

GEOLOGICAL REPORT

Hawk 1-8, Owl 1-8 and Jumbo 1-8

Mineral Claims

115-F-15 and 115-K-2

Lat. 62 01'N Long. 140 38'W

Theodore William Muraro P. Eng.

June 19, 1966 to July 7, 1966

This report has been examined by
the Geological Evaluation Unit.
Approved as to technical worth by:

D. C. Findlay

RESIDENT GEOLOGIST

Approved as to cost in the amount
of: \$ 2421.00

D. G. Needham

RESIDENT MINING ENGR. EER

Accepted as representation work
under Section 53(4) Yukon Quartz
Mining Act.

W. J. ...

ADMINISTRATOR
COMMISSIONER OF YUKON

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INTRODUCTION

The Hawk 1 to 8, Owl 1 to 8 and Jumbo 1 to 8 mineral claims cover nickel and copper prospects on Miles Ridge. Geographic details follow:

Lat. 62 01'N Long 140 38'W

Mining Division Whitehorse Y.T.

N.T.S. 115-K-2 and 115-F-15

Approximately 1½ miles west of the Alaska Highway at Mile 1171 (Onion Creek)

Topography 2300 to 5300 feet A.S.L., rugged.

Cominco Ltd. are partners to an option agreement on the 24 claims with the owners listed below:

	Interest
Estate of the late Henry Enger Executer-The Public Administrator c/o The Court House Whitehorse Y.T.	20%
P.Eikland, Beaver Creek, Alaska Highway Mile 1202 Y.T.	20%
Charles Eikland, c/o Yukon Electric Co. Ltd. Haines Junction, Y.T.	20%
Thomas Eikland, Beaver Creek, Alaska Highway Mile 1202 Y.T.	20%
Dwayne A. Backstrom, D.O.T. Snag Airport, Y.T.	20%
Total	----- 100%

Geological mapping reported here was done by employees of Cominco Ltd. listed below during the period June 19 to July 7, 1966.

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The mapping was done on air photos enlarged to a scale of 1" = 1,000' plus or minus 5%.

GEOLOGY

General Geology

Miles Ridge is the abrupt southwest wall of Shakwak Valley near Mile 1170 on the Alaska Highway. This linear form is the northern end of the Kluane Range northwest of White River and attains its maximum relief of 2000 to 3000 feet above the valley floor within the claim area.

Northeasterly trending streams form deep V-shaped incisions at regular intervals along the northeast flank of the ridge. The canyon-like draws end in angle-of-repose talus slopes extending to the ridge crest. Beginning with the first prominent draw south of Onion Creek the creeks have been designated No. 1 Creek to No. 7 Creek in succession to the southeast.

Within the area mapped the northeast flank of Miles Ridge exposes a diorite mass elongated northwest parallel to the ridge. The diorite intrudes steeply dipping green andesitic volcanics.

The southwest slope of Miles Ridge is mainly grey limestone with lesser amounts of shale siltstone chert and arkose. These rocks strike northwest with vertical to steep dips.

A pile of purple and green amygdaloidal andesite to basalt flows and breccias with moderate southwest dips occupy most of the crest of Miles Ridge.

From Onion Creek southeast to the head of No. 5 Creek the amygdaloidal volcanics are separated from the diorite and volcanics of the eastern flank by a steep dipping tabular body of mafic rock. Southeast of No. 5 Creek the strike of the older rocks trends more easterly and a limestone occurs at the east edge of the amygdaloidal volcanics. The mafic dike does not follow this strike deflection but occupies a rejuvenated fracture originally filled by a massive buff to orange weathering quartz-carbonate vein.

Primary lithologic units.

Unit 1

This unit contains a variety of green to grey-green rocks of volcanic origin. Most exposures are medium to fine grained, moderately foliated and contain varying amounts of epidote, chlorite, plagioclase and carbonate. Partly altered phenocrysts of hornblende pyroxene and plagioclase are evident in porphyritic phases. Andesite flows and breccias which have undergone greenschist metamorphism represent the bulk of the unit. Muller (1958 p.3) assigns a probable Lower Permian or older age to these rocks.

