Adjoining Sheet Nos. 14 & 15

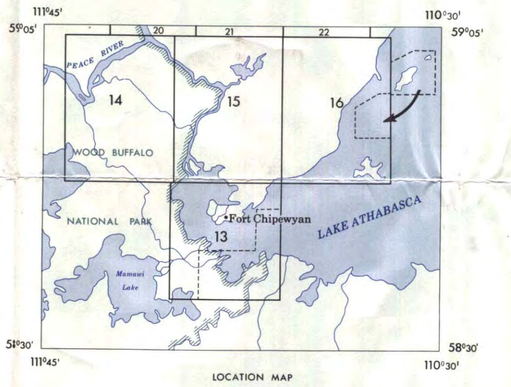
GEOLOGY OF THE FORT CHIPEWYAN DISTRICT, ALBERTA

Sheet No. 13

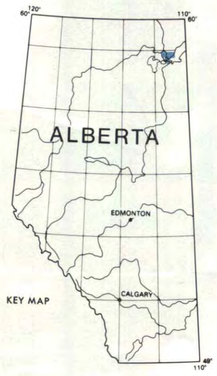
SCALE 1:31,680

Miles 1 0 1 2 Miles

Kilometres 1 0 1 2 3 Kilometres



LOCATION MAP



KEY MAP

Geological boundary (defined, approximate)

Foliation (defined: dip known, dip vertical; foliation assumed)

Foliation trend*

Lineation (combined with dip of foliation)

Extreme contortion (structural trend)

Tight fold (structural trend)

Local gneissosity in generally massive to foliated rock

Joint (dip known, vertical; unknown)

Fault (defined, dip known, assumed)

Shear (with dip)

Breccia

Mylonite (local)

Gossan

Rock alteration (possibly fault related) . . . A

Quartz vein

Granitoid standard sample . . . 259

Metasedimentary band standard sample . . . 46

Mineral occurrence (copper) . . . Cu

Radioactivity

Yellow stain, mineral . . . Y

Garnet . . . G

Chlorite (abundant) . . . C

Epidote (abundant) . . . E

Graphite . . . R

Isotopic age (millions of years); biotite (b), muscovite (m); K-Ar (k); U. of A. . . . bk1740

Glacial stria (direction of ice movement indicated)

Wind-cut groove (wind direction indicated)

Raised beach (downslope direction indicated)*

Dune*

Esker*

Crevasse filling (ridge shown)*

Sand covered area

Drainage

Muskeg

Township boundary

National Park boundary

*Primarily aerial photographic interpretation

Geology by John D. Godfrey, 1970

Alberta RESEARCH COUNCIL

LEGEND

PRECAMBRIAN*

LATE SEDIMENTARY ROCKS

Subcrop / Rubble

ATHABASCA FORMATION: typically brownish to hematite red, flaggy to rubbly bedded, silty quartz sandstone with minor pebble bands.

REGIONAL CATACLASTIC ZONES

Zones of regional cataclasis and recrystallization have principally affected granite gneisses and metasedimentary rocks to produce: ultramylonite, mylonite, cataclasite, rounded or augen rock clasts or feldspar porphyroclasts (◊).

222 RECRYSTALLIZED CATACLASTIC ROCK: green to black, granulose (siliceous) to schistose, with biotite, chlorite, sericite; feldspar and minor quartz porphyroclasts in a massive to foliated, finely banded, aphanitic matrix. Largely metasedimentary rock parent material.

227 RECRYSTALLIZED CATACLASTIC ROCK: mostly light colored, with white to pink feldspar porphyroclasts 5 to 20 mm long making up 2 to 5 percent of the rock, in a foliate, finely banded, aphanitic matrix. Largely granite gneiss parent material.

METASEDIMENTARY ROCKS (LOW-GRADE)

BURNTWOOD GROUP: reddish arkosic sandstone with minor grit and pebble bands interbedded with subordinate thin green (chloritic) phyllonitic argillite bands; milky gash quartz veins locally numerous. Sandstone shows sedimentary structures.

GRANITOID ROCKS

ARCH LAKE GRANITOIDS

ARCH LAKE GRANITE PHASE: typically reddish overall; 20 to 40 percent red, subhedral, elongate to tabular feldspar megacrysts, from 15 to 30 mm long, aligned subparallel in a medium-grained (locally coarse-grained) usually well-foliated matrix of feldspar, blue quartz and biotite. Locally reduced amounts of feldspar megacrysts. Mafic mineral content 6 to 14 percent. Commonly mildly cataclastic, with crushed matrix and augen megacrysts.

ARCH LAKE TRANSITIONAL GRANITE PHASE: (transitional to Slave Granitoids); typically reddish overall; up to 10 percent white to pink subhedral, elongate to tabular feldspar megacrysts, from 10 to 15 mm long, aligned subparallel in a medium-grained (locally coarse-grained) usually well-foliated matrix of feldspar, blue quartz, and biotite. Quartz content locally reduced from 25 to 10 percent. Commonly mildly cataclastic.

CHIPEWYAN RED GRANITE: typically red to pink; equigranular, medium-grained but locally fine-grained; massive to poorly foliated, biotite (chloritic) content generally increases with degree of foliation; fairly homogeneous lithology with very few small-scale zenoliths, locally gneissic; minor pegmatites and quartz veins.

