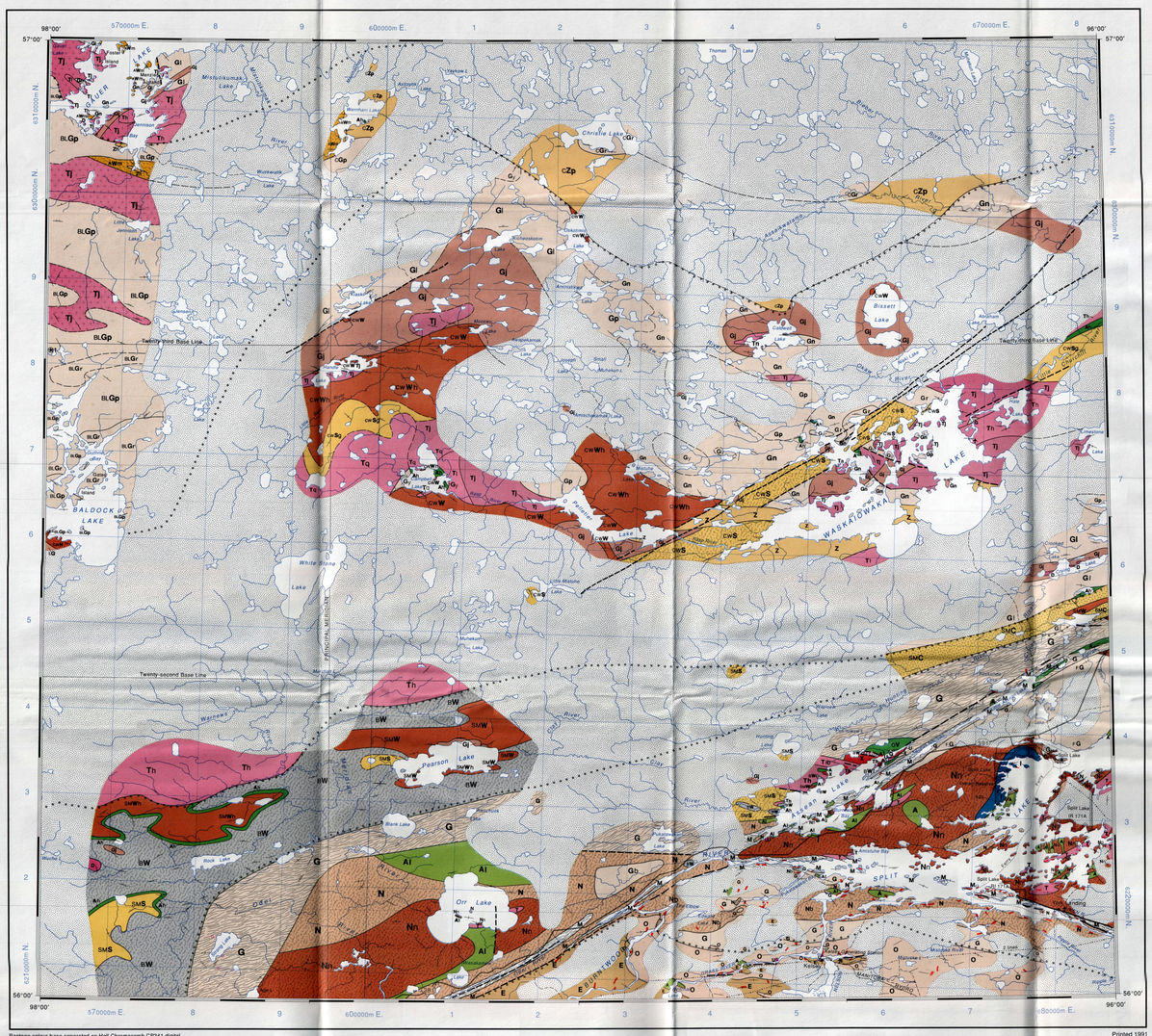
Manitoba
Energy and Mines
Geological Services
Open File Report
Split Lake, NTS 64A
1 : 250 000



Scale 1:250 000

KILOMETRES 5 0 5 10 15 20 25 KILOMETRES

Synoptic geology by M.T. Corkery, P.G. Lenton, W. Weber, and W.D. McRitchie

Compilation by D. Lindal

Cartography by T. Franceschet

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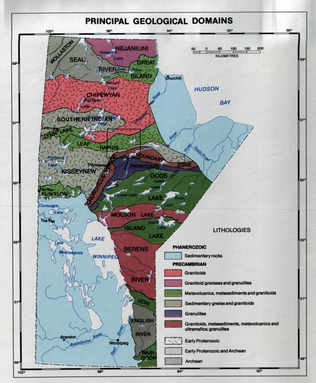


PRINCIPAL GEOLOGICAL DOMAINS

LITHOLOGIES

PHANEROZOIC
- Sedimentary rocks

PRECAMBRIAN
- Granitoids
- Granitoid gneisses and granulites
- Metavolcanics, metasediments and granitoids
- Sedimentary gneiss and granitoids
- Granulites
- Granitoids, metasediments, metavolcanics and ultramafics granulites
- Early Proterozoic
- Early Proterozoic and Archean
- Archean

Every possible effort has been made to ensure that the information presented on this map is accurate. However, the Province of Manitoba and Manitoba Energy and Mines do not assume liability for any errors that may occur. References are included for users wishing to verify critical information.

