

178-1350-615

GEOLOGICAL MAPPING AND PROSPECTING
on the
CLIFF 1 CLAIM
at the
TURNAGAIN RIVER, B.C.

Claims: Cliff 1 (18 units)
Record No. 422(7)
NTS 1041/9E
Latitude 58°40'N
Longitude 128°02'W
Union Carbide Canada Limited
Report Prepared by: R. Cook and T. Liverton
July, 1978

UNION CARBIDE CANADA LIMITED
6953

LOCATION AND ACCESS

The Cliff 1 claims are located approximately 161 kilometres south-southeast of Watson Lake within the Liard Mining Division of British Columbia. The claims are bounded to the north and west by the Turnagain River and to the south by the Cassiar River and are positioned at latitude 58°41' north and longitude 128°02' west.

Access to the Cliff 1 claims would be by fixed wing aircraft to Blue Sheep Lake which is 20 kilometres northwest of the claims then helicopter to the claim group. Alternatively passage may be obtained by boat from the Liard at Coal River then up the Kechika and Turnagain River to a point 8 kilometres northeast of the Turnagain River and Cassiar River confluence. From this point access directly to the claims may be obtained following a 5 kilometre crosscountry traverse southeast on foot or by pack horse.

Aircraft departure would be from Watson Lake (161 kilometres) to the north or from Dease Lake 116 kilometres west-southwest of the claims.

PHYSIOGRAPHY

Rugged topography dominates the Cliff 1 claim area. Local relief varies from 740 metres along the main valleys to 2,200 metre ridge tops. An abundance of U-shaped valleys, terracing, steep walled cirques and hanging valleys, clearly describes the local presence of Pleistocene glaciation.

Exposure on the Cliff 1 claims is excellent with minimal vegetative and talus cover except for the dense bush on the most northwesterly slope of the claims.

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CLAIMS

The Cliff 1 claims are held under joint agreement from W. Kuhn and are as follows:

<u>Claim</u>	<u>Record Number</u>	<u>Expiry Date</u>
Cliff 1 (18 units)	422 (7)	6th July 1978

MAPPING

Mapping Techniques

Reconnaissance mapping and prospecting of terrain was performed by the examination of ridge and creek bed geology. Describable rock outcrop units, bedding attitudes and changing lithologic contacts were duly noted and plotted on 1:35,000 scale aerial photograph BC 5622 No.113. Eight traverses throughout the Cliff 1 claims were performed by the authors. The legal corner post of the Cliff 1 claims was encountered along a south-east drainage to the Turnagain River as illustrated on claim sheet M1041/9E.

Mapping Results

a. Regional Geology

The Cliff 1 claims were mapped by the G.S.C., as a combination of unit 2 abutting to the west against the Cassiar Batholith (Reference Cry Lake geology map 29-1962). Geological mapping performed for this report encountered G.S.C. units 3 and 4 in addition to unit 2 on the Cliff 1 claims proper. The location of the batholith contact appears correct such that the Cliff 1 claims are bound by intrusive to the northwest, west and south. The structural trends for the region are

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wide open isoclinal folds plunging consistently to the northwest. No large scale regional faults were observed in the Cambro-Proterozoic sequences.

b. Detailed Geology

Stratigraphy (Reference Geology Map Cliff 1 Claims).

The sequence of units from oldest to youngest are:

1. A lowermost arenite and phyllite dominated sequence was observed in a crosscutting northern drainage 4 kilometres downstream from the Cliff 1 claims legal claim post. This lowermost sequence was conformably overlain by interbedded carbonates, arenites and phyllites.

The entire sequence is comparable to Proterozoic units 1 and 2 of the Cry Lake geology map sheet 29-1962.

