

84-1224-13411

**GEOLOGICAL BRANCH
ASSESSMENT REPORT**

13,411

ASSESSMENT REPORT ON THE
GEOLOGY OF THE NORTHERN PART OF THE
YOUNG GEORGE GROUP

EHOLT AREA
GREENWOOD MINING DIVISION

NTS 82E/2E

Latitude $49^{\circ}09.8'N$ Longitude $118^{\circ}33.5'W$

Owner: Kettle River Resources Ltd.

Operator: Noranda Exploration Company, Limited, John Keating

Author: James T. Fyles, P. Eng.

March 19 - September 30, 1984

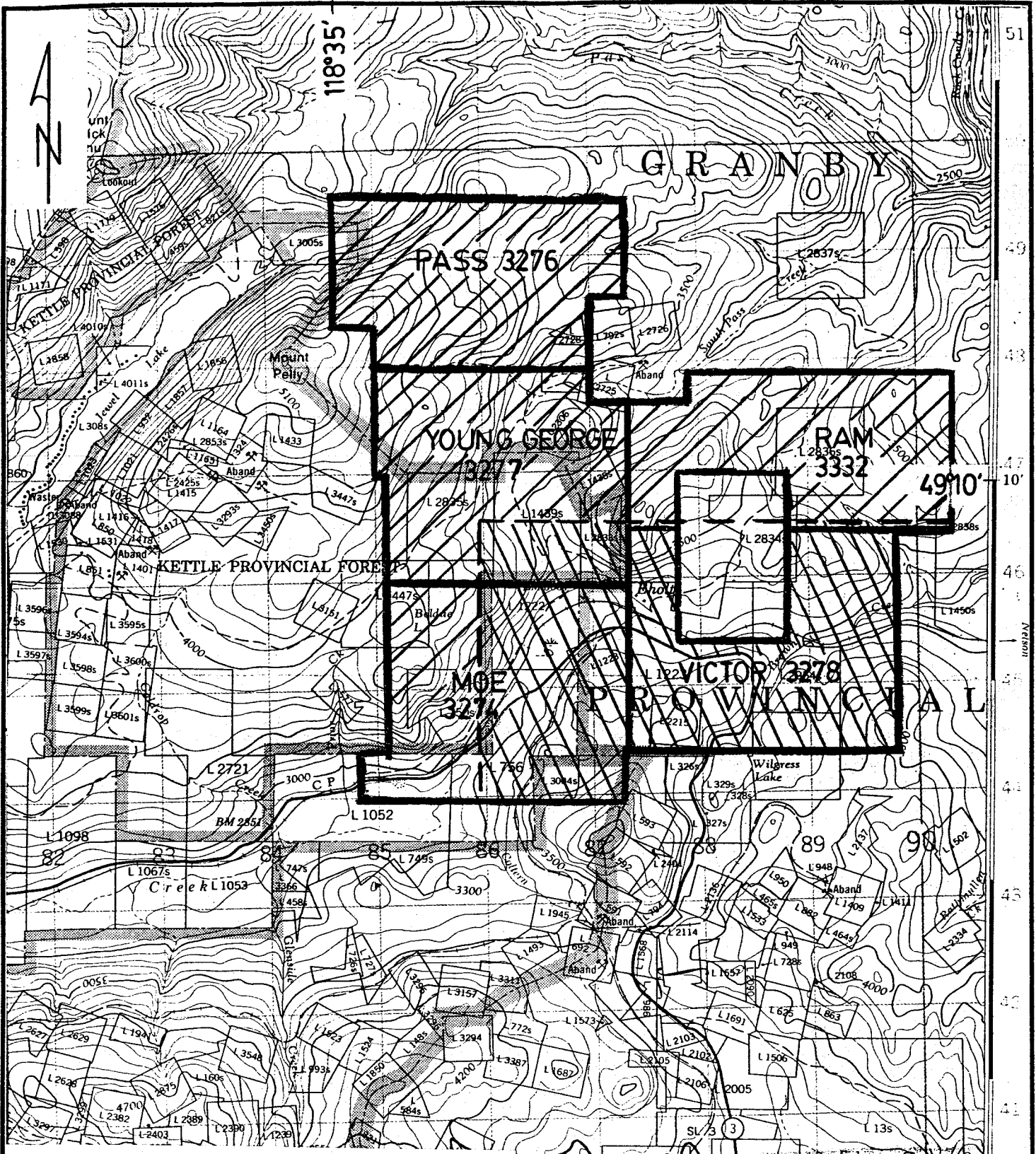
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INTRODUCTION