MARGINAL NOTES

The Split Lake map sheet (64A) is underlain by rocks that are part of Manitoba's two major geologic subdivisions: the Archean Superior Structural Province and the Proterozoic Churchill Structural Province. Each province is characterized by its lithologies and structural features. Between these major provinces is the Churchill - Superior boundary zone with lithologies and structural features that are in part similar to those in the Superior and Churchill provinces, and in part are unique to the boundary zone.

Each of the major structural provinces is subdivided into domains or blocks defined by distinct lithologies and structures. The Superior Province is represented by a portion of the Pikwitonei domain. The Churchill - Superior boundary zone is subdivided into the Split Lake block, the Orr Lake segment and various lenses of Superior and Churchill province affinities bounded by mylonite. This zone also contains supracrustal rocks of Proterozoic Ospwagan Group and related intrusive rocks of Thompson belt affinity. The Churchill Structural Province in the region is represented by portions of the Kisseynew, Leaf Rapids, and Chipewyan/Baldock domains, and a small segment of the Southern Indian Lake domain.

Superior Province

A small segment of Superior Province **Pikwitonei domain** occurs along the south edge of the map sheet. This domain is typified by rocks that attained granulite grade metamorphism. Most of the amphibolites (**A**) in the Pikwitonei domain south of NTS 64A (Weber, 1978) are interpreted to represent remnants of supracrustal rocks. Some may represent layered metagabbro. Intermediate to mafic granulite (**Oh**) represent migmatite of felsic orthogneiss and mafic supracrustal paleosome. Felsic granulite and opdalite (**O**) consist of felsic orthogneiss. Both units are interpreted to have formed originally during amphibolite facies conditions and then were subsequently metamorphosed under granulite conditions. In contrast, enderbite (**E**) may have crystallized under granulite conditions deep in the crust (Weber and Mezger, 1990). Near the contact with the Split Lake block granulite is partially retrogressed to amphibolite facies assemblages.

Churchill - Superior Boundary Zone

Several large blocks and numerous fault bounded, variably deformed subdomains of both the Superior and Churchill provinces and Thompson belt affinities have been identified in the boundary zone. Two large fault bounded segments of mainly Archean rocks are the Split Lake block and the Orr Lake segment.

The **Split Lake block** is composed predominantly of Archean gneiss and intrusive rocks representing retrogressed and deformed granulite facies assemblages that were intruded by late Archean granitoid rocks. The retrograde granulite rocks are interpreted to be equivalent to Pikwitonei domain associations and include amphibolite and metagabbro (**A**), layered amphibolite (**Ai**), garnetiferous amphibolite (**Ag**), anorthosite (**I**) and tonalite (**T**). These rocks are intruded and migmatized by late Archean granite to granodiorite (Sub Lake granite, NTS 64D) with a Rb-Sr whole rock isochron age of 2600 ± 75 Ma (Clark, 1974). This granite-granodiorite forms the neosome in hornblende and hornblende–biotite *in par it* gneiss (**Nn**), which is the dominant rock type in the western segment of the Split Lake block.

Proterozoic migmatite (**N**) composed of reworked Archean migmatite and gneiss form several linear belts that generally parallel the major cataclastic zones along Assean Lake and the south shore of Split Lake. The youngest rock recognized in the region is the Fox Lake granite (rG), which postdates Molson dykes. A Molson dyke in the Pikwitonei domain, in NTS 63P, yielded a U-Pb zircon age of 1883 ± 2 Ma (Heaman *et al.*, 1986).

The **Orr Lake segment** southward of the Split Lake block also represents a reworked Archean terrane with retrogressed mafic granulite assemblages (**Ai**). Migmatitic gneiss (**Nn**, **N**) consists of almost completely reconstituted amphibolite facies Archean felsic gneiss. They contain isolated relicts of hypersthene and Archean structures that are characteristic of the Pikwitonei domain granulite. The gneissic layering has been transposed into the Assean Lake - Odei River fault direction and is paralleled by younger (Proterozoic) granitoid *its*. This block is structurally separated from the Pikwitonei domain by the Assean Lake fault/mylonite zone. It is bounded to the north and west by Proterozoic rocks of the Kisseynew domain.