The G.S.C., describes unit 1 as a "crystalline limestone, sandy limestone and dolomite, phyllite, sheared quartzite and chlorite schist," and unit 2 as a "quartz-mica gneiss, quartzite, crystalline limestone, hornfels, skarn, feldspar-quartz gneiss." Some confusion exists between units 1 and 2 and their agreement with overlying units 3 and 4. Unit 4 contains regionally described "limestone, dolomite, oolitic limestone and minor shale" while locally, contact metamorphism has converted some of these units to marbles and calc-silicate hornfels indiscernable from those of units 1 and 2.

The lowermost arenite and phyllite dominated sequence is felt correlatable to unit 1 of G.S.C., map 29-1962 and the overlying interbedded phyllite, sericite schist,

quartzo-feldspathic schist, calc-silicate hornfels and pyroxene hornfels are directly correlatable to G.S.C. unit 2 map 29-1962. Further away from any surficially expressed nonconformable contact the same sequence of phyllites, schists, hornfels and skarn are reflected as phyllite, arenite and platy limestone interbeds as evident to the northeast of the claims.

2. Gradationally overlying the interbedded carbonate, phyllite, quartzite sequence is a non-calcareous unit of phyllites, quartzites and quartzo-feldspathic schist. This sequence is over 300 metres in thickness and weathers a dark greyish black. Fresh surfaces are a medium greyish brown to light whitish brown for the more arenaceous horizons. The grains are fine to medium crystalline, showing interlocking and moderately cemented boundaries. The beds appear massive and resistant for those higher in arenaceous content and sheared, foliated and sericitic for the more argillaceous units. Unit 3 of the G.S.C. geology map 29-1962 was felt to be facies correlatable with the above described clastics. The G.S.C. sequence was described as "quartzite, shale, siltstone and pebble conglomerate," such that good agreement exists between observed lithologies, this report and G.S.C. unit 3.
3. A sharp contact existed between the previously described clastic units and an overlying sequence of massive, resistant dolostones. The contact is believed either

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rapidly gradational or disconformable between the two sequences. No evidence of brecciation, gouge or shearing would suggest thrust or any other type of faulting along this contact. The uppermost underlying clastic units exhibited an increased carbonate content. These limey clastics gave way upsection to a medium grey weathering limestone unit that in this report was assigned to the base of the overlying massive dolostone sequence.

The dolostone was a massive unit with several thick limestone interbeds. The unit weathers a light to medium grey with the fresh surfaces showing a white to light grey colour. The texture was dominantly medium to coarsely crystalline and sugrosic in appearance. Solution pipes (?) commonly crosscut the greyish dolostone units introducing later stage reddish pink, coarsely crystalline, homogeneous dolomitic features. Common to the crosscutting pinkish dolomitic channels are some marble sections. The dolostone sequence may be correlatable with G.S.C. unit 4 from the Cry Lake geology map sheet 29-1972. The G.S.C., described unit 4 as lower Cambrian "limestone, dolomite, oolitic limestone and minor shale," and as such appears in good descriptive agreement with lithologies in this report.

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METAMORPHISM

Regional and contact metamorphism are indistinguishable throughout most of the examined claim blocks. Generally the rock units exhibit only regional low to medium grade metamorphism to the east and northeast of the claim boundary. Phyllites, quartzites and cryptocrystalline to coarsely crystalline carbonates are the dominant lithologies of lowest grade regional metamorphism. The influence of contact metamorphism was highest in metamorphic grade and dominant to the western and northwestern areas of the claim block. Sericite, quartz-muscovite and quartzo-feldspathic schists dominated the clastic units. The interbedded carbonate and clastic rocks are metamorphosed into garnet-pyroxene skarn, garnet-diopside and marble, calc-silicate hornfels and quartzo-feldspathic schists respectively, with increased grade of metamorphism in the western and northwestern areas of the claims where intrusive contact was apparent.

Foliation and crinkle banding of oriented siliceous and mica-ceous minerals within the platier carbonate sequences frequently exhibited interlaminar and interbedded recumbent and open drag folds.

