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Re.: Application for a Scientific Research Licence Land Freshwater & Marine Based Research

Attachments

This document includes the following attachments:

Maps (see red dot for locality marking on each map):
Map of Glacier Fiord locality
Map of Lost Hammer Diapir locality
Map of Slidre Fiord locality

GEOLOGICAL SURVEY OF CANADA
DEPARTMENT OF ENERGY, MINES AND RESOURCES

LEGEND

SEDIMENTARY AND VOLCANIC ROCKS

CENOZOIC

QUATERNARY

- **Q** — *Stream, deltaic, glacial, and marine beach sediments (mapped only where underlying bedrock geology cannot be inferred with reasonable certainty)*

TERTIARY

- **Te** — *EUREKA SOUND FORMATION: sandstone, siltstone; minor shale, conglomerate and coal*

MESOZOIC

CRETACEOUS

UPPER CRETACEOUS

- **Kk1** — KANGUK GROUP
  KANGUK FORMATION: dark coloured shale; minor sandstone, siltstone and mudstone; Kk, KANGUK FORMATION (see note 1)
  STRAND FIORD FORMATION: basalt flows, agglomerate
  BASTION RIDGE FORMATION: dark coloured shale; minor siltstone
- **Kh** — *HASSEL FORMATION: sandstone; minor siltstone and shale*

LOWER CRETACEOUS

- **Kc** — *CHRISTOPHER FORMATION: dark coloured shale; minor siltstone, sandstone, mudstone and pyroclastic rocks*
- **Ki** — *ISACHSEN FORMATION: sandstone; minor shale, siltstone and conglomerate*

JURASSIC AND CRETACEOUS

UPPER JURASSIC AND LOWER CRETACEOUS

- **JKd** — *DEER BAY FORMATION: dark coloured shale; minor siltstone, sandstone and mudstone*

JURASSIC

UPPER JURASSIC

- **Ja** — *AWINGAK FORMATION: sandstone, siltstone; minor shale*

LOWER, MIDDLE AND UPPER JURASSIC

- **Js** — *SAVIK FORMATION: dark coloured shale; minor siltstone and sandstone*

TRIASSIC

UPPER TRIASSIC

- **Th** — *HEIBERG FORMATION: sandstone, siltstone; minor shale (see note 2)*

MIDDLE AND UPPER TRIASSIC

- **Tba** — *BLAA MOUNTAIN FORMATION: dark coloured shale, siltstone; minor sandstone*

INTRUSIVE ROCKS

TERTIARY

- **Co1** — *OTTO FIORD FORMATION: anhydrite, gypsum; minor limestone and shale (see note 3)*

CRETACEOUS

- *Gabbro, diabase and basalt dykes (solid circle indicates downthrow side of fault intruded by dykes see note 4)*

Geological boundary (defined, approximate, assumed)
Bedding (inclined)
Bedding (from airphotograph or observed from aircraft)
Fault (defined, approximate, solid circle indicates downthrow side)
Anticline (defined; showing culmination and plunge of axis)
Syncline (defined, approximate; showing culmination and plunge of axis)
Geological boundary, fold axis or fault; inferred beneath water, glacier, or Quaternary sediments
Boundary of Quaternary sediments
Measured section showing approximate line of traverse
Fossil locality . . . 90•

Geology by R. Thorsteinsson 1963, and E.T. Tozer 1957, 1961, 1962

Compilation by R. Thorsteinsson, 1970

NOTES

1. Strand Fiord volcanic rocks are absent around the head of Glacier Fiord. There strata equivalent to the Bastion Ridge Formation are included in the Kanguk Formation (Kk).

2. The Lower Jurassic Borden Island Formation which consists of ferruginous sandstone, occurs intercalated between the Heiberg and Savik Formations on the peninsula between Wolf Fiord and Skaare Fiord. There the thickness of Borden Island strata is in the order of 100 feet. The formation is included with the Heiberg Formation on this map.

