GEOLOGICAL MAPPING AND SURFACE SAMPLING

on the

EK 1 and CUB TUNGSTEN PROSPECT

at the

TURNAGAIN RIVER, B.C.

Claims: EK 1 (6 unit)
CUB 2 (18 unit)
Liard Mining Division
NTS 104I - 9E
Latitude - 58°37'N
Longitude-128°14'W
Union Carbide Canada Limited
Report Prepared by: R. Cook and T. Liverton

July, 1978

CONTENTS

LOCATION AND ACCESS

The EK 1 and Cub 2 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 east by the headwaters of the Cassiar River, specifically positioned at latitude 58°37' north and longitude 128°14' west.

Access to the EK 1 and Cub 2 claims would be by fixed wing aircraft to Blue Sheep Lake which is 20 kilometres northwest of the claims then by helicopter to the claim group. Alternatively, passage may be obtained by boat from the Liard and Coal River then up the Kechika and Turnagain River to a point at the confluence of the Turnagain River and Cassiar River. From this point access directly to the claims may be obtained following an eight kilometre due west traverse followed by a six kilometre cross-country traverse due south on foot or by packhorse.

Aircraft departure would be from Watson Lake (161 kilometres) to the north or from Dease Lake, 111 kilometres west-south-west of the claims.

PHYSIOGRAPHY

The area is rugged locally with nontraversable cliffs on both claim blocks. Topographic relief varies from 780 metre valleys to 2,100 metre ridgetops. An abundance of U-shaped valleys, terracing, steepwalled cirques and hanging valleys, clearly describes the local presence of Pleistacene glaciations.

CONTINUED . . . .

Exposure of rock outcrop on the EK 1 and Cub 2 claims was excellent with minimal vegetative and talus cover.

CLAIMS

Claims held under joint agreement with W. Kuhn are as follows:

Claim	Record Number	Expiry Date
Cub 2 (14 units)	438 (7)	July 6, 1978
EK 1 (6 units)	437 (7)	July 6, 1978

MAPPING

Work Done

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 a 1:34,000 scale aerial photograph; BC 5517 No. 125. Five traverses throughout the EK 1 and Cub 2 claim blocks were performed by the authors. No legal corner posts were encountered during traverses although boundary posts were frequently observed from both groups.

Geology

a. Regional Geology

The Ek 1 and Cub 2 claims exhibit upper Proterozoic and lower Cambrian stratigraphy comparable to G.S.C. units 1, 2, 3 and 4 of the Cry Lake geology mapsheet 29-1962. Crosscutting the most northerly Cub 2 claim units is the non-conformable Cassiar Batholith which on a more regional scale bounds the contained units to the north, east, south and southwest creating a potential roof pendant condition.

CONTINUED . . . .

The structural trends for the region are isoclinal folds plunging consistently to the northwest. No large scale regional faults were observed in the Cambro-Proterozoic sequences although local thrusting is suspected between G.S.C. units 3 and 4.

b. Property Geology

Stratigraphy (Detailed) (Reference Geology Map EK 1 and Cub 2 claims) The sequence of units from oldest to youngest are:

1. A lowermost arenite and phyllite dominated sequence was observed in a crosscutting western drainage of the Cub 2 claim group. This lowermost sequence was conformably overlain by interbedded carbonates, arenites and phyllites. The entire sequence is comparable to Proterozoic units 1 and 2 of 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 may be correlatable to unit 1, G.S.C. map 29-1962 and the overlying interbedded phyllite, sericite schist, quartzo-feldspathic schist, garnet-diopside marble and skarn is 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 skarns are reflected as phyllite, arenite and platy limestone interbeds.

