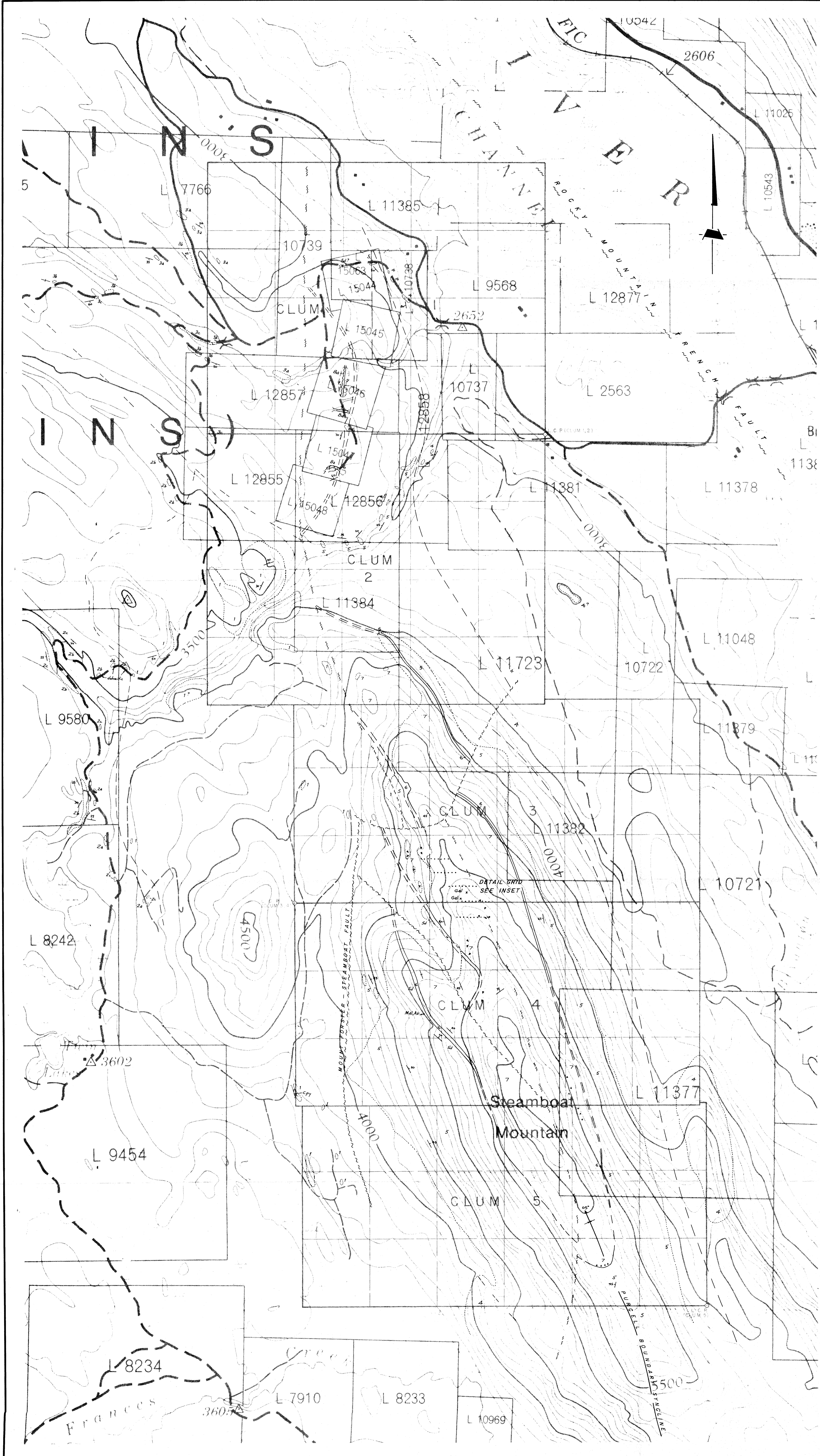
NAME J.R. Candy

ADDRESS 2426 Lawson Avenue  
West Vancouver, B.C.

EDUCATION 1st & 2nd year Science leading for a biology major,  
completed in May 1977  
Capilano College  
3rd & 4th year Science, BSc Zoology majors  
completed in 1980  
University of British Columbia

EXPERIENCE 1976 D.C. Syndicate - geologist assistant  
1977 J.C. Stephens Exploration - prospector/expeditor  
1977 AMAX Potash Limited - core splitter  
1978 AMAX Potash Limited - Geological Assistant  
1979 AMAX Potash Limited - Geological Assistant  
1980 AMAX of Canada Limited - Geological Assistant  
1981 AMAX of Canada Limited - Geologist





**LEGEND**

- ORDOVICIAN OR SILURIAN
    - 7 BEAVERFOOT FORMATION — Massive light gray dolomite.
  - ORDOVICIAN
    - 6 MOUNT WILSON QUARTZITE — White orthoquartzite.
  - CAMBRIAN AND ORDOVICIAN
    - 5 MCKAY GROUP — Argillaceous limestone. 5a Dolomitic beds near top.
  - MIDDLE AND/OR UPPER CAMBRIAN
    - 4 JUBILEE FORMATION — Thinly bedded gray dolomite.
  - LATE PROTEROZOIC (HADRYNIAN)
    - 3 HORSETHIEF CREEK GROUP — 3a White chert pebble conglomerate. 3b Slate, shale. 3c Limestone, interbedded shale.
  - 2 TOBY FORMATION (May be in part or entirely Mt. Nelson Formation). 2a Green cobble conglomerate. 2b Quartzite. 2c Spotted purple argillite.
  - EARLY PROTEROZOIC (HELIKIAN)
    - 1 MOUNT NELSON FORMATION — Massive orange weathering dolomite, minor quartzite.
- \* Sedimentary breccia (dolomite clasts in dolomite matrix).

**SYMBOLS**

- Limit of outcrop.
- Geological contact (defined, approximate, assumed).
- - - Fault (approximate, inferred).
- ↗ Bedding attitude (inclined, vertical)
- ⊕ Major fold axis (syncline), showing plunge.
- ↔ Shear vein.
- ⊥ Trench.
- Glory hole.
- ⊕ Adit.
- Legal corner post, claim boundary.
- - - Claim unit boundary.
- ⬄ Road.
- Topographic contour (contour interval 100 feet).

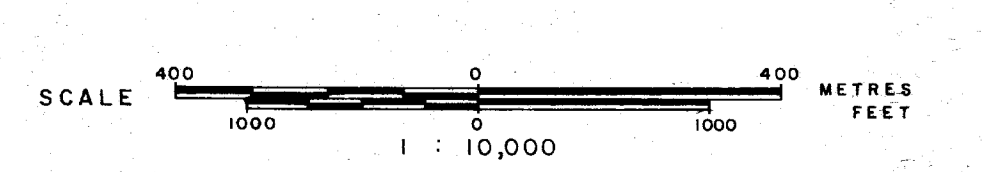
**NOTE** — Base map is an enlargement of portion of N.T.S. Sheet 82 K 16, modified.

ABBREVIATIONS

- Az. Azurite.
- Ba. Barite.
- Ch. Chalcopyrite.
- Mal. Malachite.
- Gal. Galena.

MINERAL RESOURCES BRANCH  
ASSESSMENT REPORT  
**9858**

AMAX OF CANADA LIMITED  
STEAMBOAT MOUNTAIN PROPERTY  
CLUM CLAIMS  
GOLDEN MINING DIVISION — BRITISH COLUMBIA  
**GEOLOGICAL MAP**



To accompany "1981 ASSESSMENT REPORT" by: C.J. Hodgson  
Vancouver