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GEOLOGICAL REPORT

ON THE

BOOK 1-10 MINERAL CLAIMS

SIX MILES SOUTHWEST OF CHURCHILL PEAK

LIARD MINING DIVISION

58° 125°SE

BY

D. L. Cooke, Ph.D., P.Eng.

FOR

WINDERMERE EXPLORATION LTD. (N.P.L.)

June 4 to August 1, 1970.

GEOLOGICAL REPORT ON THE BOOK 1-10 MINERAL CLAIMS

SIX MILES SOUTHWEST OF CHURCHILL PEAK

LIARD MINING DIVISION 58° 125°SE

Located claims on which assessment credits are requested:

Name of Claim	Credit Requested
Book #1-10 inclusive	2 years each

Total 20 years

Work was done on the Book #1-10 mineral claims, inclusive, between June 4, 1970 and August 1, 1970.

Report By:

D. L. Cooke, Ph.D., P.Eng.
Geologist

Date: August 23, 1970

Cooke

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SUMMARY

The Book #1-10 mineral claims cover a copper prospect near the headwaters of the Gataga River in the Liard Mining Division, northeastern British Columbia. Access to the claims is by helicopter, 25 miles southwest from the Churchill Copper Corp. concentrator, which lies some 25 miles by road south of Mile 401 on the Alaska Highway. The majority of the claims lie above the tree line.

Work on the claims was done between the dates June 4, 1970 and August 1, 1970, and consisted of geological mapping, prospecting, and chip sampling of mineralized veins. During the period of this survey, access to the property was by helicopter from a base camp established on the Bronson claims approximately three miles to the northwest.

The claims are underlain by a northwesterly trending belt of argillaceous and calcareous sedimentary rocks. These rocks have been intruded by a series of diabase and gabbro dikes, trending in the same general direction. Fault and fracture zones intersecting these rock units are usually steeply dipping, and they strike to the northeast, north and northwest. Quartz-carbonate veins occur along the margins of dikes and within fault and fracture zones. Mineralization consists essentially of chalcopyrite, with minor amounts of galena, occurring within the quartz-carbonate veins.

INTRODUCTION

This report is based on a concurrent programme of geological mapping, prospecting, and chip sampling on the Book #1-10 mineral claims. The work was done during the period July 15-23, 1970 by D. Forgeron, B.Sc., Geology, St. Francis Xavier University, assisted by J. Smiley, Department of Geology, University of British Columbia. The field work was supervised by D. L. Cooke, Ph.D., Geology, University of Toronto, who also examined the mineralized veins and did geological mapping on June 4, July 17, and August 1, 1970.

The geological mapping was done at a scale of 1" to 500', by compass and pace survey. Aerial photographs, at a scale of 1" = 1/2 mile, provided general survey control, and traverse lines were tied in to the location line of the claims. Thirty-one chip samples were taken across the full widths of mineralized veins every 100' along strike, and assayed for copper, lead, and silver by Bondar-Clegg & Company Ltd., North Vancouver, B.C. The base map for both mapping and sampling was constructed from a blowup of the 1" = 4 mile topographic map of the area, N.T.S. 94K, Tuchodi Lakes.

INTRODUCTION (Cont'd)

During the period of this survey, travel to and from the Book claims was made daily from a base camp on the Bronson property, located three to four miles to the northwest. Transportation was by a Bell 47 G3B helicopter.

As a result of the geological work performed, it is requested that two years assessment credits be applied to each of the following ten located mineral claims owned by Windermere Exploration Ltd. (N.P.L.):

Name of Claim	Record Number	Date Recorded
Book #1-10 incl.	39393 to 39402 inclusive	August 27, ~~1970~~ 1969

The total value of assessment credits requested on the Book #1-10 mineral claims is $2,000.00. The total expenditures on the geological survey is $2,256.25.

LOCATION AND ACCESS

The Book claims are located at Latitude 58°25'N, and Longtitude 125°15'W, situated six miles southwest of Churchill Peak,

LOCATION AND ACCESS (Cont'd)

in the Liard Mining Division, northeastern British Columbia. The claims lie at elevations of 6,000' to 7,800', straddling a south-flowing tributary of the upper Gataga River. The Book claims adjoin the southeastern portion of the Bronson and Mary claims, and are otherwise surrounded by the PJ claims.

The Mary and Bronson claims were located prior to the location of the Book claims. Asbestiform fibers occur within the basic dikes on the Mary claims. No previous staking for copper is known on the ground now covered by the Book claims.

