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DEPARTMENT OF ENERGY, MINES AND RESOURCES
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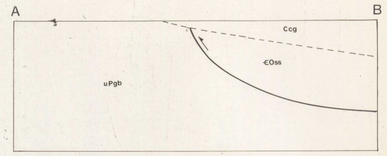
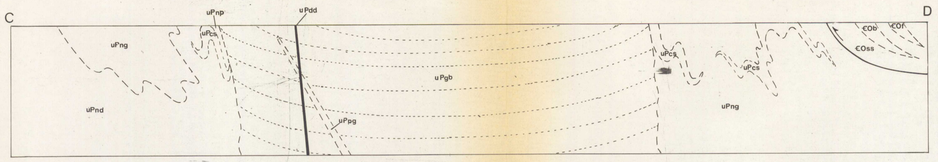
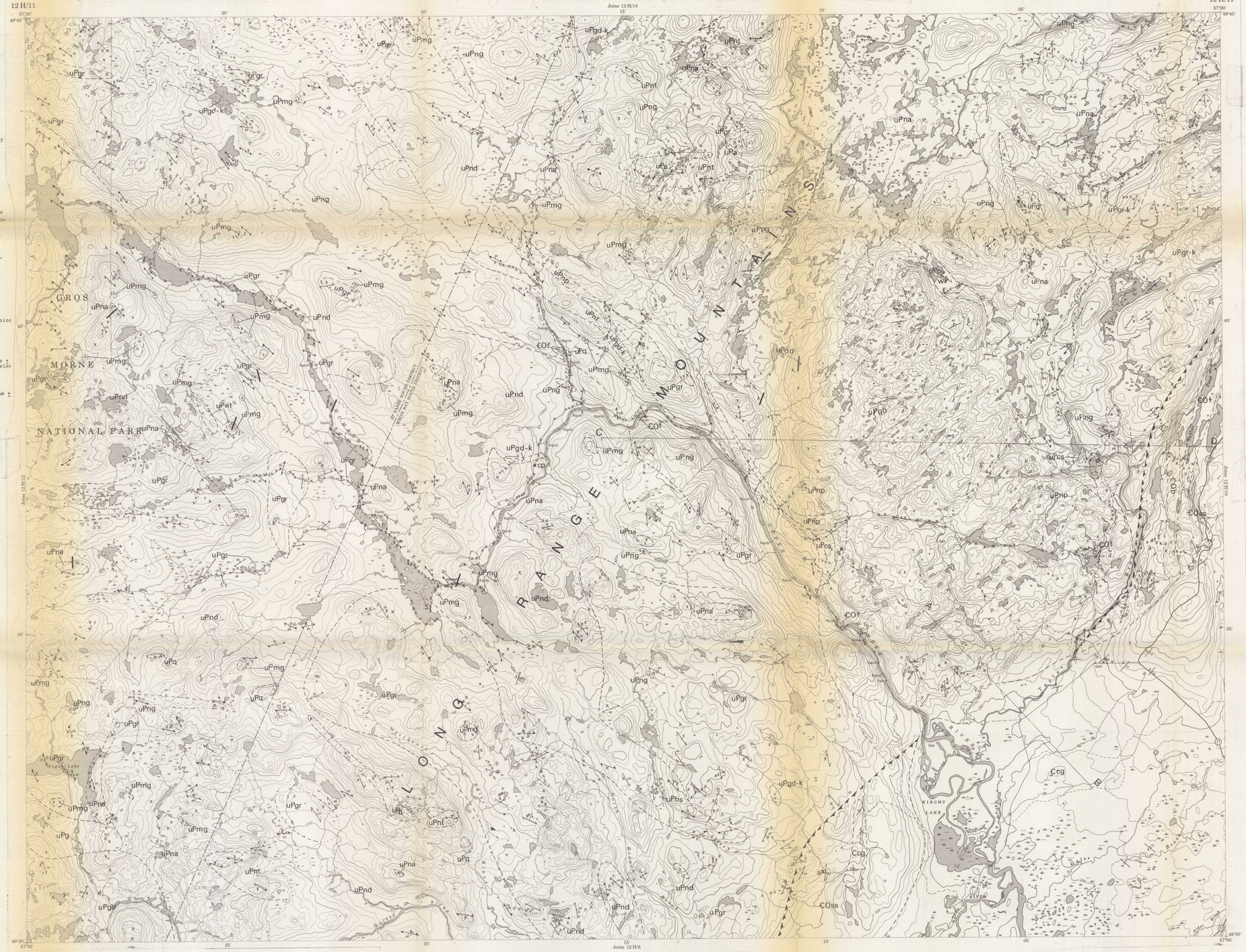




