GEOLOGICAL REPORT ON THE AL 4 CLAIM HUNTER BASIN AREA, B.C.

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SUMMARY

The AL 4 mineral claim is located in Hunter Basin 17 miles south of Smithers, B. C. The general area is underlain by Hazelton Group volcanics which are intruded by a number of small granodiorite stocks, none of which occur on the claim.

Numerous quartz fissure veins are known in Hunter Basin and these have been explored intermittently from 1903 to the present. Most veins carry economic grades in copper and silver but are too small to be of interest. However, from the King vein, which is up to 6 feet wide, a small tonnage of high grade ore was mined and shipped from 1939 to 1941.

Most of the exploration to date in Hunter Basin was concentrated on the King vein. Other mineralized veins, largely obscured by talus and overburden, occur on the AL 4 claim and have not been adequately explored. In the conclusion of this report a program for exploring these veins has been recommended.

INTRODUCTION

At the request of James A. Rutherford the following report was prepared on the AL 4 claim located in Hunter Basin. Data was obtained from published government reports and maps as well as from unpublished private reports. The writer has not visited this property.

LOCATION latitude 54° 32' longitude 127° 10'

The AL 4 claim is located in Hunter Basin, which is a north-facing cirque at the headwaters of Cabinet Creek, a tributary of Goathorn Creek which drains northward into Telkwa River. Hunter Basis is approximately 17 miles south of Smithers, B. C. The claim covers the ridge which forms the east wall of the cirque and extends from 4,500 feet to 7,500 feet elevation.

