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PRELIMINARY GEOLOGICAL REPORT

ON

"TOBY" CLAIM GROUP

FRANCES LAKE AREA - YUKON TERRITORY

BY

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Vancouver, B.C.

July 27, 1970.

INTRODUCTION

Acting under instruction from the principals of Welland Consolidated Mining Ltd. (N.P.L.) I have carried out a preliminary geological examination of a claim group located in the Frances Lake area, north of Watson Lake, Yukon Territory, and known as the "Toby" claims.

The examination was made on July 10th, 1970 and was confined to ground reconnaissance. Weather conditions were reasonable at the time.

The general Frances Lake area has been under active exploration and preliminary development for the last two years by a number of companies and some prospects have now reached an active diamond drilling stage.

LOCATION AND ACCESS

The "Toby" claim group is located approximately 125 miles northerly from Watson Lake, Y.T. along the Cantung road and then a distance of 25 miles westerly from that road. The co-ordinates of the property are approximately 61°15' North Latitude and 128°45' West Longitude. At the present time access to the property is best served by helicopter.

Watson Lake can be reached by scheduled aircraft flights from Edmonton and Vancouver or by travel over the Trans Canada highway. The Cantung road is in good condition and provides ready access to the general area. Supplies and mining equipment would have to come from Vancouver, Edmonton or Whitehorse.

Helicopters, float planes and automotive equipment are readily available at Watson Lake. Communication media is quite adequate.

CLAIMS

There are 24 claims in the "Toby" group. These are numbered from 1 to 24 inclusive and bear the recorded numbers Y41741 to Y41764 inclusive. They are located in a rectangular block 3 claims by 8 claims with the long axis in a north-south direction.

ACREAGE

There are 1200 acres, more or less, in the claim block.

TITLE

The claims are held by right of location under the Quartz Mining Act of the Yukon Territory. They were held in the name of certain individuals who have made assignment of their rights to Weland Consolidated Mining Ltd. (N.P.L.). Work commitments are up to date and there are no known encumbrances registered against the property. The claims have been staked in accordance with existing regulations for the Yukon Territory.

TOPOGRAPHY

The claim area is located in the southerly portion of the Logan Mountain range in what must be described as a quite rugged area.

Elevations vary from around 3000 feet above Mean Sea Level in the drainage valleys to 7300 feet in the more mountainous areas. There are numerous cirque valleys throughout the higher ranges.

There is reasonable tree growth in the valleys and lower slopes of the mountains but only sparse scrub occurs in the upper elevations and this is essentially located on reasonably weathered, and in most cases, smoothly rounded slopes.

Talus slopes are quite common and are indicative of the geological formations lying under and above the accumulations. The talus is inclined to be coarse and blocky.

There are numerous streams and these are swift flowing and generally precipitous in nature. The water is extremely cold at all times.

The temperature range is fairly marked, and will vary from the high 70's in summer to the 30 and 40 degree below zero temperature in winter. Permafrost is a common feature in the area.

Esker accumulations occur in many valleys and these are useful in road building activities.

AREAL GEOLOGY

The area bounded by the Frances Lakes, Tyess River, the Cantung road and the 61st parallel of North Latitude is essentially one where granitic bodies have intruded the area in volume and by so doing have replaced varied sedimentary bodies. The end result has been a series of metamorphosed, limited sized bodies of gneiss, schist, skarn, dolomite, quartzite, argillite and other variations of sedimentary-metamorphic action.

The metamorphics tend to form a fringing rim to the igneous intrusions and in some cases seem to assume a trending pattern, this factor is quite evident in the north-south drainage area that exists in the south central part of the subject area.

There are no particularly striking or complicated features to the general geology of the area and considerations basically resolve themselves into the extent of the sedimentary remnant and the degree of alteration that has been occasioned by the metamorphism introduced by the plutonic bodies.

STRUCTURAL GEOLOGY

The area contains varied indications of faulting and fracturing since many of the vein occurrences can be described as fissure veins. Minor evidence was seen of folding action and this seemed to be on a local scale. There are no clear cut structural features and it is only by inference and by topographic deformations that one can pre-suppose fault action to exist.