2. No marked facies variations influence the overlying thick sequence of argillaceous limestones and limey argillites. Apparently gradational and probably conformable, a thick sequence of medium to brownish grey to grey weathering platy argillaceous limestones to limey argillites overlies the carbonate-arenite sequence. Monotonous in lithologic consistency this unit most clearly exhibited the alignment of quartz and mica-rich minerals in layers or foliations. The thin silicate rich bands are boudinaged or continuous in extent depending on the amount of host rock argillaceous content. Drag folds and crinkle bands are frequently reflected within these silicate rich laminations. Thick arenaceous beds are conspicuously

CONTINUED . . . .

absent from this sequence in the EK 1 and Cub 2 claim locality. Unit 3 of the G.S.C. geology map 29-1962 was felt facies correlatable with the limey argillites and argillaceous limestones. The G.S.C. sequence was described as "quartzite, shale, siltstone and pebble conglomerate," whereas the carbonate content of the EK 1 and Cub 2 claims is believed to reflect a further offshore shelfal facies sequence.

3. A sharp contact existed between the previously described limey argillites - argillaceous limestones and an overlying sequence of massive, resistant dolostones. The contact is believed either rapidly gradational or disconformable between the two sequences. Considerable variation exists along the contact such that on the EK 1 and Cub 2 claims a thin light grey limestone bed appears gradational between the two units. Immediately south of the EK 1 claim group, the same contact along a ridge exhibits a less clearly defined limestone bed on the north western ridge face and a well defined dolomite breccia at the base of the dolostone contact along the west and south slopes of the same ridge. It was apparent from the examined EK 1 and Cub 2 claims, that the dolostone unit was either conformable or disconformable regionally with the underlying limey argillites and argillaceous limestones. Locally, thrust faulting

CONTINUED . . . .

of the most massive and resistant dolostone units has occurred as reflected south of the EK 1 claims. The presence of inter and intra-formational thrust faulting was quite common throughout all the examined lithologies with less competent plattier beds exhibiting drag folds, crinkle bands and minor offset. The more resistant arenaceous and carbonate dominated lithologies do not as readily exhibit movement or folding and are further displaced on strike and along fold axis than less resistant plattier units. The amount of thrust movement between beds is believed to range from none, to a few hundred metres. The period of major tectonic movement as reflected in the local thrust faults and drag folds of argillaceous beds would be synchronous with batholith emplacement. Support for this hypothesis exists in the uninterrupted sequencing of drag folded and crinkle banded beds sandwiched between resistant unfolded beds. This structure pattern would most likely occur while the lithologies behaved as a metamorphosed melt subject to the thermal gradient and stresses characteristic of intrusive emplacement. A Laramide orogenic overprint would establish the wide open north westerly plunging folds common to the mapped area.

CONTINUED . . . .

The dolostone was a massive unit with thick limestone interbeds. The units were a mottled pastel orangish brown in colour and exhibited flaggy to blocky weathering of talus blocks. All carbonates of this sequence were medium to coarsely crystalline in texture. A massive marble and an adjacent underlying calc-silicate hornfels were present within the same sequence on a ridge due south of the EK 1 claims. The dolostone sequence was felt correlatable with G.S.C. unit 4 from the Cry Lake geology map sheet 29-1962. The G.S.C. described unit 4 as Pre-Cambrian "limestone, dolomite, oolitic limestone and minor shale," and as such appears in good descriptive agreement with lithologies in this report.

METAMORPHISM

Regional and contact metamorphism are indistinguishable throughout most of the examined claim blocks. Generally the rock units exhibited only regional low to medium grade metamorphism to the west and southwest of the claim boundaries. Phyllites, quartzites and cryptocrystalline to coarsely crystalline carbonates are the dominant lithologies of lowest grade regional metamorphism. The influence of contact metamorphism was to heighten metamorphic grade in the rock units to the north, northeast and southeast of the EK 1 and Cub 2 claims. Sericite, quartz-muscovite and quartzo-feldspathic schists dominate the clastic units. The interbedded

CONTINUED . . . .

carbonate and clastic rocks are metamorphosed into garnet-pyroxeene skarn, garnet-diopside marble, calc-silicate hornfels and quartzo-feldspathic schist respectively with increased degree of contact metamorphism approaching the northern nonconformable Cassiar Batholith-sediment contact.