The **Assean Lake cataclastic zone** follows the 60° trend of Assean Lake and extends southwest into NTS 63P. The dominant feature of this zone is the ubiquitous but variable degree of brittle deformation and minor recrystallization at greenschist metamorphic grade of all rock types. A continuous steep southeast-dipping mylonite zone underlies the centre of Assean Lake and several subparallel fault zones mark the boundaries of areas containing rocks from different domains. Recognizable Kisseynew domain rocks (swB, sWI). Thompson belt volcanic rocks (cW) and Split Lake block units (**N**, rG) occur between faults on the north side of the major mylonite zone.

The **Split Lake - Aiken River cataclastic zone**, which marks the south boundary of the Split Lake block, extends from the Assean Lake mylonite zone on the Burntwood River west of Split Lake eastward across the south side of the map sheet. This cataclastic zone is similar in character to the Assean Lake cataclastic zone. Reworked Archean migmatite (**N**, **Nn**) with variable cataclastic deformation predominate with extensive steeply-dipping mylonite (**M**) forming a linear east-west fault zone.

Churchill Province

The **Kisseynew domain** is a metasedimentary gneiss belt that lies south of the Leaf Rapids domain and west of the Churchill - Superior boundary zone. It is composed of paragneiss, amphibolite and migmatite derived from Lower Proterozoic sedimentary and subordinate volcanic strata. This belt has undergone upper amphibolite facies metamorphism and polyphase deformation. The supracrustal succession consists of three divisions:

(1) the lowest division (Burntwood River Metamorphic Suite) (sW) is composed of quartzofeldspathic garnet–biotite gneiss ± cordierite ± sillimanite and anatectic migmatite derived from graphitic greywacke-mudstone turbidites (Gilbert *et al.*, 1980);

(2) the overlying middle division comprises thin, conformable amphibolite and paragneiss units (**A**, **Ah**) derived from mafic volcanic rocks and clastic to chemical sediments;

(3) the upper division (Sickle Metamorphic Suite) (swS) conformably overlies the middle division and is composed of metaconglomerate (swC) and quartz–feldspar-rich gneiss (swS) ± hornblende ± sillimanite derived from lithic sandstone, calcareous sandstone and arkose.

The **Leaf Rapids domain** lies north of the Kisseynew domain. This domain is predominantly an intrusive terrane that contains the 1878 ± 3 Ma old Rusty Lake metavolcanic belt in NTS 64B to the west (Baldwin *et al.*, 1982). The eastern part of the domain, in the Campbell - Waskaiowaka lakes area, is dominated by a complex suite of intrusive rocks in which supracrustal rocks of uncertain age occur as rafts and narrow belts. The intrusive rocks are grouped into three associations:

(1) Older intrusive rocks associated with Campbell - Waskaiowaka metasediments and/or Rusty Lake metavolcanic rocks include: diorite (**D**), tonalite to granodiorite (**Tn**, **Tq**, **Ta**) gneissic tonalite (**Ti**) and granodiorite to tonalite gneiss (**Gn** and **Gj**). These are generally highly foliated to gneissic with abundant rafts of Campbell - Waskaiowaka paragneiss and rare amphibolite.

(2) Intrusive rocks associated with the Chipewyan batholith (1855 Ma; Van Schmus and Schledewitz, 1986); these include hornblende-bearing syenogranite (**Z**), seriate to porphyritic granite (**Gr**), leucogranite (**Gl**). Included within this association are a number of intrusive rocks of similar age; hornblende tonalite (**Th**) (equivalent to Ridge Lake tonalite (NTS 64B) with a U-Pb zircon age of 1852 ± 5 Ma; Van Schmus, unpublished data), biotite tonalite (**Tb**), and granodiorite-tonalite-granite (**cG**) (equivalent to the 1862 ± 10 Ma Livingston granodiorite (NTS 64B); Van Schmus, unpublished data).

(3) Late, weakly foliated leucogranite (**Gy**) is interpreted to be similar in age to the anorogenic Thoresenson granite (no whole rock isochron age of 1713 ± 19 Ma; Halden et al., 1990).

The supracrustal rocks may include Waskiwan Group amphibolite (**Ah**) and paragneiss, and Campbell - Waskaiowaka metasediments. These include magnetiferous feldspathic metagreywacke (**cwW**), quartzose meta-arenite, quartzite, (**cwS**), and derived migmatite. The metasedimentary gneiss may be a Sickle equivalent.