MINERALIZATION

Panned concentrates for scheelite examination were obtainable only from the northernmost stream bounding the claims. Panned grain counts were variable, ranging from 30 to 67 grains of scheelite. No in situ scheelite was detected from any outcrop within the Cliff 1 claims. Syngenetic pyrite and minor pyrrhotite was detected in many of the clastic metamorphic equivalents and within large one-

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metre thick quartz veins.

SAMPLING

All stream beds panned for scheelite concentrates were sampled for geochemical analysis. Pertinent assay results were not available during the compilation of this report.

CONCLUSIONS

Reconnaissance prospecting and mapping of the Cliff 1 claims has revealed the metamorphic equivalents of carbonates and clastics of G.S.C., units 2, 3 and 4 (Reference Cry Lake geology map 20-1962). Evidence of major structural deformation was lacking on the Cliff 1 claims although northwest plunging isoclinal folds and minor thrust faults are apparent. The presence of sulphides within the carbonate and clastic metamorphic equivalents and the location of solution aquifers as quartz veins and cross-cutting dolomitic-marble solution pipes lends excellent potential to scheelite and sulphide mineralization in local lithologies.

The Cliff 1 claims shows favourable potential for skarn and hornfels tungsten mineralization with exploration emphasis to the northern and northwestern claim units.

RECOMMENDATIONS

Detailed mapping and prospecting reconnaissance is recommended for the northwestern claim units. Two hundred metre spaced soil sampling is proposed at a 100 metre elevation vertically above the western bounding batholith contact for 5 kilometres plus along the northwest of the claims.

COST STATEMENT

Wages

20 man days at \$100 per day	2,000.00
Helicopter: 6.4 hours @ \$350	2,240.00
Provisions	<u>200.00</u>
	<u>\$4,440.00</u>

Signed in the absence
of Mr Cook & Mr Livingston

Jon J. Rogan
Manager of Exploration - Canada
Univ. Canada Exploration Corp.

31st July 1978

STATEMENT OF QUALIFICATIONS OF AUTHOR

Timothy Liverton: Graduated from the University of Sydney with a B Sc degree in Geology and Geophysics in 1964.

Experience: - in Australia.

1965 - Employed by R. Hare and Associates (consultants) to work on tin, tungsten and copper mines and prospect in Queensland and Western Australia. Work included surface and underground surveying and geological mapping, supervision of diamond drilling and regional mapping.

1966 and 1967 - Employed by the Electrolytic Zinc Company of A'Asia Ltd. to work on base metal exploration in souther N.S.W. and uranium prospect in S.A. Work involved detailed mapping, supervision of drilling, geochemical surveys and geophysics and petrographic studies.

1968 to 1970 - Employed by Trans Australian Exploration to carry out regional mapping and prospecting over 2000 square miles of Queensland to explore for copper, molybdenum and tungsten.

1971 and 1972 - Employed by ANZ Exploration (Union Carbide) to carry out uranium exploration in the Northern Territories.- in Canada and abroad.

1973 - Working as a civil engineer in England.

1974 to present - Employed by Union Carbide Canada Ltd. to work in Yukon and Northern B. C. tungsten projects during the summer. During the winter working on reconnaissance for quartz in Greenland, for Manganese in Amazonia, Brazil; as a mine geologist at the Pine Creek Mine, California, work on Tungsten exploration in Norway and development work in Portugal.