12 H/11

Joins 12 H/14



Joins 12 H/12

Joins 12 H/10

Joins 12 H/6

SILVER MOUNTAIN
NEWFOUNDLAND

Scale 1:50 000 - Échelle 1/50 000

Kilometres 1 0 1 2 3 4 Kilometres

Universal Transverse Mercator Projection
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LEGEND

CARBONIFEROUS

Ccg DEER LAKE BASIN
Brown to reddish, coarse to very coarse grained, polymict conglomerate, minor red sandstone (redbeds)

CAMBRO-ORDOVICIAN OR YOUNGER

€Of Tan to rose, massive to schistose, very fine grained felsic porphyry

€Ob Dark green, medium grained metadiorite, mafic schist (epidote + chlorite + albite schist)
CONEY ARM GROUP (?)

€Oss Grey to tan, fine to very fine grained, quartzose metasedimentary schist; minor quartzite

MIDDLE TO UPPER PROTEROZOIC OR YOUNGER

uPdd Dark green, fine to medium grained, amphibole-bearing metamafic dykes

uPgr-k Pink, foliated, K-feldspar-megacrystic biotite granite; minor medium grained biotite granite

uPgd-k Rose, massive to foliated, K-feldspar-megacrystic biotite ± amphibole - bearing granodiorite to granite

uPg Pink, fine to medium grained, variably epidotized leucogranite

uPgr Pink, medium grained, massive to foliated, biotite ± hornblende - bearing granite; minor granitic gneiss

uPmg Dark green, medium grained, amphibole-bearing metagabbro, typically with a subophitic texture

TAYLOR BROOK GABBRO COMPLEX

uPpg Grey, pyroxene-bearing pegmatitic leucogabbro

uPgb Grey to dark green, fine to medium grained, pyroxene + olivine - bearing meso- to leucogabbro, typically shows igneous layering

uPq Grey, white, or bluish, massive quartz, impure quartzite

uPcs Buff, rey, or white, medium grained, forsterite ± diopside - bearing marble; talc + tremolite(?) - bearing marble; dark grey, forsterite + phlogopite ± diopside ± spinel - bearing calcsilicate rock; rare, layered, wollastonite + clinopyroxene + bytownite - bearing calcsilicate rock.

uPnp Grey to green-brown, medium grained, biotite ± garnet ± sillimanite (± retrograde hercynite + cordierite) - bearing pelitic gneiss, typically rusty weathering.

uPna Dark green, medium grained, amphibole-bearing dioritic gneiss and amphibolite

uPbs Grey, medium grained, quartzofeldspathic biotite schist.

uPnd Green-grey, medium grained, fleck-textured, biotite + hornblende ± hypersthene - bearing quartz dioritic(locally granodioritic) gneiss

uPng Pink, medium grained, biotite + hornblende + hypersthene ± garnet - bearing granodioritic to granitic gneiss, typically migmatitic

uPnt Buff, fine to medium grained, granoblastic textured, hypersthene ± clinopyroxene ± biotite ± hornblende - bearing quartz dioritic to tonalitic gneiss.