The nearest road to the property occurs at the confluence of Delano and Churchill Creeks, approximately 25 air miles to the north northeast. This road runs from the Churchill Copper Corp. concentrator some 25 miles north to Mile 401 on the Alaska Highway. A four-wheel-drive road extends another 12 miles south of Delano Creek along the bed of the Racing River and Churchill Creek, but this road is flooded during most of the summer months.

The Book claims lie above the limit of vegetation in an area of rugged terrain. Snow fall is moderate to light, but because of the altitude, the area is generally free of snow only during the period of late June to late August. No soil cover is

LOCATION AND ACCESS (Cont'd)

developed at elevations above the timber, but the lower portions of the ridges are covered by scree. Debris from mountain glaciers and gravel from the creeks and rivers also obscure many areas within the valley bottoms.

GEOLOGY

REGIONAL GEOLOGY

The Book claims lie within a northwesterly trending belt of Proterozoic rocks in the central Rocky Mountains of northeastern British Columbia. The area is underlain by both the Aida and Gataga formations (Bell 1968, p.3) which are conformable and dip gently to moderately to the southwest. The overlying Gataga formation consists of slatey-cleaved dark grey argillites, mudstones and siltstones which weather to a characteristic darker colour. The underlying Aida formation consists of calcareous rocks which are lighter in colour and brown-weathering. The lithologic units include slatey-cleaved, light grey argillites, mudstones, siltstones, and massive dolomites and limestones. The combined thickness of Aida and Gataga formations in the area is estimated

GEOLOGY - Regional Geology (Cont'd)

to be about 11,000 feet (Bell, 1968, p.74-75). The Aida and Gataga formations occur higher in the Proterozoic succession than the rocks mapped by Taylor in the MacDonald Creek area (Taylor, 1963).

Vertical to steeply-dipping diabase and gabbro dikes have intruded the Proterozoic rocks throughout the area. These dikes range in thicknesses from a few tens of feet to a few hundreds of feet.

Sedimentary rocks of Lower Cambrian age unconformably overlie the late Precambrian rocks in the Upper Gataga River area. West of the Book claims, these early Paleozoic rocks consist of grey weathering limestones and dolomites, interlayered with brown-weathering pebbly mudstones, conglomerates and dark grey shales.

DETAILED GEOLOGY

The results of geological mapping are presented in the Geology and Claim Location Map, Book Group (Appendix D).

The claims are underlain by both the Aida and Gataga formations. The slatey-cleaved dark grey to black-weathering

GEOLOGY - Detailed Geology (Cont'd)

shales and argillites of the Gataga formation occur along the ridges along the western, northeastern, and southeastern edges of the claim group. These rocks are underlain by slatey-cleaved brown-weathering argillites, argillaceous limestones, and dolomites. Both formations exhibit fine interbanding of the respective constituent rock units. Strike of the bedding is north to northwest and dips are shallow to the west and east. Slatey cleavage is well-developed throughout, striking northwesterly and dipping moderately to the southwest. A series of sub-parallel dikes interrupt the sedimentary rocks in the central and northern parts of the claim group. These dikes strike to the north and northwest, and dip moderately to steeply to the west.

Fault and fracture zones strike to the northeast across the sedimentary rocks on the southern claims, to the north and northwest along dike margins on the central part of the claim group, and to the north in the northern claims. A major north-south thrust fault is evident in the northeastern and southern section of the claim group. The eastern block has moved down relative to the western portion. On the Book #9 and #10 claims, this thrust zone reaches a thickness of 600' and dips vertically to 70° west. On the Book #1 claim the thrust plane dips about 60° to the west. The intervening central area is partially obscured by talus

GEOLOGY - Detailed Geology (Cont'd)

material, but where exposed, the dikes exhibit north-south shearing.

Quartz-carbonate veins, varying in thickness from 1 1/2' to 12', occur mainly along the trace of the north-south thrust plane. Discontinuous veins also occur along the margins of dikes, and within fractures at acute angles to the major fault.

MINERALIZATION

Three prominent zones of copper mineralization were mapped and sampled. The northern zone consists of quartz-carbonate veins with chalcopyrite over a strike length of approximately 1,600'. The main vein is about four feet wide and dips steeply to the west. It is offset in places by north-westerly trending dikes. The southern part of this zone contain blebs of galena as well as sub-massive chalcopyrite. Quartz, calcite and dolomite constitute the gangue minerals. The copper sulphides are in places weathered to a red-brown limonitic gossan, together with minor amounts of malachite and azurite.