TABLE OF FORMATIONS
MILES RIDGE

ERA	PERIOD OR EPOCH	MAP UNIT	LITHOLOGY
CENOZOIC	RECENT		Soil, present stream deposits, volcanic ash
	UNCONFORMABLE CONTACT		
	PLEISTOCENE		Gravel, sand glacial fill
	UNCONFORMABLE CONTACT		
	TERTIARY	UNIT 5	Gabbro and peridotite
MESOZOIC	INTRUSIVE CONTACT		
	CRETACEOUS	UNIT 4	Hornblend diorite
	INTRUSIVE CONTACT		
	JURASSIC OR UPPER TRIASSIC	UNIT 3	Andesite, basalt, volcanic breccia; purple and green, amygdaloidal
UNCONFORMABLE CONTACT			
PALEOZOIC	LOWER PERMIAN	UNIT 2	Limestone, shale, argillite, siltstone.
		UNIT 1	Older volcanics; andesite basalt, and accompanying breccias and tufts.

NOTE: Assigned ages of Units 1 to 4 above are according to Mullet (map 19-1958)

The most common alteration is albitization which forms local masses tens of feet long as well as large zones up to 100 feet thick. Chlorite and calcite are concentrated around shears. Several fractured masses 10 to 20 feet wide are heavily impregnated with specular hematite which probably represents flow-top oxidation. Within 50 feet of the diorite intrusive a fine hornfelsic texture is common. Inclusions or xenoliths of Unit 1 occur within the diorite particularly near its margin. Several of these inclusions are 1000 feet or more long.

Most of Unit 1 has been obliterated by the diorite. Good exposures occur in Onion Creek and at points on both sides of the diorite in creeks to the southeast.

Unit 2

Grey weathering impure limestones interbedded with grey to black carbonaceous siltstones dominate Unit 2. Most of this unit is exposed on the southwest slope of Miles Ridge where cherty and arkosic phases are also recognized. However, southeast of the head of No. 5 Creek there is a 200 to 300 foot section of grey limestone and limy carbonaceous siltstone. On the basis of lithologic similarity this band of calcareous sediments is taken to represent the eastern-most exposure of Unit 2. Details of the contact with Unit 1 are not exposed but it appears conformable. If this is so this section probably represents the base of Unit 2. Muller (p.3) fixes this unit as Lower Permian and describes, at a separate locality, a transition between his equivalents of Units 1 and 2.

Beyond the north end of the mafic dike Unit 2 is missing from the section and Unit 1 is in obscure contact with Unit 3.

Unit 3

Distinct green and purple amygdaloidal andesite and basalt comprise map Unit 3. The large calcite and/or quartz and chlorite amygdules allow easy recognition and it appears to lie directly on the Permian rocks of Unit 2. Muller (p.4) notes that these same lavas overlie Triassic sediments near the Yukon-Alaska boundary. He gives them a probable Upper Triassic or Jurassic age (p.5). The highly irregular nature of the contact between Units 2 and 3 north of the fault at the head of No. 1 Creek suggests at least an erosional disconformity.

Southeast of No. 5 Creek Unit 3 follows the easterly deflection of strike and on the northeast side of the mafic dike is characterized by strikingly coarse breccias.

Compared to Units 1 and 2, Unit 3 is fresh looking and appears less metamorphosed. According to Muller (p.8) these amygdaloidal lavas are host to the native copper showings near Canyon City. Minor amounts of native copper appear in Unit 3 float in the bed of Onion Creek.

Unit 4

Diorite, mainly medium grained, mesocratic hornblend diorite with a pale green cast is represented in Unit 4. This discoloration stems from a pervasive slight alteration of the plagioclase and the ensuing epidote.

The diorite is seen to intrude Units 1 and 3. Xenoliths, particularly of Unit 1 are abundant. Dikes of diorite cut Unit 1 within several hundred feet of the intrusive boundary.

It is possible that the diorite resulted from Unit 1 contamination of a low "melting point" silicic fraction generated deeper in the crust. This might explain the widespread trace amounts of copper which could have originated in Unit 1 lavas.

