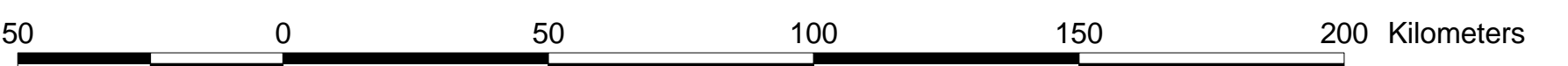
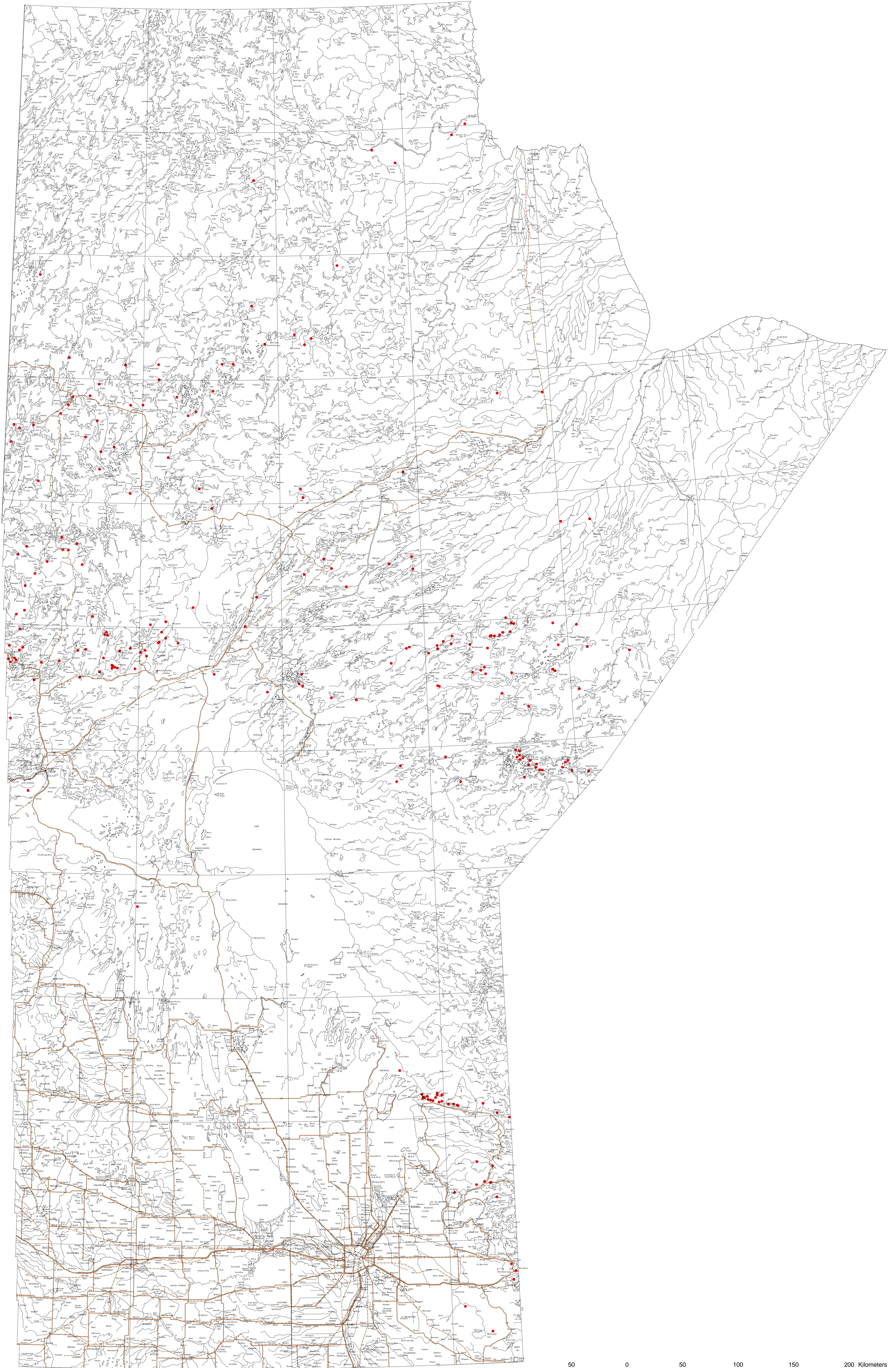


50 0 50 100 150 200 Kilometers

- Phanerozoic**
- Cenozoic**
- Tertiary**
- Paleocene**
- Turtle Mountain Formation**
Bentonitic carbonaceous sandstone, silt and clay, thin lignite, grey shale
- Mesozoic**
- Upper Cretaceous**
- Boleswan Formation**
Greenish grey sandstone, minor shale, in part kaolinitic
- Riding Mountain Formation**
Cretaceous Member - soft grey bentonitic clayey siltstone and shale
Oldsaw Member - hard grey siliceous shale
Milwood Member - soft green bentonitic shale
- Vermilion River Formation**
Morden Member - black, carbonaceous shale
Bryon Member - calcareous and dolomitic shale
Pembina Member - calcareous shale, bentonite
- Lower Cretaceous**
- Fox River Formation**
Calcareous speckled shale, minor limestone, bentonite and oil shale
- Upper and Lower Cretaceous**
- Ashtabula Formation**
Dark grey carbonaceous shale, in part bluish-grey, minor silt, sand and bentonite (black box-type sandstone)
- Lower Cretaceous**
- Swan River Formation**
Sandstone, in places glauconitic; kaolinitic shale, minor lignite
- Jurassic**
- Amaranth, Reston, Melia Formations**
Amaranth - red argillaceous dolomitic siltstone and sandstone, Reston - limestone, dolomite, shale, Melia - sandstone, shale, limestone
- Permian**
- St. Martin Complex**
Carbonate breccia fragments Ordovician to Devonian, polymict breccia, granitic microbreccia, tuffaceous
- Devonian**
- Upper/Middle Devonian**
- Souris River Formation**
Basal red shale, argillaceous micrite, high-calcium micritic limestone, dolomite
- Middle Devonian**
- Dawson Bay Formation**
Basal red shale, bluish-grey dolomite, micritic limestone, blackish micritic, calcareous shale, fossiliferous coral stromatopora limestone
- Winnipegosis Formation**
Lower member - dolomitized platform facies, upper member - inter-bedded bluish-grey micritic and micritic carbonates
- Elm Point Formation**
High-calcium limestone bionomic (platform facies)
- Ashwin Formation**
Dolomitic shale and argillaceous micrite, red to greenish grey, local basal breccia
- Hutton Bay Basin Area**
- Moore River Formation**
Fine- to medium-grained dolomitic limestone, argillaceous limestone and dolomite, chert and red shale
- Kwatabcohan Formation**
Limestone, medium to dark brown, fossiliferous, bluish-grey, partly micritic, minor dolomite
- Stopping River Formation**
Aphanitic to finely crystalline limestone, sparsely fossiliferous, minor argillaceous limestone and dolomite
- Kenogami River Formation**
Finely crystalline to aphanitic limestone; thin interbedded argillaceous silty sandy dolomite
- Kenogami River Formation**
Middle Member - reddish brown to greenish grey calcareous argillaceous sandy siltstone and silty shale
Lower Member - dolomite, slightly calcareous and argillaceous, some limestone and dolomite limestone, minor anhydrite
- Ordovician (and Lower Silurian)**
- Stonewall Formation**
Dolomite, fine-grained, sparsely fossiliferous, in part conglomeratic
- Upper Ordovician**
- Stony Mountain Formation**
Gorton and William Members
Gorton - nodular dolomite and sandy argillaceous dolomite
William - calcareous shale, fossiliferous limestone and argillaceous dolomite
- Red River Formation**
Chert Head Member - chert dolomite to micritic limestone
Fort Gary Member - massive argillaceous dolomite, minor argillaceous dolomite
- Winnipeg Formation**
Basal sandstone overlain by complex sequence of quartzose sandstone and shale
- Churchill River Group**
Cadron Creek and Chasman Creek Formations - limestone, dolomite and argillaceous dolomite
Red Head Rapids Formation - dolomite
- Bad Cache Rapids Group**
Porridge Creek Formation - basal sandstone-shale member limestone, dolomite and argillaceous dolomite
Microgastropod dolomite
- Precambrian**
- CHURCHILL PROVINCE**
- Intrusive Rocks**
- Granite, granodiorite and tonalite**
- Plutonic granite**
- Porphyritic granite and pegmatite**
- Hypersaline bearing porphyritic granite-monzonite**
- Leucogranite-leucotonalite**
- Tonalite-granodiorite**
- Tonalite-granodiorite gneiss**
- Quartzite-tonalite**
- Mafic to intermediate rocks**
- Gabbro**
- Anorthositic gabbro**
- Diorite**
- Tonalite-diorite**
- Hypersaline bearing tonalite-diorite, enderite**
- Ultramafic rocks**
- Metamorphic and Metasedimentary Rocks**
- Migmatite, gneiss and gneiss complex**
- Arkose, siltstone, and quartzite-derived gneiss and migmatite (Boule Group, Mist Group and Boule Metamorphic Suite)**
- Orthoquartzite and minor conglomerate (includes Churchill quartzite and Great Island quartzite of possibly younger age)**
- Arkose, feldspathic wacke, conglomerate and gneiss**
- Arkose gneiss and migmatite, local feldspathic rocks**
- Arkose gneiss of unknown derivation**
- Metaconglomerate with minor arkose gneiss**
- Amphibolite and mafic gneiss**
- Calc-silicate gneiss and interbedded amphibolite**
- Calc-silicate rocks, quartzite and marble**
- Gneiss, and mudstone-derived gneiss and migmatite (Boule Group and Wapiti Group in part; Wapiti Group and Burnwood River Metamorphic Suite)**
- Gneiss, argillite, slate and metagreywacke; local minor gneiss and conglomerate**
- Phanitic and semi-pelitic gneiss, pelitic schist and migmatite**
- Metavolcanic Rocks (includes Arkose and Wapiti Group and Great Island volcanic rocks)**
- Felsic metavolcanic rocks, flows and pyroclastic deposits**
- Phyllite**
- Mafic and intermediate metavolcanic flows, pyroclastic deposits and associated metasediments; local diatrematic rocks**
- Andesite**
- Basalt**
- Archaeozoic and Inferred Archaeozoic**
- Charnokite-migmatite and derived granulite gneiss**
- Rhyolite**
- Granitoid complexes**
- Grey, foliated granodiorite and granodioritic gneiss**
- Enderite and pyroxene-granulites with abundant local granitic rocks**
- Superior Province and Churchill/ Superior Boundary Zone**
- Precambrian**
- Granite, granodiorite**
- Granodiorite with inclusions of unit 15**
- Metasedimentary and metacumulate metamorphic rocks, serpentinitic pelonite, serpentinite, gneiss and metacharnokite, differentiated mafic rocks of the Fox River belt and Ojibway Group**
- Iron formation**
- Amphibolite**
- Layered migmatitic gneiss derived from units (4) to (15), siltstone and argillite**
- Transitional zone containing migmatitic gneiss and rocks of units 4-5**
- Archean**
- Granite, minor granodiorite**
- Granodiorite, minor tonalite and migmatite**
- Greywacke, conglomerate, arkose, andesite**
- Mafic and felsic fragmental volcanic rocks, serpentinitic pelonite, serpentinite, gneiss and metacharnokite, differentiated mafic rocks of the Fox River belt and Ojibway Group**
- Tonalite, minor granodiorite, granite, related gneiss**
- Tonalite and granodioritic gneiss, migmatitic gneiss, gneiss, inclusions of units 15 and 6**
- Undifferentiated granitic rocks**
- Felsic granulites with minor gabbro and anorthositic enderite, orthopyroxene, chondrocline, and related gneiss; inclusions of units (5) and (6)**
- Metasedimentary gneiss**
- Amphibolite**
- Mafic and minor ultramafic granulite, banded iron formation, quartzite and calc-silicate rock**
- Gabbro, gabbroite**
- Diorite**
- Anorthositic**
- Orthopyroxene, mudstone, conglomerate, arkose, banded iron formation**
- Felsic to intermediate, mainly pyroclastic volcanic rocks; some flows, minor intrusives and sedimentary rocks**
- Basalt, minor andesite, minor sedimentary and mafic intrusive rocks; ultramafic rocks (serpentinite, serpentinitic pelonite, pyroxenite) and differentiated ultramafic intrusions**



