GEOLOGICAL AND GEOCHEMICAL REPORT
COVERING

AC 1 to 21, AC No.1 Fraction & Alpha 1 to 24 Incl. M.C.'s

LIARD MINING DIVISION
British Columbia

57° 04' N. 131° 30' W.

Held By

STIKINE RIVER MINES LTD.
Work Done July 17th to August 16th, 1966

R.H. Dawson, B.Sc.
A.O. Hall, P.Eng. Vancouver, B.C.

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978

846

STIKINE RIVER MINES LTD.,
535 Howe Street,
Vancouver, B.C.

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References: D.A. Barr, 1966, The Galore Creek Copper Deposits, C.I.M.M. Bull. V.59, No.651, pp.841-853, July, 1966.
F.A. Kerr, 1948, Lower Stikine and Western Iskut River Areas, British Columbia, G.S.C. Memoir 246, p.94.

Accompanying Maps

INTRODUCTION

This report and the accompanying maps detail the results of a survey carried out by the writers assisted by John McGoran and Colin Swan during the period July 17th to August 16th, 1966 on and around the AC and Alpha claim groups of Stikine River Mines Ltd., Liard Mining Division.

LOCATION AND ACCESS

The area lies in the Coast Mountains of British Columbia east of the Alaska Panhandle, approximately 200 miles north 14 degrees west from Prince Rupert and 60 miles south 13 degrees west from Telegraph Creek, B.C.

Most of the area covered by the AC and Alpha claim groups lies between the northeast and east forks of Split Creek, a southwesterly flowing tributary of the Porcupine River, draining the area between Scotsimpson Mt. and Sphaler Creek (see Figure 1 inset). The area is covered by the Telegraph Creek N.T.S. map - scale 1 inch = 4 miles.

Access to the area may be obtained via a staging point on the Stikine River and thence by helicopter to the claim block. A Stikine River staging point may be reached in several ways:

(a) By barge either from Wrangell, Alaska, or from Telegraph Creek, British Columbia to a landing at the mouth of the Anuk River or Porcupine River - the barge is operated on a twice weekly basis.

ltd..-2-

(b) By float equipped aircraft from Prince Rupert to a landing at the mouth of the Anuk River or possibly at the mouth of the Porcupine River.

(c) By wheel equipped aircraft to one of the two recently prepared landing strips at the mouth of the Scud River.

It should be noted the roads made by Anaconda (Figure 1) are located about 1,500 feet from the edge of the claim block.

WORK DONE

A series of traverses were made from a camp established on the centre fork of Split Creek, close to the western border of the claim block. The geological information recorded during these traverses was supplemented by the collection of rock specimens. Representative rock specimens were later selected and twleve thin sections were cut. Five of these thin sections are scheduled for a detailed petrographic analysis by H.T. Carswell.

Stream sediment samples for geochemical analysis were collected at 37 stations and the following information was recorded at each station in the field:

(1) Approximate rate of flow of stream.

(2) Approximate size distribution of the sediment.

(3) Rock types in local outcrop and in stream gravels.

(4) Direction of drainage area from the sampling point

contd..-3-

The dried stream sediment samples were sieved and a sample of the $<^{1}/_{16}$ millimeter diameter fraction was forwarded to T.S.L. Laboratories Ltd., Vancouver for analysis. The system of analysis employed by T.S.L. for these samples was as follows:

(a) Extraction for copper, lead, zinc and silver by hot nitric acid.

(b) Determination of the proportion of each element present by use of an atomic absorption spectrometer.

(c) Molybdenum was extracted by hot hydrochloric acid and determined by the dithiol method.

The location of each geological and geochemical station was pinpointed on aerial photographs in the field and later transferred to the base map, Figure 3, prepared from an aerial photograph mosaic.

GEOLOGY

Two main rock units are present in the Upper Split Creek area, they are

(1) A (Triassic ?) volcanic group.

(2) A feldspar porphyry intrusive mass.