Unit 5

This unit is a regular steeply dipping sheet of mafic rock. Least altered exposures suggest original variations of peridotite, pyroxinite and hornblend gabbro. Gabbroic phases are coarse grained and weather mottled grey brown. Most of the unit is dark grey to blue-black on fresh broken surfaces and is coated with grey to blue-white alteration products.

Contacts of the mafic sheet are sharp and distinct notwithstanding their intensely fractured nature. This is contrary to what might be expected considering that the intruded rock along much of both contacts is not a primary lithology but an extensive zone of alteration and introduced vein material. Apophyses of the mafic mass cut into the bounding quartz-carbonate vein material.

Minor amounts of disseminated pyrrhotite occur locally and one limited exposure of fractured serpentinized peridotite contains good quality asbestos.

Veining and alteration

Quartz-carbonate

The most conspicuous rock of probable hydro thermal origin is a buff to orange weathering cream ankerite laced with white quartz veins. Spots of manganese oxide occur on unexposed fracture planes and traces of malachite

and pyrite are common. The rock is obvious from the highway as large red areas along Miles Ridge. It forms a prominent zone up to 200 feet wide along the northeast contact of the mafic intrusive from the south fork of Onion Creek to No. 7 Creek. A narrower zone of the same material occurs along the southwest side of the mafic dike from Onion Creek to the head of No. 3 Creek.

In a small basin northwest of Onion Creek a lenticular mass of quartz-carbonate at least 2000 feet long and 200 feet wide occurs at the contact between Units 1 and 3. On the south fork of Onion Creek and at the head of No. 3 Creek quartz-carbonate grades into albitized phases of the diorite. In No. 1 and 4 Creeks quartz-carbonate veins sheared and altered andesites of Unit 1. Similar relations with Unit 4 are evident near the southwest side of the mafic sheet.

The relations of quartz-carbonate rock with Units 1, 3 and 4 contrast with the previously described manner in which it is sharply intruded by the mafic dike. The quartz-carbonate zone seems to be a large vein or stringer lode. The fracture occupied by the vein reopened and was filled by the mafic dike.

Albitization

Light colored medium to fine grained crystalline rock which is mainly white plagioclase forms irregular masses within the diorite (Unit 4) and the volcanics of Unit 1. The bulk of this material is at the southwest contact of the diorite in Onion and No. 1, 2 and 3 Creeks.

Chloritization

In addition to the slight to moderate pervasive chloritization of Units 1 and 4 chlorite is concentrated in shear zones in both of these rock types. Minor sulfides occur in some of these shears.

STRUCTURE

General statement:

Altitudes in Units 1 and 2 reveal a west to northwest strike and a steep northeast dip. Where observed layering in Unit 3 dips moderately to the southwest. The mafic sheet dips vertical or steeply east.

Major structures

The largest structure in the mapped area is suggested by indirect evidence. Details above show the quartz carbonate zone to be a large vein. The fracture

occupied by the vein is, in its northern extent, the contact between Units 1 and 3. Apparently Unit 2 is faulted out. South of No. 5 Creek the fracture diverges from the contact as the rocks swing easterly on an older flexure and Unit 2 is revealed in its correct position.

The mafic dike was intruded following a later reactivation of the fracture and a splitting of the quartz-carbonate vein.

A west striking normal fault at the head of No. 1 Creek brings a strip of Unit 2 to the surface between areas where it is covered by Unit 3. This is probably a branching feature of the main northwest fracture. The history of the northwest vein fault in turn is most likely closely allied to the Shakwak fault.

Minor structures

Joints and minor shears are common throughout the area. A northwesterly trend appears most common for planes of differential movement. Joints show a more random orientation. Intense close spaced fracturing or crushing is common in quartz-carbonate exposures and in the borders of the mafic dike.

MINERALIZATION

General statement:

Minor concentrations of sulfide minerals were noted at a number of locations on the claims. None of them appear to have economic significance.