UTM	Location and Access	SIZE
Easting 579500 Northing 6044500 Zone 14	Accessibility All-weather road Locality 1 Superior Province - Gods Lake Domain Locality 2 Cross Lake Greenstone Belt	Area (km2) 12 Maximum Dimensions 0.9 x 17 km

AGE DATA

Age	Archean
Geochronological Data	2758+/-3 Ma (Corkery et al., 1992)

CLASSIFICATION

Intrusion Type	Lopolith
Geochemical Classification	Tholeiitic - Low Ti
General Classification	Mafic
Other Classification	Rifted Archean basement

GEOLOGY

Principal Rock Types	Anorthosite, leucogabbro, gabbro, pyroxenite, massive magnetite-ilmenite
Host Rocks	Pipestone Lake Group (basalt); Whiskey Jack Gneiss Complex
Layering Features	Megacyclic Units
Igneous Textures	Plagioclase megacrystic layers; Gabbro pegmatite
Other Igneous Features	Magmatic breccia with layered anorthosite-gabbro autoliths in plagioclase megacrystic gabbroic matrix; massive and disseminated magnetite-ilmenite layers in the middle and upper parts of the intrusion
Metamorphic Grade	Amphibolite facies
Deformation	Local east-striking shear zones; otherwise undeformed

Synoptic Geology

Detailed reviews of the geology, mineral occurrences and petrogenesis of the Pipestone Lake anorthosite complex (PLAC) are given in Cameron (1992), Jobin-Bevans (1997) and Jobin-Bevans et al. (1997). The regional geology is described by Corkery et al. (1992). The late Archean Pipestone Lake Anorthosite Complex (PLAC) is a 0.9 x 17 km sill-like layered intrusion. It is part of a suite of coeval megacrystic anorthosite bodies in the Cross Lake region, northwestern Superior Province. Detailed mapping, drill core, geochemical and mineralogical studies (e.g., Jobin-Bevans et al., 1997) have established a laterally continuous igneous stratigraphy comprising three megacyclic units, each of which consists of a melagabbro/ferrogabbro lower part and a leucogabbro to anorthosite upper part. Massive oxide mineralization occurs at the base of the second (middle) cyclic unit, and abundant disseminated oxide mineralization occurs in the melgabbro units of each cyclic unit. The proportion of ilmenite to magnetite increases up section. The base of the intrusion is principally made up of a thick megacrystic anorthositic unit, but local megacryst-bearing pyroxenitic units locally develop just above the basal contact in the thickest part of the intrusion. These pyroxenitic rocks may have crystallized from dense, residual mafic liquids that collected in topographical lows along the basal contact (keel or conduit/feeder zone). Field evidence, including disrupted blocks of layered units, scour contacts, and size-graded and modally-graded layering, indicates that convection and/or vigorous magma flow was involved during the development of the three megacyclic units. Each megacyclic unit is interpreted to represent a separate pulse of magma into the chamber. A cryptic compositional trend is now recognized in the PLAC and involves an increase in incompatible trace element contents and a decreases in plagioclase anorthite (An) content up-section (e.g., An75 near the base of the PLAC to An30 near the top). This cryptic trend likely reflects the ascent of chemically-evolved late-stage melts throughout the crystallization history of the intrusion. See also Peck et al. (1998).

PREVIOUS EXPLORATION

Geophysical Surveys	Airborne magnetic and ground magnetic
Assessment Files	92610, 91274, 91289, 92613, 92611, 92612, 91271, 91270, 91273

Mineral Occurrences

One massive (Main Central Subzone) and 3 disseminated (South Subzone, Disseminated Subzone and North Contact Subzone) Fe-Ti-V rich units are developed in the PLAC. These are hosted by or occur immediately below decametre-thick ferrogabbro layers that form the lower parts of the three megacyclic units in the PLAC (Jobin-Bevans et al., 1997). Gossan Resources Ltd. (news releases, Vancouver Stock Exchange, 1998) estimate a resource of >300 million tonnes and

comprising approximately 6% TiO₂, 0.4% V₂O₅ and 20% Fe₂O₃ to a depth of 300 m within a 6 km long segment of the PLAC. Although scarce, pyrrhotite and subordinate chalcopyrite were identified in anorthositic rocks in the lower parts of the intrusion and in drill core samples of massive oxide layers belonging to the Main Central Zone.

Exploration History

In 1959-1960, Noranda Mine Ltd. (AF 92610, 91270)

1. Completed the ground EM and magnetic surveys on the Lisi (1-85) claim group along the southern shore of Pipestone Lake.
2. Drilled 9 holes on Lisi 14, 15, 38 and 40 claims along the southern shore of Pipestone Lake.

In 1963-1964, Noranda Exploration Co. Ltd. (AF 92611, 92612, 91271, 91274)

1. Completed geological mapping on part of the Lisi claim group.
2. Drilled 7 holes on Lisi 2, 3, 4, 17 and 31 claims, and encountered anorthosite and gabbro in 6 holes.
3. Conducted a ground EM survey in Pipe 7 claim area (the Pipe claim group is located about 2 km northwest of the Pipestone Lake).
4. Drilled two holes (P-1 and P-2) on Pipe 12 claim. The hole P-2 encountered 73 feet long serpentinite (11-84 ft. interval) associated with mafic volcanic rocks.

In 1968-1969, Noranda Exploration Co. Ltd. (AF 91269, 92613)

1. Completed the ground EM survey on the Mil (86-90, 96-120) and Lisi (17, 33-39) claim groups.
2. Drilled the Mil-18 on the conductor and encountered metasediments and metavolcanic rocks in the hole.

Between 1993 and 1995, Gossan Resources Limited and Cross Lake Mineral Exploration completed a >100 diamond drill program that delineated four major oxide-rich subzones. Subsequently, Gossan Resources Limited has completed metallurgical studies on bulk samples from some of these units. For the most part, the oxide-rich layers have near-vertical orientations and relatively uniform thicknesses along strike. Where intersected by an east-trending shear zone that is developed along the south shore of Pipestone Lake, flattening and boudinage of the massive oxide layers is locally observed.