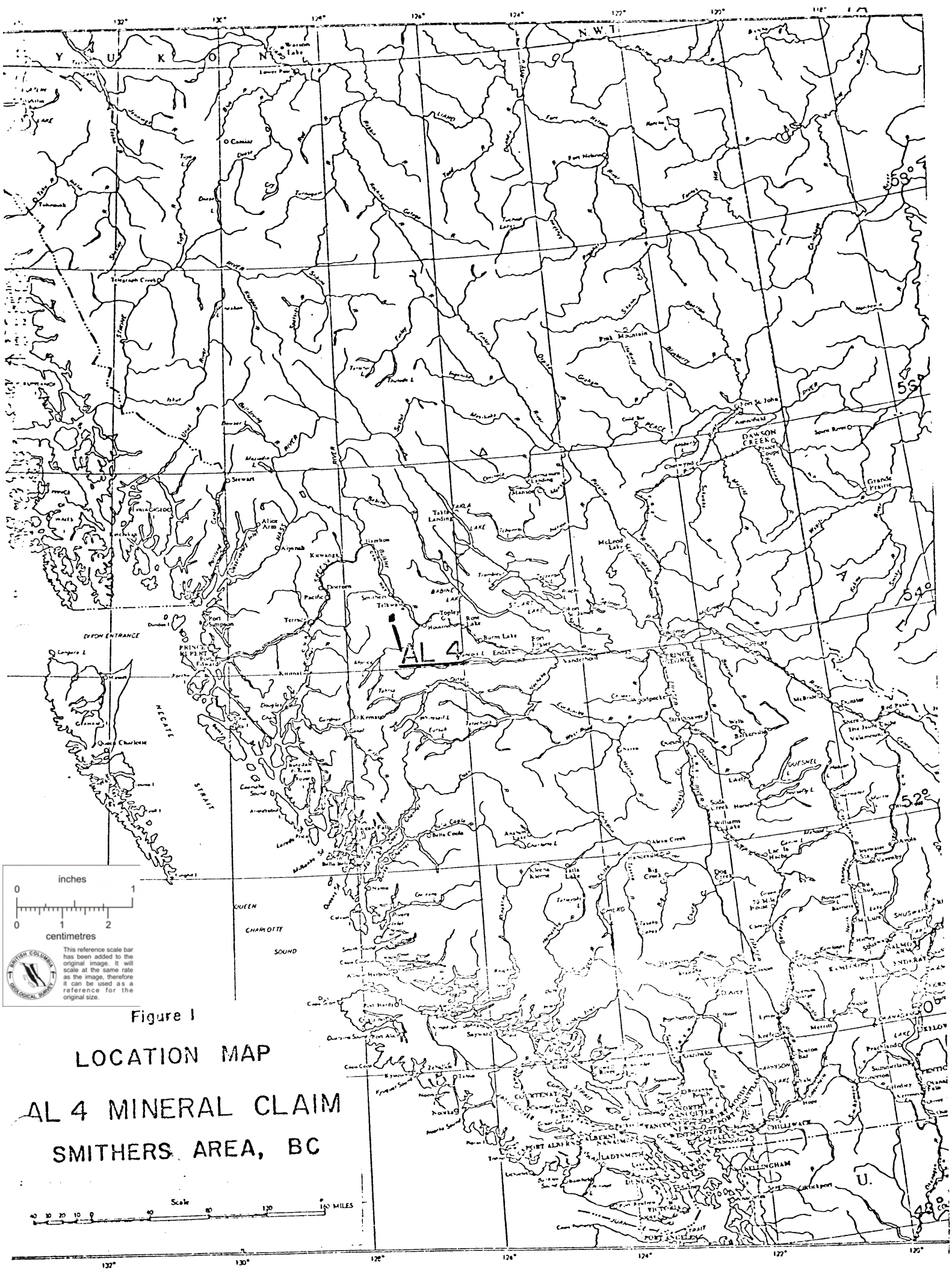


Figure 1

LOCATION MAP

AL 4 MINERAL CLAIM

SMITHERS AREA, BC

ACCESS

The claim is accessible via 6 miles of good road from Telkwa to Bulkley Valley Collieries on Goathorn Creek, then by 9 miles of 4-wheel drive road to the property.

Easier access is by helicopter from Smithers.

TOPOGRAPHY

The AL 4 claim is located in the Telkwa Mountain Range, which is a part of the larger Bulkley Mountain Range that is characterized by isolated groups of mountains that rise to elevations exceeding 8,000 feet and that are separated by prominent valleys. The Bulkley Mountain Range is bordered on the east by the Nechako Plateau and on the west by the Coast Mountain Range.

HISTORY AND PREVIOUS WORK

The first reported activity in Hunter Basin was in 1903 when William Hunter discovered copper mineralization at scattered locations within the cirque. The following year numerous prospectors explored the general area which resulted in many claims being staked.

Hunter discovered numerous narrow veins and thin volcanic flows mineralized with bornite, chalcopyrite and in some cases tetrahedrite. He located the following claims to cover these showings: Idaho, Mohock, Rainbow, King and Jackpot; then explored each with shallow pits, trenches and shafts until 1914. In 1916 the property was optioned and 5 tons of selected ore was shipped to a smelter at Prince Rupert.

Following this early activity, the Hunter Basin area appears to have been idle until Conwest Exploration Co., Ltd. optioned the properties from 1939 to 1941. During this period Conwest developed two levels totalling 750 feet on the King vein and mined a limited tonnage. They shipped 249 tons of sorted ore to the Tacoma smelter which averaged 0.83 oz./ton gold, 23.6 oz./ton silver and 15.6% copper.

In October 1962, 28 tons of selected mine dump ore was shipped to the same smelter by Canadian American Mining Corporation, Inc. This shipment averaged 0.45 oz./ton gold, 13.58 oz./ton silver and 6.65% copper.

In 1967 Canadian American Mining Corporation, Inc. carried out an exploration program consisting of an aeromagnetic survey, induced polarization survey, and road construction. Trenching was attempted to test the I.P. anomalies, but was unsuccessful in reaching bedrock. The results of this work are not available to the writer.

Falconbridge Nickel Mines, from 1968 to 1970, explored all or part of the old Tom, Lava, Webster, Crater and Marmot claims. These claims are now partially covered by the recently staked AL 4 claim but they mostly lie to the east of it. During this period Falconbridge carried out a program which included topographic and geological mapping, magnetometer and self potential surveys, soil and silt sampling and limited diamond drilling. The results of the above work are in private company records and not available to the writer. However, British Columbia Department of Mines and Petroleum Resources publications summarize the results as follows:

> "Copper-silver mineralization occurs in siliceous volcanic units of the Hazelton Group and copper-molybdenum mineralization is present in a small body of granodiorite."
>
> "Pyrite, chalcopyrite, minor bornite, and tetrahedrite occur in siliceous volcanic rocks."
>
> "Near flat-lying volcanics intruded by granodiorite and diorite dykes and plugs; largest plug contains disseminated chalcopyrite with molybdenite on fractures."