TRIASSIC (?) VOLCANIC GROUP

(Kerr, 1948, pp.27-29) Most of the claim block is underlain by a stratified sequence of tuffs with minor amounts of agglomerate and andesitic rocks which may be lavas, although characteristic forms of lava flows, such as pillow structures and amygdules were not observed in the field.

contd..-4-

An examination of the thin sections (6) of specimens taken from the rocks mapped as "(Triassic ?) Volcanic Group" shows that the rocks include altered andesites (?), altered tuffs, plagioclase-amphibole porphyry, amphibole-plagioclase porphyry, pyroscene porphyry and greenstone (?). The alteration of these andesitic rocks may be summarized as follows: plagioclase has been replaced by white mica, biotite, epidote zoisite (?) and amphibole; amphiboles have been replaced by biotite, epidote chlorite and carbonate; pyroxene has been replaced by chlorite.

A prominent rock type in the boulders along split creek at the Stikine River Mines' camp site and in the moraines due east of the camp site is thought to be an explosion breccia. This breccia contains numerous angular fragments of light grey weathering fossiliferous limestone and angular fragments of other rocks set in a medium grained matrix. It is noted that Kerr (1948, p.27) reports a similar breccia from the base of the Triassic volcanic group at several places in the region. The fossils in the limestone have a Paleozoic aspect and are probably of Permian age.

FELDSPAR PORPHYRY

Granitic rocks, mapped as "Feldspar Porphyry", crop out at many places along the northeast fork of Split Creek and for about 4,600 feet along the eastern fork, east of Anaconda's 1965 camp site.

contd..-5-

Megascopically the rock is observed to consist of pink or white feldspar phenocrysts up to 1/2" in length and minor hornblende (?) set in a fine grained matrix. In many places the rock is strongly altered but relict pink feldspars can still be discerned.

An examination of thin sections of six specimens the the "feldspar porphyry" (see appendix for details) indicates that the rock ranges from syenite to porphyritic granite bearing 10% quartz.

All of the specimens are altered. Plagioclase has been altered to white mica, biotite, epidote and dusty material. Potash feldspars are commonly altered to hematite. The textures of the three specimens which were studied in detail (DS 13, DS 22 and DS 26) suggest that the potash feldspar is to some extent a hydrothermal replacement of previous plagioclase. Barr, (1966, p.848) notes the same feature from mineralized zones at Galore Creek. It is interesting to note that some of the rocks (DS 22) contain biotite as an alteration product and that Barr (ibid.) states that this is a "consistent and directly associated alteration product" within mineralized area at the rich Galore Creek property.

In the field it was observed that the feldspar phenocrysts became smaller as the contact with the Triassic (?) volcanic sequence was approached, and that close to the contact the rock was equigranular. The volcanic rocks close to the contact contain abundant pyrite and some chalcopyrite. It is concluded that the "feldspar porphyry" intrudes the volcanic sequence, and the absence of notable sheared and fractures zones adjacent to the contact gives added weight to this conclusion.

contd..-6-

Bedding attitudes on the eastern side of the area are rather regular 23° - 30° south or southwest, but near the contact bedding observations suggest that a number of small folds are present; the axis of one such fold was observed east of the Stikine River Mines' camp site - the folding is probably related to the intrusion of the porphyry mass.

The granitic "feldspar porphyry" rocks and the volcanic rocks both carry anhedral and subhedral , medium grained, apatite and appear to be genetically related in this regard.

COPPER MINERALIZATION

Two types of mineralization can be distinguished on the AC and Alpha claim blocks:

Type (1) Within the volcanics, close to the volcanics - feldspar porphyry contact.

Type (2) Disseminated within the feldspar porphyry.

(1) The contact deposits, found within the volcanics, consist of chalcopyrite and malachite along joints and disseminated through the rock with abundant pyrite. At a showing near the Stikine River Mines' camp site chalcopyrite is also found in calcite veins.

(2) The copper mineralization disseminated through the feldspar porphyry occurs as chalcopyrite with traces of bornite and malachite. Pyrite is common in the mineralized porphyry and traces of magnetite veinlets were observed.

contd..-7-

The feldspar porphyry was found to be strongly altered at the outcrops along the east fork of Split Creek (DS 22 and DS 26 thin sections), and at each of the six locations visited the feldspar porphyry was found to carry disseminated chalcopyrite, visual estimate approximately 0.1% copper.

The geology and copper mineralization of the AC-Alpha claim block has features in common with the Galore Creek area (Barr, 1966).

(1) In both area, copper mineralization is associated with syenitic porphyry complexes.

(2) Both have characteristics, common to both "porphyry copper" and to contact type deposits.

(3) Some features of the rock alteration are similar.