QUALIFICATIONS

- Raymond A. Cook: Graduated from the University of Alberta with an Honors B.Sc. in Geology and Zoology in 1973.
- 1972 Examined and collected palaeontological specimens throughout the Palaeocene Ravenscrag Formation of southern Saskatchewan for the University of Alberta.
- 1973 Employed by Eldorado Nuclear Mining Division. Worked in the Fay and Fay Winze underground workings.
- 1974 - 75 Employed as Underground Mine Geologist Terra Mines Ltd. Located in Andesitic Volcanics at their high-grade silver mine on the Camsell River N.W.T. Duties involved underground mapping, sampling, grade control, diamond drill supervision, core logging, staking, exploration heading supervision and assistance in monthly progress report compilation.
- 1975 - 76 Canadian Mining & Smelting Company Limited, Exploration Branch, Vancouver office; Work was performed within the Kootenay area and the MacKenzie Mountains from Virginia Falls through to Arctic Red River. Duties involved; reconnaissance mapping, local and regional prospecting, staking, property assessment and initial evaluation, trenching geochemical and chip sampling, monthly progress report compilation. Elements sought were lead, zinc, copper and precious metals.
- 1976 - 78 Master Thesis - University of British Columbia - In progress.
Topic: Detection of Metalliferous Sediments from the Juan de Fuca Ridge through the study of Micro-

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palaeontology, Sediment Geochemistry and Sedimentology.

1977

(Summer) Thesis Field Area sampling and Sonar mapping.

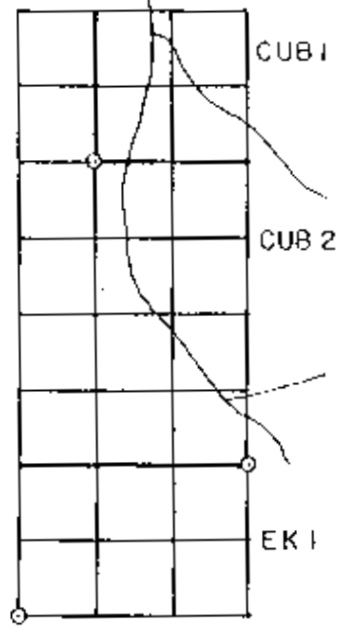
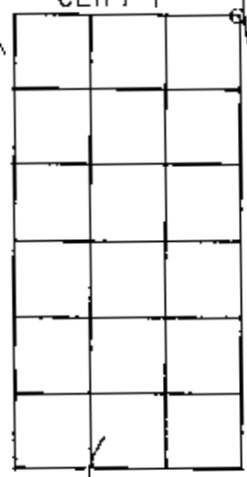
1978

Employed by Union Carbide Canada Limited. Duties include tungsten exploration, local and regional mapping, sampling, staking and property evaluation.