CLAIM GEOLOGY

The claim group lies on the shoulder of a mountain with the main showings existing between the 5000 and 5500 foot levels above Mean Sea Level. The area is relatively bare and presents a gentle slope over the area of interest. Evidence of the mineral continuity exists over a distance of 2500 feet in a direction N 70° E from the main pit area. The indicated dip is 70° North.

The mineralized zone occurs on the contact of a granite mass and must be classed as a contact metamorphic deposit. The host rock approaches a skarn in composition. Geological Survey maps of the Frances Lake area (Map 6-1966) indicate a possible North-South trend to the metamorphics in the general area but this is incorrect and short diamond drill holes in the area that were drilled in an East-West direction were definitely drilled into the strike of the formation.

Shaly limestone and granitic gneiss extend southward from the main skarn occurrences. The entire mountain-side shows a brown oxidization cover that is likely related to the main rock composition rather than to a prominent sulphide component. Minor drainage patterns intersect the slight sloping plateau area.

There are three fissure vein occurrences that have been opened to a limited extent by rock trenching and there is evidence of a limited amount of "X-Ray" diamond drill coring. The diamond drilling can be discarded as useless since it is entirely into the strike of the formation and parallels the mineralized areas.

Evidences of mineralized float similar to the mineral zone material was found to extend for at least 2500 feet in an easterly direction. This has not, to date, been followed with concrete exploration work.

A prominent cirque valley occurs about one-half mile north of the mineralized area and appears to contain a noticeable gossan zone. Snow conditions would not allow examination of the cirque at this time. The main mineral showing is located on the northerly end of Toby No. 16 and extends eastward through Toby No. 13.

ECONOMIC GEOLOGY

The mineralized zone on Toby No. 16 has been opened by a series of trenched pits and currently must be described as a contact metamorphic deposit. The host rock ranges from a skarn to a granitic gneiss, which may be the result of intrusion into shaly limestone.

Mineralization is comprised of chalcopyrite, sphalerite, galena and pyrite. A representative sample taken from the main trenched area returned the following assay values:

Copper	2.80%
Lead	14.61%
Zinc	3.04%
Silver	4.9 oz/ton.

This represented a width of 4.0 feet.

It is quite obvious that mineralized zones encountered in the area will be associated with contact areas of the granitic intrusive and that prospecting efforts should be confined to those regions. There is very little surface soil cover in the area and prospecting except in the cirque valleys should be readily accomplished.

CONCLUSIONS

1. Mineralization of consequence occurs on the "Toby" claim group and should be subjected to a comprehensive exploration program.

2. Deposits will in all likelihood be those of a contact-metamorphic type.

3. Magnetometer and geo-chemical methods may serve some purpose in evaluation, but physical prospecting and rock trenching should be widely used.

4. The area is currently one that has limited access possibilities and the helicopter must be used extensively in servicing any exploration program. Roads can be established when detailed exploration is required.

5. Silver, lead-zinc and copper mineralization is reasonably common in the general Frances Lake area.

6. Water supplies are inclined to be seasonal in nature and must be considered in the planning of any diamond drilling program. Timber resources are good and occur in most valley areas.

7. Road transportation is limited into the area largely due to the volume of work and not to topographic conditions.

RECOMMENDATIONS

1. That adequate geological mapping be carried out on the claim group.

2. Magnetometer and geochemical surveys can be conducted in conjunction with a full prospecting program.

3. Rock trenching should be carried out on any anomalous or mineralized areas that are encountered in the various exploration efforts.

4. Shallow diamond drilling may be necessary or useful in the horizontal and depth extension of the mineral zones of consequence since this method would be quite comparable in cost to physical trenching efforts.

5. The estimated cost to carry out an adequate program on the "Toby" claims would be as follows:

PHASE 1

Geological Survey 1 month	\$ 2,000
Magnetometer & Geochemical	\$ 2,500
Prospecting, trenching etc.	\$ 5,000
Camp & maintenance	\$ 3,000
Transportation	\$ 3,500
Engineering & Supervision	\$ 3,000
Miscellaneous - tools & tool rentals etc.	\$ 1,500
	\$20,500

PHASE 2

Diamond Drilling 2000 feet @ \$25.00 per ft. (over all costs)	\$50,000

PHASE 2 (Cont'd)

Engineering & Supervision	$ 2,500
	$52,500

Phase 2 will be entirely contingent upon results of the exploration carried out in Phase 1.