This report on the geology of an area north of Eholt extends the geological work on the Young George Claim Group submitted in 1983 (Assessment Report # 11845). Interest in the area was stimulated late in the 1982 field season by the examination of old workings which indicated a potential for sulphide mineralization in extensions of the Brooklyn Formation northwest of the Summit Camp. The program of 1:12000 scale geological mapping was started in 1983 and continued in July and September 1984. This report and map give the results of the 1984 work which complements the report and map on the southern part of the Young George Group and other reports in the area by Kettle River Resources (see Assessment Report #10632 and Laxey Group dated 1984).

One objective of the geological mapping was to determine the extent and the structural and stratigraphic characteristics of the Brooklyn Formation in this area. Another was to determine the nature and significance for mineralization along the western edge of the Thimble Mountain Tertiary basin which passes through the northeastern part of the claim group from the vicinity of the B. C. Mine. A third objective was to assess the exploration potential of the Knob Hill Group of rocks between the Lion Creek Pluton south of the claims and the similar granitic rocks in the north and to look for possible extensions of the Jewel Lake-Dentonia gold quartz mineralization in these rocks.



CLAIM AREA COVERED BY THIS REPORT



CLAIM AREA COVERED BY ASSESSMENT REPORT NQ.11845

REVISED

LOCATION MAP

YOUNG GEORGE CLAIM GROUP

PROJ. No.

SURVEY BY: JK

DATE: DEC. 1984

N.T.S. BZE2

DRAWN BY: JK

SCALE: 1:50,000

DWG. No.

1

NORANDA EXPLORATION

OFFICE:

LOCATION, ACCESS

The Young George Claim Group is in the Eholt area approximately 16 km northwest of Grand Forks and 12 km northeast of Greenwood, B. C.

Highway #3, the Eholt-Jewel Lake Road and numerous logging and mining roads provide convenient access to most of the claim area.

Elevations on the claims range from 3000 ft. to 5200 ft. above sea level. Topography consists of moderate to steep slopes flanking the Eholt, Brown and South Pass Creek valleys. Mixed forest vegetation is generally fairly dense throughout the claim area, particularly on the north slopes. Large areas in the valleys and north-facing slopes are covered with till and gravel.

CLAIM DATA

The following claims comprise the Young George Group. All are owned by Kettle River Resources Ltd.

CLAIM	RECORD NO.	MONTH	UNITS
Moe	3274	10	20
Young George	3277	10	20
Pass	3276	10	18
Victor	3278	10	20
Ram	3332	11	18

PREVIOUS WORK

Although the Young George Claim Group contains several old pits, trenches and short adits and covers ground formerly held as Crown granted claims, there is no reference in government publications to early work which was probably done during the first decade of this century or just before that time.

Assessment reports indicate that geophysical and geochemical work was done by Granby Mining Company between 1959 and 1966 on a group of six claims west of Boldue Lake. In the same period, Rayore Mines Ltd. of Vancouver did geophysical work at the head of South Pass Creek. In 1980 an assessment was made and one hole drilled on the showings on the ridge northeast of Eholt (Eholt Ridge). Trenching and X-ray drilling was done on the Rambler claim during the last ten years but the results of this work are not recorded.