MAPPING

Most Detailed Mapping	1:2 500 scale (Peck et al., 1994a; Jobin-Bevans et al., 1995)
Sketch Map Figure#	Yes
Regional Mapping	1:20 000 scale (Corkery and Cameron, 1985)
Type Section Figure#	Yes

GEOCHEMISTRY

Geochemistry	Whole-rock Geochemistry, including REE and PGE Analyses
PGE Analyses Numbers	1.1027 to 1.1106 and 1.1399 to 1.1406
Whole-rock Analyses Numbers	2.554 to 2.597 and 2.793 to 2.801

Geochemical Features and PGE Abundances

Limited surface grab samples with visible, disseminated pyrrhotite contain <100 ppb combined Pd+Pt but up to 880 ppb Au (Table 1). The new PGE data for the PLAC, contained in Table 1, reflect anomalously low PGE contents that could indicate prior extraction of PGE by sulphide liquids at depth or along the base of the intrusion. See also Peck et al., (1994b).

Recommendations

The anomalously low PGE contents of most of the analysed samples presented in Table 1 appear to reflect significant PGE depletion in the PLAC magmas. These low values likely reflect prior removal of PGE from the parental magmas to the exposed/sampled parts of the intrusion, although they could also indicate derivation of the entire PLAC from PGE-impoorished mantle-derived magmas. Exploration along the base of the PLAC for contact-type PGE mineralization (e.g., Peck et al., 1993) is recommended.

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- Cameron, H.D.M., 1992: Pipestone Lake anorthosite complex : geology and studies of titanium-vanadium mineralization; Manitoba Energy and Mines, Geological Services, Open File Report 92-1, 134p.
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UTM	Location and Access	SIZE
Easting 752290 Northing 5595980 Zone 14	Accessibility All-weather road Locality 1 Superior Province - southeastern Manitoba Locality 2 Bird River Sill	Area (km2) 30 Maximum Dimensions 20 x 1.5 km

AGE DATA

Age	Archean
Geochronological Data	2745+/-5 Ma (Timmins et al., 1985)

CLASSIFICATION

Intrusion Type	Sill
Geochemical Classification	Tholeiitic - Low Ti
General Classification	Mafic-Ultramafic
Other Classification	Rifted Archean basement

GEOLOGY

Principal Rock Types	Dunite, peridotite, troctolite, pyroxenite, gabbro, leucogabbro, anorthosite, trondhjemite
Host Rocks	Metavolcanic rocks of Peterson Creek Formation; overlain by felsic volcanic rocks; underlain by basalt
Layering Features	Megacyclic Units
Igneous Textures	Ultramafic rocks have supersaturation textures (hopper and amoeboidal olivine); local megacrystic anorthosite; local dendritic olivine
Other Igneous Features	Chromitite layers at several levels in ultramafic series; local disrupted layering; some breccia layers
Metamorphic Grade	Greenschist facies
Deformation	North-trending block-faults cause local offsetting of the stratigraphy on a metre-scale at the Chrome property

Synoptic Geology

The Chrome Property is one of several major fault-bounded blocks of the Bird River sill - a once-continuous, layered mafic-ultramafic intrusion more than 20 km in length. The Chrome Property and the Maskwa-Dumbarton mines area are the best documented parts of the Bird River sill. Several detailed studies have been completed on the Bird River sill (e.g., Trueman, 1971; Theyer, 1989; Scoates et al., 1989; Talkington et al., 1983; Karop-Moeller and Brummer, 1971). The Bird River sill consists of a less than 100 m to 400 m thick basal ultramafic series overlain by a thicker (300 to 500 m) mafic series. The contact between the two series is rarely exposed and may have been faulted. Rhythmic modal layering occurs in the ultramafic series and reflects variable proportions of olivine, pyroxene and chromite. Layering is only sporadically developed in the mafic series, in which megacrystic anorthosite is locally developed. At the Chrome Property, the upper part of the exposed section of the mafic series contains a trondhjemite layer that is underlain by anorthositic rocks that contain an interstitial trondhjemitic component. The trondhjemite is interpreted to represent a coeval melt likely derived from older intermediate to felsic orthogneiss by contact-related partial melting during the emplacement of the Bird River sill. Ongoing petrogenetic studies by the Manitoba Geological Survey have demonstrated that the mafic series was likely derived from the underlying ultramafic series by fractional crystallization of olivine, chromite and pyroxene. The mafic series comprises abundant leucogabbro but evolves to trondhjemite and quartz diorite. Chromitite layers are planar or convoluted and are typically several centimetres thick, although some layers are up to 1 m in thickness. Sulphides occur within several metre-thick intervals of stratabound disseminations within the ultramafic series.

PREVIOUS EXPLORATION

Geophysical Surveys	IP, ground magnetic and airborne magnetic
Assessment Files	Not yet reviewed

Mineral Occurrences

The Bird River sill contains chromitite and Ni-Cu sulphide deposits, including 2 past-producing Ni-Cu mines (Maskwa and Dumbarton mines; Karup-Moller and Brummer, 1971). Surface sampling results obtained by Theyer (1985) and Scoates et al. (1987, 1989) indicate the presence of multiple PGE-enriched sulphide-bearing intervals within the ultramafic series. Maximum reported whole-rock PGE abundance is x.x g/t Pd and x.x g/t Pt.

Exploration History

Chromitite layers in the sill have seen intermittent exploration dating back to before the start of World War II. In the 1980s, Falconbridge Limited undertook the first significant exploration of the Bird River Sill for PGE. Despite extensive exploration of the central part of the Bird River sill for Ni-Cu mineralization (e.g., Maskwa Mining, Falconbridge Limited, Canmine Resources Limited) and the presence of local sulphide-related PGE mineralization > 2g/t, the Bird River sill remains underexplored for PGE. There is no drilling in most parts of the sill, particularly to the west of the Maskwa-Dumbarton property.

MAPPING

Most Detailed Mapping	Williamson (1990)
Sketch Map Figure#	Yes
Regional Mapping	Trueman (1971)
Type Section Figure#	Yes

GEOCHEMISTRY

Geochemistry	Whole-rock Geochemistry, including REE and PGE Analyses
PGE Analyses Numbers	1.0004 to 1.0115
Whole-rock Analyses Numbers	2.033 to 2.144

Geochemical Features and PGE Abundances

Rocks in the mafic and ultramafic series sampled from the Chrome Property display similar whole-rock geochemical trace element ratios and mantle-normalized abundances (Table 2). Accordingly, and based on detailed mapping (e.g., Williamson, 1990) of the sill at the Chrome Property, the mafic series is believed to represent the product of evolved, plagioclase-rich residual liquids that were generated during the crystallization of the ultramafic series. PGE mineralization at the Chrome Property consists of three or more apparently stratiform sulfide-bearing peridotite layers up to several metres in thickness. The PGE tenor of these occurrences is described in detail by Theyer (1985), Theyer (1989), Scoates et al. (1987), Scoates et al. (1989), Williamson (1990) and Peck and Theyer (1998). In addition, PGE-bearing minerals occurring in the chromitiferous zone of the ultramafic series at the Chrome Property are documented by Talkington et al. (1983). The average PGE tenor of the PGE-rich intervals in the ultramafic series at the Chrome Property appears to be directly proportional to the Cu content and locally coincides with increases in the modal proportions of disseminated chromite in the host rocks. The genesis of the mineralization warrants additional research.

Recommendations

The Bird River Sill is one of the best known PGE prospects in Manitoba. Most of the sill's strike length remains underexplored for PGE. The extent of PGE-rich layers in the ultramafic series and the range of their PGE contents along strike and at depth remains unknown. The mineralization is best documented at the Chrome Property but is likely to occur elsewhere in the Bird River Sill, based on the strong lithostratigraphic similarities between the main blocks of the sill. Future exploration should also investigate the potential for classic reef-type PGE mineralization near the contact between the ultramafic series and the mafic series. Detailed chemostratigraphic studies of the best exposed segments of the sill should be undertaken to establish regional across-strike trends in chalcophile metal contents that could pinpoint mineralization. The potential for PGE-rich chromitite layers, although not indicated at the Chrome property, should be investigated as part of a regional PGE exploration program of the Bird River Sill.

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UTM	Location and Access	SIZE
Easting 739235 Northing 5593773 Zone 14	Accessibility All-weather road Locality 1 Superior Province - southeastern Manitoba Locality 2 Bird River Sill	Area (km2) 1 Maximum Dimensions 3 x 0.25 km

AGE DATA

Age	Archean
Geochronological Data	2745+/- Ma (Timmins et al., 1985)

CLASSIFICATION

Intrusion Type	Sill
Geochemical Classification	Tholeiitic - Low Ti
General Classification	Mafic-Ultramafic

GEOLOGY

Principal Rock Types	Peridotite, gabbro
Host Rocks	Lamprey Falls basalt (footwall), Bernic Lake conglomerate (hanging wall)
Layering Features	Megacyclic Units
Igneous Textures	Massive peridotite overlain by chromitiferous zone and by a mafic series; a transitional zone occurs locally
Metamorphic Grade	Greenschist facies
Deformation	Soft sediment deformation in chromitites; late brittle deformation produces block faulting disrupting the stratigraphic continuity

Synoptic Geology

Tripartite subdivision of the sill into a lower ultramafic series containing discrete chromite layers within its stratigraphically upper section, in places overlain by a peridotitic to gabbroic transition series, and capped by a gabbroic to dioritic mafic series.