In 1969 Hunter Basin Mines Ltd. staked the HB and AJ claims to cover the Hunter Basin area. The following year, on behalf of this company, Alrae Engineering conducted an exploration program which included detailed geological mapping, stream silt sampling, eight lines of E.M. surveying totalling 4,500 feet and four diamond drill holes totalling 1,606 feet. This program was supervised by G. C. Stephens, B.Sc, M.Sc. and it is from his report which much of the recent information was obtained.

In 1972 Hunter Basin Mines Ltd., carried out 1,000 feet of stripping and 1.5 miles of road construction. The following year they stripped 750 feet.

PROPERTY

The property consists of one claim, AL 4, comprising 15 units. The following information was obtained January 28, 1976 from the "Affidavit for Mineral Claim" filed in the Vancouver Sub-mining Recorder's Office:

Claim Name	-	AL 4
Record Number	-	168
Recording Date	-	October 27, 1975
Owner	-	James A. Rutherford 1887 W. 58th Avenue Vancouver, B. C.

"Consisting of 5 unit lengths south and 3 unit lengths east. The legal corner post is situated in Hunter Basin - Cabinet Creek, latitude 54°32', longitude 127°10' approximately 20 miles south of Smithers, B. C."

REGIONAL GEOLOGY

The claim is underlain by Hazelton Group volcanics which are Lower Jurassic in age. Regionally, the flows of the Hazelton Group vary in composition from basalt to rhyolite. Interbedded with the flows are numerous volcanic fragmental rocks which vary from very fine grained, sub-aerial tuffs to very coarse volcanic agglomerates containing rock fragments up to 3-4 inches in diameter.

Conglomerates containing conglomeratic pebbles, are present in the Hazelton Group, indicating an erosional period during deposition of the Group.

The stratigraphy of the Hazelton Group was separated by Kindle (1954) into five separate lithologies. The volcanics within the claim group are thought by Stephens (1970) to belong to the lowest unit of this five-fold division and may, therefore, have a total thickness of 4,000 feet (Kindle, 1954, p.9).

Numerous, small intrusive bodies, two to four miles in diameter, occur within the Hazelton Group. These vary in composition from diorite to granodiorite and are known as the Bulkley Intrusives. They are middle to late Cretaceous in age. Kindle (1954) states that:

"These granitic intrusions are of special significance in that most of the mineral deposits of the region either occur in them or near them in the invading rocks of the Hazelton Group."

One of these granodiorite stocks occurs to the south of the property and contains small amounts of disseminated pyrite.

Numerous mineral deposits in the Hazelton and Smithers area contain sulfides of Ag, Au, Cu, Mo, Pb and Zn. These deposits are similar to those within the claim area; that is, they occur in veins mostly developed along fault and shear zones.

LOCAL GEOLOGY

A. Hazelton Group Volcanics

All bedrock exposed in Hunter Basin consists of the Hazelton Group volcanics (Stephens, 1970). He mapped four separate units which were described as follows in decreasing age:

1. Lower Red Unit - thickness unknown - it varies in colour from brick-red to dark maroon, and consists almost entirely of fragmental volcanic rocks which vary from fine grained tuffs to very coarse volcanic agglomerates.
2. Epidote - Rich Unit - 850 to 1,000 feet thick - it is yellowish-green to dark greyish-green in colour and composed predominantly of medium to coarse grained tuffs but also contains a few fine grained beds of either fine grained tuffs or aphanitic flows.
3. Upper Red Unit - 250 feet thick - it is composed predominantly of very fine grained, dark red tuffs and/or flows with sparse interbeds of coarse grained tuffs.
4. Diorite Flow Unit - thickness is unknown because where it occurs it now forms the land surface. It is similar to, but slightly coarser grained than a typical basalt.

B. Bulkley Intrusive

The Bulkley Intrusive, while not exposed in Hunter Basin, may be of importance in the mineralization of the Hazelton Group. The nearest exposure is approximately 2,000 feet south east of the AL4

claim and consists of porphyritic granodiorite with approximately 2% fine disseminated pyrite. While not exposed on the claim, this intrusive might underlie it. It is generally believed that there is a genetic relation between the copper deposits in the Hazelton Group and the Bulkley Intrusives (Kindle, 1954).

STRUCTUAL GEOLOGY

Structual features mapped by Stephens (1970) include minor folds, numerous joints and shears and a scattering of faults. He also observed many veins.

