# REPORT ON STAR COPPER PROSPECT ATLIN M.D.

Lat. 58°13' Long. 131°43'
N.T.S. 104-J-4

for

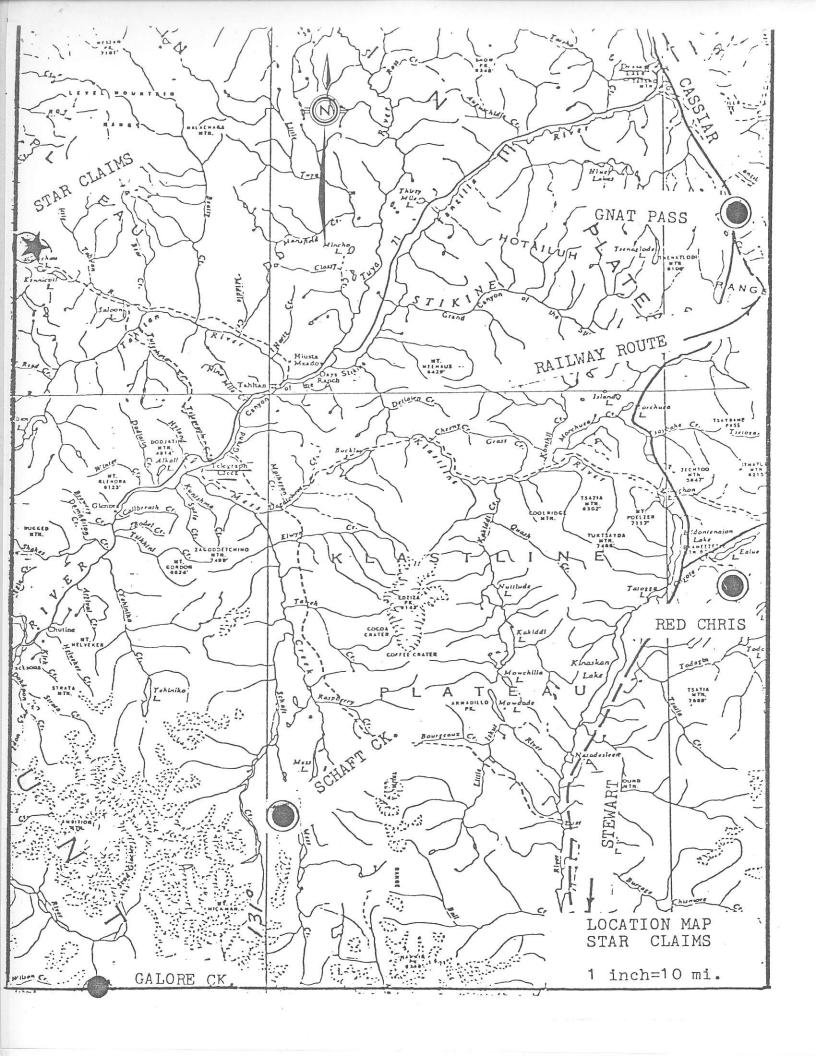
### UNITED CAMBRIDGE MINES LTD.

by

T.E. LISLE, P.Eng. R.H. SERAPHIM, Ph.D, P.Eng. November 14, 1977

## CONTENTS:

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS	2
COST ESTIMATE	1
INTRODUCTION	5
CLAIMS	6
BACKGROUND & GRID CONTROL	8
REGIONAL GEOLOGY	8
GEOLOGY - DICK CREEK PROSPECT	9
GENERAL	9
STRUCTURE	10
ALTERATION	11
MINERALIZATION	12
SAMPLING AND ASSAYS	14
MAGNETIC SURVEYS	14
GEOLOGY - COPPER CREEK PROSPECT	15
EXPLORATION POTENTIAL - OTHER AREAS	17
REFERENCES	21
CERTIFICATIONS 22 &	: 23
MAPS	
LOCATION MAP CLAIM MAP CLAIM MAP WITH EXPLORATION AREAS - AFTER SEVENSMA	1 7 14
Figure 1 - General Geology - Dick Creek (In Pocket) Figure 2 - Detail Geology - Dick Creek (In Pocket) Figure 3 - Assay Plan - Dick Creek (In Pocket) Figure 4 - Baseline Magnetics - Dick Creek (In Pocket)	i



#### SUMMARY, CONCLUSIONS & RECOMMENDATION:

United Cambridge Mines Limited (N.P.L.) completed a bulldozer trenching program and a limited amount of geologic and magnetic surveying between May 22 and August 19, 1977 on the Star Copper Prospect. The bulldozer work revealed a zone of "Porphyry Type" copper mineralization in the area previously outlined by geochemical surveys.