PREVIOUS EXPLORATION

Geophysical Surveys	Ground magnetic and EM
Assessment Files	Not yet reviewed

Mineral Occurrences

Chromite, concentrated in layers mainly within the stratigraphically upper part of the ultramafic series. Field observations in 1994 suggest that the stratigraphic distribution of chromite layers in the Page claim group is equivalent to the stratigraphy of the chromite on the Chrome property. This observation is in contrast to that of Young (1992), who reported discrepancies in the .

Exploration History

Initial rock sampling and assaying for chromite in 1942 by J.D. Bateman.
 Bulk sampling, drilling and HLEM survey between 1942 and 1967 by Hudson Bay Exploration and Development and Manitoba Chromium Limited.
 Geological mapping, magnetometer survey and drilling by INCO Ltd. in 1981 and 1982.
 Davies, 1962.

MAPPING

Most Detailed Mapping	1:2 000 scale map - Young (1992)
Sketch Map Figure#	Yes
Regional Mapping	Trueman, D.L. (1971)

GEOCHEMISTRY

Geochemistry	none
PGE Analyses Numbers	N.A.
Whole-rock Analyses Numbers	N.A.

Geochemical Features and PGE Abundances

No modern data currently available.

Traces of platinum were reported in "dense chromite ore" by Hudson Bay Mining and Smelting Co. Ltd. (Bateman, 1943).

Recommendations

Layered intrusions are characterized by a stratigraphy that is consistent over large distances along strike. Parallels in the chromite stratigraphy on the Page and Chrome groups of claims support this notion. It follows that recommendations made for the exploration of the Chrome group are also valid for the Page group, namely: Compare the stratigraphy of the chromitite layers to determine unequivocally whether there is stratigraphic continuity between the Page and Chrome groups of claims. After establishing stratigraphic continuity, it is suggested that detailed mapping and geochemical sampling for PGE should be undertaken at the stratigraphic levels that contain PGEs in the Chrome group of claims.

Selected Bibliography

Bannnatyne, B.B. and Trueman D.L. 1982: Chromite reserves and geology of the Bird River sill, Manitoba; Manitoba Energy and Mines, Open File Report OF82-1.

Bateman, J.D. 1943: Bird River chromite deposits, Manitoba; Transactions of the Canadian Institute of Mining and Metallurgy, v. 46, p. 154-183.

Davies, 1962.

Timmins, E.A., Turek, A., Symons, D.T.A., Smith, P.E., 1985: U-Pb zircon geochronology and paleomagnetism of the Bird River greenstone belt, Manitoba; Geological Association of Canada, Mineralogical Association of Canada, 1985 Joint Annual Meeting, Program with Abstracts, v. 10, p. A62.

Young, J. 1992: Geology of the chromitite layers in the Page Property, Bird River Sill, southeastern Manitoba; in Report of Activities 1992 Manitoba Energy and Mines, Minerals Division.

UTM	Location and Access	SIZE
Easting 719463 Northing 5586678 Zone 14	Accessibility Boat Locality 1 Superior Province - southeastern Manitoba Locality 2 Bird River Sill	Area (km2) 1 Maximum Dimensions 3.2 km x 400 m

AGE DATA

Age	Archean
Geochronological Data	2745+/- Ma (Timmins et al., 1985)

CLASSIFICATION

Intrusion Type	Sill
Geochemical Classification	Tholeiitic - Low Ti
General Classification	Mafic
Other Classification	Greenstone belt

GEOLOGY

Principal Rock Types	Gabbro
Layering Features	Modally graded/weakly differentiated
Igneous Textures	Three gabbro varieties recognized: fine grained, medium grained and porphyritic (anorthositic)
Metamorphic Grade	Greenschist facies
Deformation	Brittle faulting into blocks

Synoptic Geology

Mafic volcanic rocks host a steeply dipping southwest-trending chromite- and sulphide-bearing gabbro sill that may or may not be a part of the adjacent Bird River sill (Bannatyne and Trueman, 1982).

PREVIOUS EXPLORATION

Geophysical Surveys	Airborne magnetic
Assessment Files	91382

Mineral Occurrences

Chromite layers, seams and pockets; pyrrhotite, pyrite and chalcopyrite, all hosted by gabbro

Exploration History

Trenches and pits were sunk initially in 1943 to evaluate chromite potential; further pitting and drilling were performed until 1950. No assay records or drill logs are available.

MAPPING

Regional Mapping	1:100 000 scale (Cerny et al., 1981)
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GEOCHEMISTRY

PGE Analyses Numbers	1.1389 to 1.1392
Whole-rock Analyses Numbers	2.030 to 2.032

Geochemical Features and PGE Abundances

Up to 1.37 g/t, Pt and 1.71 g/t Po in drill core (AF 91382)

Up to 540 ppb Pt and 780 ppb Pd were obtained from coarse-grained pyrite-bearing gabbro (Theyer, 1986).

Recommendations

Small tonnage and extent, anomalous PGE concentrations but low-grade, erratically distributed mineralization. This is a prospect of marginal importance. No further work is recommended.

Selected Bibliography

Bannnatyne, B.B. and Trueman D.L. 1982: Chromite reserves and geology of the Bird River sill, Manitoba; Manitoba Energy and Mines, Open File Report OF82-1.

Cerny, P., Trueman, D.L., Ziehlke, D.V., Goad B.E. and Paul, B.J., 1981; The Cat Lake-Winnipeg River and the Wekusko Lake pegmatite fields, Manitoba; Manitoba Department of Energy and Mines, Mineral Resources Division, Economic Report ER80-1.

Theyer, P., 1986: Platinum group elements in southeastern Manitoba; in Report of Field Activities 1986, Manitoba Energy and Mines, Minerals Division, p. 120-124.

Timmins, E.A., Turek, A., Symons, D.T.A., Smith, P.E., 1985: U-Pb zircon geochronology and paleomagnetism of the Bird River greenstone belt, Manitoba; Geological Association of Canada, Mineralogical Association of Canada, 1985 Joint Annual Meeting, Program with Abstracts, v. 10, p. A62.

UTM	Location and Access	SIZE
Easting 329000 Northing 5954250 Zone 15	Accessibility Fixed-wing Locality 1 Superior Province - Gods Lake Domain Locality 2 Knife Lake Greenstone Belt	Area (km2) Maximum Dimensions

AGE DATA
Age Archean

CLASSIFICATION
Intrusion Type Unknown Geochemical Classification Unknown General Classification Mafic-Ultramafic Other Classification Greenstone belt

GEOLOGY
Host Rocks Mafic volcanic rocks

Synoptic Geology
Both gabbro and ultramafic rocks were recognized by Noranda Exploration. The main gabbro body is less than 100 m wide and approximately 300 m long.

PREVIOUS EXPLORATION
Geophysical Surveys Airborne magnetic/EM and ground magnetic/EM Assessment Files 93482

Exploration History
Drilling by Noranda Exploration (1984 and 1985).

MAPPING
Most Detailed Mapping Assessment File 93842

GEOCHEMISTRY

Recommendations
Determine if the ultramafic rocks are intrusive or extrusive.

UTM	Location and Access	SIZE
Easting 746446 Northing 5596780 Zone 14	Accessibility All-weather road Locality 1 Superior Province - southeastern Manitoba Locality 2 Bird River Sill	Area (km2) 2 Maximum Dimensions 5 x 0.3 km

AGE DATA

Age	Archean
Geochronological Data	2745+/- Ma (Timmins et al., 1985)

CLASSIFICATION

Intrusion Type	Sill
Geochemical Classification	Tholeiitic - Low Ti
General Classification	Mafic-Ultramafic
Other Classification	Greenstone belt

GEOLOGY

Principal Rock Types	Peridotite, gabbro
Host Rocks	Lamprey Falls basalt (footwall), Bernic Lake conglomerate (hanging wall)
Layering Features	Megacyclic Units
Igneous Textures	Unknown
Metamorphic Grade	Greenschist facies
Deformation	Brittle deformation resulting in block faulting

Synoptic Geology

The National-Ledin property is underlain by a poorly exposed part of the Bird River sill; a small outcrop of peridotite was reported on this property by Davies (1952). The geology is cursorily known from drillhole descriptions and consists of peridotite containing layered and disseminated chromite.

PREVIOUS EXPLORATION

Geophysical Surveys	Airborne magnetic and EM
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Mineral Occurrences

Chromite

Exploration History

The Howe Bay Mining Company Limited drilled 7 holes (approximately 300 m) in 1951, intersecting peridotite and sporadically occurring chromite layers.

MAPPING

Regional Mapping	1:100 000 scale (Cerny et al., 1981)
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GEOCHEMISTRY

Geochemistry	none
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Geochemical Features and PGE Abundances

No data available.

Recommendations

Poor exposures on this property preclude petrological and/or geochemical exploration. It is suggested that more expensive exploration methods should only be employed if significant PGE concentrations have been detected in other, better exposed portions of the sill.