1. Folds -

   Folds occur in at least three locations within Hunter Basin and all have fold axes which trend N 10° - 20° W. The folds show no noticeable plunge and vary from approximately 10 to 150 feet wide.

2. Joints -

   They occur in three dominant sets, namely N 20°E, N 45°W and approximately east-west. Many show evidence of slight movement - ¼ to ½ inch displacements and slickensided surfaces.

3. Shear Zones -

   Many shear zones are present and they parallel the above joint sets. They vary in width from one to six inches.

4. Faults

   Major faults are present but they are not always easy to recognize. They are generally steeply dipping and strike either east-west or randomly to the northwest. On surface they appear as either long, narrow, linear depressions or as closely spaced parallel fracture zones adjacent to the main break.

5. Veins

   Quartz commonly forms veins throughout the Hazelton Group volcanics in the Hunter Basin area. These veins fill many of the above mentioned joints, shears and faults. In joints quartz occurs as small veinlets 1/16 inch wide while in shears veins up to six inches wide are common. Veins in fault zones are much wider, as evidenced by the King vein which is up to six feet wide.

ALTERATION

Epidote and chlorite are the principal alteration products in this area. Epidote is widespread in the Epidote-Rich Unit where it appears to be stratigraphically controlled. Pervasive epidotization does not extend beyond this unit. Epidote occurs in veinlets with quartz and calcite in the Lower and Upper Red Units and as large blebs in the Lower Red Unit.

Chlorite occurs as a thin film along joint surfaces in the Lower and Upper Red Units and along the margins of mineralized veins. In the latter case the chlorite alteration zone may attain a considerable width, as shown by the King vein where it is 20 to 30 feet wide on both sides of the vein.

Pervasive chloritization occurs in some areas not related to veining.

MINERALIZATION

Numerous mineral occurrences are known in Hunter Basin, most of which are mineralized quartz veins. As mentioned earlier, quartz veining is common and is associated with all joint, shear and fault sets. However, studies by Stephens (1970) indicate that only those which strike approximately east-west are mineralized. All veins are steeply dipping.

The mineralized veins are composed of white quartz containing massive pods of chalcopyrite and bornite with minor pyrite and specularite. Chlorite alteration is commonly associated with the veins and varies from a thin slickensided film to pervasive alteration of the wall rocks. Veins are commonly narrow but several are known which vary from three to 10 feet wide (King vein, Colorado vein).

Kikuchi (1969) inferred that a large low grade disseminated ore body existed in a "hybrid zone" on the ridge to the east of Hunter Basin. Later work by Stephens (1970) in this area found that instead of a "hybrid zone", a zone of closely spaced shears and faults were present which were mineralized not only within the gougy sections but also to a minor degree in the wall rocks. Ore grade mineralization exists only in the shears and faults, not in the wall rocks.

The western boundary of the AL 4 claim (not yet surveyed) lies approximately 1,500 feet east of the King vein, the only producer in Hunter Basin. The eastern extension of this vein, if present, has not yet been found; but it could be on the AL 4 claim. Numerous mineral occurrences are on this claim but as yet they have not been tested. These are poorly exposed and are covered to a large degree by talus and/or overburden.

Hunter Basin Mines Ltd. tested two mineralized areas by diamond drilling. DDH 1 and 2 were drilled to explore for the down-dip extension of the King vein and DDH 3 and 4 were drilled to test Kikuchi's (1969) disseminated low grade copper zone.

DDH 1 intersected 2 inches of sphalerite (?) and specularite at an approximate down-dip length of 300 feet while DDH 2 did not locate the vein. This latter hole was drilled at approximately 20° to strike and consequently may not have gone far enough. DDH 3 and 4 encountered numerous clay-rich fault zones, a few fine quartz stringers containing minor pyrite, chalcopyrite and bornite, and weakly disseminated chalcopyrite over the last 50 feet of the hole.

Assays from all holes were very low.

CONCLUSION

Numerous mineral occurrences are known within Hunter Basin most of which are quartz-filled fissure veins. Many of these contain small discontinuous pods of massive chalcopyrite, bornite, pyrite, and specularite with associated values in silver and gold. Most of these high grade veins are too small to be of economic importance.

The east rim of the cirque, now covered by AL 4 claim, contains many east-striking fault zones containing veins similar to those described above. In this area they are poorly exposed due to talus and overburden.