The mineralized zone trends northeast and coincides generally with the outer margins of a large dike-like mass of diorite (Porphyry). Trenching has exposed the zone intermittently for approximately 600 meters (1968 feet) of length and well pyritized rocks are evident for an additional 250 meters (820 feet) in a northerly direction. Sampling in the trenches has shown widths of several hundred feet with important copper content, although neither the full width nor the shape of the deposit has been determined because of deep overburden.

The deposit is characterized by strong fracturing in both intrusive and volcanic rocks. It contains chalcopyrite, pyrite, magnetite and locally bornite in addition to conspicuous secondary copper minerals, malachite, azurite, and a black copper oxide (tenorite?). It is marked in part by a strong pyritic zone, perhaps a halo, and the area is highly oxidized and weathered. Gypsum is well developed, and zones of argillic alteration and quartz and calcite veinlets are locally prominent.

Samples from the mineralized zone yielded high assays for total copper. Trench 1 West near the southwest end of the zone averaged 0.33% Cu. over 70 meters (230 feet). Trench 2 West, about 450 meters to the northeast, yielded a weighted average of 0.417% Cu. over 179 meters (587 feet). Much of the sampling in surrounding trenches yielded assays of 0.10% to 0.20% copper. Gold assays ranged from less than 0.003 oz./ton to 0.01 oz./ton and silver assays ranged from 0.01 to 0.18 oz./ton.

This zone is presently of sufficient importance to be investigated by drilling. Other target areas or extensions to the zone might be found by completing magnetic and Induced Polarization surveys prior to drilling.

The Copper Creek deposit, approximately 2 kilometers (1½ miles) southeast of Dick Creek, is in an area underlain by the same formations as those at Dick Creek. Preliminary work indicates that the geology is complex and that drill targets will be found only after completion of geological and geophysical surveys. Further 400 scale mapping should also be completed along the volcanic-sedimentary belt containing both the Dick and Copper Creek deposits.

A number of other target areas within the claims remain to be investigated. This will be best accomplished initially by a combination of prospecting and geological, geophysical and geochemical surveys.

# COST ESTIMATE:

# STAGE 1

Dick Creek - Linecutting	g, Magnetic	& I.P. S	Surveys	\$20,000.00
Copper Creek - "	11	**	11	17,000.00
Other Areas - "	11	" & Geoch	ıı nem	25,000.00
Prospecting, Mapping, et	C.			15,000.00
Camp Construction & Oper Expediting, etc.	ations - T	ransporta	tion,	15,000.00
Engineering, Supervision	& Conting	ency		13,000.00
	SUB TOT	AL		\$105,000.00

# STAGE 2 DICK CREEK (Revised)

5000 feet B.Q.	wireline drilling @ \$30.00/foot	
	overall	\$150,000.00
Helicopter and	Aircraft Support	15,000.00
Assaying		5,000.00
Engineering and	Contingency	25,000.00
	SUB TOTAL	\$195,000.00
		With the state of

TOTAL	STAGE	7	AND	2

\$300,000.00

#### INTRODUCTION:

United Cambridge Mines Limited completed a trenching program on the Star Copper Prospect located at Sheslay in the Atlin Mining Division between May 23 and July 23, 1977. This trenching investigated strong copper anomalies outlined by 1976 geochemical surveys. The work was completed, under contract, with a T55 bulldozer (D-7) owned by B. Ball of Glenora, B.C.

Some trenching was also completed at Copper Creek and access roads were constructed between Copper Creek, Dick Creek and Sheslay. The airstrip at Sheslay was cleared. A limited amount of magnetic surveying was undertaken and detailed geological mapping of the mineralized zone was completed.