GENERAL GEOLOGY

The principal rocks in the area are amphibolites and quartzites of the Knob Hill Group, granodiorite of the Nelson plutonic suite and Tertiary syenite, feldspar porphyry, basalt and arkose. Only a remnant of the Upper Triassic Brooklyn Formation extending northwest from the Summit Camp is present.

Knob Hill Group

The group consists of interbedded formations of amphibolite and quartzite. The amphibolites are aphanitic to

very fine-grained, dark green rocks which generally are massive but which, on the eastern slope of Mt. Pelly, have a poorly developed schistosity and farther west a gneissic foliation. The quartzites are white to buff, rusty-weathering rocks with a blocky fracture which, at least locally, is parallel to the bedding. One well-defined quartzite on the east slope of Mt. Pelly is dark grey to black with a high proportion of disseminated pyrrhotite and pyrite. Only the dominant lithologies are shown on Figure 2. Amphibolites contain lenses of quartzite and quartzites commonly include small masses of amphibolite. Transition zones of interbedded quartzite and amphibolite between the major units at a few places in the southwestern part of the claim group contain lenses and beds of crystalline limestone and marble. These rocks are similar to those south of Eholt and south of the Lion Creek Pluton which are correlated with the Knob Hill Group and which through petrographic and analytical work (Church 1983, p.2 and 1974, p.42) are considered to be basic volcanic rocks, interbedded cherts and siliceous tuffs and siltstones.

The largest area of outcrops of the Knob Gill Group is on the eastern and southeastern slopes of Mt. Pelly and the hills west of Eholt. Isolated, poorly-exposed areas of similar rocks probably of the same group occur on the ridge east of the northeast end of Jewel Lake where they include gneissic diorite, granodiorite, pale green hornfelsic quartzite and greenstone. Another small area of probably Knob Hill Group is north of the upper part of South Pass Creek on the Rambler claim. The rocks there are rusty, dark green amphibolite, minor amounts of thin-bedded buff cherty quartzite and epidote-actinolite skarn.

The formations in the Knob Hill Group trend northwestward swinging from almost due west near Eholt to northwest on Mt. Pelly. They dip at moderate angles to the north parallel to the attitude of the bedding and foliation. No evidence has been found for folding or faulting which would cause a repetition of the stratigraphy. Minor, open to fairly tight folds plunge at low to moderate angles to the north and northeast. Tertiary faults trending north and northeast probably offset the formations along dykes and along the valley of Boldoe Lake-upper South Pass Creek but evidence for faulting such as crushed zones and offset contacts has not been found.

Brooklyn Formation

Rocks of the Brooklyn Formation are found on Eholt Ridge and on the 3800 foot hill 1.5 km north of Eholt. These localities form the northernmost exposures of the formation northwest of the Summit Camp from which copper-gold ore has been produced at the Emma and the Oro Denoro mines.

The Brooklyn Formation contains Upper Triassic fossils in limestone 4 km south of the area. The base of the Brooklyn, identified in the past as an unconformity, is present in the Eholt area on the slopes west of the Emma Mine and along the railroad grade south of Eholt. The basal member is chert breccia, referred to in the Phoenix area as sharpstone conglomerate (see Seraphim 1956). South of Eholt it is buff to grey-weathering and consists of angular fragments of light colored chert, quartz, jasper, volcanic rocks and rarely limestone, mainly less than 3 cm across, in a dark grey siliceous matrix

containing metamorphic biotite and amphibole. Bedding is rarely visible, but ^{at} a few localities the strike is to the north and the dip is nearly vertical.

Northeast of Eholt, chert breccia is found only in one rock cut on the old Jewel Lake Road. It is east (and south) of a single outcrop of siliceous argillite and chert (Knob Hill) and beneath bluffs of silicate marble to the east. While the evidence is minimal, the sequence and position of these outcrops is distinctive enough to be reasonably sure of the correlations and that the Brooklyn chert breccia and limestones continue northward through the covered areas at the head of South Pass Creek.