SYMBOLS

Metamafic dykes (unit uPdd)

outcrop, area of outcrops

geological contact: approximate, assumed

gneissosity, first schistosity, second schistosity

fold axis (showing asymmetry), mineral lineation, intersection lineation

LS-fabric, bedding (tops unknown), ingeous layering

glacial striation: flow direction known, unknown

high-angle thrust or reverse fault

Mineral locality: w - wollastonite
s - sillimanite
a - andalusite
cp - chalcopyrite

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CONTRIBUTION TO THE CANADA-NEWFOUNDLAND MINERAL DEVELOPMENT AGREEMENT 1984-1989

DEPARTMENT OF MINES AND ENERGY
GOVERNMENT OF NEWFOUNDLAND AND LABRADOR

Energy, Mines and Resources Canada
Énergie, Mines et Ressources Canada

Canada

Notes

The Silver Mountain area lies 50 km NNE of Pasadena, and can be reached either by helicopter or float-equiped aircraft chartered from Pasadena, or via woods roads west of the Hampden highway.

The map area straddles the SE margin of the Long Range Inlier of the northern Long Range Mountains. It is underlain predominantly by middle to upper Proterozoic gneisses and mafic to felsic plutonic rocks, which are flanked to the SE by deformed, lower Paleozoic supracrustal and intrusive rocks, and by undeformed Carboniferous conglomerates of the Deer Lake Basin. U-Pb (zircon) radiometric dating undertaken by Erdmer (1986) indicates that high grade metamorphism in the inlier occurred at ca. 1250 Ma, and that massive to foliated intrusive rocks in the area are Grenvillian or younger.

The bulk of the gneisses are quartzofeldspathic rocks probably derived from igneous protoliths. They all locally contain hypersthene, indicating the attainment of granulite facies conditions. The dominant gneissic unit is a medium grained, flecky textured, green-grey, biotite ± hornblende ± hypersthene quartz diorite gneiss (unit uPnd). Narrow bands of biotite + plagioclase + quartz schist (unit uPbs) locally occurring in the gneiss probably represent a textural variant of the unit. Bands of buff, granoblastic, hypersthene ± clinopyroxene ± biotite ± hornblende quartz diorite to tonalite gneiss (unit uPnt) and pink, migmatitic, biotite ± hornblende ± hypersthene ± rare garnet granodiorite to granite gneiss (unit uPng) up to 8 km wide define an overall NW lithologic trend in the inlier. Dioritic gneiss and amphibolite (unit uPna) are medium grained rocks containing amphibole + plagioclase ± biotite ± clinopyroxene ± orthopyroxene ± quartz. They are distinguished from younger (or less deformed) mafic intrusive rocks by their granoblastic texture and the local presence of leucocratic migmatitic segregations.

Rocks of sedimentary origin include both pelites (unit uPnp) and metacarbonate rocks (unit uPcs). The pelites are grey to green-brown migmatitic gneisses, typically rusty weathering, which consist of biotite + plagioclase + quartz ± microcline ± cordierite ± orthopyroxene ± graphite ± garnet ± sillimanite; the latter two minerals are locally replaced by fine grained hercynite + cordierite. The pelitic gneiss occurs as bands up to 0.5 km wide infolded with quartz dioritic gneiss (unit uPnd), and is associated with metacarbonate rocks flanking the Taylor Brook Gabbro Complex (TBGC) (Erdmer, 1986). The metacarbonates consist of medium grained, buff, grey or white marble, in places with layers of dark grey calc-silicate rock up to several metres wide. Forsterite and(or) diopside are common accessory minerals in the marble; the calcsilicate rock consists of calcite + forsterite ± phlogopite ± diopside ± spinel. Wollastonite occurs with bytownite and clinopyroxene (salite) in mylonitized calcsilicate rock in some outcrops along the NE flank of the TBGC. Marble along Taylor Brook was previously correlated (Hibbard, 1983) with parts of the Ordovician Coney Arm Group (Smyth and Schillereff, 1982). Although locally containing talc and(or) tremolite(?), in places diopside ± forsterite are present, suggesting that the marble comprises older, higher grade metacarbonate rocks (unit uPcs) partly retrograded during lower Paleozoic reworking of the eastern margin of the inlier.