3. The Otto Fiord Formation crops out in normal stratigraphic successions in northwestern Ellesmere Island, and it is there that the formation has been dated as Late Carboniferous. Intrusive bodies of the Otto Fiord Formation are especially common on Axel Heiberg Island where they cut various formations including, in some instances, the Tertiary Eureka Sound Formation. The intrusions are generally related to faults and folds formed by Tertiary earth movements. They are accordingly dated as Tertiary.

4. Basic dykes and sills intrude upper Paleozoic and Mesozoic sediments of the Sverdrup Basin throughout much of Axel Heiberg Island and western Ellesmere Island. They intrude all formations older than, and including the Strand Fiord Formation, but have not been observed to intrude the Kanguk and Eureka Sound Formations. They are especially common in Mesozoic rocks that predate the Kanguk Formation, and while it is possible that more than one episode of intrusion is represented, it is probable that the vast majority of dykes and sills are Cretaceous in age.

   The larger and more conspicuous dykes are shown on the map but sills have not been mapped. Sills are particularly abundant and commonly thick (up to about 200 feet) in the Blaa Mountain and Heiberg Formations of the map-area. They are an insignificant constituent in the Christopher and Hassel Formations. Relatively rare and thin sills (up to about 50 feet) occur in the Savik, Awingak, Deer Bay and Isachsen Formations.

Geological cartography by the Institute of Sedimentary and Petroleum Geology, Geological Survey of Canada, 1971

Intermittent stream
Indefinite Lake
Icefield, glacier
Dry river bed with channel
Moraine
Contours (interval 500 feet)
Horizontal control point
Height above mean sea-level

Topographic base-map at the same scale published by Surveys and Mapping Branch, 1966 with revisions by the Institute of Sedimentary and Petroleum Geology, 1971

The daily change of the North Mangetic Pole causes the magnetic compass to be very erratic in the area

N.W.T. GLACIER FIORD
1:250,000
MAP 1304A
1971

Published, 1972
Copies of this map may be obtained from the Geological Survey of Canada, Ottawa

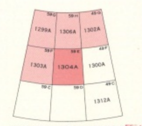
Printed by the Surveys and Mapping Branch