The basal member exposed 1.5 km north of Eholt is mottled brownish-green and white skarnified chert breccia composed of fragments of recrystallized chert (unstrained quartz in thin section) in a matrix of epidote, brown garnet, amphibole and chlorite which locally contains pyrite, hematite and chalcopyrite. Although the outcrops of these rocks are limited, they seem to form a northerly-trending member lying west of a more extensive series of outcrops of greenstone and green volcanic breccia. Attempts to find this basal member of the Brooklyn on strike to the north have been unsuccessful and it must be concluded that the formation ends in the drift-covered area of the upper part of South Pass Creek, either because of faulting or irregularities in the unconformity at the base of the formation.

The Brooklyn limestone which overlies the chert breccia in the Eholt area is normally a massive, light grey to

white, fine to medium grained marble. Locally it is grey banded crystalline limestone and in the bluffs north of Eholt it is white, coarsely crystalline, siliceous marble containing well cleaved blades of a white silicate (Tremolite or Wollastonite). No limestone is exposed on the 3800 foot hill 1.5 km north of Eholt but the chert breccia has a calcareous matrix.

A volcanic complex consisting of greenstone and/or microdiorite lies above the Brooklyn limestone on Eholt Ridge. The greenstone and microdiorite are dark green, aphanitic to very fine grained massive rocks in which plagioclase and hornblende can be distinguished with a hand lens. Weathered surfaces are commonly mottled and these rocks with a uniform texture grade laterally into two distinctive fragmental facies.

One is brecciated greenstone containing subangular fragments of greenstone up to 10 cm across in a matrix of the same rock with a crushed appearance. This rock is well-exposed on the open slopes of Eholt Ridge where it forms a northwesterly-trending, steeply dipping layer as much as 100m wide, grading laterally into massive greenstone. The other fragmental variety is a volcanic breccia with rounded and angular fragments of porphyritic volcanic rock and locally of limestone 5-10 cm across in a matrix of greenstone. The western contact of these greenstones and microdiorites with the Brooklyn limestone appears to be transgressive and in ~~in~~ part intrusive.

Granodiorite

Plutonic rocks of the Late Mesozoic Nelson suite occur in the northern part of the claim group and are well-exposed on

the northeast ridges of Mt. Pelly. These rocks are blocky, medium-grained biotite granodiorite with minor hornblende, chlorite and epidote. The southern margin of a large pluton (see Little 1983) has been mapped from the ridge east of Jewel Lake to the head of South Pass Creek where it is an irregular contact zone with dyke- and sill-like offshoots of granodiorite and diorite and large inclusions of mafic wall rock. Dykes and irregular masses of Tertiary monzonite and syenite are particularly abundant in this contact zone, making it difficult to plot accurately on the map. Judging from the trace of the contact zone on the steep slopes east of the north end of Jewel Lake, it probably dips steeply to the north. The granodiorite forms an easterly-trending protrusion from a larger mass of granodiorite to the northwest and is comparable to the Lion Creek Pluton immediately south of the claim group (see Church 1983, p.5).

Tertiary Rocks

The Young George group is crossed by the western edge of an extensive area of Tertiary volcanic, sub-volcanic and sedimentary rocks referred to as the Thimble Mountain Tertiary basin. All the Eholt area is laced with dykes of syenite (Tsy), monzonite and various sorts of feldspar porphyry (Tp) which appear to be feeders for the more extensive Tertiary suite of rocks within the basin comprising the principal rocks in the northeastern part of the claim group. The dykes are highly variable in appearance, ranging from light buff and pinkish syenite and porphyritic phonolite through monzonite to grey porphyritic trachyte, diorite and lamprophyre. Many trend north 15 to 25 degrees east and dip steeply, some have a low dip to the

northeast, mainly they are lenticular and branching. Only the largest and more distinctive dykes are shown on Figure 2.