The Owl River shear zone is expressed as a strong geophysical anomaly trending southwest across the north side of Waskaiowaka Lake. Structural elements include southeast-trending cataclastic foliation and rare mylonite. Units southeast of the break are dominated by granitic rocks (**Gn**, **Gj**) and gneisses (**Ti**, **Gj**) similar to those in the western part of the domain. Enclaves (**Z**), and porphyritic granite (**Gp**), similar in character to those of the Chipewyan domain, form a significant proportion of the area southeast of the Owl River shear, and become the major rock types on the Kettle Rapids map sheet (NTS 54D).

The **Chipewyan domain** is a batholithic complex that underlies the predominantly drift covered north margin of the map sheet and includes the eastern portion of the Baldock batholith. In the Split Lake map area the domain comprises three major components, each with several phases:

(1) magnetiferous syenogranite (**cZp**)

(2) porphyritic microcline granite (**cGp** ± **Gp**)

(3) seriate to porphyritic granite (**cGr** ± **Gr**)

In the Gauer River area (NTS 64B), porphyritic granite (**cGp**) of the Baldock batholith gave a preliminary U-Pb age of 1855 ± 30 Ma (Van Schmus, unpublished data). Porphyritic monzogranite, rapakivi-textured granite and quartz monzonite phases of the batholithic complex in the Big Sand Lake area yielded ages of 1857 ± 9 Ma, 1854 ± 12 Ma and 1860 ± 17 Ma (Van Schmus and Schledewitz, 1986).

A Rb-Sr whole rock age of 1800 ± 32 Ma and an initial ratio of 0.7028 ± 0.0006 (Halden *et al.*, 1990) was derived from a plot of 28 samples collected along the southern margin of the Chipewyan batholith from Eyne Lake (NTS 64F) east to Northern Indian Lake area (NTS 64N). A distance of 225 km. This composite age is consistent with Rb-Sr isotopic systematics for individual components of the batholith, which range in age from 1800 to 1818 Ma with initial 87Sr/86Sr ratios of 0.7021 ± 0.0007 to 0.7034 ± 0.0006. Similarly, an age of 1802 ± 94 Ma with ± = 0.7024 ± 0.0006 was reported for the Baldock batholith (Halden *et al.*, 1990). These Rb-Sr ages are considered to reflect a disturbance due to a post-magmatic metamorphic event. The restricted range of the initial ratios suggests homogeneity of the source region for the granitic magmatism, coupled with a short crustal residence time (Halden *et al.*, 1991).

Inclusions of migmatite derived from arkosic metasediments (**cWm**), amphibolite (**Ah**), and tonalite (**Tj**) occur at Wenham Lake and as a generally east-trending zone south of Gauer Lake.

The **Southern Indian Lake domain** in the northeast corner of the map is dominated by late intrusive rocks consisting of granite to granodiorite (**Gi**) intrusive into older foliated hornblende-bearing tonalite to granodiorite (**Ti**) and hornblende-bearing tonalite (**Th**). A northeast-trending band of orthogneiss consisting of granodiorite to tonalite gneiss (**Gj**) and granodiorite to granite gneiss (**Gn**) occurs through the centre of the lake. Paragneiss (**cWm**) occurs in the centre of the lake as chains of xenoliths of migmatite derived from quartzose meta-arenite and feldspathic metagreywacke.

Tectonic Synopsis

Tectonically, the rocks in NTS 64A are part of the Trans-Hudson orogen. This orogen is an early Proterozoic collisional belt with remnants of early Proterozoic oceanic and island arc rocks between Archean cratons, the Superior Province and the Hearn/Nain (Northwest Churchill) Province (Hoffman, 1988). Assuming a northwest-dipping subduction polarity, the following tectonic elements are represented in the Split Lake sheet (NTS 64A):

- Foreland zone, comprises the Churchill - Superior boundary zone. Thrusting of the Reindeer zone (see below) onto the Superior craton is interpreted to be the cause of the highly tectonized nature of the zone.
- Internal Reindeer zone; this zone is made up of juvenile Proterozoic arc successions (volcanics, volcaniclastics, plutons, and younger molasse type sediments) of the Southern Indian and Leaf Rapids domains and supracrustals (volcanogenic sediments) of the Kisseynew domain. Internal structures and tectonic relationships between the domains are poorly understood.
- Chipewyan domain; this is an Andean type large batholithic complex with subduction related and arc magmatic chemical characteristics. It extends along the southeastern edge of the hinterland that is not exposed in NTS 64A.
- Split Lake block; This is interpreted to represent a portion of the Archean craton that was dislocated by a late Archean tectono-metamorphic event and probably further modified during terminal Hudsonian collision.