Foliation and crinkle banding of oriented siliceous and micaceous minerals within the plattier carbonate sequences frequently exhibited interlaminar and interbedded recumbent and open drag folds. These foliations may exhibit second phase sympathetic folding and agreement to the major regional open folds and local thrust faults.

MINERALIZATION

Scheelite was observed in panned concentrate samples taken from several creeks draining the EK 1 and Cub 2 claims. Panned values ranged from a low of 10 grains to a high of 500 plus grains for the Cub 2 claims and a low of 18 to a high of 30 scheelite grains for the EK 1 claims.

Scheelite was also observed in a few garnet-diopside skarn rock samples found in float. No in situ scheelite has been found on either the EK 1 nor the Cub 2 claims. Syngenetic pyrite was common to all lithologic units with the G.S.C. unit 2 equivalent exhibiting the highest content, often noticeable by the presence of a dark red limonitic coating on the units weathered surface. Quartz veins sometimes several metres in width frequently parallel the dominatly argillaceous and arenaceous units. These quartz veins along with several calc-silicate hornfels horizons exhibit

CONTINUED . . . .

good pyrrhotite and pyrite associations, both along fractures and between grain boundaries. Lithologies exhibiting pyrrhotite mineralization were frequently found in place on both the EK 1 and Cub 2 claim blocks.

Reconnaissance to the northeast and southeast of the EK 1 and Cub 2 claims revealed higher grade metamorphism than observed on the claims. Detailed examination resulted in the location of calc-silicate hornfels and garnet-diopside skarn (Reference Geology Map EK 1 and Cub 2 claims).

SAMPLING

All stream beds panned for scheelite were also sampled for geochemical analysis. At the time of thie report's compilation no assay results were available.

CONCLUSIONS

Local reconnaissance of EK 1 and Cub 2 claims has revealed the presence of older geological units than those mapped by the Geological Survey. Northwesterly plunging isoclinal folds has topographically exposed high-grade metamorphic rock types showing skarn and hornfels to the northeast and east both on and off the claim boundaries.

COST STATEMENT

Wages

11 man days at $100 per day	1,100.00
Helicopter: 4.9 hours at $350	1,715.00
Provisions	160.00
	$2,975.00

Signed in absence of
Mr. Cook & Mr. Linton
John J. Rogan
Manager of Exploration - Canada
31st Jan 1978

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 Virgina 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-

CONTINUED . . . . .

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.

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.