MINERALIZATION (Cont'd)

At the southern end of the Book #7 and #8, another quartz carbonate vein is exposed over a strike distance of 500'. This vein averages about 8' in width and it dips from 55° to 70° to the west. Its northern section is covered by talus material. Another zone, 5' wide, runs for 400' before being displaced beyond the boundary of the claim group to the south. Mineralization within the southern zones consist essentially of chalcopyrite in a quartz-carbonate gangue. These zones trend in a general north-south direction either along the same trace or slightly en echelon. The overall distance along which copper mineralization is intermittently exposed measures 6,000'.

CONCLUSIONS

1. The Book claims overlie a relatively unmetamorphosed sequence of calcareous and argillaceous sedimentary rocks of late Proterozoic age. These rocks have been structurally deformed and later intruded by diabase and gabbro dikes.

2. Development of gentle folds, slatey cleavage, and some faults took place prior to the intrusion of the dikes.

CONCLUSIONS (Cont'd)

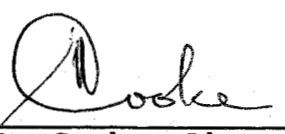
3. Post-intrusion shearing and faulting also occurred, and evidence of this is observeable along dike margins.

4. The emplacement of quartz-carbonate veins and chalcopyrite mineralization appears to be structurally controlled, following fault and fracture zones within the sedimentary rocks along the margins of dikes.

5. Mineralized quartz-carbonate veins occur along a strike distance of some 6,000', in places pinching out and in others disappearing under talus. With a total exposed length of approximately 3,000' and an approximate average width of 5', this prospect has the potential of developing into a small deposit with grade in the order of 3% copper.

6. The potential of this prospect could be tested further by bulldozer trenching of the talus-covered areas to determine surface continuity between exposed veins. Diamond drilling or underground tunnelling along the vein structure appears to be the logical initial step in determining the subsurface continuity of the mineralized structures.

Respectfully submitted,



D. L. Cooke, Ph.D., P.Eng.
CORDILLERAN ENGINEERING LIMITED

DLC:ifs

REFERENCES

1. D. L. Cooke, 1970, Field notes and map, Book Group.

2. D. Forgeron, 1970, Property report, Field notes and map, Book Group

3. R. T. Bell, 1968, Proterozoic Stratigraphy of Northeastern British Columbia, Geol. Surv. Can., Paper 67-68, pp.75.

4. G. C. Taylor, 1963, MacDonald Creek, British Columbia, Geol. Surv. Can., Prelim. Series, Map 28-1963

APPENDIX A

STATEMENT OF EXPENDITURES

APPENDIX A

STATEMENT OF EXPENDITURES

THE BOOK 1-10 MINERAL CLAIMS, SIX MILES SOUTHWEST OF CHURCHILL PEAK, LIARD MINING DIVISION 58° 125° SE

SALARIES AND FEES		
D. Forgeron, Geologist		
July 15-23,1970, 9 days @$30/day.....	270.00	
J. Smiley, Geological Assistant		
July 15-23,1970, 9 days @$20/day.....	180.00	
D.L.Cooke, Geologist		
Field Work & Supervision-3 days		
June 4,July 17,August 1,1970		
Office-2days		
August 2-4,1970		
5 days @$75/day.....	375.00	
Drafting Service.....	50.00	
Stenographic Service.....	25.00	$ 900.00
SUPPLIES AND MISCELLANEOUS		
Printing and Office Supplies.....	25.00	
Assays - 31 chip samples, ea. for		
Cu,Pb,Ag @$10/sample.....	310.00	
Food - 18 man days @$10/day.....	180.00	
Tents and field equipment.....	200.00	715.00
TRANSPORTATION		
Bell 47 G3B Helicopter		
4 3/4 hours @$135/hour.....	641.25	641.25
TOTAL EXPENDITURES		$2,256.25

Date: August 23, 1970

APPENDIX B

STATUTORY DECLARATION IN SUPPORT OF EXPENDITURES

APPENDIX B

STATUTORY DECLARATION IN SUPPORT OF EXPENDITURES

CANADA)IN THE MATTER OF the Statement
)of Expenditures for geological
Province of British Columbia)work on the Book Mineral Claims
TO WIT)in the Liard Mining Division.