SELECTED BIBLIOGRAPHY

Baldwin, D. A., Syme, E. C., Zwanzig, H. V., Gordon, T. M., Hunt, P. A. and Stevens, R. D.
1987: U-Pb zircon ages from the Lynn Lake and Rusty Lake metavolcanic belts, Manitoba: two ages of Proterozoic magmatism; Canadian Journal of Earth Sciences, v. 23, p. 1053-1063.

Clark, G. S.
1974: Rb/Sr age of granite in the northeastern Churchill - Superior boundary area; **in** Centre for Precambrian Studies, University of Manitoba, Annual Report, 1974, p. 53-55.

Corkery, M. T.
1985: Geology of the lower Nelson River project area; Manitoba Energy and Mines, Geological Report GR82-1, 66p.
1978: Baldock - Waskaiowaka lakes region (64A); regional reconnaissance; **in** Manitoba Mines, Resources and Environmental Management, Mineral Resources Division, Report of Field Activities, 1978, p.37-39.
1977: Waskaiowaka Lake area; **in** Manitoba Mines, Resources and Environmental Management, Mineral Resources Division, Report of Field Activities, 1977, p. 71-72.
1976: Little Assean Lake - Odei Lake area; **in** Manitoba Mines, Resources and Environmental Management, Mineral Resources Division, Report of Field Activities, 1976, p. 51-53.

Corkery, M. T. and Lenton, P. G.
1990: Geology of the lower Churchill River region; Manitoba Energy and Mines, Geological Report GR85-1 (maps GR85-1-5 to GR85-1-9).

Dawson, A. S.
1941: Assean - Split lakes area; Manitoba Mines and Natural Resources, Mines Branch, Publication 39-1, 18 p.

Geological Survey of Canada
1981: Magnetic anomaly map (residual total field), Southern Indian Lake; Map NO 14; 1: 1 000 000.
1963: Aeromagnetic series, 64A Map 2443G; 1: 253 440.

Gilbert, H. P., Syme, E. C. and Zwanzig, H. V.
1980: Geology of the metavolcanic and volcaniclastic metasedimentary rocks in the Lynn Lake area; Manitoba Energy and Mines, Geological Paper GP80-1, 118 p.

Gill, J. C.
1951: Waskaiowaska Lake area; Manitoba Mines and Natural Resources, Mines Branch, Publication 50-5, 41 p.

Halden, N., Clark, G.S., Corkery, M. T., Lenton P. G. and Schledewitz, D. C. P.
1990: Trace-element and Rb-Sr whole-rock isotopic constraints on the origin of the Chipewyan, Thoresenson, and Baldock batholiths, Churchill Province, Manitoba; **in** The Early Proterozoic Trans-Hudson orogen of North America (*J.F. Lewry and M.R. Stauffer, ed.*); Geological Association of Canada, Special Paper 37, p. 201-214.

Haugh, I.
1969: Geology of the Split Lake area; Manitoba Mines and Natural Resources, Mines Branch, Publication 65-2, 87p.

Heaman, L., Machado, N., Krogh, T. E. and Weber, W.
1986: Precise U-Pb zircon ages for the Molson dyke swarm and the Fox River sill: implications for Early Proterozoic crustal evolution in NE Manitoba, Canada; Contributions to Mineralogy and Petrology, v. 94, p. 82-89.

Hoffman, P. F.
1988: United plates of America, the birth of a craton: Early Proterozoic assembly and growth of Laurentia; Annual Review of Earth and Planetary Sciences, v. 16, p. 543-603.

Lenton, P. G. and Corkery, M. T.
1981: The lower Churchill River project (Interim Report); Manitoba Department of Energy and Mines, Mineral Resources Division, Open file report OF81-3, 23 p.

Manitoba Energy and Mines
1979: Geological map of Manitoba; Map 79-2; Manitoba Mineral Resources Division; 1: 1 000 000.

McRitchie, W. D.
1977: Harding - Rock lakes region; **in** Manitoba Mines, Resources and Environmental Management, Mineral Resources Division, Report of Field Activities, 1977; p. 54-57.

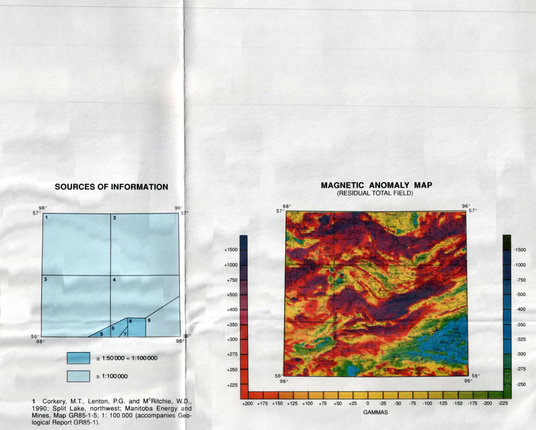
Van Schmus, W. R. and Schledewitz, D. C. P.
1986: U-Pb zircon geochronology of the Big Sand Lake area, northern Manitoba; **in** Manitoba Energy and Mines, Mineral Resources Division, Report of Field Activities, 1986, p. 207-210.