Selected Bibliography

Bannnatyne, B.B. and Trueman D.L. 1982: Chromite reserves and geology of the Bird River sill, Manitoba; Manitoba Energy and Mines, Open File Report OF82-1.

Cerny, P., Trueman, D.L., Ziehlke, D.V., Goad B.E. and Paul, B.J. 1981: The Cat Lake-Winnipeg River and the Wekusko Lake pegmatite fields, Manitoba; Manitoba Department of Energy and Mines, Mineral Resources Division, Economic Report ER80-1.

Timmins, E.A., Turek, A., Symons, D.T.A., Smith, P.E., 1985: U-Pb zircon geochronology and paleomagnetism of the Bird River greenstone belt, Manitoba; Geological Association of Canada, Mineralogical Association of Canada, 1985 Joint Annual Meeting, Program with Abstracts, v. 10, p. A62.

UTM	Location and Access	SIZE
Easting 751508 Northing 5595807 Zone 14	Accessibility All-weather road Locality 1 Superior Province - southeastern Manitoba Locality 2 Bird River Sill	Area (km2) 2.75 Maximum Dimensions 5.5 x 0.5 km

AGE DATA

Age	Archean
Geochronological Data	2745+/- Ma (Timmins et al., 1985)

CLASSIFICATION

Intrusion Type	Sill
Geochemical Classification	Tholeiitic - Low Ti
General Classification	Mafic-Ultramafic
Other Classification	Greenstone belt

GEOLOGY

Principal Rock Types	Peridotite, gabbro
Host Rocks	Peridotite
Layering Features	Modally graded/weakly differentiated
Igneous Textures	Unknown
Other Igneous Features	Serpentinized peridotite layer approximately 200 m thick, under- and overlain by gabbro: "Upper and Lower" gabbro (Juhas, 1973). This unit is part of the Bird River sill, an approximately 33 km long mafic-ultramafic intrusion in the Rice Lake belt.
Metamorphic Grade	Greenschist facies
Synoptic Geology	Disseminated Ni-Cu sulphides accumulated at and near the stratigraphic base of the ultramafic part of the Bird River sill.

PREVIOUS EXPLORATION

Assessment Files	Not yet reviewed
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Mineral Occurrences

Dominantly pyrrhotite containing Ni-Cu mineralization. Mined were 365 730 tonnes with an average grade of 1.16% Ni and 0.2% Cu (Coats et al., 1979). An additional 816 000 tonnes are indicated reserves with a grade of 1.34% Ni and 0.23% Cu (Northern Miner, July 15, 1976).

Exploration History

The Maskwa West mineralization was identified by drilling in 1974. Previous exploration had been centred on the Dumbarton property (approximately 1.2 km to the northeast). Open pit mining commenced in 1975 and closed in 1976.

MAPPING

Most Detailed Mapping	1:12 000 scale (Davies, 1955)
Regional Mapping	1:100 000 scale (Cerny et al., 1981)

GEOCHEMISTRY

Geochemistry	none
PGE Analyses Numbers	N.A.

Geochemical Features and PGE Abundances

N.A.

Recommendations

Ore from the Maskwa pit was crushed and mixed with ore from the Dumbarton Mine before concentration in the Consolidated Faraday mill at Werner Lake. Thus, neither the content nor the grade of PGEs in the Maskwa ore is known. A comprehensive petrological and petrochemical investigation of the drillcore from the Maskwa pit is recommended to determine the existence and grade of PGE content.

Selected Bibliography

- Coats, C.J.A., Stockford, H.R. and Buchan, R. 1979: Geology of the Maskwa West nickel deposit, Manitoba; Canadian Mineralogist, v 17, p 309-318.
- Davies, J.F. 1955: Geology and mineral deposits of the Bird Lake area; Manitoba Mines Branch, Publication 54-1.
- Juhas, A.P. 1973: Geology and origin of copper-nickel sulphide deposits of the Bird River area of Manitoba; PhD. thesis, University of Manitoba.
- Karup-Moller, S. and Brummer, J.J., 1971. Geology and sulphide deposits of the Bird River claim group, southeastern Manitoba. Geological Association of Canada, Special Paper 9, p. 143-154.
- Timmins, E.A., Turek, A., Symons, D.T.A., Smith, P.E., 1985: U-Pb zircon geochronology and paleomagnetism of the Bird River greenstone belt, Manitoba; Geological Association of Canada, Mineralogical Association of Canada, 1985 Joint Annual Meeting, Program with Abstracts, v. 10, p. A62.

UTM	Location and Access	SIZE
Easting 335500	Accessibility Boat	Area (km2)
Northing 5948500	Locality 1 Superior Province - Gods Lake Domain	Maximum Dimensions
Zone 14	Locality 2 Knife Lake Greenstone Belt	

AGE DATA

CLASSIFICATION

General Classification Ultramafic

GEOLOGY

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

UTM	Location and Access	SIZE
Easting 662350 Northing 6063050 Zone 14	Accessibility Fixed-wing Locality 1 Superior Province - Gods Lake Domain Locality 2 Carrot River - Walker Lake Greenstone Belt	Area (km2) Maximum Dimensions

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Sill
Geochemical Classification Unknown
General Classification Ultramafic
Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Serpentinized peridotite, olivine hornblendite
Host Rocks Pillowed basalt, andesite of Hayes River Group, tonalite porphyry of Bayly Lake Complex.
Layering Features Unknown
Metamorphic Grade Amphibolite facies

Synoptic Geology

Three small occurrences of ultramafic sills were located at longitudes 96°31'W, 96°34'W and 96°39'W, along western Carrot River.

PREVIOUS EXPLORATION

Geophysical Surveys Ground EM

Mineral Occurrences

Po, py, cpy

Exploration History

Occurrence at 96°34' W:

Barry (1960) reported a sulphide mineralized zone, about 600 m long and 1.5-9.1 m wide, near the southwestern end of the Carrot River. The mineralized zone follows the shore of the bay and consists of pyrite and pyrrhotite with minor specks of chalcopyrite.

In 1973, Mineral Resources Division conducted an EM survey in the area that identified a 608 m long conductor, and subsequently drilled a hole to tested the conductor. The hole encountered pillow basalts (0-20.7 m), pyrrhotite mineralized serpentinite (20.7-23.7 m) and tonalite porphyry (23.7-31.7 m). The pyrrhotite appears as veinlets and replacement fillings in the serpentinite and is associated with heavy silicification. The tonalite porphyry contains disseminated pyrrhotite in xenoliths of serpentinite (Haskins & Stephenson, 1974). The serpentinite contains 0.02% Cu and 0.03-0.05% Ni.

MAPPING

Most Detailed Mapping 1:50 000 scale; (Hubregtse, 1985).
Sketch Map Figure# No
Regional Mapping 1:250 000 Scale (Bedrock Geology Compilation Map Series, Cross Lake, NTS 63I, 1996).
Type Section Figure# No

GEOCHEMISTRY

Selected Bibliography

- Barry, G.S. 1960: Geology of the western Oxford Lake-Carghill Island area; Manitoba Mines and Natural Resources, Mines Branch, Publication 59-2, p. 35.
- Haskins, R.A. and Stephenson, J.F., 1974: Geology and mineralization of western Oxford Lake and Carrot River; in Summary of Geological Field Work 1974, Manitoba Department of Mines, Resources and Environmental Management, Mineral Resources Division, Geological Paper 2/74, p. 38, 44-46.
- Hubregtse, J.J.M.W. 1985: Geology of the Oxford Lake-Carrot River area; Manitoba Energy and Mines, Geological Report 83-1A, p. 7.
- Southard, G.G. 1977: Exploration history, compilation and review, including exploration data from cancelled assessment files, for the Gods, Knee and Oxford Lake areas, Manitoba; Manitoba Department of Mines, Resources and Environmental Management, Mineral Resources Division, Open File Report 77-5, p. 43.
- Theyer, P. 1980: Stratigraphic setting of selected ultramafic bodies in the Superior and Churchill provinces and certain aspects of nickel copper deposits in the Thompson nickel belt; Manitoba Mineral Resources Division, Economic Report ER79-2, p.17, 56.

UTM	Location and Access	SIZE
Easting 678750 Northing 6077550 Zone 14	Accessibility Fixed-wing Locality 1 Superior Province - Gods Lake Domain Locality 2 Carrot River - Walker Lake Greenstone Belt	Area (km2) 1.25 Maximum Dimensions Approx. 250 m x 5 km

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Sill
Geochemical Classification Komatiitic
General Classification Ultramafic
Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Serpentinized peridotite, pyroxenite, feldspathic pyroxenite
Host Rocks Mafic metavolcanic rocks
Layering Features Local modal layering
Igneous Textures Areally extensive, well preserved, spinifex-textured komatiitic flows
Other Igneous Features Sill displays a crude zoning, with a pyroxenite to feldspathic pyroxenite, margin surrounding a highly serpentinized peridotite core.
Metamorphic Grade Amphibolite facies
Deformation Locally affected by major east-trending shear zones

PREVIOUS EXPLORATION

Geophysical Surveys Airborne magnetic/EM and ground magnetic/EM
Assessment Files 91285, 92269, 92303, 92304, 92306, 93237, 93196, 93248

Mineral Occurrences

Py, cpy, po

Exploration History

In 1950, Sherritt Gordon Mines (AF 91285) drilled 4 holes east of Peridotite Island. The holes intersected andesite and tuff, which is crosscut by quartz veins and disseminated pyrite (py), arsenopyrite, and some quartz-carbonate veinlets containing trace chalcopyrite (cpy). No Au and Cu were detected in the samples analyzed.