MAP 1304A
GEOLOGY
GLACIER FIORD
DISTRICT OF FRANKLIN

Scale 1:250,000

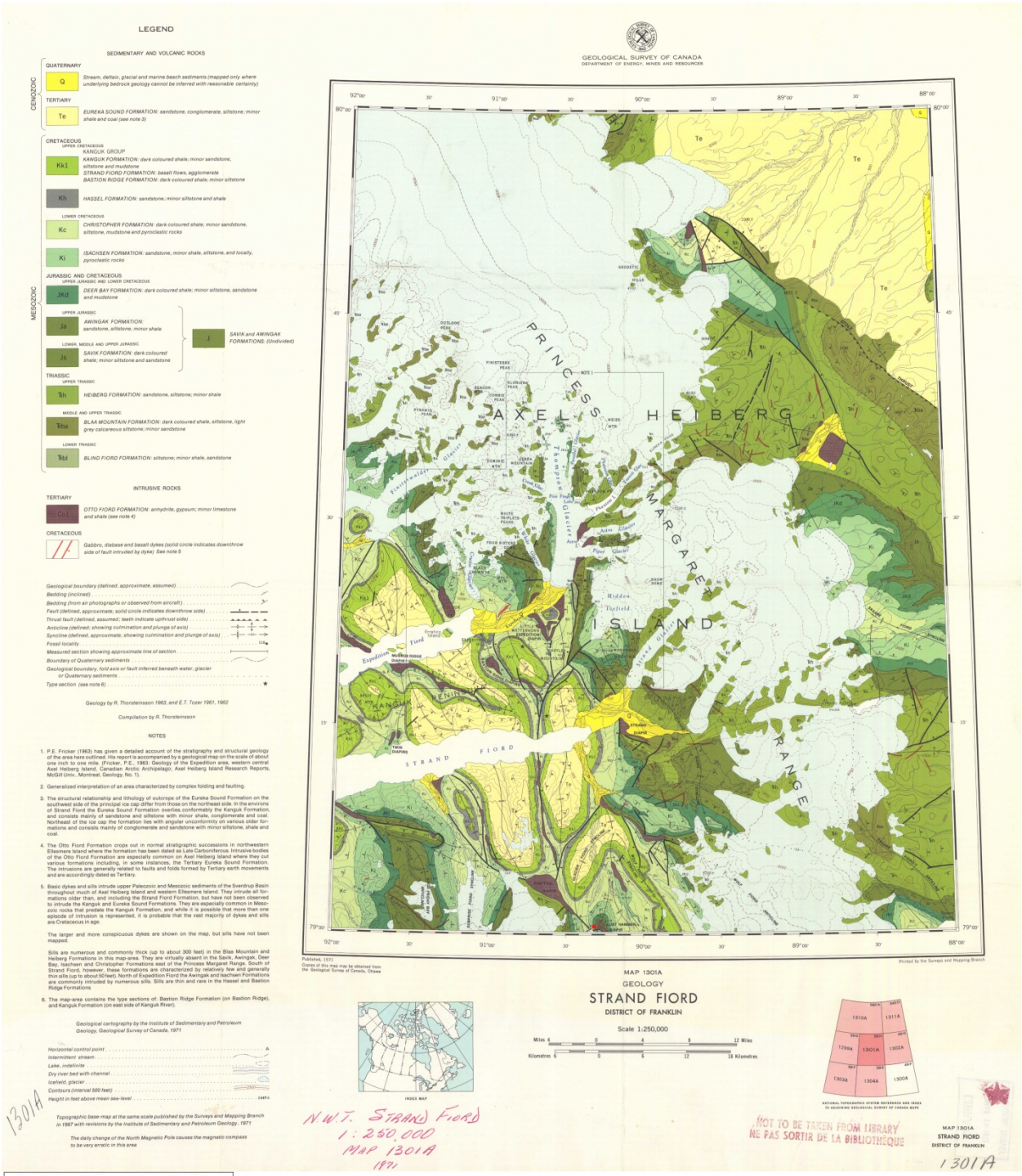
Miles 4 0 4 8 12 Miles
Kilometres 6 0 6 12 18 Kilometres

INDEX MAP



NATIONAL TOPOGRAPHIC SYSTEM REFERENCE AND INDEX TO ADJOINING GEOLOGICAL SURVEY OF CANADA MAPS

MAP 1304A
GLACIER FIORD
DISTRICT OF FRANKLIN



13014

N.W.T. STRAND FIORD
1:250,000
MAP 1301A
1971

1301A

LEGEND

SEDIMENTARY AND VOLCANIC ROCKS

CENOZOIC

QUATERNARY

- Q — Stream, deltaic, glacial and marine beach sediments (mapped only where underlying bedrock geology cannot be inferred with reasonable certainty)

TERTIARY

- Te — EUREKA SOUND FORMATION: sandstone, siltstone, conglomerate, shale, minor coal (see note 3)

MESOZOIC

CRETACEOUS

UPPER CRETACEOUS

- Kk — KANGUK FORMATION: dark coloured shale, minor sandstone, siltstone and mudstone
- Kh — HASSEL FORMATION: sandstone, minor siltstone and shale

LOWER CRETACEOUS

- Kc — CHRISTOPHER FORMATION: dark coloured shale, minor siltstone, sandstone, mudstone and pyroclastic rocks
- Ki — ISACHSEN FORMATION: sandstone, minor shale, siltstone and conglomerate

JURASSIC AND CRETACEOUS

UPPER JURASSIC AND LOWER CRETACEOUS

- JKd — DEER BAY FORMATION: dark coloured shale, minor siltstone, sandstone and mudstone