Nickel

On the south fork of Onion Creek two trenches 1000 feet apart on the pyroxinite-quartz-carbonate contact located nickel values. Pieces of near massive foliated pyrrhotite up to 4 inches thick with minor niccolite occur in both trenches. None of the material was found in place. Previous assays returned nickel values of about 20% over to 4 inches. The contact is well exposed here for about 4000 feet horizontally and 500 feet vertically but no additional sulfides were found after careful search. Nor were any occurrences of possible nickel values located further southeast on this contact.

Copper

A small pit 2 feet by 2 feet immediately above the creek bed on the east bank at the main forks of Onion Creek reveals minor chalcopyrite and a trace of molybdenite. The sulfides occur in vuggy quartz stringers in a one-foot fracture zone in diorite.

Several local stains of malachite with a trace of chalcopyrite occur on the southeast wall of Onion Creek where it cuts the diorite intrusive.

On No. 4 Creek there are three minor showings. The best is at 4200 A.S.L. where a shear 20 feet wide striking N50W in diorite contains minor pyrite chalcopyrite and molybdenite disseminated in calcite stringers. The zone was not sampled. At elevation 4275 a one by three foot rusty zone in diorite contains less than 1% chalcopyrite. At 4600 feet a shear at N50W in andesite is one foot wide and was traced 15 feet. It contains malachite azurite and minor pyrite and chalcopyrite.

Other than the above mentioned locations a few disseminated grains of chalcopyrite were noted in numerous places. They seem to be most common in the diorite near its boader and around large andesite inclusions.

CONCLUSIONS AND RECOMMENDATIONS

A combination of good exposure and careful mapping with attention directed to favourable structures and lithogies has failed to reveal any showings or geologically interpreted targets on the Hawk-Owl-Jumbo claims which merit further work.

It is recommended that the Hawk-Owl-Jumbo option be terminated at the end of its current phase.

Signed: T. W. Muraro
T.W. Muraro P. Eng.

COMINCO LTD.
TRAIL, B. C.

1966 GEOLOGICAL SURVEY EXPENDITURES
HAWK-JUMBO-OWL GROUP OF MINERAL
CLAIMS - WHITEHORSE M.D.

GEOLOGICAL WORK

Geological mapping performed by L.J. Nagy, geologist,
and K.W. Bell, geologist. Work performed from June
19 to July 7, 1966; 19 days at \$60 per day \$ 1,140

GEOLOGICAL MAPPING SUPPLIES

Air photos and enlarged prints 70

SUPERVISION

T.W. Muraro, P. Eng., 9 days at \$50/day 450

ROOM AND BOARD

47 man-days 488

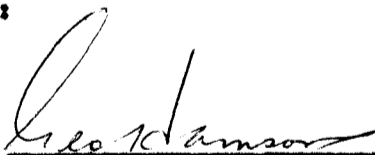
TRANSPORTATION

Truck rental 273

TOTAL: \$ 2,421


T.W. Muraro, P. Eng.

Endorsed by:


G. Hanson
Accountant, Tadanac Operations

This is Exhibit "A" to the
Statutory Declaration of T.W. Muraro,
declared before me this 3rd day of
... August, A.D. 1966.