58°40' N

Turnagain
River

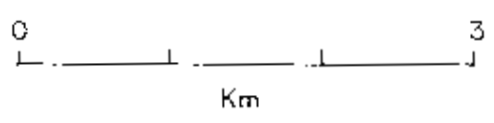
CLIFF I



MINERAL RESOURCES DIVISION
ASSESSMENT REPORT
6953
NO. 6953

128° 00' W

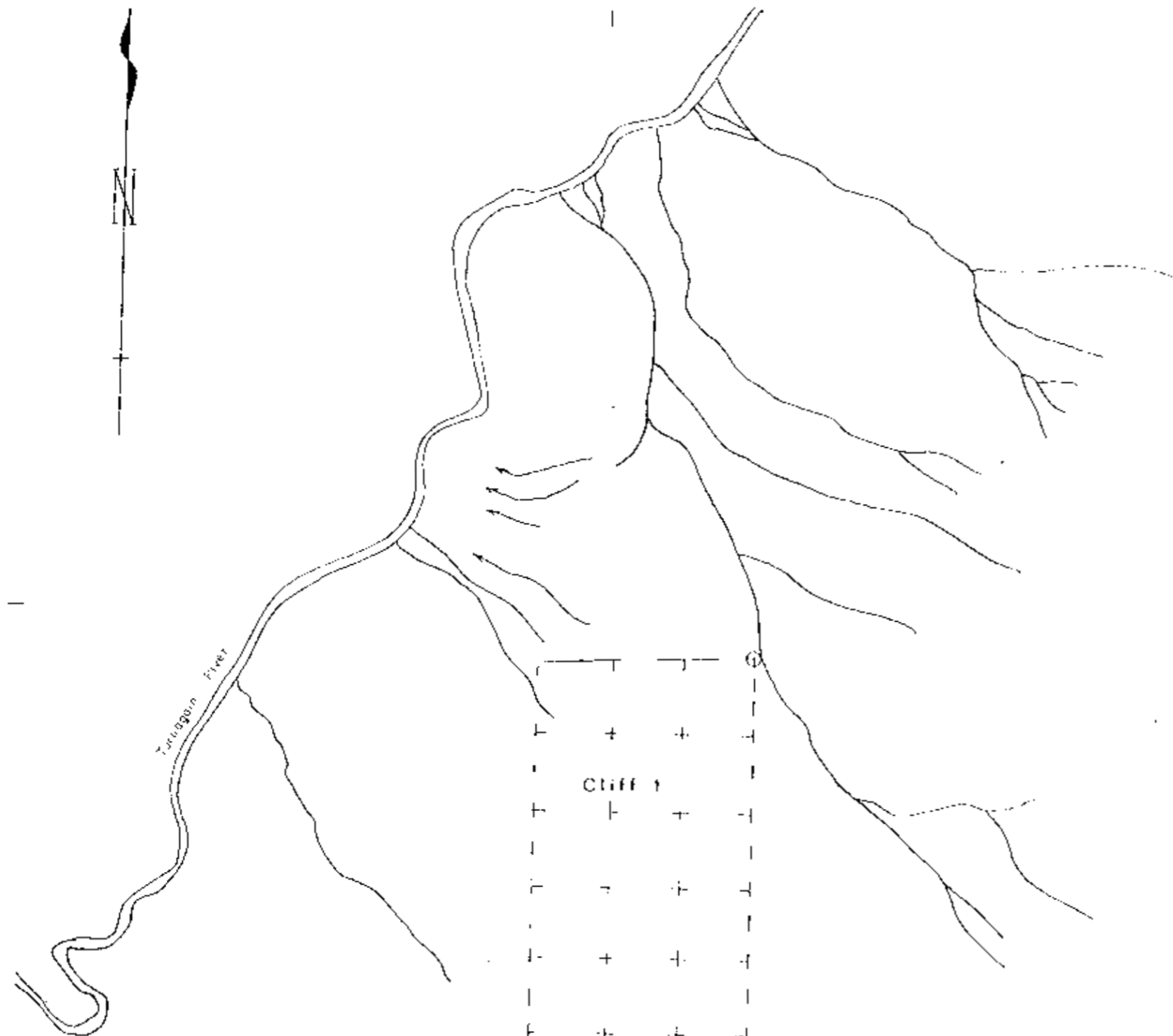
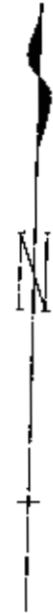
UNION CARBIDE CANADA LTD.
LOCATION MAP FOR CUB,
EKI AND CLIFF CLAIMS