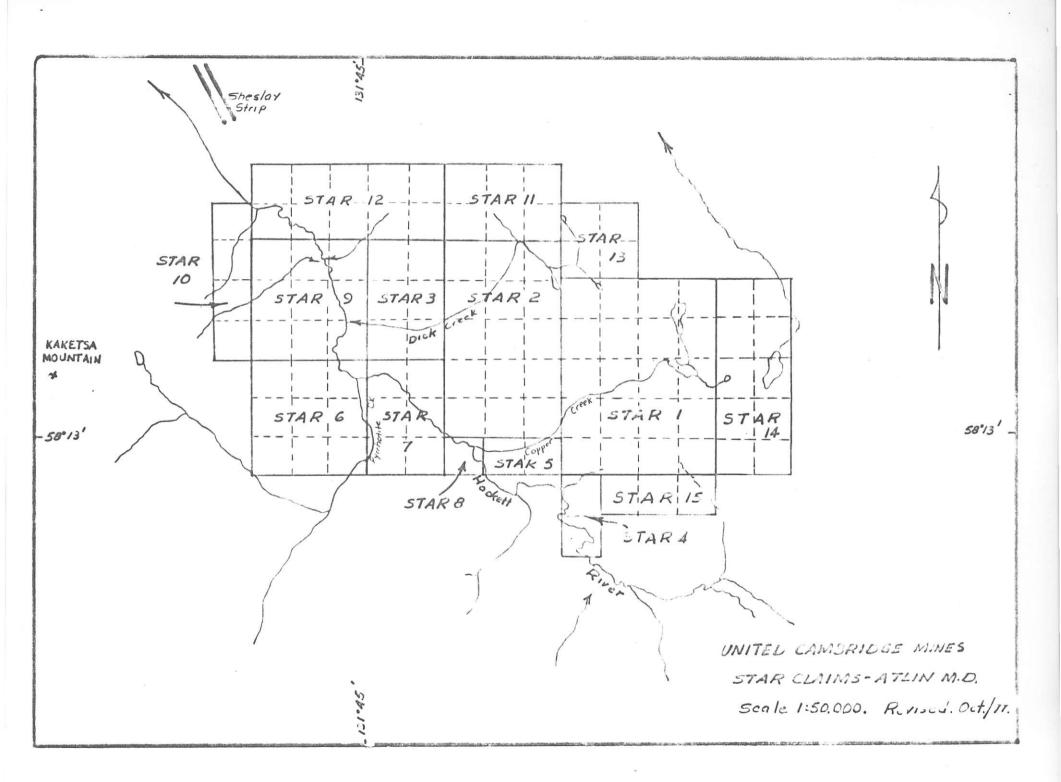
The author with a two man crew, in addition to the bulldozer operator, spent from May 23 to August 19, 1977 on the property. Dr. R.H. Seraphim, Ph.D., P.Eng., in company with Mr. N. Thompson, President of United Cambridge Mines Limited, visited the property from June 22 to June 24, 1977 and examined a number of the mineralized showings.

This report describes the results of the season's work and makes recommendations for the further exploration of the Star Prospect.

## CLAIMS:

The claim group was enlarged during the field season from 94 to 107 units. Assessment work was recorded on the 1976 claims and the following summary provides the current status of the property.

NAME		NUMBER UNITS	GROUP	RECORDED	EXPIRY DATE
Star	1	20	Hackett	July 5/76	1979
11	2	15	Sheslay	Ħ	1981
11	3	6	II		1981
11	4	2	Hackett	11	1980
11	5	2	11	<u>u</u>	1979
11	6	9	Beaver	Sept. 30/76	1979
11	7	6	Sheslay	<u>ii</u>	1981
11	8	1	11	п	1983
11	9	9	Beaver	tt	1979
11	10	1+	11	ift	1979
*1	11	6	Sheslay	11	1981
11	12	10	Beaver	ŧŧ	1980
11	13	1+	Hackett	11	1979
11	14	10		June 30/77	1978
11	15	3		Sept. 6/77	1978



#### BACKGROUND & GRID CONTROL:

United Cambridge Mines Limited undertook preliminary geological and geochemical survey work on the Dick Creek Copper Prospect in September, 1976. A 122 meter (400 feet) grid was established by pace or chain and compass.

Stations were marked with coloured ribbon but lines were not cut out. Many of the shortcomings inherent in this method of survey are apparent at Dick Creek.