JURASSIC

UPPER JURASSIC

- Ja — AWINGAK FORMATION: sandstone, siltstone, minor shale

LOWER, MIDDLE AND UPPER JURASSIC

- Js — SAVIK FORMATION: dark coloured shale, minor siltstone and sandstone

- J — AWINGAK, SAVIK AND BORDEN ISLAND FORMATIONS (Undivided): see note 4

TRIASSIC

UPPER TRIASSIC

- Th — HEIBERG FORMATION: sandstone, siltstone; minor shale (see note 4)

MIDDLE AND UPPER TRIASSIC

- Tba — BLAA MOUNTAIN FORMATION: dark coloured shale, siltstone, light grey calcareous siltstone; minor sandstone
- Ts — SCHEI POINT FORMATION: calcareous siltstone and sandstone, shale, minor limestone

LOWER TRIASSIC

- Tbl — BLIND FIORD FORMATION: siltstone; minor shale and sandstone
- Tb — BJORNE FORMATION: sandstone (mainly red weathering); minor siltstone and shale

PALEOZOIC

PERMIAN

UPPER PERMIAN

- Ptf — TROLD FIORD FORMATION: green sandstone, minor bioclastic limestone, conglomerate and chert

LOWER PERMIAN

- Pv — VAN HAUEN FORMATION: dark coloured shale, siltstone, minor chert
- Pa — ASSISTANCE FORMATION: sandstone, minor siltstone

CARBONIFEROUS AND PERMIAN

UPPER CARBONIFEROUS AND LOWER PERMIAN

- CPh — HARE FIORD FORMATION: dark coloured siltstone, shale, limestone
- Pt — TANQUARY FORMATION: limestone, sandstone siltstone

CARBONIFEROUS

UPPER CARBONIFEROUS

- Co — OTTO FIORD FORMATION: anhydrite, gypsum, minor limestone and shale

INTRUSIVE ROCKS

TERTIARY

- Coi — OTTO FIORD FORMATION: anhydrite, gypsum, minor limestone and shale (see note 5)

CRETACEOUS

- Gabbro, diabase and basalt dykes (solid circle indicates downthrow side of fault intruded by dyke) see note 6

Geological boundary (defined, approximate, assumed)
Bedding, tops known (inclined)
Bedding (from air photographs or observed from aircraft)
Fault (defined, approximate; solid circle indicates downthrow side)
Thrust fault (defined, assumed; teeth indicate upthrust side)
Transcurrent fault (arrows indicate relative movement)
Anticline (defined, approximate; showing culmination and plunge of axis)
Syncline (defined, approximate; showing culmination and plunge of axis)
Fossil locality
Measured section showing approximate line of traverse
Boundary of Quaternary sediments
Geological boundary, fold axis, or fault, inferred beneath water, glacier or Quaternary sediments
Type section (see note 7)

Geology by R. Thorsteinsson 1956, 1957, 1961, 1963, 1963 and E.T. Tozer 1956, 1961, 1962

Compiled by R. Thorsteinsson 1969, 1970

N.W.T. Eureka Sound North
1:250,000
Map 1302A

NOTES

1. A basalt flow of uncertain stratigraphic position and about 100 feet thick crops out adjacent to the shore of Eureka Sound, north of the entrance to Mokka Fiord. The strike of the flow more or less parallels Mokka Fiord. The flow underlies conformably the Eureka Sound Formation, but no sediments are exposed beneath it. The flow is provisionally included in the Christopher Formation.

2. The area outlined represents the lower part of the Slidre Fiord map (1298A). This is a detailed geologic map of the environs of the Eureka Weather Station on the scale of 1:50,000.

3. The Eureka Sound Formation on Fosheim Peninsula, and east of the Depot Point anticline on Axel Heiberg Island, lies conformably on the Kanguk Formation and consists mainly of sandstone. In other parts of Axel Heiberg Island, the Eureka Sound Formation lies unconformably on either the Isachsen Formation or Christopher Formation, and consists mainly of conglomerate.