I, DAVID LAWRENCE COOKE, Geologist of 1418 - 355 Burrard Street, in the City of Vancouver, in the Province of British Columbia, DO SOLEMNLY DECLARE:-

1. THAT the Geological Investigation of the Book Group was carried out under my supervision.

2. THAT the Statement of Expenditures set out in Appendix "A" of my report "Geological Report on the Book 1-10 Mineral Claims," dated June 4 to August 1, 1970, truly represents the amounts expended on geological work on the said claim group.

AND

I make this solemn Declaration conscientiously believing it to be true, and knowing that it is of the same force and effect as if made under oath, and by virtue of the Canada Evidence Act.

DECLARED before me at the)
City of Vancouver, in the)
Province of British Columbia)
this 14th day of September)
A.D. 1970.)

D. L. Cooke

~~A Commissioner for taking Affidavits for British Columbia.~~

D. T. Lee

A Commissioner for taking Affidavits for British Columbia

APPENDIX C

STATEMENT OF QUALIFICATIONS

APPENDIX C

STATEMENT OF QUALIFICATIONS

1. I am a geologist residing at 334 Francis Road, Richmond, B.C., with an office at 1418 - 355 Burrard Street, Vancouver.

2. I graduated with a B.Sc. degree in Geology from the University of New Brunswick, Fredericton, N.B. in 1959; and received a Master of Arts degree in Geology from the University of Toronto, Toronto, Ontario, in 1961. In 1966 I graduated from the University of Toronto with a Ph.D. degree in Geology.

3. I am a certified member of the Association of Professional Engineers in the Province of British Columbia.

4. I am the author of this report.

5. I supervised the geological work performed on the Book claim group which is described herein.

Signed: 