Scoates (1971) examined the serpentinite and serpentinized peridotite (Barry, 1960) on the north shore of the Carrot River. Fine-grained disseminated sulphides have an erratic distribution, and locally constitute 5% and average less than 2% of the rock. A one-pound grab sample, containing approximately 3% sulphides, assayed 0.27% Ni, 0.01% Cu and 0.01% Co. A few, narrow, cross-fibre asbestos veinlets were observed. However picrolite veinlets, with associated magnetite and carbonate, are more common.

In 1972 and 1973, Canex Placer Ltd. (AF 92269, 92303, 92304, 92306) carried out an exploration program on 2 ultramafic intrusions in the area along Carrot River, following claim staking in 1971. The exploration areas consisted of West Grid and East Grid. The West Grid is located about 2.4 km west of Eagle Island, and covers the northern river channel and shores of Carrot River. The East Grid is located about 200 m east of Eagle Island, and covers the southern river channel and shores of Carrot River (south of Peridotite Island).

Geological survey:

Geological mapping (1":400' scale) on both grids was completed in 1972. The geological map of East Grid was revised by combining all available geological, drill core and geophysical data in 1973.

Geophysical surveys:

The geophysical surveys consisted of ground magnetics, horizontal and vertical loop EM and IP. The magnetics and EM readings were taken on a 400'x100' grid (1":400' scale) and the IP readings were taken at 200' intervals along the lines. The surveys outlined the ultramafic intrusions in some detail, and suggested that both the north and south contacts of the intrusions have mineral potential.

Drilling:

12 holes were drilled in the area:

- 1) CR-1 and CR-2 were located near west end of northern channel of Carrot River (West Grid), and drilled into the ultramafic intrusion from the north and south contacts. The ultramafic rocks consisted mainly of serpentinite, serpentized dunite, dunite, serpentized peridotite and peridotite. The country rocks consisted of dacite, dacite-rhyodacite, and chlorite or serpentine-talc schist. Trace amounts of pyrite, pyrrhotite and chalcopyrite were found in the ultramafic rocks. They only assayed for Ni, which ranged from 0.1 to 0.29% and averaged about 0.23%.
- 2) CR-8 was collared on top of the ultramafic intrusion near the south shore of the center of Peridotite Island (East Grid), and drilled through the ultramafic body and the south contact with metasediments, ending in the granite. The ultramafic body consisted mainly of pyroxenite and olivine pyroxenite with trace amounts of sulphides. In the drillcore samples, the Ni content ranged from 272 to 1920 ppm, and averaged about 1200 ppm.
- 3) CR-15 and CR-17 were located about 500 and 1000 feet northeast of Eagle Island, respectively. CR-17 intersected two gabbro dykes (at 30-74 feet and 203-276 feet).
- 4) CR-4, CR-5, CR-12, CR-13, CR-14 and CR-21 were located in the south river channel, southwest of Peridotite Island (East Grid). CR-4, CR-13 and CR-14 were drilled into the north contact of the ultramafic intrusion, and CR-5, CR-12 and CR-21 were drilled into the south contact.

CR-4 passed through andesite, metasedimentary rock and rhyolitic tuff, then the silicified contact zone from 466 to 469 feet and the ultramafic intrusion from 469 to 566 feet, and finally aplite. The ultramafic rocks are serpentized peridotite and dunite that contain trace disseminated sulphides and were assayed for Ni, Ag and S. The Ni contents ranged from 140-3535 ppm, and averaged about 1547 ppm.

The drillhole intersected 37 feet (from 427 to 464 feet) of massive to semimassive sulphides (20-80%) in the metasediments and rhyolitic tuff. The zone contains pyrite, pyrrhotite, chalcopyrite (5%), sphalerite (1-2%), chlorite, graphite and some siliceous segments (fine-grained rhyolitic tuff?) with 0.16% Cu and 0.82% Zn.

CR-13 passed through metasedimentary rocks, rhyolite and graphitic tuff and ended in the serpentized peridotite (395-425 feet). The peridotite contains 5% sulphides and the Ni contents ranged from 930-5100 ppm, and averaged about 2680 ppm Ni.

CR-14 passed through metasedimentary rocks, andesite and rhyolite, and ended in a gabbro dyke (454-465 feet).

CR-5 was collared atop the ultramafic intrusion, passed into the gabbro dyke at 691 feet and did not penetrate the basal contact of the ultramafic rocks. The ultramafic rocks are serpentized peridotite and dunite, and contain trace pyrite, usually in fractures. The ultramafic rocks were assayed for Ni and S. The Ni content ranged from 1980-7250 ppm, and averaged about 3100 ppm Ni. The gabbro is fine-grained and porphyritic, with feldspar phenocrysts.

CR-12 was collared in the granite, passed through fine-grained diorite, intersected 408 feet of fine-grained dunite from 588 to 966 feet and ended in the dunite. The dunite contains trace sulphides, and was assayed for Ni, Cu and S. The Ni content ranged from 1600 to 7000 ppm, and averaged about 3400 ppm; Cu content ranged from 6 to 1300 ppm, and averaged about 360 ppm.

CR-21 was collared in the granite and encountered serpentized peridotite from 173 to 438 feet. The south contact is brecciated and consists mainly of rhyolite, andesite agglomerate and unidentified volcanics. Samples were analyzed for Ni and S, the Ni content ranging from 2100 to 2900 ppm, and averaging about 2600 ppm.

In 1984, Westmin Resources Ltd. (AF 93237) carried out a gold exploration program, consisting of airborne geophysical, ground geophysical and geochemical surveys, and geological mapping and sampling, in Carrot River area.

Geophysical survey:

- 1) 8.75 line-km, in total, of VLF survey was done on grids XG-1 (located about 500 m southwest of Eagle Island and on the south shore of Carrot River) and WG-2 (west of XG-1).
- 2) A helicopter-borne geophysical survey, totalling 1,392 line-km with 150 m line-spacing, was done in the area. The survey consisted of helicopter-borne radar-controlled EM, magnetics, resistivity, and a lesser amount of VLF-EM.

Geochemical survey:

- 1) Approximately 155 lake sediment and rock samples were analyzed for Au and As to supplement the original Cu and Zn analyses. These samples were collected by Barringer in early 1970s during lake sediment geochemical reconnaissance in the area.
 - 2) 1,113 humus and soil samples were collected on the 4 grids and 9 reconnaissance lines.
 - 3) 174 lake sediment samples were collected on 16 lake profiles.
 - 4) 165 rock samples from gossans, prospects and drill core were collected.
- Samples from 2, 3, and 4 were analyzed for Au, Ag, As, Cu, Zn, Pb, Mo and the organic content (LOI).

Geological survey:

- 1) Detailed geological mapping was done on grids XG-1 and WG-2.
- 2) Reconnaissance mapping was done in most sampling areas.

Highlights of the results:

- 1) Two gold anomalies in lake sediments were found in the area. One contains 1450 ppb Au near the western end of Peridotite Island. Another one contains 1200 Au on the north shore of Carrot River and north of the west end of Peridotite Island (near station 204, section D-D', Peck et al., 1997).
- 2) A rock sample containing 580 ppb Au and 1450 ppm Cu was collected from the shore of the western end of the south channel of Carrot River (in grid WG-2).
- 3) Two siliceous, brecciated rock samples (felsite dyke or statabound chert?) containing pyrite-chalcopryrite mineralization, from south side of Peridotite Island near the contact of peridotite and quartz-magnetite iron-formation, yielded anomalous Au, Ag and Cu values (sample 4047 contained 1450 ppb Au, 12 ppm Ag, 210 ppm Pb, 24 ppm Zn, 88 ppm Cu, 3.2 ppm As and 75 ppm Mo; sample W18a-11 contained 1360 ppb Au, 9.5 ppm Ag, 10 ppm Pb, 39 ppm Zn, and 4 ppm Mo).

In 1985, Westmin Resources Ltd. (AF 93196) completed a geochemical survey program and collected 87 humus and 35 rock samples to analyze for Au, Ag, As, Cu, Zn, Pb, Mo and LOI, and examined and investigated geochemical and geophysical anomalies in the area for selection of diamond-drill targets. Thirteen diamond drill targets were proposed based on Au, Mo, As, Cu and conductivity anomalies.

In 1990, Westmin Resources Ltd. (AF 93248) completed a four drillhole program on the eastern part of the Carrot River. Drill core and sludge samples containing sulphide mineralization were sent for analysis for Au and Cu by fire assay and AA.