Respectfully submitted

F.L. Croteau
P.Eng. P.Geol.

Vancouver, B. C.

July 27, 1970

CERTIFICATE

I, F.L. Croteau, of 1055 West Hastings Street, Vancouver, in the Province of British Columbia, certify that:

1. I am a graduate of the University of Saskatchewan and hold the degree of B.Sc. in Mining Geology. Year of graduation was 1936.

2. I am a Registered Professional Engineer in the Province of British Columbia and in the Yukon Territory, a Registered Professional Geologist in the Province of Alberta and hold a license to practice Professional Engineering in the Province of Saskatchewan.

3. I have practiced my profession in Canada, the United States, Mexico and the West Indies since 1936.

4. I have personally examined the claims covered by this report and certify them to be properly staked.

5. I have no interest, direct or indirect, in the lands or securities of Welland Consolidated Mines Ltd. (N.P.L.).

6. The findings of this report are based on personal examination of the claims, prolonged acquaintance with the area, discussion with prospectors and other engineers and a study of the available government geological maps and reports on the area.

F.L. Croteau

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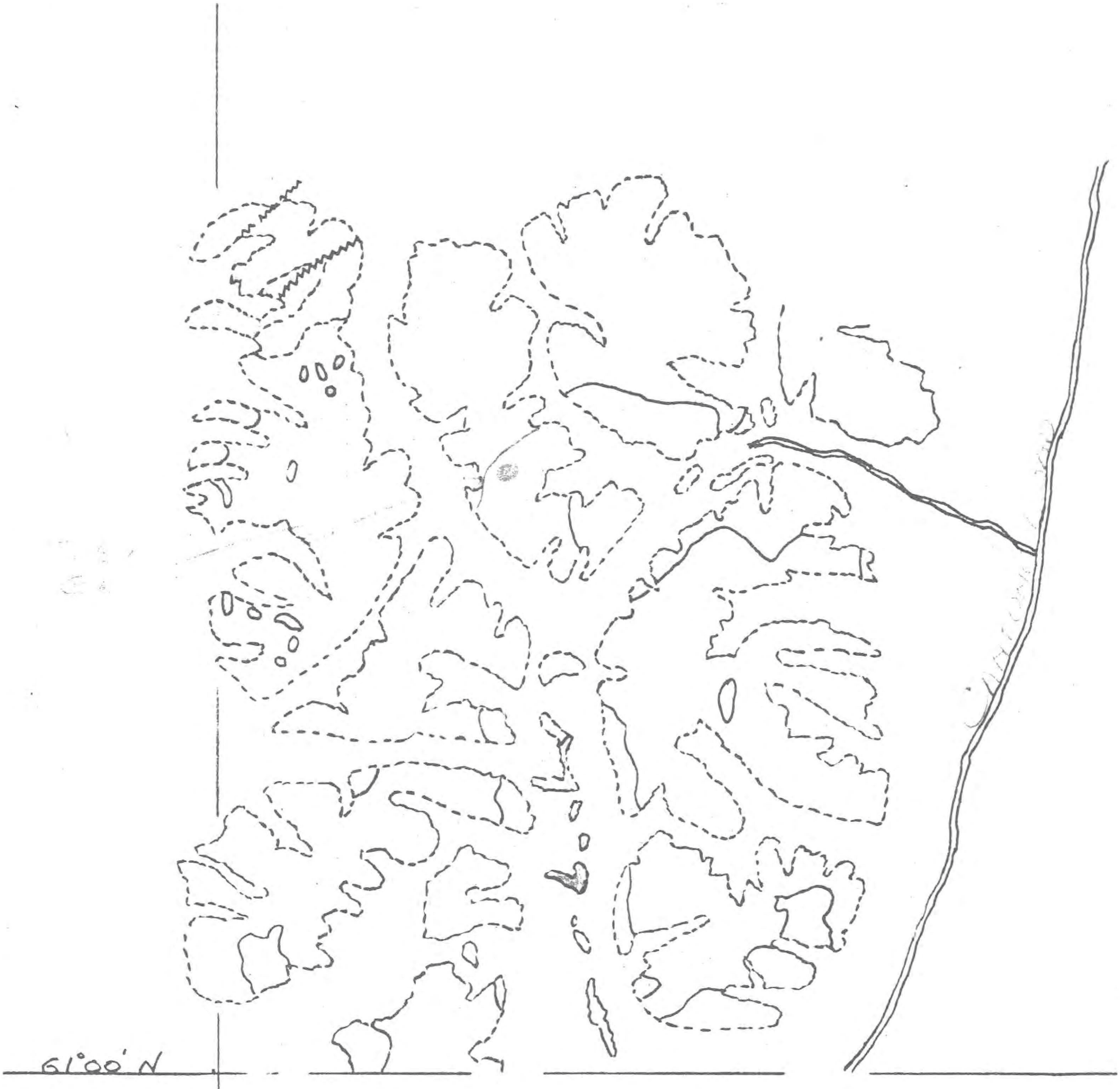
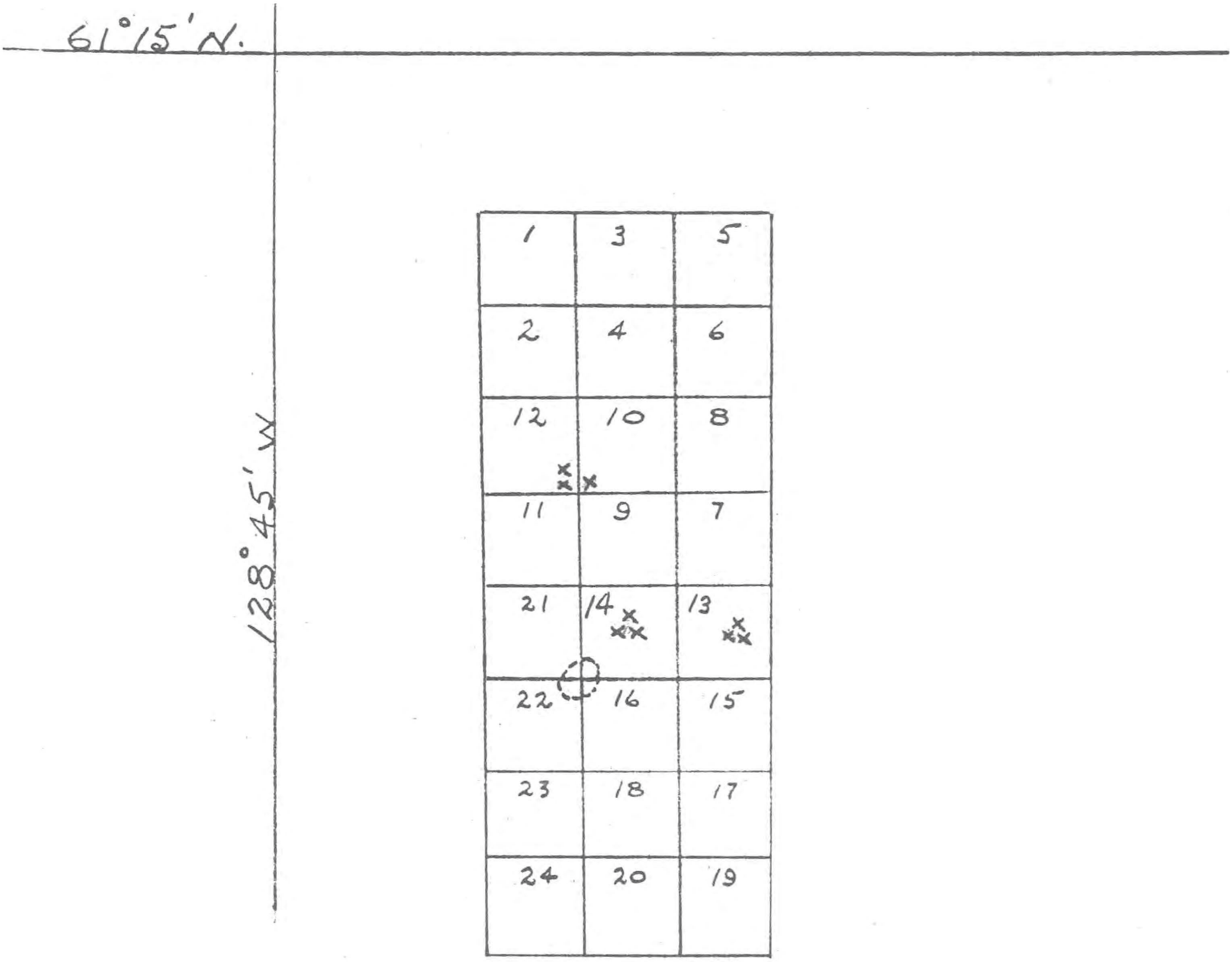