A Commissioner for taking Affidavits

REFERENCES

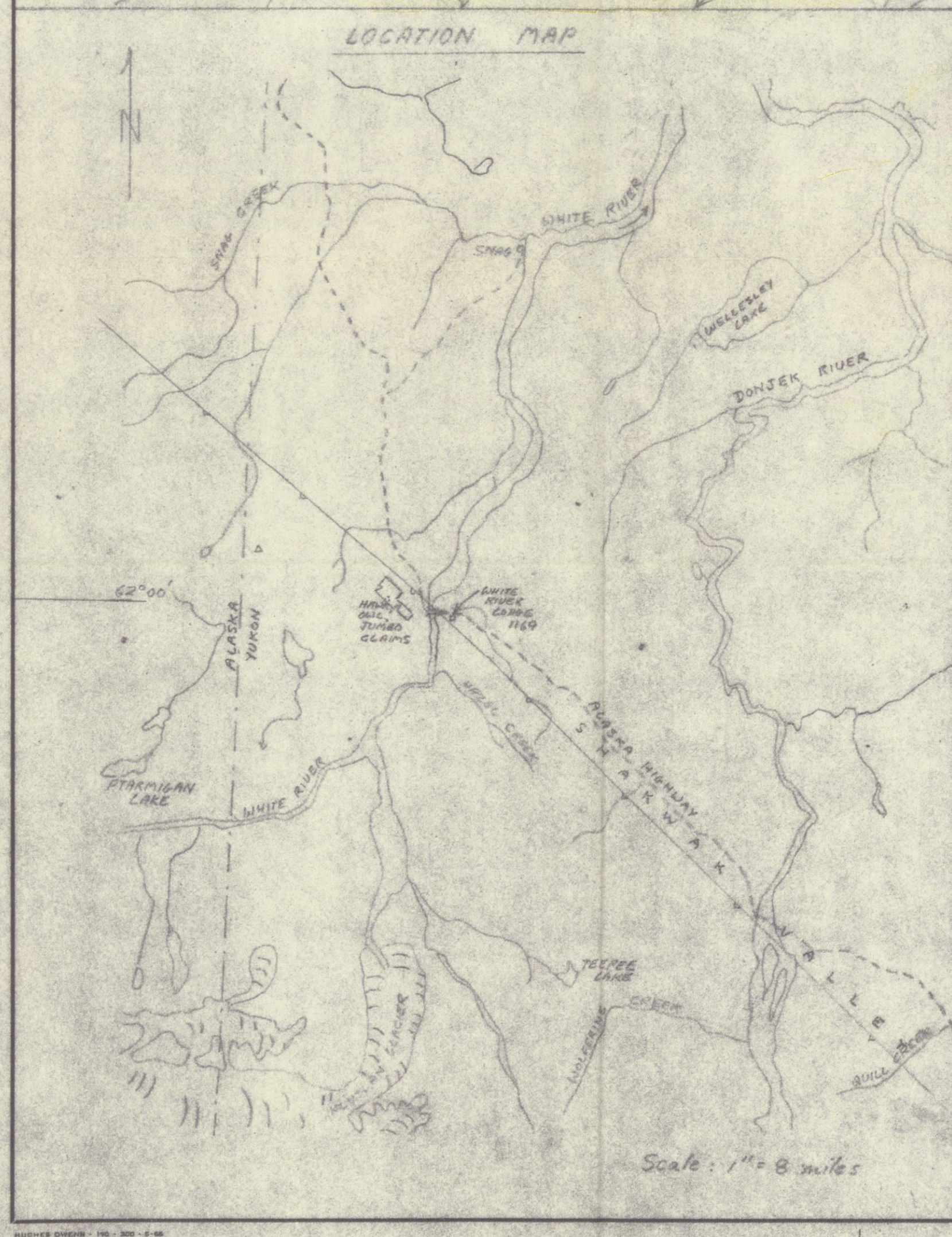
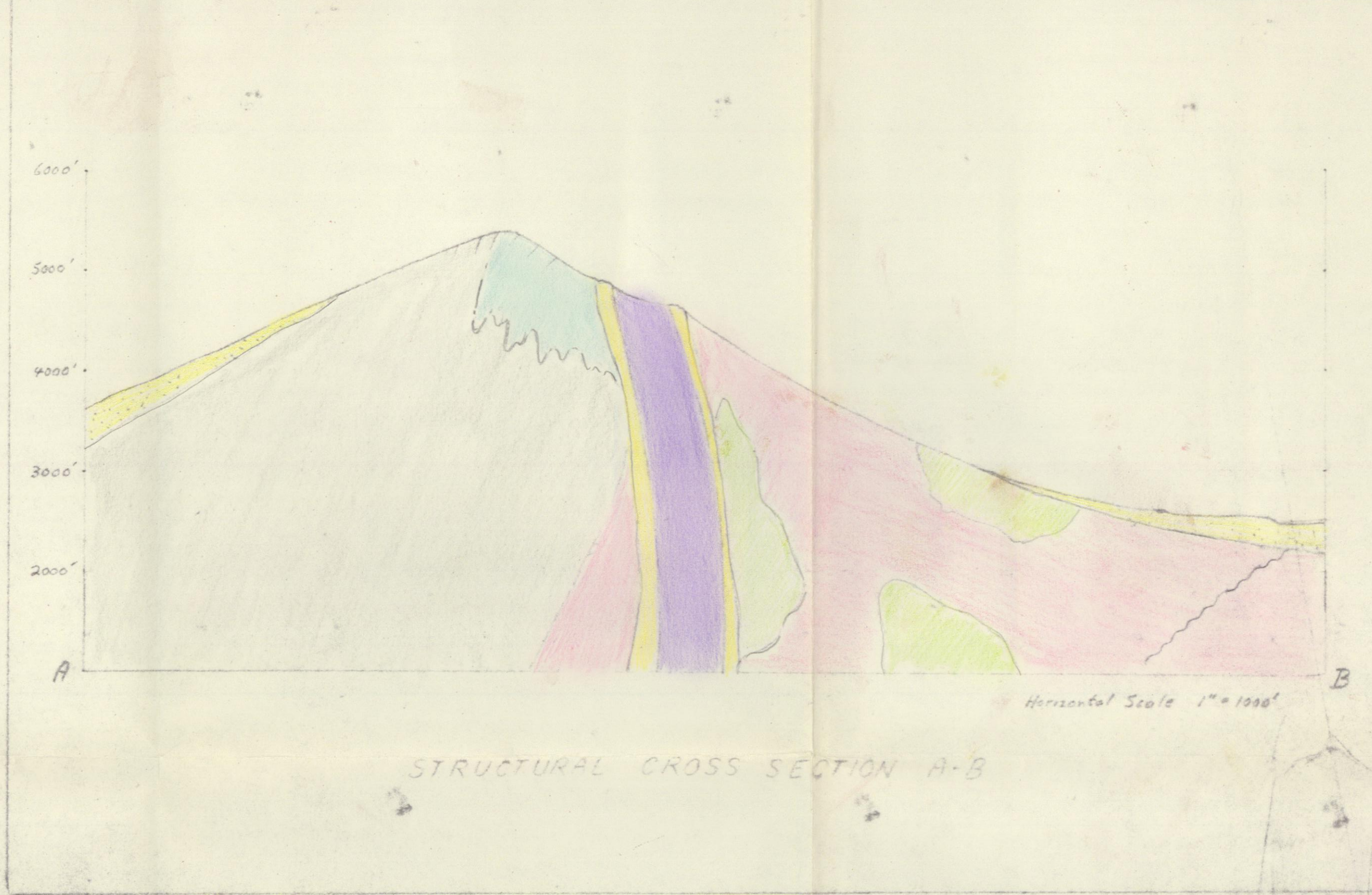