1) Hole 90-1 was drilled on the south shore of the center of Peridotite Island to intersect the rock beneath the chalcopryrite-siliceous breccia showing (1450 ppb Au, 1200 ppm Cu in grab sample), and magnetic and VLF anomalies south of the showing. The drillhole encountered peridotite, gabbro, pyroxenite, mudstone, felsite dyke, iron formation and quartzite. Pyrite and pyrrhotite mineralization occurs mainly in quartz and quartz-carbonate veins or veinlets within the mudstone and iron-formation, and in the felsite dyke. A chlorite-graphite-pyrrhotite zone at 20.2-20.6 m contains 530 ppb Au. An additional four samples with anomalous gold values between 105 and 325 ppb were obtained between 21.3 and 32.8 m from pyrite-quartz veins and felsite dykes within iron-formation and mudstone.

2) Hole 90-2 was collared on the south shore of the center of Peridotite Island, 400 m east of Hole 90-1, and encountered fine- to medium-grained peridotite with occasional coarse-grained sections. Serpentinization is variable, no sulphides were found, and no samples were taken.

3) Hole 90-3 was collared in pyrite-bearing iron-formation east of Peridotite Island and 60 m from the south shore of Carrot River, and encountered peridotite and then dunite (?) near the bottom of the hole. The hole intersected 3% sulphides (pyrrhotite + chalcopryrite) at the end of the peridotite section (97.3-100.4 m) that returned 25-185 ppb Au and 1840-2540 ppm Cu.

4) Hole 90-4 was collared 1050 m southeast of Peridotite Island and 550 m from the south shore of Carrot River, and encountered serpentinized peridotite and gabbro. The hole intersected a pyrite (5%)-quartz vein at 24.6-25.9 m with 145-250 ppb Au and 82-120 ppm Cu, and a weakly mineralized zone (2-3% pyrrhotite, 1% chalcopryrite) with less than 5% ppb Au and 230-485 ppm Cu in probable chlorite metasediment.

MAPPING

Most Detailed Mapping	1:50 000 scale; (Hubregtse, 1985)
Sketch Map Figure#	Yes
Regional Mapping	1:250 000 scale (Bedrock Geology Compilation Map Series, Cross Lake, NTS 63I, 1996).
Type Section Figure#	No

GEOCHEMISTRY

Geochemistry	Whole-rock Geochemistry, including REE
PGE Analyses Numbers	1.0137 to 1.0140
Whole-rock Analyses Numbers	2.152 to 2.157

Selected Bibliography

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- Bell, C.K. 1962: Cross Lake map area, Manitoba; Geological Survey of Canada, Paper 6122, p. 14.
- Davidson D.D. 1974: The Carrot River ultramafic complex; M.Sc. thesis, Acadia University, 154 p.
- Hubregtse, J.J.M.W. 1985: Geology of the Oxford Lake-Carrot River area; Manitoba Energy and Mines, Geological Report GR 83-1A, 73p.
- Peck, D.C. and Heaman, L.M. 1998: Geochemical characteristics and preliminary U-Pb zircon age of Proterozoic mafic dykes from the eastern part of the Carrot River greenstone belt (part of NTS 63I/16); in Report of Activities 1998, Manitoba Energy and Mines, Geological Services, p. 135-143.
- Peck, D.C. and Theyer, P. 1997: Geology and geochemistry of komatiites and mafic-ultramafic intrusions, Carrot River Greenstone Belt; Manitoba Energy and Mines, Manitoba Mining and Minerals Convention '97, Winnipeg, Manitoba, Nov. 20-22, 1997, Program, p. 43.
- Peck, D.C., Theyer, P., Liwanag, J., Chandler, C. 1997: Geology and geochemistry of the eastern part of the Carrot River greenstone belt, northwestern Superior Province, Manitoba (part of NTS 63I/16); in Report of Activities 1997, Manitoba Energy and Mines, Minerals Division, p. 18-36.
- Scoates, 1971:
- Southard, G.G. 1977: Exploration history, compilation and review, including exploration data from cancelled assessment files, for the Gods, Knee and Oxford Lake areas, Manitoba; Manitoba Department of Mines, Resources and Environmental Management, Mineral Resources Division, Open File Report 77-5, p. 40-42.
- Theyer, P. 1980: Stratigraphic setting of selected ultramafic bodies in the Superior and Churchill provinces and certain aspects of nickel copper deposits in the Thompson nickel belt; Manitoba Mineral Resources Division, Economic Report ER79-2, p.17-18, 56.

UTM	Location and Access	SIZE
Easting 676100	Accessibility Fixed-wing	Area (km2) 0.2
Northing 6076300	Locality 1 Superior Province - Gods Lake Domain	Maximum Dimensions 0.2 x 1 km
Zone 14	Locality 2 Carrot River - Walker Lake Greenstone Belt	

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Sill
 Geochemical Classification Tholeiitic - Low Ti
 General Classification Mafic
 Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Gabbro, leucogabbro, diorite
 Host Rocks Mafic metavolcanic rocks, Lower Series, Carrot River greenstone belt
 Layering Features Local modal layering
 Igneous Textures Several decametre-thick modal layers are present; local variably-textured gabbroic pegmatite pods
 Metamorphic Grade Amphibolite facies
 Deformation Relatively undeformed; primary layering is well preserved

Synoptic Geology

The regional geology is discussed in Hubregtse (1985). Detailed mapping of the Eagle Island gabbro body (Peck et al., 1997) delineated 9 major layers (L1 to L9), including (from base to top, thickness in parentheses): L1 (>10 m) - coarse-grained leucogabbro; L2 (30 m) - coarse-grained to medium-grained leucogabbro with diffuse gabbroic bands; L3 (25 m) - medium-grained leucogabbro with pyrrhotite-bearing granophyric gabbro pods, layers and veins, and displaying minor centimetre-scale modal layering; L4 (1 m) - fine-grained gabbro; L5 (2 m) - modally layered (centimetre-scale) fine-grained gabbro, coarse- to medium-grained leucogabbro and quartz gabbro; L6 (8 m) - medium-grained gabbro with minor, irregular patches of pegmatitic, variably textured gabbro; L7 (6 m) - irregular mixing between fine-grained gabbro, medium-grained leucogabbro and pegmatitic, locally dendritic quartz-bearing gabbro, with abundant stratiform, lenticular zones of disseminated pyrrhotite + chalcopyrite mineralization; L8 (3 m) - thinly banded (2-15 cm) coarse-grained quartz gabbro/diorite, medium-grained leucogabbro and fine-grained gabbro with local, lenticular, pyrrhotite-rich bands containing up to 15% sulphides; L9 (>10 m) - a distinctive coarse-grained gabbro/leucogabbro characterized by randomly orientated acicular amphibole crystals. The layered gabbro body is overlain by massive and pillowed basalt flows containing local amygdaloidal units.

PREVIOUS EXPLORATION

Assessment Files 91285, 92269, 92303, 92304, 92306, 93237, 93196, 93248

Mineral Occurrences

Sulphides are concentrated into the upper parts of the gabbro, where losange-shaped, disseminations of pyrrhotite and minor chalcopyrite, measuring less than 20 cm wide by 1-5 m long, are developed in variably textured granophyre-bearing gabbro, coarse-grained leucogabbro and fine-grained gabbro. The average sulphide content in these zones is less than 5%.

Exploration History

Not explored

MAPPING

Most Detailed Mapping 1:50 000 scale; (Hubregtse, 1985).
 Sketch Map Figure# Yes
 Regional Mapping 1:250 000 scale (Bedrock Geology Compilation Map Series, Cross Lake, NTS 63I, 1996).
 Type Section Figure# Yes

GEOCHEMISTRY

Geochemistry	Whole-rock Geochemistry, including REE and PGE Analyses
PGE Analyses Numbers	1.0202 to 1.0215
Whole-rock Analyses Numbers	2.219 to 2.232

Geochemical Features and PGE Abundances

Peck et al. (1997) reported low PGE contents for a suite of samples collected from the Eagle Island layered gabbro body. The layered gabbro body appears to be coeval and comagmatic with adjacent peridotite bodies. The potential for stratiform PGE mineralization, typically situated at or above the first occurrence of plagioclase in mafic-ultramafic complexes, warranted investigation. Table GS-4-4 (Peck et al., 1997) reports the assay results for samples from the layered gabbro body (station 216, Fig. GS-4-2) and additional sulphide-bearing gabbro samples. Four samples contained anomalously high Au, with values between 29 to 83 ppb (Table GS-4-4). However, none of the samples contained anomalously high Pt or Pd, with most of the values being below the limit of detection for the method used (<5 ppb for Pd; <10 ppb for Pt). Given a komatiitic parent liquid for the gabbroic rocks (based on REE data described above), the high Au and low Pt and Pd values are problematic. The S/Se ratios for most of the samples exceed those typical of the mantle (1000 to 5000), indicating that a hydrothermal or sedimentary sulphide component may be present in the rocks. The low total PGE abundances could reflect prior extraction of the PGE during fractional crystallization of a sulphide phase.

Recommendations

Preliminary surface sampling by Peck et al. (1997) did not return anomalously high values, even in sulphide-bearing samples. Additional, systematic assays should be completed.