Budget restrictions did not permit establishing grids in 1977, and all work completed during the 1977 season was, with minor adjustments, based on the 1976 grid. More detailed exploration of the Dick Creek Copper deposit will necessitate a proper grid for control. A grid with northwest trending grid lines might be appropriate in view of the apparent northeast trend of the mineralized zone.

#### REGIONAL GEOLOGY:

The Star Prospect is in the Stikine Arch, a structural unit suspected by many to be a former Island Arc. The Arch contains numerous porphyry copper prospects and deposits and continues to be explored extensively.

The Star claim block is near Sheslay and centered on the Hackett River which flows northwest along a prominent topographic lineament. Strong lineaments are evident both crossing and paralleling the major northwesterly trend. The Hackett River Valley within the claim area is partially coincident with the eastern margins of the main mass of the Kaketsa stock, a Triassic intrusion (218 ± 8 my.) trending north to northeast.

A number of areas on the northeast side of the river are also underlain by intrusive masses which range in size from small dikes and sills to stocks. Many of these masses are similar to and are probably outliers of the Kaketsa stock which is comprised mainly of light coloured, medium grained diorite. Other areas, however, are underlain by dark coloured coarser grained gabbroic intrusive rocks which are perhaps unrelated to the Kaktsa stock. All of the granitic rocks intrude rocks of the Stuhini Group, an assemblage which includes andesite, basalt, chert, siltstone and related tuffaceous sedimentary rocks. Some of the latter are well pyritized.

#### GEOLOGY - DICK CREEK PROSPECT:

#### GENERAL:

Copper mineralization at the Dick Creek Prospect

occurs in and around the outer margins of a small intrusion. The intrusion may be a northeasterly trending dike, or a partially unroofed stock of the same trend. It has an exposed width of about 400 meters but the present shape may have resulted from post intrusion faulting. The rock is medium grained diorite or quartz diorite, commonly hornblende rich and locally containing biotite. It is locally porphyritic.

The diorite intrudes volcanic and sedimentary rocks of the Stuhini Group. The stratigraphy of the Stuhini is complicated by faulting at this locale. Augite andesite is dominant at the lower trenches but is overlain by fine grained, locally porphyritic andesite. This unit contains a few interbeds of sedimentary rocks and is overlain by a predominantly sedimentary sequence including tuff, siltstone, and chert, with minor adesite. The sedimentary rocks are predominantly concordant with the intrusion. Massive porphyritic andesite flows flank the sedimentary rocks mainly on the northwest.

#### STRUCTURE:

The mineralized zone trends northeast, roughly parallel to the upper part of Dick Creek. This part of the Creek flows in one of a number of lineaments which trend

about S20°-30°W and which are believed to be fault zones. A strong clustering of lineaments is also evident on the upper west flank of the creek where trenching has shown they are caused by faults. Much of the faulting and fracturing occurs in the following systems: N25°-30°W; N55°-60°W; N15°-30°E; and to a lesser extent, within a few degrees of east-west or roughly S60°W. Where these systems intersect, the rocks are strongly shattered.

#### ALTERATION:

The mineralized zone is oxidized and highly weathered and displays a wide variation of colours from bright yellow to deep red, or locally, where copper stained, green and blue. Although the weathering masks other alteration, a number of features are apparent.

Argillic alteration is developed along some of the fault zones near the upper? limits of the intrusion. Quartz and pyrite fractures and sericite are locally evident within these zones.

Secondary potash feldspar occurs mainly in sparse, narrow quartz aplite zones a centimeter to almost a meter wide. Much of the pervasive pink alteration found in the fresh intrusion of the lower trenches may be hematite stained feldspar. Biotite, commonly fine grained, occurs erratically within the intrusion but is perhaps more abundant around the northeast

fringes. It may be related to secondary alteration.

Chlorite and epidote are erratically distributed, but are more common in the hornfelsed volcanics near the contact. The mafic minerals within the intrusive rocks are locally well chloritized. Pyrite in amount of 2 to 5% forms a prominent partial halo around the northern section of the intrusive. It occurs commonly in fractures, but is also disseminated, particularly in the well bedded sedimentary rocks.