The Thimble Mountain Tertiary basin contains many intrusions of the types just referred to as well as some areas of vesicular and amygdaloidal trachyte (Tt) and basalt. These flows are most abundant in the eastern part of the claim group (Ron claim). Light greenish-grey, white-weathering arkose (Ta), arkosic conglomerate and breccia (Tbx) are found to the north on the Rambler claim and the ridge north of it. The arkose is composed of poorly-cemented, subangular fragments of feldspar and quartz generally less than 5 mm across but conglomerates of the same composition are not uncommon. Bedding is obscure and is assumed to be parallel to an insipient jointing which dips at low to moderate angles to the east.

These clastic rocks (typical of the Kettle River Formation) (see Little 1983, p.25) are considered to mark the western side of the Thimble Mountain Tertiary basin, and their relationships to the older rocks and to the overlying lavas (Marron Formation) in this area is obscured by swarms of Tertiary intrusions. Little describes a northwesterly-trending fault, the B.C. Fault, but this could not be identified on the claim group. Other faults, however, and irregularities in the pre-Tertiary surface, the details of which are poorly known, cause pre-Tertiary rocks to be exposed within the Thimble Mountain basin.

MINERALIZATION

Small showings of sulphide mineralization exposed in old pits and trenches occur in rocks of the Knob Hill Group and Brooklyn Formation. In the Knob Hill Group, disseminated pyrite, pyrrhotite and minor chalcopyrite are found in metachert on the eastern slope of Mt. Pelly between elevations of 4000 and 4500 feet. The sulphides are most abundant in dark grey siliceous argillites adjacent to an amphibolite contact where they comprise as much as 20 percent of the rock. Showings on the Rambler claim in the Knob Hill Group include a lens of massive pyrrhotite with minor chalcopyrite at a metachert-amphibolite contact and disseminated pyrrhotite and pyrite in a massive dark green actinolite-epidote skarn. The pyrrhotite lens is a few meters long and as much as two meters thick while the skarn zone is much more extensive. Gold values are reported to be low.

In the Brooklyn Formation, pyrite, pyrrhotite and chalcopyrite are found in calcareous skarns. On the hill 1.5 km north of Eholt they are in the upper part of the basal chert breccia. On Eholt Ridge they occur in volcanic rocks with local pods of limestone. One showing on Eholt Ridge contains samples of massive chalcopyrite and another is reported locally to have assayed 1.0 percent copper, 0.45 ounces per ton gold and 1.0 ounces per ton silver.

CONCLUSIONS

- 1) Mapping of the Young George claims and adjacent areas shows that the Brooklyn Formation continues north from the Summit Camp across Eholt Ridge to the south side of South Pass Creek where it ends either by faulting or by irregularities in the underlying surface of unconformity. Although there is some mineralization, the showings in the Brooklyn are very small and the stratigraphy is not comparable to that in the Summit Camp or at Phoenix. The favourable transition zone from the basal sharpstone through volcanoclastic siltstones to the Brooklyn limestone is not present in this area. Instead, green volcanic rocks, probably flows and epiclastic breccia overly the basal sharpstone in place of the sedimentary members. Showings on the Rambler claim which are on strike from the Brooklyn Formation are now known to be within the Knob Hill Group.
- 2) No mineralization clearly related to the western margin of the Thimble Mountain Tertiary basin has been recognized. The margin and the internal structure of the basin are complicated by swarms of dykes and by obscure faulting. No epithermal veins are known along the margin of the basin within the claim group.
- 3) Mineralization in the Knob Hill Group is typical of showings elsewhere in these rocks in the Greenwood area. The disseminated sulphides on the eastern slopes of Mt. Pelly are stratigraphically controlled and the showings should be sampled for gold.