WYLIE LAKE GRANITOIDS

133 FISHING CREEK QUARTZ DIORITE: medium gray overall; mottled grayish white on a medium- to dark-gray background in hand specimen; medium grained, typically almost megacrystic but may be locally distinctly megacrystic or equigranular; megacrystic white to gray to pale green feldspars from 5 to 10 mm long in a greenish gray matrix of feldspar, quartz, and biotite; typically poorly foliated, locally massive, or gneissic. Rock types are predominantly quartz diorite but range to quartz-bearing diorite and granodiorite. Minor, irregularly shaped small bodies of leucocratic, predominantly fine-grained aplite-pegmatite and microgranite; schlieren and lenses of biotite or high-grade metasedimentary rocks may be present.

131 WYLIE LAKE GRANODIORITE PHASE: generally dark greenish or brownish red; may appear finely mottled; medium grained, typically equigranular except for rare 15 mm pink feldspar megacrysts in a feldspar, quartz, biotite matrix; typically poorly foliated to massive. Rock types are predominantly granodiorite with minor quartz diorite.

110 THESIS LAKE GRANITE: typically dark appearance (fresh surface) with up to 10 percent hematized red to pink megacrystic augen feldspars 6 to 13 mm long (locally 20 mm), and bluish gray quartz, in a medium-grained, foliated matrix; biotite may be chloritized, lithology fairly homogeneous, very few small-scale xenoliths; minor, distinctive quartzo-feldspathic aplitic (⁂) to pegmatitic bodies (⁂) locally concentrated as pods, blocks and dykes, forming from 10 to 90 percent of individual outcrops within the Thesis Lake Granite.

SLAVE GRANITOIDS

101 SLAVE GRANITE PHASE: typically whitish gray (locally white to greenish gray or pink feldspar mottled on a darker background); medium- to coarse-grained (locally fine-grained); up to 5 percent white feldspar megacrysts, 7 to 15 mm long, in a matrix of white feldspars, quartz, and biotite (<1 to 5 percent); massive to more commonly foliated (increase in biotite content tends to better define foliation); typically garnetiferous, may be locally gneissic; includes minor small-scale mafelsic lenses of metasedimentary appearance; minor gray white, fine- to medium-grained felsic dykes and quartz veins.

102 MAFIC SLAVE GRANITE PHASE: similar to Slave Granite but with a notably higher biotite content (up to 10 percent); distinctly foliated.

MEGACRYSTIC COMPONENT: up to 15 percent white feldspar megacrysts 15 to 50 mm long, either randomly oriented or aligned with the foliation of map-units 101 and 102 (▮).

METASEDIMENTARY ROCKS (HIGH-GRADE)

31 METASEDIMENTARY ROCKS: the high-grade metasedimentary rock types included in this map unit are lithologically and texturally gradational, and in part intermixed on outcrop scale. Typically impure quartzite, fresh surface is dark, greenish (bluish) gray; fine-grained, layered, with ferruginous and garnetiferous zones, locally scattered pyrite, gossans, and milky or bluish gray quartz pods and veins. Minor amphibolite may be present. Common local lithologic gradational variations to: (1) fine- to medium-grained, metamorphic quartzo-feldspathic (granitic and minor pegmatitic) phase ranging from individual white feldspar megacrysts, 5 to 15 mm long, to nebulous or distinct aggregations and masses; commonly foliated to locally gneissic (⁂) (2) fine-grained, retrograde phyllite and schist (biotite, chlorite, sericite, and uncommonly hornblende), and phyllonite.

AMPHIBOLITE

20 Dark brownish green (fresh surface) to grayish green; typically medium grained; biotite may be common; composition ranges from essentially amphibole pure or amphibole rich to a feldspathic biotite amphibolite; commonly foliated but may be banded where feldspar rich; minor pyrite common.

GRANITE GNEISSES

12 HORNBLENDE GRANITE GNEISS: typically pink to reddish with dark green bands; quartz-feldspar bands interlayered with mafic-rich bands (hornblende, with biotite; generally chloritic) on hand specimen scale; fine- to medium-grained, typically equigranular, uncommonly megacrystic; typically well banded, uncommonly poorly banded, and rarely foliated. Composition is predominantly granite, with minor granodiorite, and quartz diorite. Large areas are migmatitic, particularly where intimately associated with minor lenses, pods, or bands of metasedimentary rocks, pegmatite, or amphibolite.

11 BIOTITE GRANITE GNEISS: typically pink to reddish; quartz-feldspar bands interlayered with mafic-rich bands (biotite, possibly with subordinate hornblende; may be chloritic) on hand specimen scale; fine- to medium-grained, generally equigranular, rarely megacrystic; commonly well banded but may be locally poorly banded to foliated, and leucocratic phases may be nearly massive. Composition is predominantly granite, with minor quartz monzonite, granodiorite, quartz diorite, and monzodiorite. Large areas are migmatitic, particularly where intimately associated with minor lenses, pods, and bands of metasedimentary rocks, pegmatite, and amphibolite.

*NOTE: Rock groups are arranged in approximate chronological sequence. Nomenclature follows Streckeisen (1967): Classification and Nomenclature of Igneous Rocks; Neues Jahrbuch für Mineralogie, Abhandlungen, 107, No. 2, pp. 144-240.

Base maps compiled from planimetric sheets published by Alberta Department of Lands and Forests, Edmonton

Air photographs covering this area are obtainable from the Technical Division, Alberta Department of Lands and Forests, Edmonton and the National Air Photographic Library, Ottawa

Approximate magnetic declination 24° 16′ East in 1979, decreasing 6′ annually.

Map drawn by C. Parent

Cartographic editing by A. Campbell

Published 1979

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