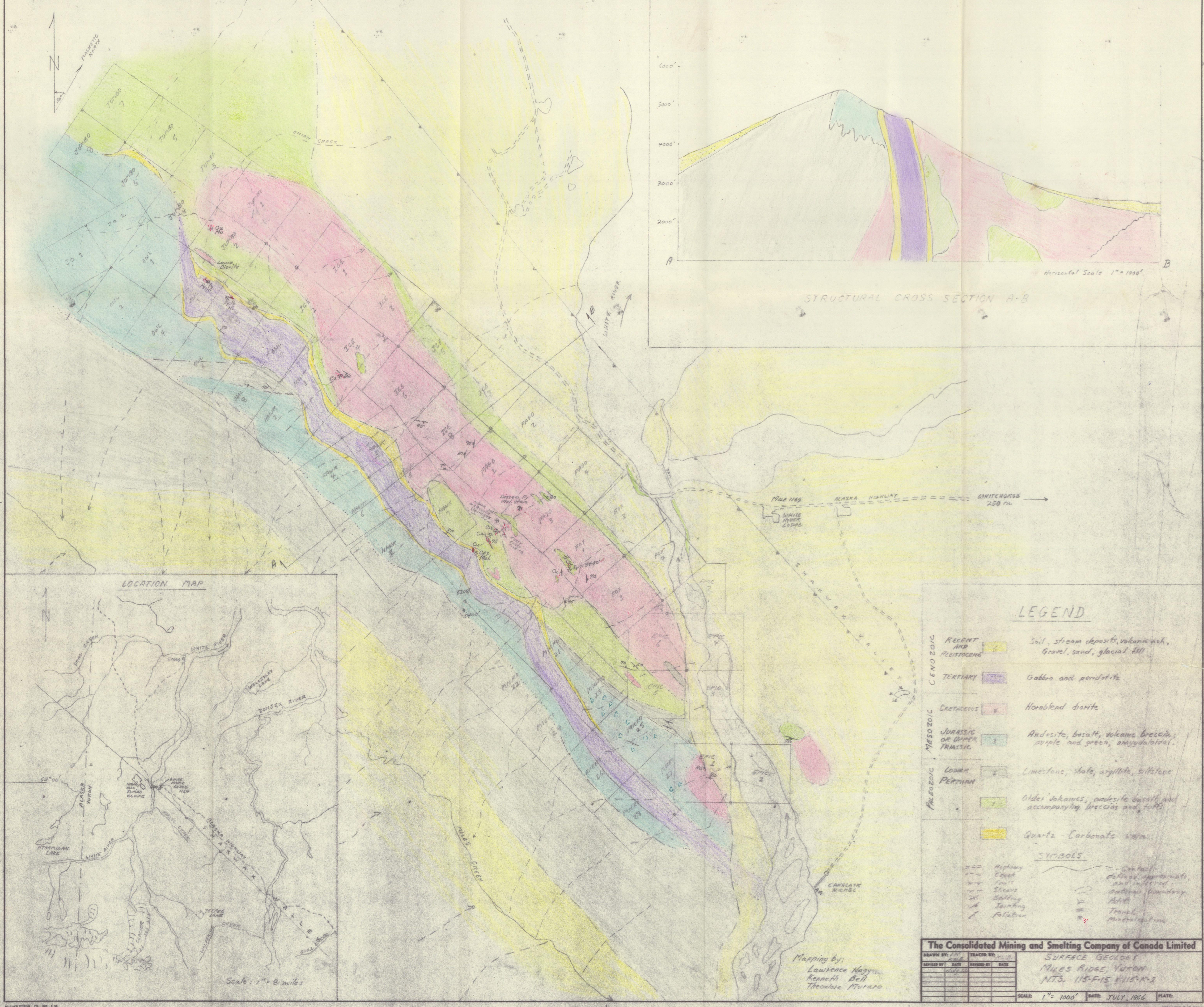
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LEGEND