GEOLOGICAL SKETCH MAP

FRANCES LAKE AREA - YUKON TERRITORY

- GRANITE
- GNEISS & SKARN
- METAMORPHOSED SEDIMENTS

Scale 1" = 4 miles



CLAIM LOCATION MAP

"TOBY" CLAIMS

FRANCES LAKE AREA - YUKON TERRITORY

MINERAL IN PLACE

FLOAT

SCALE 1" = 2650'

F. L. CROTEAU LTD.

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GEOLOGICAL SURVEY OF CANADA
DEPARTMENT OF MINES AND TECHNICAL SURVEYS

PRELIMINARY SERIES

105 H

LEGEND

CENOZOIC

QUATERNARY

735 **16** Unconsolidated glacial and alluvial deposits

MESOZOIC

CRETACEOUS (?)

743 **15** Fine- to medium-grained biotite-quartz monzonite, granodiorite, minor diorite and gneiss; 15a, fine- and medium-grained biotite hornblende quartz monzonite and granodiorite, in part porphyritic; 15b, hornblende syenite

PALAEOZOIC

DEVONIAN AND (?) MISSISSIPPIAN

13 Brown and black shale, black and grey chert, quartzite, greywacke, chert-pebble conglomerate; 13a, fine-grained light grey limestone and minor dolomite; 13b, greenstone; 13c, serpentinite

14 746 Rusty brown weathering fine-grained schistose and spotted biotite hornfels, fine-grained quartzite, black pyritic argillite, dense light green to grey calc-silicate hornfels and fine-grained marble; minor slate, silty limestone and greywacke; 14a, light grey thin-bedded fine-grained marble and calc-silicate hornfels. May include some 1 and 2

SILURIAN AND DEVONIAN (?)

740½ **12** Fine-grained light to dark grey dolomite and quartzite; minor buff-grey dolomitic quartzite and silty to sandy dolomite

ORDOVICIAN AND SILURIAN

734½ **11** Black shale, slate; minor chert, siltstone, dark limestone

CAMBRIAN

MIDDLE AND LATE CAMBRIAN

9 Light grey and brownish grey weathering, intercalated platy argillaceous silty limestone, siltstone, and fine-grained grey limestone

10 Dark grey and brown silty shale and finely laminated siltstone, dark grey slate, thin-bedded brown-grey fine-grained sandstone; minor hornfels

EARLY AND/OR MIDDLE CAMBRIAN

741 **7** Buff-weathering dolomite, silty and sandy dolomite; minor sandstone and shale

6 Bright yellow and orange-weathering silty and sandy dolomite

8 Dark brown-grey to black, in part pyritic, calcareous argillite, slate, shale, and minor thin-bedded argillaceous limestone

EARLY CAMBRIAN

738½ **5** Sandstone, buff-weathering sandy and silty dolomite, dolomite, minor quartzite and argillaceous limestone; basic volcanic flows

740 **4** 'Swiss-cheese' limestone, irregular interbanded dolomitic siltstone and argillaceous to silty limestone; pods and lenses of limestone; minor blue-grey fine-grained limestone and orange-weathering dolomite

CAMBRIAN AND/OR EARLIER

3 Brown to red-brown weathering slate, phyllite, siltstone and fine-grained quartzite; 3a, green-grey slate and phyllite

PROTEROZOIC

745½ **1** Brown, grey, maroon and green shale; grey to green slate and phyllite, gritty feldspathic quartzite, quartz- and feldspar-pebble conglomerate, sandstone; 1a, minor limestone; 1b, light grey weathering, fine-grained grey limestone; 1c, mainly grey to green slate and phyllite; 1d, maroon and green shale and slate; 1e, mainly brown and grey shale and slate, minor maroon and green shale. 1d and 1e are probably equivalent and perhaps correlative with 1c