(4) Both have approximately the same dominant trend - Galore Creek north 20 degrees east - Upper Split Creek about north 10 degrees east.

(5) Proximity - the southern-most deposits of the Galore Creek Basin - South Butte deposit is 3 miles from the AC-Alpha claim block.

No information is available on the group of claims immediately to the south and southwest of the AC-Alpha block. These claims are being explored by the Anaconda company.

GEOCHEMISTRY

The geochemical results point the way to several areas of interest, the most prominent of which lies in the southwest corner of the claim block in an area devoid of outcrop (GJM 14-15, DGS 18-19 and 21).

The station GJM 11 is below an exposed copper mineralized outcrop of volcanic rocks near the contact with the feldspar porphyry; GJM 4 and DGS 9

contd..-8-

anomalies are probably related to a similar type of mineralization. The high reading at DGS 23 is from a creek draining the original showing of Anaconda's claim block.

RECOMMENDATIONS

It is recommended that

(1) All of the claim posts of the AC group should be found and their positions marked on the ground and pin-pointed on aerial photographs.

(2) A program of soil sampling be carried out in the southwest corner of the claim block in the area north of the east fork of Split Creek.

(3) Stream sediment samples be taken at all streams not already sampled, which drain the southwest corner of the claim block both north and south of the east fork of Split Creek and east of the northeast fork of Split Creek.

(4) The outcrops along the east fork of Split Creek be closely examined and a program of bulk sampling be carried out, if the further examination of the mineralization appears to justify the program.

(5) When the claim locations have been properly established, those claims which are drained by creeks without anomalous copper readings should be allowed to lapse.

Respectfully submitted,

R.H. Dawson, B.Sc.
A.O. Hall, P.Eng.

T.S.L. Laboratories Limited,
325 Howe Street,
Vancouver 1, B.C.

Certificate of Analysis (Copy)
No.V0868-1 & 2, dated August 3rd, 1966
Stream Sediment Samples - Results in Parts Per Million

	Cu	Pb	Zn	Ag	Mo
DGS 1	73	10	14	1	*
" 2	100	25	64	2	*
" 3	94	24	45	2	*
" 4	58	25	22	2	*
" 5	66	24	23	1	*
" 6	65	15	25	1	*
" 7	44	10	13	1	*
" 8	46	12	25	2	*
" 9	270	25	43	3	*
" 10	110	15	32	3	*
" 11	94	15	27	2	.5
" 12	86	21	64	2	*
" 13	82	15	47	3	.5
" 14	150	21	18	3	*
" 15	62	5	16	2	*
" 16	49	11	20	1	*
" 17	42	8	14	1	*
" 18	450	24	64	3	1
" 19	160	25	45	3	5
" 20	38	11	18	1	*
" 21	990	32	38	4	3
" 22	41	24	23	1	*
" 23	2490	38	32	5	2
GJM 1	190	15	26	3	.5
" 2	280	26	22	3	*
" 3	320	15	24	3	1
" 4	350	11	13	3	2
" 6	62	10	34	2	*
" 8	130	24	52	3	*
" 9	250	28	44	3	*
" 10	500	24	44	4	1
" 11	120	15	65	3	*
" 12	100	15	38	2	*
" 13	104	14	37	2	*
" 14	820	26	65	4	2
" 15	140	28	35	3	*
" 16	47	15	37	2	.5

Cu, Pb, Zn, Ag by hot HNO_3 extraction method by A.A.
Mo by hot HCl extraction determined by dithiol method.

* = Less than .5

APPENDIX

PETROGRAPHIC DETAILS

(Results of a thin section study by H.T. Carswell, Petrographer)

The location of each rock specimen collection point is shown in Figure 3.

The five sections JM 11, DS 13, DS 22, DS 23 and DS 26 were given a detailed examination; DS 4, DS 10, DS 25 and JM 15 were given a less detailed examination, and JM 2, JM 12 and DS 14 were examined only briefly.

GRANITIC ROCKS

Specimen DS 13 - Porphyritic granite

Texture The rock consists mainly of subhedral, less than 5 mm., potassium feldspar phenocrysts; less than 4 mm., subhedral, altered plagioclase crystals; equant to interstitial, less than 4 mm. quartz grains; generally subhedral, medium grained to fine grained, amphibole and euhedral chlorite pseudomorphs.