REFERENCES

- Church B.N. 1983, Geology in the vicinity of the Oro Denoro Mine in Geology in British Columbia, 1976, Ministry of Energy, Mines and Petroleum Resources. pp. 1-13.
- Church B.N. and J. Winsbey 1974, Denoro Grande-Jewel in Geology, Exploration and Mining, Department of Mines and Petroleum Resources pp. 39-51.
- Little, H.W. 1983, Geology of the Greenwood Map Area, B.C. Geological Survey of Canada Paper 79-29.
- Seraphim, R.H. 1956, Geology and Copper Deposits of the Boundary District, British Columbia. Canadian Institute of Mining and Metallurgy. Transactions Vol. LIX. pp.384-394
- Ministry of Energy, Mines and Petroleum Resources Assessment Reports No. 297, 809, 1217, 8812, 10632 and 11845.

APPENDIX 1

STATEMENT OF COSTS

Fee	12 days at \$250.00 per day June 25-28 July 5,6 and 9-11 September 19-21	\$3,000.00
Food and Accomodation	12 days at \$50.00 per day	600.00
Transportation	12 days at \$100.00 per day	1,200.00
Cost of Report Preparation		
	Author - 2 days @ \$250.00	500.00
	Drafting	500.00
	Typing	<u>100.00</u>
Total Cost		<u>\$5,900.00</u>

APPENDIX 2

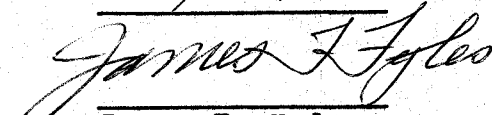
STATEMENT OF QUALIFICATIONS

I, James T. Fyles, of 1720 Kingsberry Crescent, Victoria, B.C. hereby certify that:

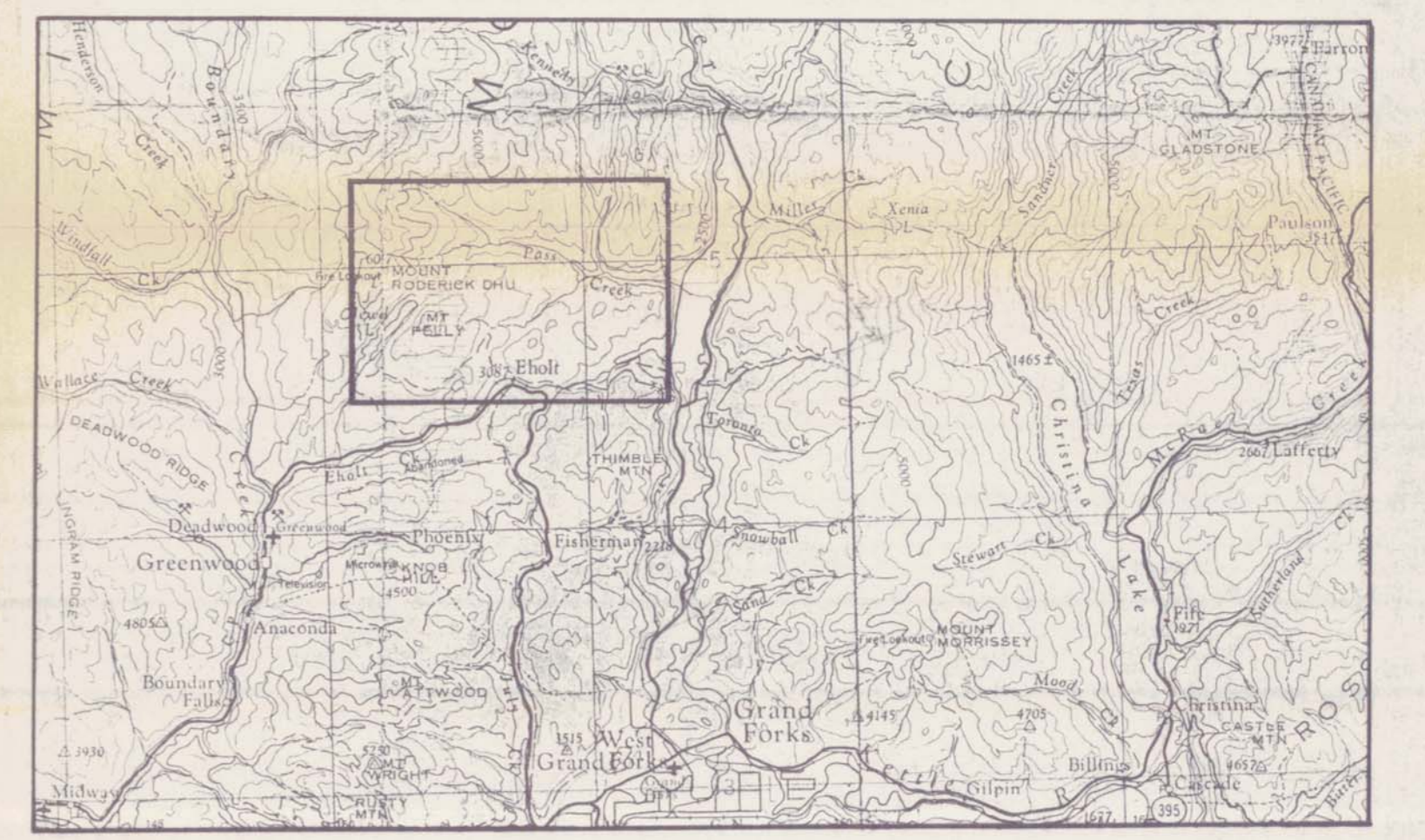
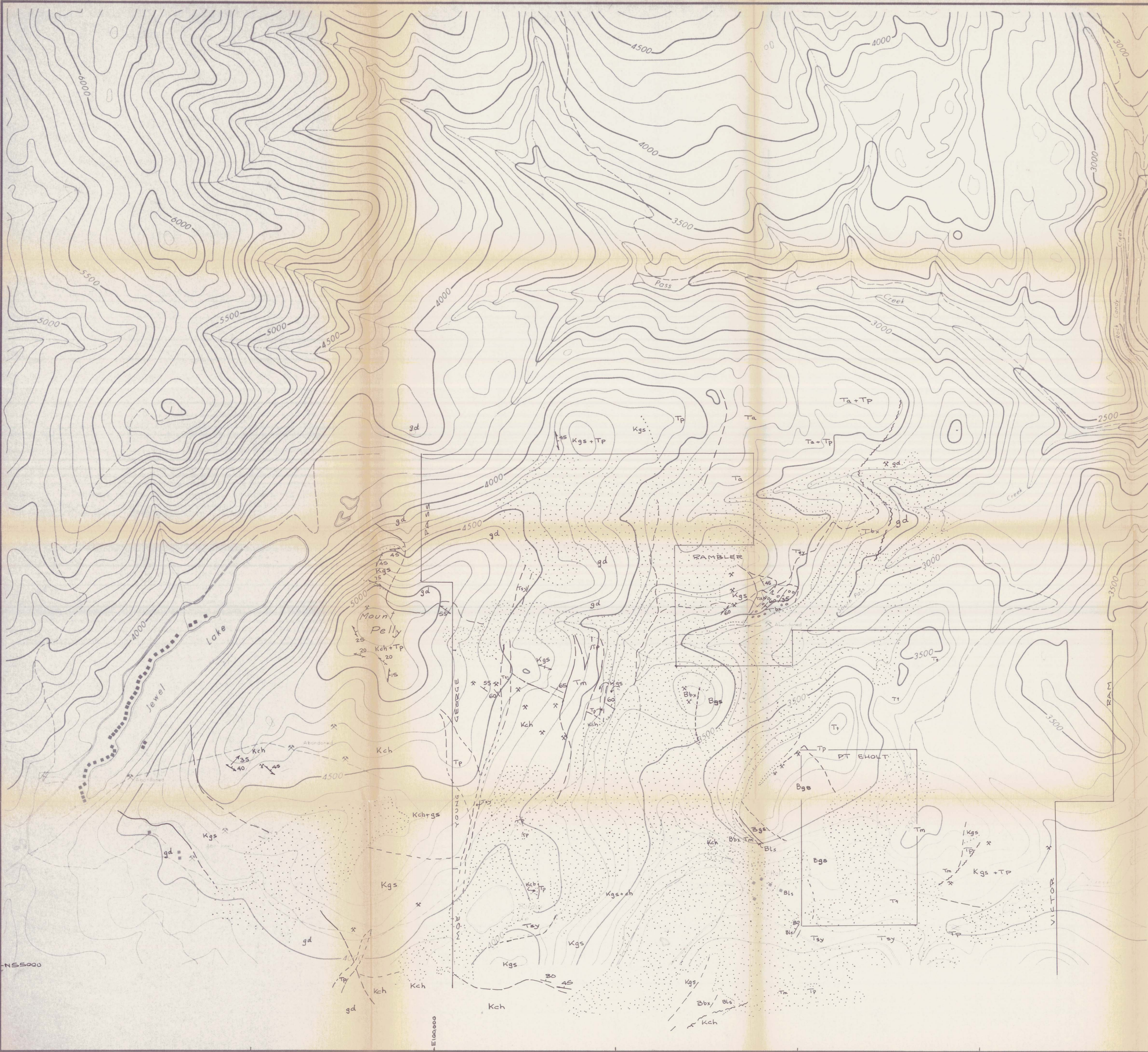
- 1) I am a consulting geologist and Director of Kettle River Resources Ltd.
- 2) I have practiced my profession in British Columbia since 1948.
- 3) I am a graduate of the University of British Columbia (BASC'47, MASc'49) and of Columbia University (PhD'54).
- 4) I am a registered Professional Engineer in British Columbia (#2563), a Fellow of the Geological Association of Canada, a Fellow of the Society of Economic Geologists and a Member of the Canadian Institute of Mining and Metallurgy.
- 5) This report is based on field work done by me in the area shown in the included map.