Bands of massive quartz and layered, impure quartzite (unit uPq) up to ~300 m wide occur in the southwestern and northeastern parts of the map area. Both sedimentary and intrusive (igneous/ hydrothermal?) origins are inferred for these quartz-rich rocks. Grey quartzite with biotite ± magnetite-bearing layers typically 1 to 100 cm wide occurs as a 75 m wide band in granitic and quartz dioritic gneiss (units uPng, uPnd) northeast of Silver Mountain Lake. A sedimentary protolith is also inferred for a band of massive, white quartz containing narrow screens (cm-scale) of biotite ± sillimanite-bearing gneiss (unit uPnp) northeast of the Taylor Brook Gabbro Complex. Massive quartz with a blunk cast is interpreted to be intrusive. It occurs as veins spatially associated (and locally interlayered) with metagabbro (e.g. unit uPmg), and cuts quartzofeldspathic gneiss near these mafic bodies.

The ortho- and paragneissic rocks are intruded by a variety of massive to foliated, mafic to felsic plutonic rocks. Unit uPgr is a pink, biotite ± hornblende-bearing granite spatially associated with granitic and quartz dioritic gneiss (units uPng, uPnd). In some outcrops, the granite is clearly discordant, elsewhere it shows gradational contacts with migmatitic granitic gneiss (unit uPng). Only relatively large bodies of the granite are distinguished on the map, and the unit locally includes granitic gneiss (unit uPng). The age of the granite relative to the intrusive rocks described below is unknown.

The Taylor Brook Gabbro Complex is a layered, intrusive body which incorporates two principal lithotypes. The dominant unit (uPgb) is a meso- to leucogabbro typically containing clinopyroxene and olivine. Biotite, orthopyroxene, and brown amphibole are common accessory minerals. The gabbro contains rare inclusions of the quartzofeldspathic gneiss country rock. Igneous layering in the gabbro is defined both by variations in grain-size and in the mafic mineral/plagioclase ratio. It is developed on a cm- to m-scale, and dips toward the center of the intrusion. The igneous layering is cut by dykes of pegmatitic leucogabbro (unit uPpg), which forms a mappable, ovoid body in the northwestern part of the intrusion.

Small bodies of metagabbro (unit uPmg) in quartzofeldspathic gneiss are distinguished from amphibolite (unit uPna) by the typical presence of a well preserved subophitic texture, and from gabbroic rocks of the TBGC by the preponderance of amphibole and apparent absence of pyroxene and olivine. Unit uPgm probably incorporates several ages of variably strained and recrystallized mafic intrusive rocks.

A portion of the Lomond River granodiorite (Erdmer, 1988) is exposed in the southwestern corner of the map area. This grey to rose granodiorite (unit uPgd) is medium grained, and typically contains both biotite and amphibole. Most of the intrusion is massive, although a well developed schistose fabric is locally evident. Immediately to the north of the granodiorite is a relatively fine grained, pink, variably epidotized leucogranite (unit uPgr) containing traces of biotite and(or) chlorite. Contact relations between the granite and the Lomond River granodiorite have not been observed.

There are two varieties of K-feldspar megacrystic granitoid rocks in the map area. Unit uPgd-k is a rose, massive to foliated, megacrystic biotite ± amphibole-bearing granodiorite to granite which occurs as relatively narrow (100-200 m) northwest-trending bands in quartzofeldspathic gneiss, and which forms the southern member of a larger, composite(?) intrusion in the north-central part of the map area. Erdmer (1986) noted that the latter intrusion includes more mafic, non-megacrystic rocks farther to the north. Unit uPgr-k is a pink, megacrystic biotite granite occurring immediately to the west of the ESE-dipping high angle thrust or reverse fault inferred to separate lower Paleozoic supracrustal and intrusive rocks from crystalline rocks of the inlier. Minor non-megacrystic granite occurs near the southwestern flank of the intrusion. The megacrystic granite has been extensively recrystallized under greenschist facies conditions, and contains a well developed schistose fabric similar in orientation to the lower Paleozoic, low grade fabric present in rocks east of the thrust. This fabric is inferred to have developed during lower Paleozoic reworking of crystalline rocks near the margins of the inlier.