The texture is granitic with slightly porphyritic, poikilitic potassium feldspar containing remnants (?) of plagioclase as well as euhedral, fine grained oriented inclusions of the same mineral. The potassium feldspar also contains anhedral, fine grained, inclusions of quartz and subhedral, fine grained, oriented inclusions of apatite, biotite, epidote and amphibole - chlorite is commonly subophitic in the amphibole. Inclusions of round, altered fine grained plagioclase occurs in medium grained chlorite. Fine grained round

contd..-11-

epidote inclusions are present in amphibole. Quartz replaces amphibole. Epidote replaces plagioclase. Some potassium feldspar is interstitial. Sphene is usually round and fine grained. Colourless amphibole apparently replaces hornblende. Leucoscene is present in chlorite.

Alteration Plagioclase is strongly altered to very fine grained white mica and fine grained epidote. Potassium feldspar contains brown very fine grained dusty hematite. Opaque minerals are associated with mafics and are fine grained and anhedral; those occurring in amphibole are rimmed by chlorite.

Specimen DS 22 - Altered syenite

Texture The texture is diomorphic with subhedral, less than 5 mm. perthitic potassium feldspar; less than 3 mm., subhedral potassium feldspar and minor quartz. Some 0.5 mm. subhedral apatite is present. The altered cores of some orthoclase crystals may have originally been plagioclase. Mutual contacts of potassium feldspars are marked by minute albite crystals.

Alteration Plagioclase has been altered to very fine grained brown 'dust', very fine grained white mica (?), and very fine grained brownish green biotite. Some plagioclase has been altered completely to the very fine grained white mica. Some altered plagioclase contains fine grained carbonate. Orthoclase has been altered to very fine grained, brown 'dusty' hematite. The quartz present (5%) appears to have been introduced at a later stage. Diffuse, less than 0.1mm. veinlets of fine grained white mica and quartz are present. A veinlet 0.5 mm. wide of opaque grains and biotite cuts the rock. Some orthoclase is bent. The feldspars are moderately well-oriented. Opaque grains are fine grained and anhedral to interstitial and are generally not all

associated with mafics.

Specimen DS 26 - Altered syenite

Texture The specimen is partly crystalloblastic, with feldspars generally anhedral. One phase of the rock is characterized by mafic-poor interlocking fine grained plagioclase cut by fine grained epidote veinlets. This phase is in gradational contact with coarser grained potassium feldspar-bearing, strongly epidotized material.

Traces of medium grained euhedral plagioclase are present in the coarse grained phase. Anhedral medium grained apatite is present in the fine grained material. In the coarser grained phase, masses of medium grained amphibole and epidote are associated with opaques. Sphene is present as interstitial networks in fine grained plagioclase and also as fine grained equant anhedra. Actinolite less than 5 mm. in length is generally euhedral.

Alteration Plagioclase has been altered to fine grained epidote (?), minor fine grained white mica and fine grained needles of amphibole. Potash feldspar has been altered to round, very fine grained "dusty" hematite. Some carbonate is interstitial. Plagioclase is more strongly altered in the coarse grained phase.

Veins Discontinuous, less than 0.5 mm. quartz and orthoclase veinlets are present.

Opaque Minerals The opaque mineral grains are round fine grained and commonly associated with the mafics.

contd..-13-

Specimen JM 12 - Pyroxene granite

Texture The texture is granitic with round pyroxene, small euhedral plagioclase grains and graphic quartz.

Alteration The pyroxene has been altered to very fine grained clay minerals (?) and slightly altered to chlorite and amphibole. The orthoclase contains very fine grained hematite. The plagioclase has been strongly altered to very fine grained white mica.

Specimen JM 21 - Altered feldspar-porphyry

Texture Very fine grained alteration minerals obscure the original texture although some ghosts of subhedral, medium grained feldspars are visible. Metallic minerals present are associated with fine grained quartz.

Specimen DS 14 - Medium grained granite

Texture The texture is granitic with euhedral potassium feldspar grains, smaller euhedral plagioclase grains. Some of the potassium feldspar occurs as phenocrysts.

Alteration The plagioclase is saussuritized.