Weber, W.
1978: Natawahunan Lake; **in** Manitoba Mines, Resources and Environmental Management, Mineral Resources Division, Report of Field Activities, 1978, p. 47-53.
1977: Odei - Burntwood rivers region; **in** Manitoba Mines, Resources and Environmental Management, Mineral Resources Division, Report of Field Activities, 1977, p. 58-59.

Weber, W. and Mezger, C.
1990: An oblique section of Archean continental crust at the northwestern margin of Superior Province, Manitoba, Canada; **in** Exposed Cross Sections of the Continental Crust (M.H. Salisbury and D.M. Fountain, *ed.*), NATO ASI Series, Series C: Mathematical and Physical Sciences, v. 317, p. 327-341.

Additional references for Split Lake, NTS 64A, are available in Manitoba Energy and Mines, Bibliography Series BMG-1, 1989.

SOURCES OF INFORMATION



1 Corkery, M.T., Lenton, P.G. and McRitchie, W.D., 1990: Split Lake, northwest; Manitoba Energy and Mines, Map GR85-1-5; 1: 100 000 (accompanies Geological Report GR85-1).

2 Corkery, M.T., Lenton, P.G. and McRitchie, W.D., 1990: Split Lake, northeast; Manitoba Energy and Mines, Map GR85-1-6; 1: 100 000 (accompanies Geological Report GR85-1).

3 Corkery, M.T., Lenton, P.G. and McRitchie, W.D., 1990: Split Lake, southwest; Manitoba Energy and Mines, Map GR85-1-8; 1: 100 000 (accompanies Geological Report GR85-1).

4 Corkery, M.T., Lenton, P.G. and McRitchie, W.D., 1990: Split Lake, southeast; Manitoba Energy and Mines, Map GR85-1-9; 1: 100 000 (accompanies Geological Report GR85-1).

5 Weber, W., 1977: Burntwood - Odei rivers, west half; Manitoba Mines, Resources and Environmental Management, Mineral Resources Division, Preliminary Map 1977U-1; 1: 50 000.

6 Weber, W., 1977: Burntwood - Odei rivers, east half; Manitoba Mines, Resources and Environmental Management, Mineral Resources Division, Preliminary Map 1977U-2; 1: 50 000.

7 Weber, W. and Malyon, J., 1978: Amot; Manitoba Mines, Resources and Environmental Management, Mineral Resources Division, Preliminary Map 1978U-3; 1: 50 000.

8 Haugh, I., 1969: Split Lake area; Manitoba Mines and Natural Resources, Mines Branch, Map 65-2; 1: 63 360 (accompanies Publication 65-2).

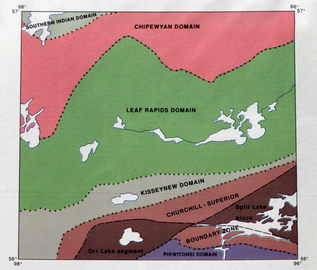
9 Corkery, M.T., 1985: lower Nelson River compilation; Manitoba Energy and Mines, Map GR82-1-5; 1: 250 000 (accompanies Geological Report GR82-1).

In addition, recent unpublished data have been incorporated.

MAGNETIC ANOMALY MAP

(RESIDUAL TOTAL FIELD)

MAJOR DOMAINS



LEGEND

PRECAMBRIAN

CHURCHILL PROVINCE				CHURCHILL - SUPERIOR BOUNDARY ZONE	SUPERIOR PROVINCE
CHIPEWYAN DOMAIN	SOUTHERN INDIAN DOMAIN	LEAF RAPIDS DOMAIN	KISSEYNEW DOMAIN	ORR LAKE SEGMENT AND SPLIT LAKE BLOCK	PIKWITONEI DOMAIN

Proterozoic

Chipewyan Batholithic Complex

- 1 **cGr** m **Gr** — Seriate to porphyritic granite; **cGr** - Chipewyan batholith; m**Gr** - Baldock batholith; 1: 1855 ± 30 Ma
- **cGp** m **Gp** — Porphyritic microcline granite; leucocratic biotite granite; ±**Gp** - Chipewyan batholith, m**Gp** - Baldock batholith
- **cZp** — Syenogranite (Chipewyan batholith); **Zh** - hornblende–biotite syenogranite to alkali feldspar granite
- **Tj** — Tonalite to granodiorite with hornblende ± biotite; aligned clots of mafics and inclusions of paragneiss and **D**
- **cWm** — Migmatite derived from quartzose meta-arenite and feldspathic metagreywacke, with hornblende, magnetite (Arkosic Suite)
- **Ah** — Amphibolite, diopside bearing