58°40' N

Turnagain River

CLIFF 1

CUB 1

CUB 2

EKI

128°15' W

128°00' W

Cassiar River

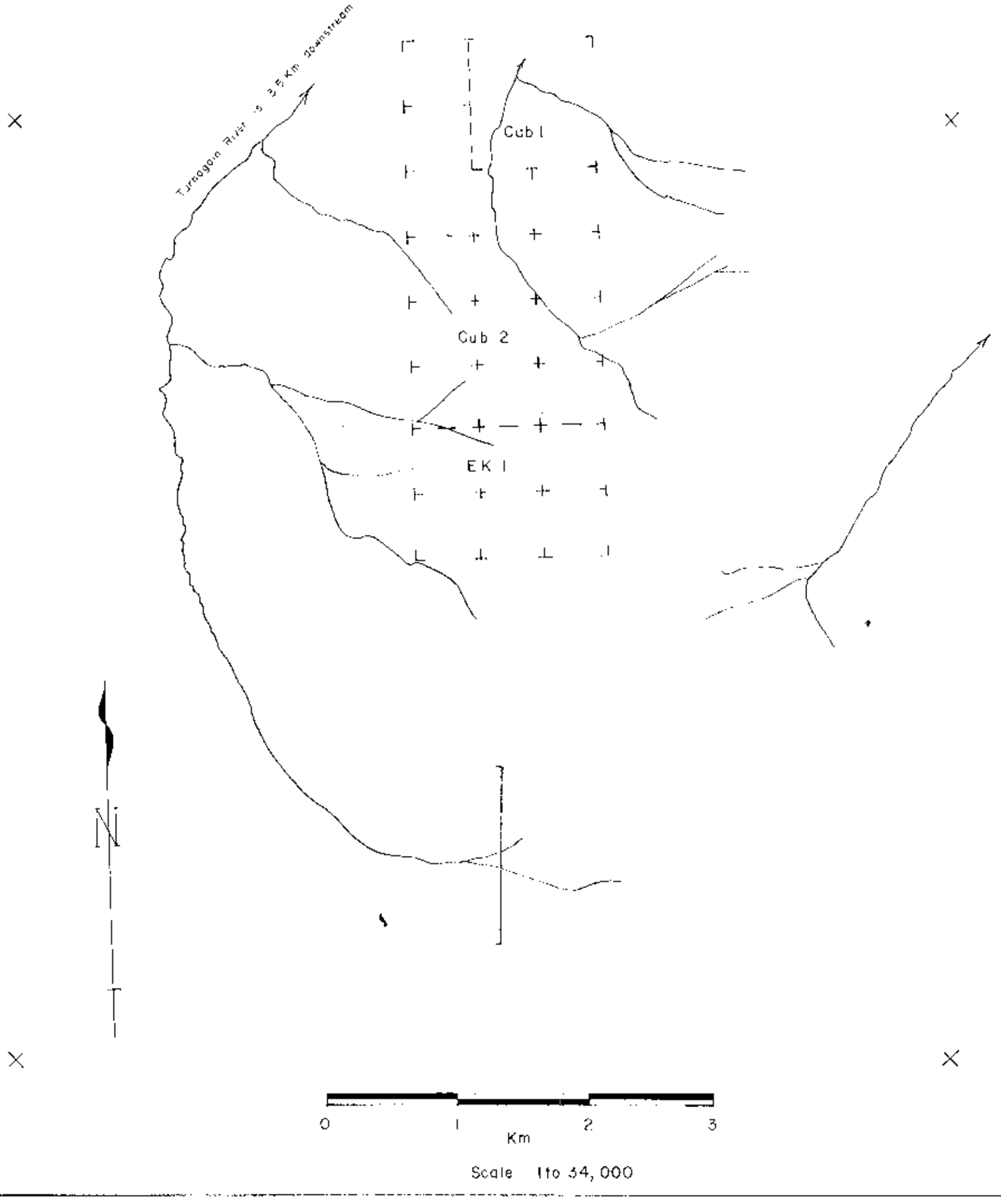
0 Km 3

MINERAL RESOURCES BRANCH
ASSESSMENT REPORT
6952

UNION CARBIDE CANADA LTD.