2 742 Quartz-feldspar-mica gneiss and schist, granitoid gneiss, feldspathic and micaceous quartzite, biotite schist, minor marble and skarn; numerous small granitic bodies, aplite and pegmatite; 2a, fine- to coarse-grained marble

~~744~~ **A** Highly altered, green to brown, megacrystic, coarse-grained biotite-quartz monzonite or granodiorite. Age uncertain

Geological boundary (defined, approximate or assumed)
Bedding (inclined, vertical)
Foliation (horizontal, inclined, vertical)
Lineation (horizontal, inclined)
Fault (defined, approximate)
Anticline (defined, approximate, arrow indicates plunge)
Syncline (defined, approximate, overturned)
Fossil locality .... F
Mineral occurrence or prospect (tungsten, W; copper, Cu; zinc, Zn) .... ×W
Areas of mineral prospects (zinc, Zn; lead, Pb; copper, Cu; silver, Ag) .... Zn,Pb
Hot spring .... H.S.
Glacier .... Gl

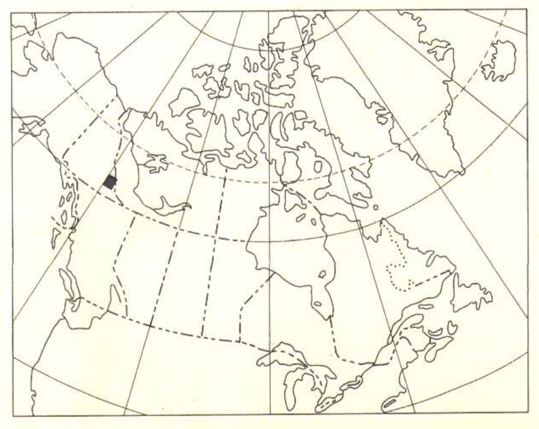
Geology by E. F. Roots, 1953; L. H. Green and J. A. Roddick, 1960
S. L. Blusson, 1962 and 1965

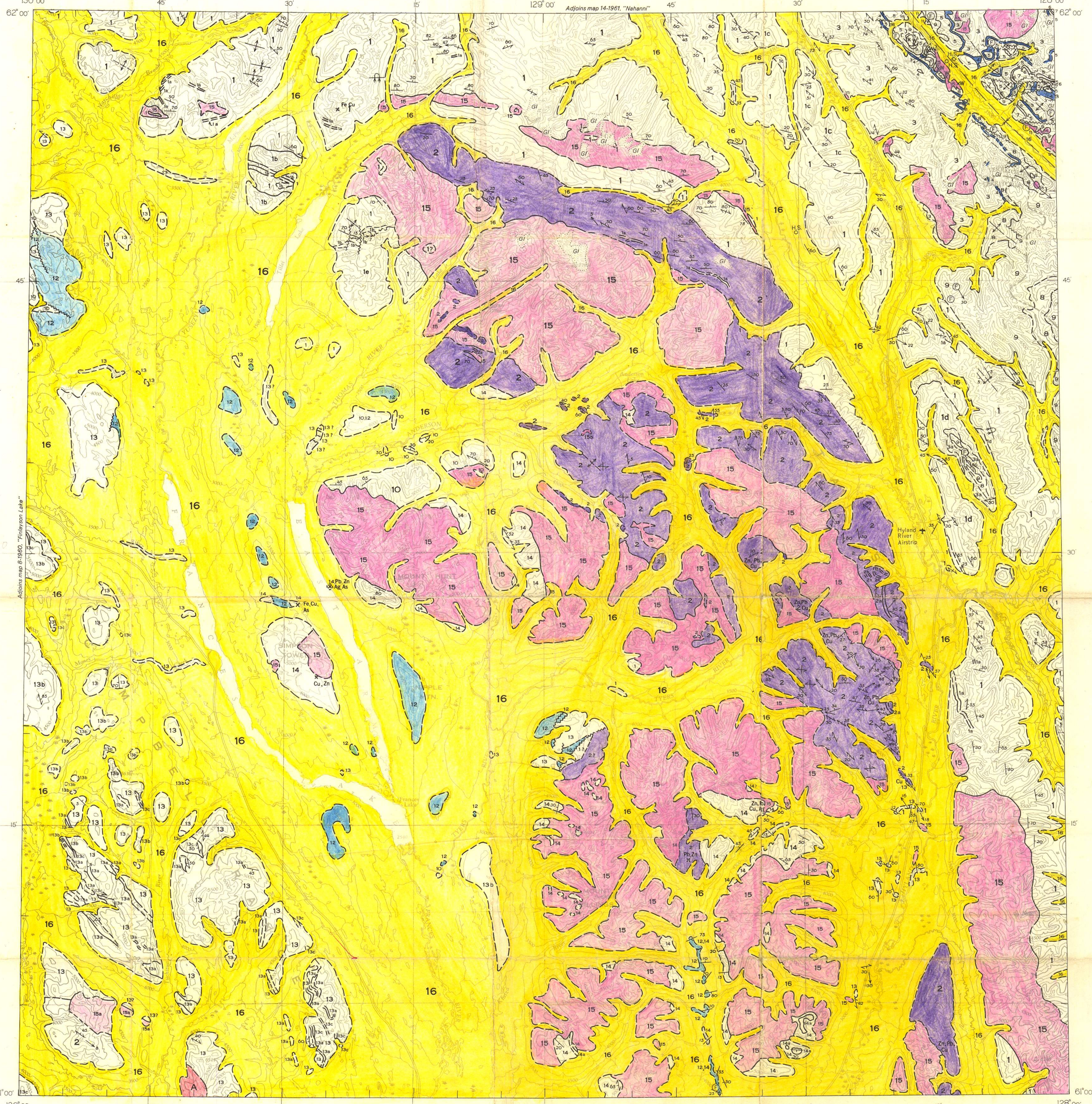
Geological cartography by the Geological Survey of Canada, 1966