VOLCANIC ROCKS

Specimen DS 23 - Altered andesite

Texture Plagioclase phenocrysts occur with amphibole phenocrysts in a fine grained matrix. Although the plagioclase phenocrysts are commonly euhedral, some have irregular outlines. The plagioclase grains are less than 4 mm. in length and the amphibole grains are less than 2 mm. in length. The fine grained

contd..-14-

matrix consists of interlocking quartz and feldspar with minor anhedral biotite. The fine grained quartz in the matrix appears to have been introduced at a later stage in the rocks' history.

Alteration Amphibole is replaced along its cleavage by biotite. Some anhedral medium grained epidote is present. Plagioclase has been strongly altered to fine grained white mica, biotite, epidote and zoisite (?). Amphibole has been strongly altered in some cases to chlorite and carbonate. Plagioclase has been replaced by potash feldspar. Some carbonate is present and contains fine flakes of chlorite (?). Some of the original plagioclase crystals now consist of dense, very fine grained white mica. Fine grained round epidote occurs in amphibole.

Veins Discontinuous fine grained carbonate veinlets are present. A minute quartz vein and several carbonate veinlets cut amphibole.

Specimen JM 11 - Altered tuff

Texture The rock contains less than 3 mm. euhedral albite among smaller, rounded to angular albite grains in a very fine grained granular feldspathic matrix. There is no obvious directed texture.

Alteration The matrix is strongly altered to biotite, amphibole, epidote and chlorite; some fine grained nests of these minerals are present. A 1 cm. nest of medium grained radiating clear amphibole is associated with opaque minerals.

Veins A 0.05 mm. epidote veinlet cuts the rock and a potash feldspar veinlet cuts albite.

Note The texture is reminiscent of a crystal tuff, with broken and rounded grains between euhedral crystals.

contd..-15-

Specimen DS 4 - Plagioclase-amphibole porphyry

Texture Less than 4 mm. euhedral amphibole; euhedral, less than 3 mm. plagioclase; and euhedral to anhedral epidote occur in a very fine grained granular to idiomorphic albite groundmass. Some interstitial medium grained carbonate is present. Two varieties of amphibole occur - one green (hornblende), the other colourless.

Alteration Plagioclase has been altered to fine grained, scattered, white mica and epidote. In some phenocrysts, white mica and epidote are dense. Carbonate has replaced amphibole to a slight extent. Epidote nests appear to have replaced plagioclase phenocrysts.

Note The phenocrysts show a slight orientation.

Specimen DS 10 - Pyroxene porphyry

Texture Less than 1 mm. subhedral clinopyroxene grains occur in a fine grained albite matrix. The rock contains the same anhedral medium grained apatite as other rocks of the suite.

Alteration Chlorite slightly replaces pyroxene. The matrix is strongly altered to fine grained epidote and zoisite (?).

Veins Thin epidote veinlets cut the rock.

Specimen DS 25 - Altered Amphibole - plagioclase porphyry

Texture Amphibole, biotite and plagioclase phenocrysts occur in a very fine grained granular albite matrix. The rock contains some anhedral medium grained

contd..-16-

apatite. No obvious directed texture was observed.

Alteration Carbonate replaces amphibole. Plagioclase is almost completely altered to very fine grained epidote. Biotite and fine grained epidote are present both in amphibole and in the groundmass.

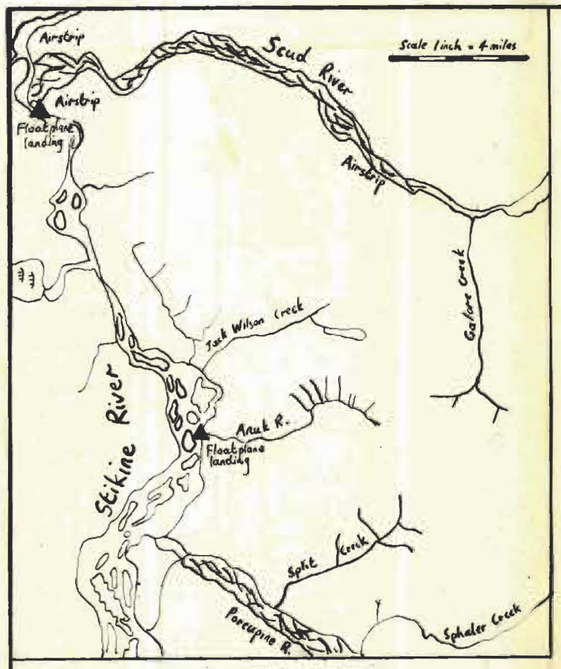
Veins A 5 mm. carbonate-epidote vein cuts the rock.