128° 15' W

Scale 1 to 50,000	N.T.S. 104 1/9E
Drawn F. Liverton	July 1978





Cassiar River at
edge of sheet



Scale: 1 to 35,000

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CLIFF 1 CLAIM

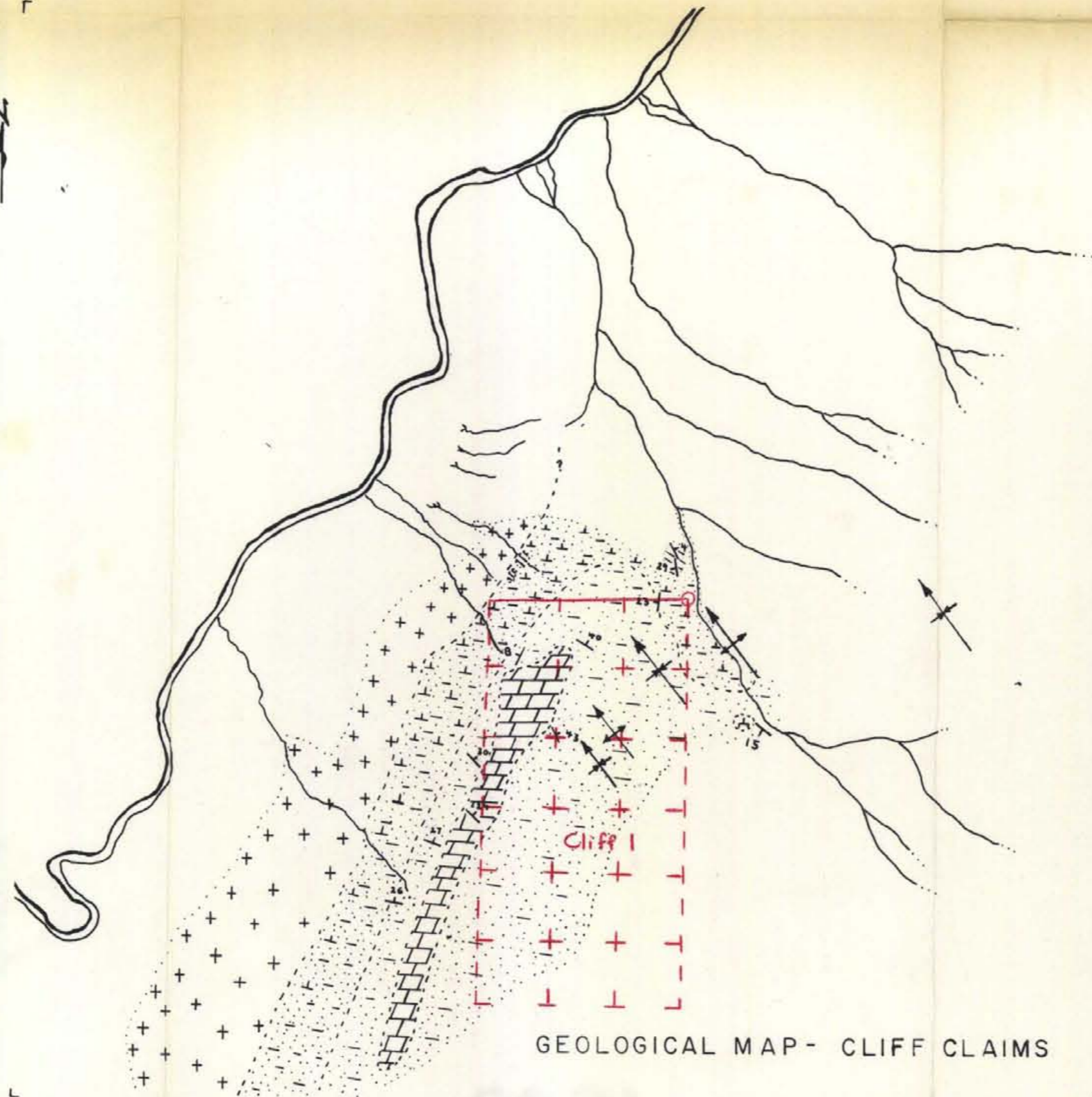
APPROXIMATE CLAIM COVERAGE AND
LOCALITIES MENTIONED IN TEXT

Scale 1 to 35,000

Drawn T. Iverson, July 1978

Base Airphoto BC 5622 No. 113

Sheet No










GEOLOGICAL MAP - CLIFF CLAIMS

SCALE 1:35,000



LEGEND

-  DOLOSTONE
-  QUARTZO-FELDSPATHIC SCHIST & PHYLLITE
-  LIMESTONE, PHYLLITE & QUARTZO-FELDSPATHIC SCHIST
-  MONZONITE
-  COVERED
-  SYNCLINE & ANTICLINE
-  BEDDING - INCLINED

MINERAL RIGHTS

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Drawn by: R.A. COOK
 Date: JULY 12, 1978
 Geology by: T. LIVERTON
 & R.A. COOK