It is concluded that the AL 4 claim warrants further exploration to examine the mineralized east-west fault zones for the possible presence of a large high grade vein, similar to or better than the King vein. As previously mentioned, the eastern extension of the King vein has not been found but it could also be present on this claim.

RECOMMENDATION

The following exploration program is recommended for the AL 4 claim:

1. Detailed geological mapping and prospecting to locate and define all mineralized fault zones.
2. V.L.F. E-M-16 surveys to explore talus and overburden-covered areas for extension of surface mineralized zones as well as for hidden high grade veins.
3. Hand trenching, drilling and blasting to expose mineral occurrences for sampling.
4. Sampling of all significant veins.

It is estimated that this program would take 2 months to complete.

Respectfully submitted,

Harold M. Jones

Harold M. Jones, P.Eng.

COST ESTIMATE FOR PROPOSED PROGRAM

Stage I

Personnel	
1 geologist @ $125/day - 2 months	$7,500
1 assistant @ $40/day - 2 months	$2,400
1 driller-blaster @ $60/day - 1 month	$1,800
1 labourer @ $40/day - 1 month	$1,200
Camp	
Equipment - tents, lumber, supplies, etc.	$2,500
Food	$2,000
Bulldozing	
Road repairs, stripping, etc.	$5,000
Transportation	
Air Fares	$ 500
4-wheel drive truck @ $600/month	$1,200
Assays	$1,000
Report Preparation	
Report, maps, printing costs	$1,000
	$26,100
Contingencies - 15%	3,900
Total	$30,000

Contingent on the results of this proposed program, Stage II is proposed as follows:

COST ESTIMATE - cont'd.

Stage II

Diamond Drilling	
2,000 feet of BQ drilling @ $20/foot	$40,000
Transportation	
Helicopter for drill moves, say	$ 4,000
Engineering	
Locating drill holes, logging core, etc.	$ 3,000
Contingencies	$ 3,000
Total	$50,000

REFERENCES

1. Minister of Mines Annual Reports, Province of B. C. - 1904, p. 102; 1905, 83, 127; 1906, p.98; 1908, p.64; 1909, p.85, 1911, p.111; 1914, p.219; 1932, p.85; 1939, p.99; 1940, p.40, 84; 1941, p.24, 72.

2. G.E.M., B. C. Dept. of Mines and Petroleum Resources, 1969, p.86; 1970, p.160; 1971, p.176; 1972, p.418.

3. Kindle, E. D. (1954) - Mineral Resources Hazelton and Smithers Area, Cassiar and Coast Districts, B. C.

4. Jury, Rae G., (1968) - Private report for Hunter Basin Mines Ltd. (N.P.L.)

5. Haaland, O. E., (1968) - Private report for Hunter Basin Mines Ltd. (N.P.L.)

6. Kikuchi, T. (1969) - Private report for Hunter Basin Mines Ltd. (N.P.L.)

7. Stephens, G. C. (1970) - Private report for Hunter Basin Mines Ltd. (N.P.L.)

8. Map 971A - Smithers - Fort St. James, geological map; issued by G.S.C. 1949.

CERTIFICATE

I, Harold M. Jones, of the City of Vancouver, British Columbia, do hereby certify that:

1. I am a Consulting Geological Engineer.

2. I am a graduate of the University of British Columbia in Geological Engineering, 1956.

3. I am a registered Professional Engineer of the Province of British Columbia and also a member of the Canadian Institute of Mining and Metallurgy.

4. I have practiced my profession continuously since 1956 in mining exploration in British Columbia, Yukon Territory, Alaska, Arizona and Australia.