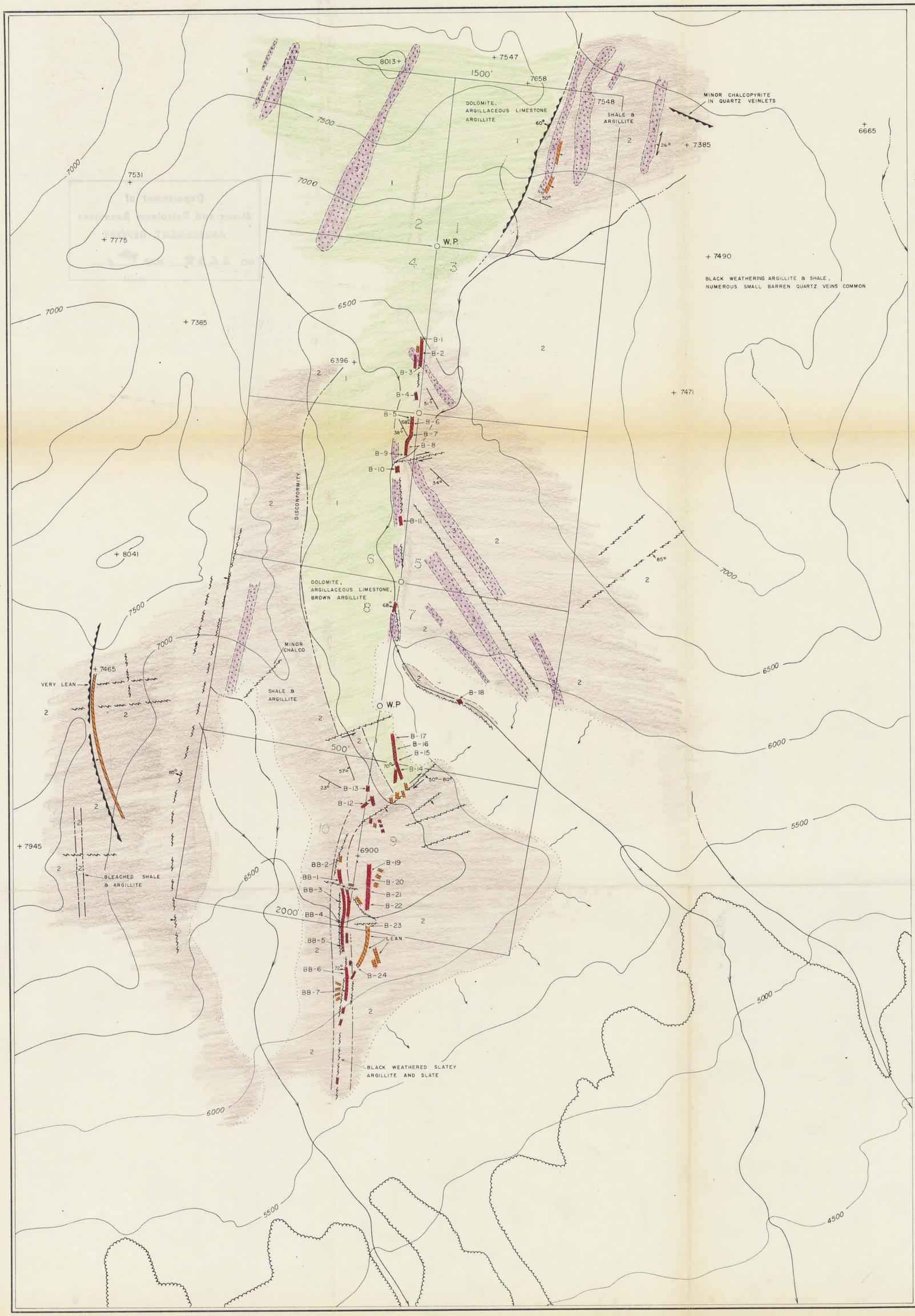
D. L. Cooke, Ph.D., P.Eng.
Geologist

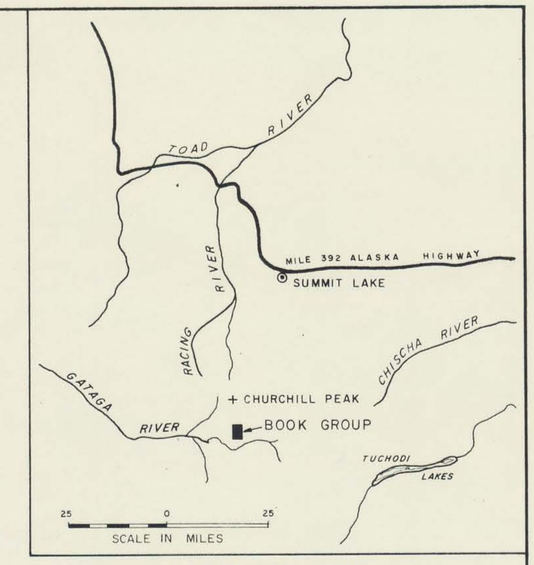
August 23, 1970
Vancouver, B.C.

APPENDIX D

GEOLOGY AND CLAIM LOCATION MAP

BOOK GROUP 1"-500'.





LOCATION MAP

LEGEND

LITHOLOGY

PRE-SILURIAN — 3 — BASALTIC TO GABBROIC DIKES

PROTEROZOIC — 2 — BLACK-WEATHERING SHALE & ARGILLITE

PROTEROZOIC — 1 — INTERBEDDED BROWN-WEATHERING ARGILLACEOUS LIMESTONE, DOLOMITE & SHALE

QUARTZ-CARBONATE VEINS: (ESTIMATED 0-2% Cu.)

QUARTZ-CARBONATE VEINS: (ESTIMATED 2%-5% Cu. OR GREATER)

SYMBOLS

ATTITUDE OF BEDDING

ATTITUDE OF SHEAR

THRUST FAULT (TEETH IN HANGING WALL)

GEOLOGICAL CONTACT

APPROXIMATE OUTCROP OUTLINE

LIMIT OF TREES

TALUS FALL

B-1 TO B-24 — ROCK CHIP SAMPLES

FAULT

CLAIM POST, LINES AND NUMBERS

CONTOUR INTERVAL: 500 FEET

2638

" TO ACCOMPANY GEOLOGICAL REPORT BY D.L. COOKE, PH.D., P.ENG. ON THE BOOK 1-10 MINERAL CLAIMS, 6 MILES SOUTHWEST OF CHURCHILL PEAK, LIARD MINING DIVISION, DATED JUNE 4 TO AUGUST 1, 1970."

'BOOK' GROUP

WINDERMERE EXPLORATION LIMITED

LIARD M.D. N.T.S. 94 K/3

GEOLOGY AND CLAIM LOCATION

CORDILLERAN ENGINEERING LIMITED

SCALE: 1"= 500'	DATE: JULY 17, 1970	DRAWN BY D.FORGERON J.SMILEY	CHECKED BY: D.L. COOKE