Victoria, B. C.

EA/12/17


James T. Fyles

James T. Fyles



LOCATION MAP
(82E - 1:250,000)

LEGEND

- TERTIARY**
- TpTsyTr DYKES & IRREGULAR BODIES FELDSPAR PORPHYRY, SYENITE TRACHYTE ETC.
 - TaTbx KETTLE RIVER FORMATION ARKOSE & VOLCANIC SANDSTONE BRECCIA
- NELSON INTRUSIONS**
- gd GRANODIORITE & INCLUDED HORNFELS
- BROOKLYN FORMATION**
- Bgs GREENSTONE & VOLCANIC BRECCIA
 - Bls LIMESTONE
 - Bbx BRECCIA (SHARPSTONE CONC)
- KNOB HILL GROUP**
- Kch CHERT, QUARTZITE & META-ARGILLITE
 - Kgs GREENSTONE & AMPHIBOLITE
- AREAS OF LITTLE OR NO OUTCROP
- GEOLOGICAL CONTACT**
- FAULT**
- BEDDING
 - SCHISTOSITY
 - MINE WORKING
 - CLAIM BOUNDARY

GEOLOGICAL BRANCH
ASSESSMENT REPORT

13,411

SCALE
1:12,000



REVISED JTF SEPT '84	GREENWOOD AREA	
	REGIONAL GEOLOGY	
	Northern Part of the Young George Claim Group Eholt B.C.	
PROJ. No. 15	SURVEY BY: J.T.F. JULY '84	DATE: March '84
N.T.S. 82E/2	DRAWN BY: J.T.F.	SCALE: 1:12,000
Sheet No. 5	NORANDA EXPLORATION	
	OFFICE: Vancouver	