Reference for U-Pb zircon age:
1 *Van Schmus, unpublished data.*

- **Gl** — Leucogranite
- **Gn** — Gneissic granite to granodiorite, biotite-bearing
- **Th** — Hornblende tonalite
- **Gj** — Granodiorite to granite gneiss; commonly seriate, containing partially assimilated to schlieric remnants of paragneiss or **D**, **Tn**, **Tj**
- **Ti** — Gneissic tonalite, leucocratic, with numerous amphibolite inclusions
- **Tj** — Tonalite to granodiorite with hornblende ± biotite; aligned clots of mafics and inclusions of paragneiss and **D**
- **D** — Diorite, melanotonalite, gabbro, diabase dykes, ultramafic intrusion breccia
- **cWm** — Migmatite derived from quartzose meta-arenite and feldspathic metagreywacke, with hornblende, magnetite (Arkosic Suite)

- **Gy** — Leucocratic biotite granite
- **cG** — Granodiorite, tonalite, granite (Livingston granodiorite)
- **Tb** — Tonalite, biotite tonalite
- **Gl** — Leucogranite
- **Gr** — Seriate to porphyritic granite; **Gp** - porphyritic microcline granite
- **Z** — Syenogranite
- **Gn** — Gneissic granite to granodiorite, biotite-bearing
- **Th** — Hornblende tonalite
- **Gn** — Granodiorite to tonalite gneiss
- **Gj** — Granodiorite to granite gneiss; commonly seriate, containing partially assimilated to schlieric remnants of paragneiss or **D**, **Tn**, **Tj**
- **Ti** — Gneissic tonalite, leucocratic, with numerous amphibolite inclusions
- **Tn** / **Tj** — **Tn** - Tonalite to granodiorite; **Ta** - augen tonalite; **Tq** - biotite tonalite, quartz-rich; **Tj** - tonalite to granodiorite, hornblende– or hornblende–biotite bearing, with aligned clots of mafics and inclusions of paragneiss and **D**
- **D** — Diorite, melanotonalite, gabbro, diabase dykes, ultramafic intrusion breccia

Campbell - Waskaiowaka Metasediments

- **cwS** — **cwS** - Campbell Waskaiowaka sediments, undivided (Sickle equivalents?); **cwG** - pelitic metagreywacke, garnet–cordierite–sillimanite–magnetite bearing (Odei River gneiss equivalents?); **cwS** - (patterned) migmatite derived from quartzose meta-arenite, quartzite, psammitic and pelitic metagreywacke with hornblende, magnetite (**cwWh**) and feldspathic metagreywacke (**cwW**)
- **cwW** — Feldspathic metagreywacke, magnetiferous; **cwWh** - psammitic and pelitic metagreywacke, hornblende–magnetite bearing
- **A** — Amphibolite; **Ah** - amphibolite, diopside bearing
- **cwN** — Diatectic garnet–biotite gneiss

- **Gl** — Leucogranite
- **Gj** — Granodiorite to granite gneiss to anatectic granodiorite; commonly seriate, contains partially assimilated to schlieric remnants of paragneiss or **D**, **Tn**, **Tj**
- **D** — Diorite, melanotonalite, gabbro, diabase dykes, ultramafic intrusion breccia

Sickle Metamorphic Suite

- **swS** — **swS** - Sickle Metamorphic Suite, undivided; **swS** - (patterned) migmatite derived from meta-arenite, quartzite, psammitic and pelitic metagreywacke with hornblende, magnetite (**swWh**) and feldspathic metagreywacke (**swW**)
- **swC** — Polymictic metaconglomerate, magnetite bearing
- **swW** — Feldspathic metagreywacke, magnetiferous; **swWh** - psammitic and pelitic metagreywacke with hornblende, magnetite
- **Ah** — Amphibolite, diopside bearing

Burntwood River Metamorphic Suite

- **sW** — Metatectic greywacke-derived gneiss

- **Gj** — Granodiorite to granite gneiss to anatectic granodiorite; commonly seriate, contains partially assimilated to schlieric remnants of paragneiss or **D**, **Tn**, **Tj**
- **Gj** — Granodiorite to granite gneiss; commonly seriate, contains partially assimilated to schlieric remnants of paragneiss or **D**, **Tn**, **Tj**

Sickle Metamorphic Suite

- **swS** — Migmatite derived from meta-arenite, quartzite, psammitic and pelitic metagreywacke with hornblende, magnetite (**swWh**) and feldspathic metagreywacke (**swW**)
- **swW** — Feldspathic metagreywacke, magnetiferous
- **A** — Amphibolite; **Ah** - amphibolite, diopside bearing; **Ag** - garnet amphibolite