Specimen JM 15 - Greenstone (?)

Texture Epidote and chlorite are intergrown as pseudomorphs after a tabular or prismatic mineral. Some clusters of medium grained epidote are present. These minerals occur in a finer grained groundmass of amphibole, chlorite and epidote. Some 5 mm. amphibole grains are present.

R.H. Dawson, B.Sc.
A.O. Hall, P.Eng.

[TO ACCOMPANY GEOLOGICAL AND GEOCHEMICAL REPORT BY R.H.DAWSON AND A. HALL P.ENG. ON THE AC AND ALPHA GROUPS ON UPPER SPLIT CREEK, LIARD M.D. DATED AUGUST 16, 1966]



INDEX MAP

2 (?TRIASSIC) VOLCANIC GROUP TUFFS, AGGLOMERATES, ?ANDESITES AND BRECCIAS

1 FELDSPAR PORPHYRY

Approx. 131° 31' W Long.

N

magnetic North

declination of compass needle in 1954 30° east and decreasing 4 mins. annually.

MOUNT SCOTSIMPSON

Stikine River Mines 1966 camp

Approx. 57° 04' N Lat.

BEDDING (INCLINED, HORIZONTAL, APPROXIMATE)

ANTICLINE, PLUNGE SHOWN

GEOLOGICAL BOUNDARY (DEFINED, APPROXIMATE)

CLAIM POST

ROAD

UNMARKED CAIRN

GLACIER

CAMPSITE

rock trench

Arm trenching + drilling

Anaconda 1965 campsite

Anaconda 1966 campsite

SPLIT CREEK

FIG.1 - GEOLOGICAL MAP OF THE UPPER SPLIT CREEK AREA — STIKINE RIVER MINES LTD. AC AND ALPHA CLAIM GROUPS, LIARD MINING DIVISION
scale 1 inch = 1,500 feet

0 1500 3000 4500 6000 7800 Feet

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Map by R.H. Dawson Aug. 16th, 1966

FIGURE 2.

GEOCHEMICAL MAP OF THE UPPER SPLIT CREEK AREA — STIKINE RIVER MINES AC AND ALPHA CLAIM GROUPS, LIARD MINING DIVISION

[TO ACCOMPANY GEOLOGICAL AND GEOCHEMICAL REPORT BY R.H.DAWSON AND A. HALL P.ENG. ON THE AC AND ALPHA GROUPS ON UPPER SPLIT CREEK LIARD M.D. DATED AUGUST 16, 1966]

scale 1 inch = 1500 feet

0 1500 3000 4500 6000 7500 Feet

O GEOCHEMICAL SAMPLE LOCATION

● CLAIM POST

△ UNMARKED CAIRN

GLACIER

N

magnetic north

MT. SCOTSIMPSON

Approx. 57° 04' N Lat.

Approx. 131° 31' W Long.

SPLIT CREEK

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DS Dawson geological stations
Dawson geochemical stations
JM McGoran geological stations
GJM McGoran geochemical stations
CES Swan geochemical stations
BC Corrigan geochemical stations
mineral claim post

Approx. 131°31' W Long.

Approx. 57°04' N Lat.

N

magnetic north

FP AC 1 & 2 IP AC 3 & 4

FP AC 3 & 4 IP AC 5 & 6

FP AC 5 & 6 IP AC 7 & 8

FP AC 7 & 8 IP AC 9 & 10

FP AC 9 & 10

FIG. 3 - GEOLOGICAL AND GEOCHEMICAL STATIONS UPPER SPLIT CREEK AREA — STIKINE RIVER MINES LTD. AC AND ALPHA CLAIM GROUPS, LIARD MINING DIVISION BRITISH COLUMBIA

[TO ACCOMPANY GEOLOGICAL AND GEOCHEMICAL REPORT BY R.H.DAWSON AND A. HALL P.ENG. ON THE AC AND ALPHA GROUPS ON UPPER SPLIT CREEK, LIARD M.D. DATED AUGUST 16, 1966]

scale 1 inch = 1500 feet

0 1500 3000 4500 6000 7500 Feet

Map by R.H. Dawson Aug. 18, 1966

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