Gypsum is widespread, but more prevalent in the upper sections of the zone. It is perhaps more abundant in the strongly pyritized rocks. Quartz veinlets are sparse throughout most of the complex but locally from strong networks. Carbonate (calcite) veinlets are also sparse, and laumontite? is present mainly in fractures within the intrusive rocks.

#### MINERALIZATION:

The mineralized zone is interpreted to trend northeast but this interpretation may change with further exploration in the surrounding areas. The zone is delimited only to the northwest by outcrop and by trenching. Large adjoining areas to the northeast and southwest, and particularly the valley slopes to the southeast are obscured by overburden and remain to be explored. Trenching has exposed the zone intermittantly

over approximately 600 meters (1968 feet) of length in a northeast direction. Strongly pyritized rocks are evident for at least another 250 meters (820 feet) in a northerly direction.

Chalcopyrite, pyrite and magnetite occur mainly in fractures and occasionally in quartz veinlets in intrusive and volcanic rocks in the upper trenches. These minerals also form minor disseminations in the intrusive rocks. Much of the copper mineralization in this area occurs as malachite, azurite or a black oxide, (tenorite?). Chalcopyrite, with magnetite, pyrite, and minor bornite in the lower trenches are disseminated mainly around the mafic minerals in the intrusion. Only minor amounts are evident on fractures. Chalcopyrite also occurs to a minor extent in adjoining fractured volcanic rocks, particularly where intrusive stringers are present.

Minor amounts of chalcopyrite and pyrite occur with magnetite, epidote and orthoclase? in a highly fractured, but distinctly bedded sequence of tuff, siltstone, chert and interbedded flows on the east side of Dick Creek. This mineralization appears to be in part stratigraphically controlled. A limited amount of trenching was completed but did not reveal abundant copper mineralization.

#### SAMPLING AND ASSAYS:

A large number of samples were collected from the trenches and assayed for total copper. Some samples were analysed individually for molybdenum, gold and silver. Seventeen composite samples also were prepared from 55 trench samples and assayed for gold and silver.

Trench 2 West yielded a weighted average of 0.417% Cu. over 179 meters (587 feet). Trench 1 West yielded a weighted average of 0.33% copper over 70 meters. Molybdenum content is low. Gold content is usually in the order of 0.003 oz./ton and silver content ranges from 0.01 to 0.18 oz./ton. All assays are shown on Figure 3 appended to this report.

#### MAGNETIC SURVEYS:

A preliminary magnetic survey was completed over the grid. The number of discrepancies found in the records during the plotting of the data detracts from the validity of the survey. However, the data collected along the baseline is believed to be reproducible and is shown on Figure 4 appended to this report.

High magnetic response is obtained from andesitic rocks along the baseline between 4 Northwest and 20 Northwest.

Lower response is obtained from mineralized diorite from 4 Northwest to 6 Southeast. A slight increase in magnetic

response from 6 Southeast to 8 Southeast perhaps reflects the change back to pyritized volcanic rocks which are present in the eastern section of trench 3 West.

The baseline from 8 Southeast to 20 Southeast is on the drift covered slopes of Dick Creek. The magnetic response of this section is surprisingly low, perhaps indicating underlying intrusive rocks. The contoured data, although suspect, also indicates relatively low magnetic response for much of the Dick Creek valley. The magnetic response increases from 20 Southeast to 28 Southeast, an area suspected to be underlain by volcanic rocks.

#### GEOLOGY - COPPER CREEK PROSPECT:

Copper mineralization in this area occurs in a complex assemblage of volcanic and related sedimentary rocks, similar to those found at Dick Creek, except for the fact that volcanic breccias and agglomerates are more prevalent. Intrusive rocks here are mostly porphyritic and occur more commonly as narrow dikes or sills rather than large masses.

Copper Creek is transected by strong northwesterly and northeasterly trending lineaments, and the rocks are extensively fractured. The main zone of mineralization coincides with or is adjacent to a strong northwesterly lineament

parallel to the Hackett River valley. The lineament may extend northwest to the mineralized area at Dick Creek.

Chalcopyrite, mostly with pyrrhotite and abundant pyrite, occurs in rocks that are well chloritized and epidotized where exposed along Copper Creek. Trenching of the zone on the west bank of the creek shows a continuation of this strong green alteration accompanied locally by garnet and chalcopyrite. This area is underlain in part by a zone of volcanic breccia or agglomerate of unknown size.