Burntwood River Metamorphic Suite

- **sW** — Burntwood River Metamorphic Suite, undivided; **BWI** - metagreywacke, staurolite bearing
- **sW** — Metatectic greywacke-derived gneiss
- **cwN** — Diatectic garnet–biotite gneiss

- **X** — Assean Lake and Split Lake mylonite, protolith unknown

Plutonic Rocks of Unknown Age

- **X** — Pegmatite

Cataclastic Rocks

- **Gj** — Cataclastic granite to tonalite gneiss, derived from granite and felsic gneiss listed below
- **A** — Cataclastic garnet amphibolite, derived from mafic units listed below

- **Gj** — Granodiorite to granite gneiss to anatectic granodiorite; commonly seriate, contains partially assimilated to schlieric remnants of paragneiss or **D**, **Tn**, **Tj**

Sickle Metamorphic Suite

- **swS** — Migmatite derived from meta-arenite, quartzite, psammitic and pelitic metagreywacke with hornblende, magnetite (**swWh**) and feldspathic metagreywacke (**swW**)
- **swW** — Feldspathic metagreywacke, magnetiferous
- **A** — Amphibolite; **Ah** - amphibolite, diopside bearing; **Ag** - garnet amphibolite

Burntwood River Metamorphic Suite

- **sW** — Burntwood River Metamorphic Suite, undivided; **BWI** - metagreywacke, staurolite bearing
- **sW** — Metatectic greywacke-derived gneiss
- **cwN** — Diatectic garnet–biotite gneiss

Proterozoic and/or Archean

- **Tb** / **Th** — Leucocratic biotite tonalite; **Th** - tonalitic to granodioritic orthogneiss
- **rG** — Leucocratic granite, biotite–garnet bearing (Fox Lake granite); **Gb** - biotite granite
- Gabbroic and mafic dykes (Molson swarm)
- **U** — Ultramafic rocks (Open symbol - drill intersection)

Ospwagan Group

- **uW** — Metabasalt, massive and pillowed
- **N** — Migmatite, migmatitic gneiss; composed of reworked Archean migmatites with variable amounts of mobilizate and injected granitic neosome; **Nb** - *ill par lit* biotite gneiss

Archean

- **G** — Granite, granodiorite; containing rebulitic zones of highly assimilated older gneiss
- **Nn** — Migmatite, hornblende and hornblende–biotite gneiss; composed of mobilized and injected layered gneiss and agmatites derived from **T** and **A** (below), with 10% - 75% tonalite to granodiorite neosome
- **T** — Tonalite-granodiorite; with hornblende clots, containing up to 25% inclusions of **A** (below)

Archean

- **E** — Enderbite with mafic inclusions
- **O** — Felsic granulite, opdalite; in part, retrogressed
- **Oh** — Granulite of intermediate to mafic composition
- **I** — Anorthosite, anorthositic gabbro
- **A** — Amphibolite and metagabbro; **Ai** - layered amphibolite and metagabbro; **Ag** - garnet amphibolite; **Al** - plagioclase amphibolite
- **A** — Amphibolite, pyroxene bearing

STRATIGRAPHIC NOTE:
The map units within each domain are in approximate chronological order. However, some units in the Churchill - Superior Boundary Zone may not correlate with adjacent domains.

SYMBOLS

- Geological boundary (approximate, inferred from aeromagnetic survey)
- Bedding, tops unknown (inclined 30°-59°); primary layering (vertical)
- Foliation and metamorphic layering (dip unknown, 0°-29°, 30°-59°, 60°-79°, 80°-90°)
- Fault (defined, inferred)
- Domain boundary
- Area of little or no outcrop
- 1 Sample locality for U-Pb zircon age determination

IMPORTANT MINERAL OCCURRENCES

	Name	UTM Northing/Easting	Commodity	References
1 ▲	Lindal vein	659650/6237200	Au	MI 64A/8 AU1[1]
2 ▲	Dunbrack vein	658220/6235750	Au	MI 64A/1 AU1

PROPERTY STATUS

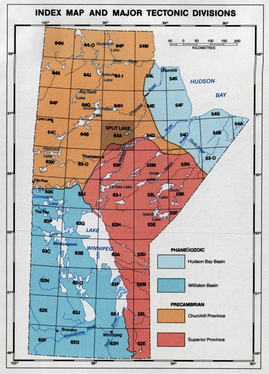
Important mineral property ▲

COMMODITIES

Au gold

[1] Mineral inventory card, Manitoba Energy and Mines.

INDEX MAP AND MAJOR TECTONIC DIVISIONS



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