4. The Savik Formation west of the Joy Range consists mainly of shale with lesser amounts of siltstone and sandstone, and is readily differentiated in the topography from the underlying Borden Island Formation and overlying Awingak Formation. On the west side of the Joy Range, the Borden Island Formation (Lower Jurassic), which consists of about 200 feet of grey sandstone with interbeds of dusky red ferruginous sandstone, is included on this map with the Heiberg Formation. East of the Joy Range, the Savik Formation is mainly sandstone with lesser amounts of shale and siltstone, and does not constitute an easily picked map-unit where exposures are poor. Because of these circumstances, the Borden Island, Savik and Awingak Formations, east of the Joy Range, have been mapped as one map-unit that bears the letter symbol J.

5. Limited exposures of the Otto Fiord Formation occur in normal stratigraphic sequence north of Whitsunday Bay, overlying the Stolz Thrust. Extensive exposures of the formation crop out in normal stratigraphic successions in northwestern Ellesmere Island, and it is there that the formation has been dated as Late Carboniferous. Intrusive bodies of the Otto Fiord Formation are especially common on Axel Heiberg Island where they cut various formations including, in some instances, the Tertiary Eureka Sound Formation. The intrusions are generally related to faults and folds formed by Tertiary earth movements. They are accordingly dated as Tertiary.

6. Basic dykes and sills intrude upper Paleozoic and Mesozoic sediments of the Sverdrup Basin throughout much of Axel Heiberg Island and western Ellesmere Island. They intrude all formations older than, and including the Strand Fiord (volcanic) Formation, but have not been observed to intrude the Kanguk and Eureka Sound Formations. They are especially common in Mesozoic rocks that predate the Kanguk Formation, and while it is possible that more than one episode of intrusion is represented it is probable that the vast majority of dykes and sills are Cretaceous in age.

   The larger and more conspicuous dykes are shown on the map but sills have not been mapped.

   Sills are numerous and commonly thick (up to 400 feet) in the Blind Fiord, Blaa Mountain and Heiberg Formations on Axel Heiberg Island. They are rare and generally thin (up to about 100 feet) in the Hare Fiord, van Hauen, Savik, Awingak, Deer Bay, Isachsen and Christopher Formations on this island. Sills are numerous and thick in the Heiberg and Blaa Mountain Formations in western regions of Ellesmere Island but do not occur in exposures of the Heiberg Formation east of the Fosheim Anticline.

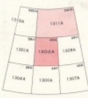
7. The map-area contains the type sections of the Heiberg, Savik and Awingak Formations.

Geological cartography by the Institute of Sedimentary and Petroleum Geology, Geological Survey of Canada, 1971

Horizontal control point
Airstrip
Intermittent stream
Contours (interval 500 feet)
Sand
Height in feet above mean sea level

Topographic base-map at the same scale published by the Surveys and Mapping Branch in 1966, with revisions by the Institute of Sedimentary and Petroleum Geology, 1971

The daily change of the North Magnetic Pole causes the magnetic compass to be very erratic in this area



NATIONAL TOPOGRAPHIC SYSTEM REFERENCE AND INDEX TO ADJOINING GEOLOGICAL SURVEY OF CANADA MAPS

INDEX MAP

MAP 1302A

GEOLOGY

EUREKA SOUND NORTH

DISTRICT OF FRANKLIN

Scale 1:250,000

Miles 4 0 4 8 12 Miles

Kilometres 6 0 6 12 18 Kilometres

GEOLOGICAL SURVEY OF CANADA
DEPARTMENT OF ENERGY, MINES AND RESOURCES

Published, 1971
Copies of this map may be obtained from the Geological Survey of Canada, Ottawa

Printed by the Surveys and Mapping Branch

MAP 1302A
EUREKA SOUND NORTH
DISTRICT OF FRANKLIN