CENOZOIC	RECENT AND PLEISTOCENE	Soil, stream deposits, volcanic ash, Gravel, sand, glacial till
CENOZOIC	TERTIARY	Gabbro and peridotite
MESOZOIC	CRETACEOUS	Hornblende diorite
MESOZOIC	JURASSIC OR UPPER TRIASSIC	Andesite, basalt, volcanic breccia, purple and green, amygdaloidal.
PALEOZOIC	LOWER PERMIAN	Limestone, shale, argillite, siltstone
PALEOZOIC		Older volcanics, andesite basalt, and accompanying breccias and tuffs
		Quartz-Carbonate vein

SYMBOLS

==	Highway	---	Contact
- - -	Fault	~	Fault, approximate and inferred
- - -	Stream	---	Geological boundary
- - -	Shoals	---	Adit
- - -	Bedding	---	Trench
- - -	Spouting	---	Mineralization
- - -	Foliation		

Mapping by:
Lawrence Nagy
Kenneth Bell
Theodore Muraro

The Consolidated Mining and Smelting Company of Canada Limited

DRAWN BY: [] TRACED BY: []
 REVISED BY: [] DATE: [] REVISED BY: [] DATE: []

SURFACE GEOLOGY
MILES RIDGE, YUKON
N.T.S. 115-F-15 & 115-F-2

SCALE: 1" = 1000' DATE: JULY, 1966