Records show that the drilled area contains important concentrations of copper mineralization, the best intersection being 0.485% copper over 143 feet in drill hole G-2. The records also indicate that the rocks are locally well altered by chlorite, epidote and secondary potash feldspar. They are well fractured and contain quartz, calcite and gypsum veinlets, and commonly contain abundant pyrite and locally magnetite.

Detailed geologic surveys augmented with geophysical surveys would be particularly useful in the search for extensions and other mineralized zones in this area.

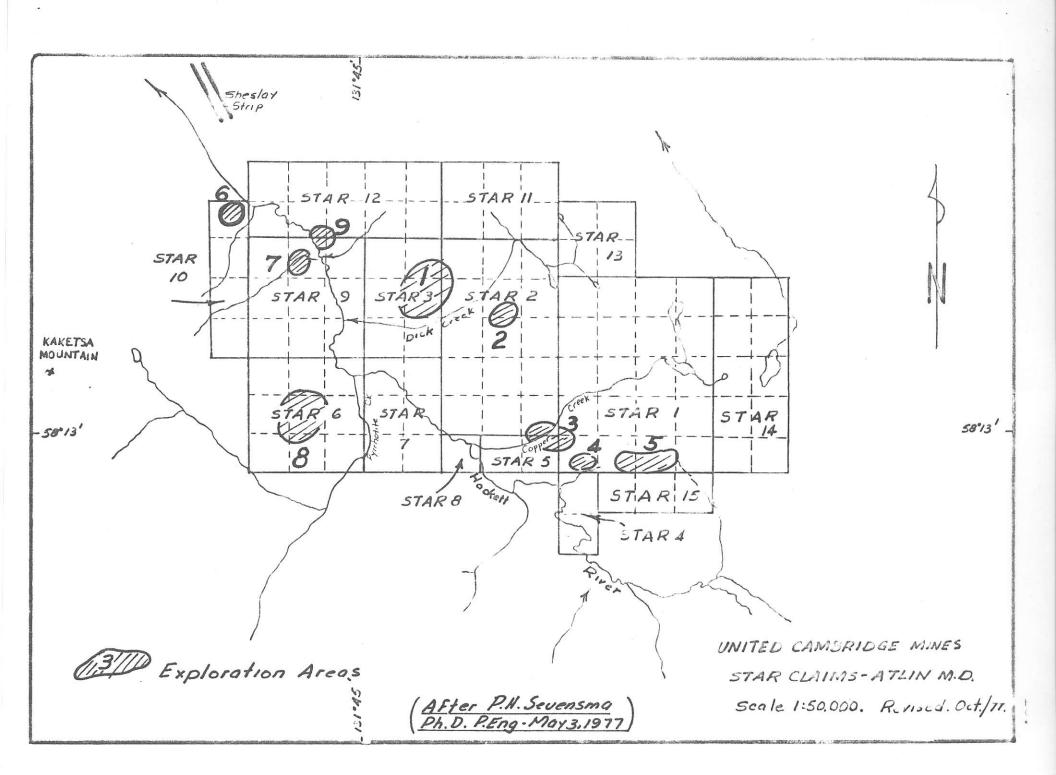
#### EXPLORATION POTENTIAL - OTHER AREAS:

Dr. P.H. Sevensma's report dated May 3, 1977, outlined nine specific target areas which warranted further exploration within the Star claims.

Areas 1 to 5 are on the northeast side of the Hackett River and include the two previously described deposits at Copper and Dick Creeks. The other three areas require follow-up exploration which should include geological, geochemical and geophysical surveys as initial steps to outline targets for drilling. Drill targets are already indicated at Dick Creek.

Three further areas, Numbers 6, 7 and 9, are clustered around the Hackett River near the northwest end of the claims. Areas 7 and 9 are related to copper soil anomalies. The upper section of area 9 was investigated in 1977 by soil samples along the new road from Dick Creek to the airstrip. Copper assays ranged from 138 to 530 PPM therefore further prospecting and mapping is recommended. Area 7 is mostly obscured by overburden.