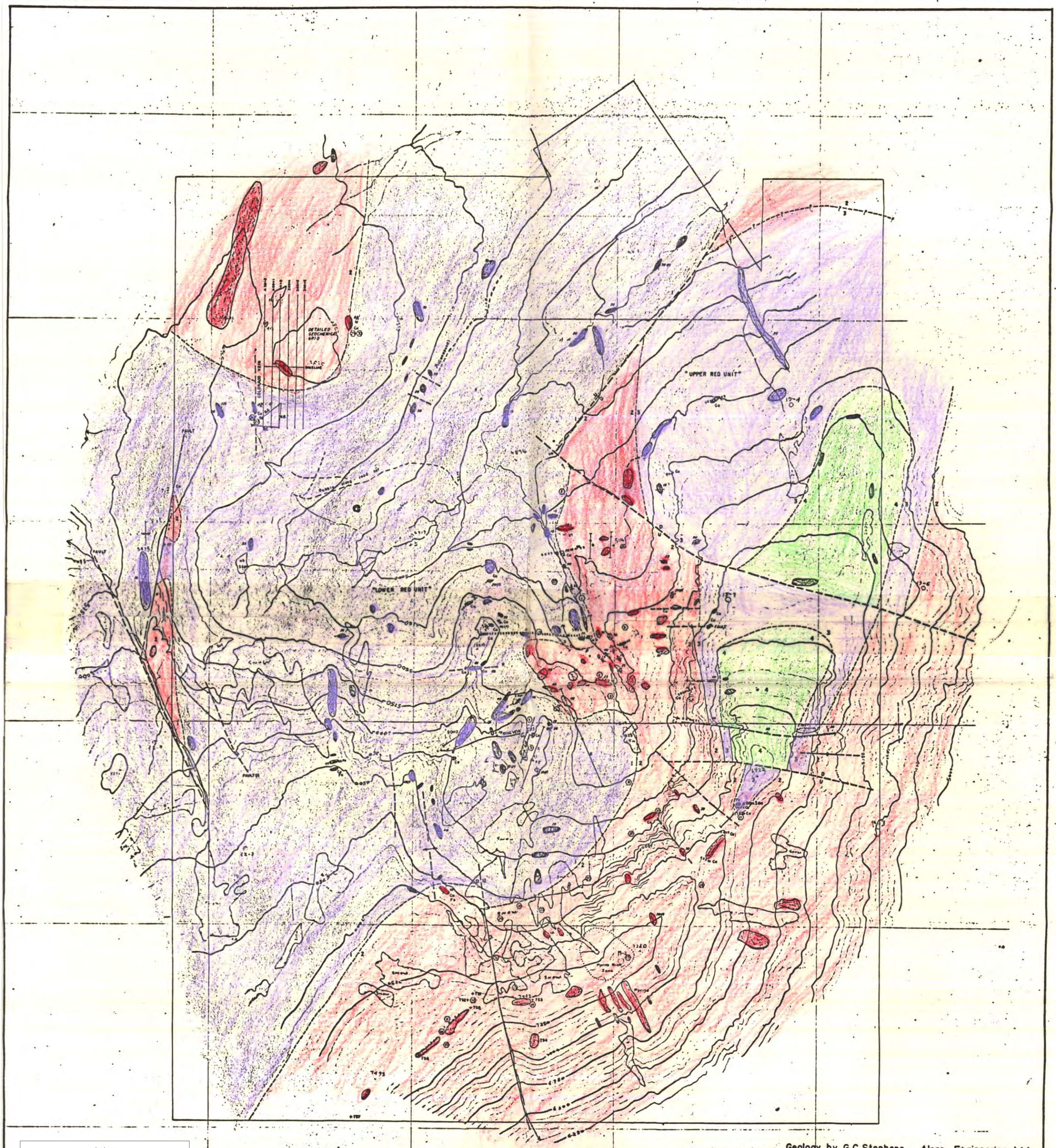
5. I have reviewed those reports and data listed under References at the end of this report.

6. I have not received, nor do I expect to receive any interest, direct or indirect, in the AL 4 claim.

Dated at Vancouver, B. C. this 4th day of February, 1976.

Harold M. Jones

Harold M. Jones, P.Eng.



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BRITISH COLUMBIA GEOLOGICAL SURVEY

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LEGEND

GEOLOGY
- DIORITE FLOW UNIT
- UPPER RED UNIT
- EPIDOTE RICH UNIT
- LOWER RED UNIT

SYMBOLS
- SAMPLE LOCATIONS
- DIAMOND DRILL HOLE LOCATIONS
- ADIT
- GEOLOGICAL CONTACT
- FAULT
- VEIN DEPOSIT
- GRID LINE
- THIN SECTION SAMPLE LOCATIONS

Geology by G.C.Stephens, Alrae Engineering, Ltd.

G.A. NOEL & ASSOCIATES
Consulting Geologists Vancouver, B.C.

GEOLOGY MAP
HUNTER BASIN AREA, B.C.

Date - Oct. 1970 | Scale - 1"=1000'