North- to NE-trending rectiplanar mafic dykes (unit uPdd) typically ≤1 m wide have been observed to crosscut most of the Proterozoic rocks described above. These dykes are narrower and less extensive than similarly oriented mafic dykes of the Long Range swarm occurring to the northeast of the map area (e.g. Bostock, 1983; Strong, 1974). All contain amphibole, and record late metamorphism spanning amphibolite to greenschist facies in the inlier.

Northeast-trending schists east of Taylor Brook are inferred to be metamorphosed Cambro-Ordovician sedimentary and intrusive rocks. Unit €Oss is a grey to tan, fine to very fine grained quartz-rich two-mica schist which contains andalusite in at least one locality. It is tentatively correlated with parts of the middle Ordovician Coney Arm Group (Smyth and Schillereff, 1982) which occurs along strike to the NNE of the map area. The schists developed during a period of greenschist facies metamorphism as evidenced by chlorite + epidote + albite-bearing mafic schist forming the highly strained margins of a concordant band of metadiorite (unit €Ob) enclosed by unit €Oss.

Very fine grained, tan to rose felsic porphyry (unit €Of) of uncertain age occurs as narrow (<100 m), massive dykes crosscutting the TBGC and granitic gneiss (unit uPng), and in a concordant, 0.5 km wide schistose band associated with metasedimentary schist (unit €Oss) east of Taylor Brook. The porphyry contains 1-4 mm phenocrysts of quartz and K feldspar (± biotite and plagioclase) set in a quartz- and plagioclase-rich, locally spherulitic groundmass.

The lower Paleozoic schists east of Taylor Brook are overlain (contact not seen) by undeformed, very coarse grained, polymict conglomerates and redbeds (unit Ccg) of the Carboniferous Deer Lake Basin (Hyde, 1982).

The Precambrian terrane is dominated by a regional, northwest-trending lithological and structural grain. Early, tight to isoclinal folds (F1) in the gneissic rocks were deformed about SSE- to SW-plunging axes (F2) during the development of schistose fabrics occurring in the gneisses and in various mafic to felsic plutonic rocks (e.g. units uPgr to uPgr-k). F1 folds deform gneissic, pre- or early-Grenvillian fabrics (ca. 1250 Ma) developed during an early, granulite facies metamorphic event. The granulites were largely retrograded to amphibolite facies, probably during D2 and(or) subsequent thermal events, including recrystallization of the Long Range dykes under amphibolite (to greenschist) facies conditions.

The effects of lower Paleozoic orogenesis are pronounced along the eastern margin of the inlier. Cambro-Ordovician(?) schistose rocks were thrust westwards over the relatively rigid crystalline rocks of the inlier prior to the Carboniferous as evidenced by local CS-fabrics developed in felsic porphyry (unit €Of). In the east, thrusting was accompanied by extensive recrystallization under low pressure, greenschist facies metamorphic conditions. Although acting largely as a buttress against lower Paleozoic deformation, crystalline rocks of the inlier locally contain fabrics attributable to this event. North- to northeast-trending, greenschist facies fabrics are pervasive in quartz-rich rocks along the east margin of the inlier (e.g. in unit uPgr-k), and are locally evident in the TBGC. Similarly oriented fabrics developed in narrow, high strain zones in the western portion of the map area contain lower amphibolite facies assemblages, and may be contemporaneous, but deeper level analogues of the low grade fabrics farther to the east. Granitoid rocks and quartzofeldspathic gneiss in this area typically are epidotized, indicating pervasive fluid migration through parts of the inlier. Evidence of greenschist facies metamorphism is also present in some of the Long Range mafic dykes; it may be related to a regional (hydro?)thermal imprint associated with the intrusion of Acadian granites (Owen and Erdmer, 1986).

Mafic rocks in the area appear to be the most favourable targets for base metal exploration. Chalcopyrite occurs with drusy quartz and biotite in vugs in an outcrop of amphibolite (unit uPna) along the woods road on the north side of the Humber River, northeast of Silver Mountain Lake. Massive bands of quartz (unit uPq) up to ~300 m wide are a potential source of industrial stone. Gold mineralization has been recently reported along rusty high strain zones developed in granite along strike with unit uPgr-k in the vicinity of Sops Arm, NNE of the map area (V. French, pers. comm., 1985).

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