Area 6 includes poorly exposed outcrops on the west bank of a small northeasterly flowing creek. Chalcopyrite and pyrite occur as disseminations and in fractures in brown quartz diorite. The mineralization may be in a dike



or chilled margin of an intrusion as it is in part bounded on the southeast by fresh hornblende diorite. Two samples of mineralized material yielded 830 and 1080 PPM Cu. Dr. Sevensma also reports a chalcopyrite-bornite showing to the north of the small creek. This showing was not found.

Target area 8 is on the upper southwest slopes of the Hackett River and bounded by Pyrrhotite and Polar Creeks. It is part of an area investigated previously by Skyline Explorations and includes scattered copper mineralization with pyrite in both intrusive and volcanic rocks. More detailed mapping and Induced Polarization surveys would be useful in the further exploration of this area.

Pyritized and altered volcanic rocks near the eastern border of the Star 1 claim were noted in 1976 but not thoroughly investigated. Some chalcopyrite was found in this general area, therefore further prospecting and mapping is recommended.

Much of the mineralization evident within the claims occurs on the valley slopes. Little attention has been directed in the past to the broad drift covered valley of the Hackett River. Members of both the northwest and northeast sets of fractures found in the Copper and Dick Creek areas probably are present also in the valley bottom. The valley bottom

is easily accessible from the road, therefore a number of reconnaissance Induced Polarization lines could be put in at reasonable cost, and would be useful in determining the potential of this area.

T.E. LISLE, P.ENG.

R.H. SERAPHIM, PH.D., P.ENG.

## REFERENCES:

- LISLE, T.E. & SERAPHIM, R.H. Report on The Sheslay

  Project, Star Claims, Kaketsa Area Atlin

  Mining Division, B.C. November 2, 1976
- SEVENSMA, P.H. United Cambridge Mines Ltd. Star Group Atlin Mining Division, B.C. May 3, 1977
- MISCELLANEOUS RECORDS & MAPS Copper Creek Area Courtesy of Dr. P.H. Sevensma. P.Eng.

Telephone: Office 685-2914 Res. 224-7309

# R. H. SERAPHIM ENGINEERING LIMITED GEOLOGICAL ENGINEERING

316 - 470 GRANVILLE STREET VANCOUVER, B.C. V6C1V5

#### CERTIFICATION

I, Dr. R.H. Seraphim, of the City of Vancouver, Province of British Columbia, hereby certify as follows:

- 1. I am a Geological Engineer residing at 4636 West 3rd Avenue, Vancouver, B.C., and with office at 316, 470 Granville Street, Vancouver, B.C.
- 2. I am a registered Professional Engineer of British Columbia. I graduated from the University of British Columbia in 1947, and from Massachussetts Institute of Technology in 1951.
- 3. I have practiced my profession for 26 years.
- 4. With T.E. Lisle, I retain a "Prospector's Interest" in the Star Mineral Claims.
- 5. The above report is based mainly on examinations made by me between June 29 and July 2, 1976 and June 22 and June 24, 1977, and on data collected by T.E. Lisle during 1976 and 1977.

DATED at Vancouver, B.C. this 17th day of November, 1977.

R.H. Seraphim, Ph.D., P.Eng.

#### CERTIFICATION

I, T.E. Lisle, of the District of North Vancouver,
Province of British Columbia, hereby certify as follows:

- 1. I am a Geologist residing at 145 West Rockland Road, North Vancouver, B.C.
- 2. I am a Professional Engineer registered in British Columbia. I am a graduate of the University of British Columbia, 1964.
- 3. I have practiced my profession since graduation and was engaged intermittently in exploration geology for several years prior to 1964.
- 4. With Dr. Seraphim, I retain a "Prospector's Interest" in the Star Mineral Claims.
- 5. The above report is based primarily on field work carried out by me between June 8 July 2, 1976, and August 30 September 28, 1976, and May 23 August 19, 1977; and by examinations by Dr. Seraphim June 29 to July 2, 1976, and June 22 to June 24, 1977. Some data was obtained in the references cited.
- 6. All of the mineral claims were staked by me and are believed to be staked in accordance with the British Columbia regulations.

DATED at Vancouver, B.C. this 17th day of November, 1977.

T.E. Lisle, P.Eng.