Road, all weather
Airstrip
Mine
Horizontal control point
Provincial boundary
Intermittent stream
Marsh
Contours (interval 500 feet) 5000
Height in feet above mean sea-level 6365

Base-map compiled and drawn by the Army Survey Establishment, RCE, 1949-1952

Mean magnetic declination 33° 24' East, decreasing 5.3' annually.
Readings vary from 32° 42' in the SW corner to 34° 06' in the NE corner of the map-area





Published, 1966
Copies of this map may be obtained from the Director, Geological Survey of Canada, Ottawa

Printed by the Surveys and Mapping Branch

MAP 6-1966

GEOLOGY

FRANCES LAKE

YUKON TERRITORY AND DISTRICT OF MACKENZIE

Scale 1:253,440
1 inch to 4 miles

This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.

YUKON GEOLOGICAL SURVEY

DESCRIPTIVE NOTES

Access is provided by well maintained gravel roads linking Watson Lake on the Alaska Highway, Ross River on the Canol Road, and the Canada Tungsten mining community near the headwaters of Flat River.

An ice-sheet covered all but the highest peaks at least once during the Pleistocene Epoch, leaving erratics at elevations greater than 6,600 feet. Little evidence of direction of ice movement remains in the upland areas, but forms of drumlinoid ridges indicate that ensuing valley glaciers flowed southward down the major drainage systems.

Unit 1 comprises two main divisions with a combined thickness probably well in excess of 10,000 feet. A lower division is characterized by granule-pebble conglomerate and gritty quartzite and an upper one, at least 1,500 feet thick, is composed almost entirely of shale. The upper division is represented by map-unit 1d east of Hyland River and probably by units 1c and 1e, but owing to complex structure has not been separated elsewhere from unit 1.

Unit 3 contains appreciable siltstone and fine-grained quartzite near Flat River. Southwestward it changes progressively to shale and phyllite that may be correlative in part with uppermost strata of unit 1. A minimum thickness of 10,000 feet is estimated in the coarser grained facies northeast of Flat River. The base of unit 3 is ill-defined in the shaly facies near Little Hyland River and some basal strata may be included within 1c. Unit 3a is tentatively correlated with unit 3 on the basis of lithologic similarity, but may be older.

Unit 4, informally termed the 'Swiss-cheese limestone', forms a distinctive and persistent marker 100 to 200 feet thick above unit 3. It is characterized by recessively weathering oval-shaped pods and lenses of limestone in a more resistant siltstone matrix.