LOCATION MAP FOR CUB, EKI AND CLIFF CLAIMS

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



Scale 1 to 54,000

MINERAL DEVELOPMENT BRANCH
ASSESSMENT REPORT
6952

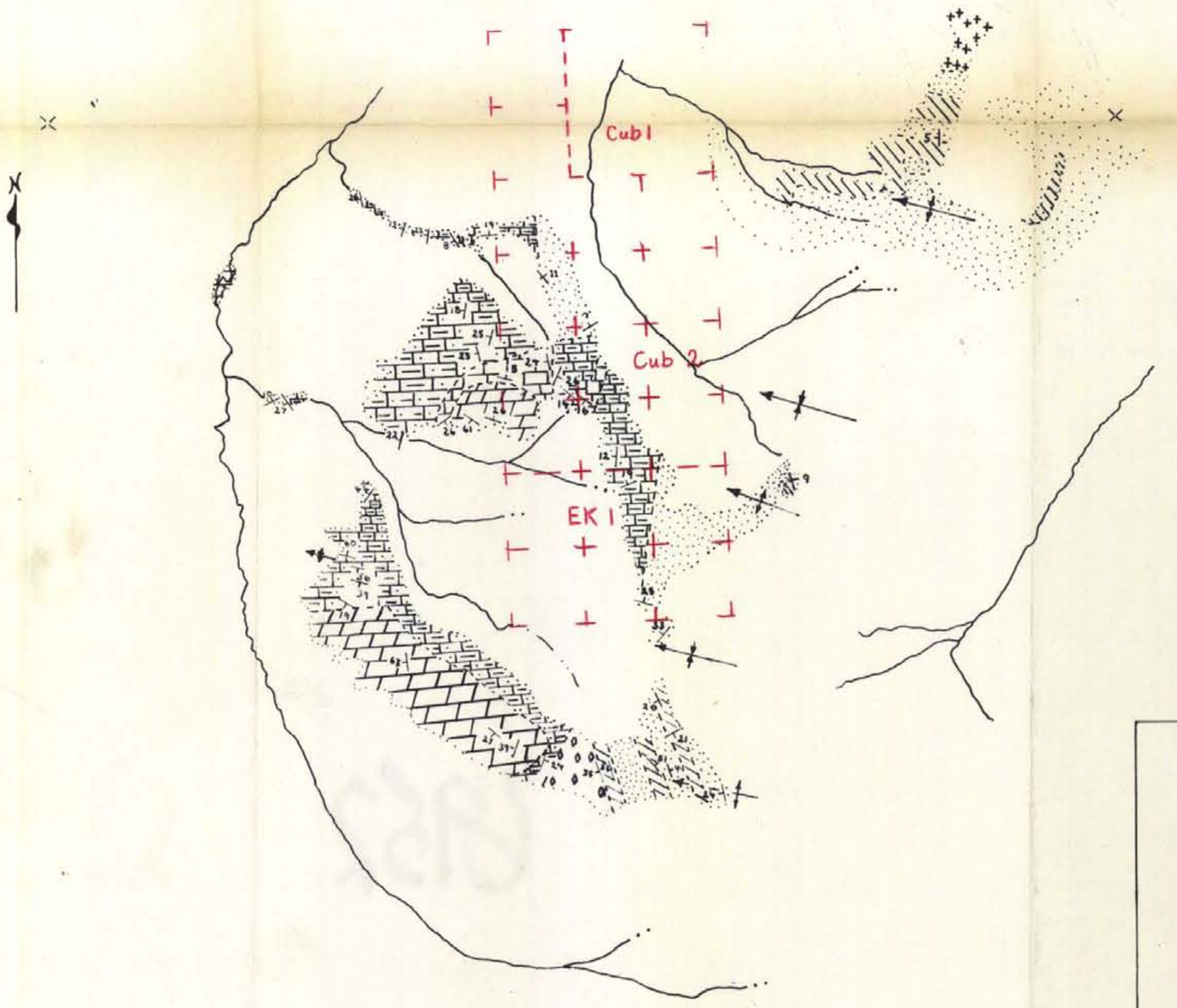
UNION CARBIDE CANADA LIMITED

CUB 2 & EK 1 CLAIMS

APPROXIMATE CLAIM COVERAGE AND

LOCALITIES MENTIONED IN TEXT

Scale 1 to 54,000	Drawn T.I. Verton, July 1978
Base Airphoto BC5517 No. 175	Sheet No.



GEOLOGICAL MAP EK & CUB 2 CLAIMS

SCALE 1:34,000

0 1 2 3

KILOMETRES

LEGEND

- DOLOSTONE
- LIMESTONE
- LIMY ARGILLITES & ARGILLACEOUS LIMESTONE
- QUARTZO-FELSPATHIC SCHIST, QUARTITE & PHYLLITE
- CALC-SILICATE HORNFELS
- GARNET DIOPSIDE SKARN & MARBLE
- MONZONITE
- COVERED
- SYNCLINE & ANTICLINE
- BEDDING- INCLINED

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

(2)