Units 5 and 7 total a minimum of 4,000 feet in thickness northeast of Flat River where they are separated by a thin but conspicuous bright orange weathering dolomite unit (6). They comprise various mixtures of dolomite, sandstone, siltstone, minor limestone and shale. Individual members and beds lense out or interfinger abruptly and diastems appear to be numerous. Basic volcanic flows and tuffaceous beds occur in the upper part of unit 5. An abrupt change in facies occurs westerly across Flat River where at least the lower part of this carbonate section (5), (6), and (7) changes to calcareous shale and argillite of unit 8. A discontinuous limestone member, about 100 feet thick, at the base of unit 8 is the host rock for the principal tungsten deposits at and near the Canada Tungsten mine. It gradually lenses out about 2½ miles northwest and 4 miles southeast of the mine. Apparent thinning or absence of unit 3 or equivalent strata northeast of Hyland River airstrip is believed due to an unconformity at the base of unit 8.

Intercalated siltstone and limestone of unit 9 characteristically occurs in wavy, undulatory or anastomosing bands, which on weathering impart a very rough pitted surface. An important regional unconformity at the base of this unit in places sharply bevels Lower Cambrian and older strata. Unit 9 is at least 4,000 feet thick near the Yukon - Northwest Territories boundary, but is itself bevelled by an unconformity beneath unit 11, so that apparently its thickness varies markedly. Exposures of unit 11 are limited to stream cuts along Flat River valley where it overlies unit 9 unconformably. Graptolites collected from the lowermost 500 feet are Upper Ordovician, but as the overlying part of unit 11 is much thicker, it may be in part of Silurian age.

Units 10 and 12 are lithologically correlated with strata previously mapped in adjacent regions.

Unmetamorphosed, predominantly pelitic, strata (13) are believed correlative with Devono-Mississippian rocks in adjacent regions. Characteristic are chert-pebble conglomerate, varicoloured chert, and black quartz-bearing greywacke and gritty quartzite. In the Campbell Range unit 13 includes numerous small bodies of greenstone, many intrusive, but most of the greenstone, mapped as 13b, appears to be volcanic and probably overlies or occurs within the upper part of unit 13. Serpentinite (13c) is thought to be an integral part of the Devono-Mississippian assemblage. A profound angular unconformity occurs at the base of this sequence.

Unit 14 comprises mainly hornfelsed pelitic rocks whose age and correlation are in doubt. Overall lithologic character, lack of regional metamorphism in rocks near the gneissic belt (2) and one collection of Middle or Upper Devonian fossils (near the south boundary at 128° 40'W) suggest that probably most, if not all, of this unit is correlative with Devono-Mississippian strata of unit 13.

Granitic rocks (15) generally have sharply defined contacts, but in the schist-gneiss belt (2) they are commonly bordered by complex zones as much as 1/4 mile wide in which massive plutonic rock is interspersed with lit-par-lit migmatites and partly granitized inclusions. There mapped boundaries are largely arbitrary, based on proportion of intrusive to host rocks.

Outside the complexly deformed central crystalline terrain, regional structures trend northwest except in the northern part of the map-area where they become westerly. Regional metamorphism appears unrelated to Cretaceous (?) granitic intrusion and probably predates the Devono-Mississippian strata. These strata overlie schist and gneiss of unit 1 unconformably and are essentially non-schistose. Northwest-trending regional folds near Flat River, which may be related to tectonism in the central belt, are post Late Ordovician, as they involve rocks of this age and older. These folds clearly predate and are modified by intrusion of granitic rocks.

Sphalerite with minor amounts of galena, pyrrhotite and chalcopyrite occur in silicated calcareous members in several localities throughout the schist-gneiss terrain (2) and in hornfelses that may be equivalent to unit 13. Pyrrhotite with some chalcopyrite was noted in black slate and argillite of unit 13, west of Hyland River road at mile 53. Scheelite is reported in the north-central part of the map-area near 61° 48' in contact zones with calcareous beds of unit 1.

A high-grade tungsten deposit on Flat River is presently being mined by Canada Tungsten Mining Corporation. Scheelite, with pyrrhotite and minor amounts of chalcopyrite occurs with skarn minerals in massive Lower Cambrian limestone. The deposit is several hundred feet from nearest exposed granitic rocks, but within a zone of moderate to high-grade contact metamorphism.

MAP 6-1966
FRANCES LAKE
YUKON TERRITORY AND DISTRICT OF MACKENZIE
105 H

(GEOLOGY)