Selected Bibliography

- Barry, G.S. 1960: Geology of the Western Oxford Lake-Cargill Island area; Manitoba Mines Branch, Publication 59-2, p. 34.
- Bell, C.K. 1962: Cross Lake map area, Manitoba; Geological Survey of Canada, Paper 61-22, p. 14.
- Hubregtse, J.J.M.W. 1985: Geology of the Oxford Lake-Carrot River area; Manitoba Energy and Mines, Geological Report 83-1A, p. 7-8.
- Peck, D.C., Theyer, P., Liwanag, J., Chandler, C. 1997: Geology and geochemistry of the eastern part of the Carrot River greenstone belt, northwestern Superior Province, Manitoba (part of NTS 63I/16); in Report of Activities 1997, Manitoba Energy and Mines, Minerals Division, p. 18-36.
- Southard, G.G. 1977: Exploration history, compilation and review, including exploration data from cancelled assessment files, for the Gods, Knee and Oxford Lake areas, Manitoba; Manitoba Department of Mines, Resources and Environmental Management, Mineral Resources Division, Open File Report 77-5, p. 40-42.
- Theyer, P. 1980: Stratigraphic setting of selected ultramafic bodies in the Superior and Churchill provinces and certain aspects of nickel copper deposits in the Thompson nickel belt; Manitoba Mineral Resources Division, Economic Report ER79-2, p.17-18, 56

Name of Intrusion		Cross Lake (Sandy Bay)		Ref ID.	27
UTM		Location and Access		SIZE	
Easting	581750	Accessibility	Boat	Area (km2)	
Northing	6053000	Locality 1	Superior Province - Gods Lake Domain	Maximum Dimensions	
Zone	14	Locality 2	Cross Lake Greenstone Belt		
AGE DATA					
Age		Archean			
CLASSIFICATION					
General Classification		Ultramafic			
GEOLOGY					
Principal Rock Types		Peridotite			
PREVIOUS EXPLORATION					
Assessment Files		91266, 91268			
Exploration History					
<p>In 1968, Noranda Exploration Co. Ltd. (AF 91262, 91268):</p> <p>1) completed ground EM on the Mil (1-31) claim group along Sandy Bay; and</p> <p>2) drilled 4 holes on Mil 6 and Mil 11 claims; hole Mil-4 intersected 62 feet of peridotite to serpentized (peridotite from 150 to 212 feet) and granodioritic gneiss (from 212 to 291 feet). The peridotite probably contains disseminated pentlandite or pyrite and the Ni content ranges from 0.07 to 0.20%.</p>					
MAPPING					
Most Detailed Mapping		1:2500 scale (Peck et al., 1994; Jobin-Bevans et al., 1995)			
Regional Mapping		Corkery et al. (in preparation)			
GEOCHEMISTRY					

UTM	Location and Access	SIZE
Easting 752311 Northing 5595965 Zone 14	Accessibility All-weather road Locality 1 Superior Province - southeastern Manitoba Locality 2 Bird River Sill	Area (km2) 0.02 Maximum Dimensions 2.3 km x 10 m

AGE DATA

Age	Archean
Geochronological Data	2745+/- Ma Timmins et al., 1985

CLASSIFICATION

Intrusion Type	Sill
Geochemical Classification	Tholeiitic - Low Ti
General Classification	Other
Other Classification	Greenstone belt

GEOLOGY

Principal Rock Types	Basalt, sulphide-facies iron-formation, peridotite
Host Rocks	Sulphide-facies iron-formation
Layering Features	Modally graded/weakly differentiated
Igneous Textures	None
Metamorphic Grade	Greenschist facies
Deformation	Small-scale folding

Synoptic Geology

A layer of silicate-facies iron formation with sulphide-facies iron-formation zones, deposited on basalt, contains Ni, Cu and Zn. It is thought that the Cu and Zn were accumulated in the exhalative stage of the iron-formation, whereas Ni, Pt and Pd mobilized during metamorphism of the adjacent ultramafic rocks of the Bird River sill were introduced at a later stage.

PREVIOUS EXPLORATION

Geophysical Surveys	Ground magnetic and EM
Assessment Files	Mineral Inventory 52L/6 Ni 1

Mineral Occurrences

Pyrrhotite, pentlandite, chalcopyrite, pyrite, pentlandite, cubanite

Exploration History

Staked in 1920, trenching before 1926; drilling (1200 m). Active mining from 1969 to 1973. Currently owned by Canmine Ltd.

MAPPING

Most Detailed Mapping	Juhas (1973)
Sketch Map Figure#	Yes
Regional Mapping	1:100 000 scale (Cerny et al., 1981)

GEOCHEMISTRY

Geochemical Features and PGE Abundances

Karup-Moller and Brummer (1971) published an analysis of two random flotation concentrate samples: 4.69 and 5.96% Cu; 8.5 and 9.88% Ni; 0.036 and 0.032 oz./ton Pt; 0.11 and 0.12 oz./ton Pd

Theyer (1986) analyzed selected drill core of the Dumbarton mine and Maskwa pit area; results were: Pd up to 320 ppb Pd and up to 220 ppb, Pt.

Jonasson et al., (1987) reported the results of 5 ore samples from the Dumbarton mine: 0 to 260 ppb Pt and 465 to 1760 ppb

Recommendations

This deposit consists of an iron-formation containing Fe, Cu and Zn sulphides. All the additional nickel, most of the copper and probably, most of the PGEs originated from the (in places) adjacent Bird River sill. Since PGE concentrations in the most thoroughly investigated Chrome area of the sill are comparable in magnitude to those in the Dumbarton exhalative layer, one has to presume either an extremely efficient (ionic?) scavenging and transfer of the PGEs from the sill to the exhalative layer or (even more interesting) very high PGE concentrations in the adjacent sill.

Selected Bibliography

- Cerny, P., Trueman, D.L., Ziehlke, D.V., Goad B.E. and Paul, B.J. 1981: The Cat Lake-Winnipeg River and the Wekusko Lake pegmatite fields, Manitoba; Manitoba Department of Energy and Mines, Mineral Resources Division, Economic Report ER80-1.
- Jonasson, I.R., Eckstrand, O.R. and Watkinson, D.H. 1987: Preliminary investigations of the abundance of platinum, palladium and gold in some samples of Canadian copper-nickel ores; in Current Research, Part A, Geological Survey of Canada, Paper 87-1A.
- Juhas, A.P. 1973: Geology and origin of copper-nickel sulphide deposits of the Bird River area of Manitoba; unpubl. PhD thesis, University of Manitoba.
- Karup-Moller, S. and Brummer, J.J. 1971: Geology and sulphide deposits of the Bird River claim group, southeastern Manitoba; Geological Association of Canada, Special Paper No 9.
- Theyer, P. 1986: Platinum group elements in southeastern Manitoba; in Report of Field Activities, 1986, Manitoba Energy and Mines, Minerals Division.
- Timmins, E.A., Turek, A., Symons, D.T.A., Smith, P.E., 1985: U-Pb zircon geochronology and paleomagnetism of the Bird River greenstone belt, Manitoba; Geological Association of Canada, Mineralogical Association of Canada, 1985 Joint Annual Meeting, Program with Abstracts, v. 10, p. A62.

UTM	Location and Access	SIZE
Easting 631000	Accessibility Fixed-wing	Area (km2)
Northing 6030000	Locality 1 Superior Province - Gods Lake Domain	Maximum Dimensions Unknown
Zone 14	Locality 2 Cross Lake Greenstone Belt	

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Unknown
 Geochemical Classification Unknown
 General Classification Mafic-Ultramafic
 Other Classification Unknown

GEOLOGY

Principal Rock Types Gabbro and talc-serpentine schist (ultramafic)
 Host Rocks Metavolcanic and metasedimentary rocks of Hayes River Group
 Layering Features Unknown
 Metamorphic Grade Amphibolite facies

PREVIOUS EXPLORATION

Geophysical Surveys IP, ground magnetic and EM
 Assessment Files 91260, 91261, 92039, 92145, 93299, 93843, 93889, 93891, 93893, 93898, 93890

Mineral Occurrences

Visible gold, pyrrhotite, pyrite, chalcopyrite, sphalerite, stibnite, galena

Exploration History

In 1937, T.L. Tanton wrote a geological report on the Echimamish Area. The report documented the gold prospecting and exploration activities prior to 1936, and geological information of each group of mining claims in Echimamish River area. He also noted that F.D. Shepherd reported a dark green hornblende gabbro or diorite with variable texture occurring in the Pine Creek area.

In 1962-1963; Robo and Bergun Syndicates (AF 91260, 91261) carried out an exploration program, consisting of the following geological mapping, ground EM surveys and drilling, in the Echimamish River area.

1) Defined several ground conductors, some of which are associated with magnetic response along the Echimamish River.
 2) Completed 2 holes (hole 1A and hole 2) along the Echimamish River. Hole 1A drilled encountered andesite from 87 to 240 feet and 264.8 to 398.1 feet, a quartz porphyry from 240 to 264.8 feet, and 51.9 feet of talc-serpentine schist (from 389.1 to 450 feet at the end of the hole).

The zones of sulphide mineralization occur in the andesite (from 176 to 205 feet) and at the contact area between the quartz porphyry and andesite (from 264 to 266.6 feet). The zones are silicified and contain pyrite, chalcopyrite and arsenopyrite. Hole 2 intersected andesite from 41.6 to 503 feet (end of the hole) with a carbonate-quartz vein containing pyrrhotite mineralization from 103 to 105 feet.

3) Completed 2 holes (hole 2 and hole 1) about 200 and 1000 feet north of Marakesh Lake (Ole Lake), respectively. Both holes encountered andesite, rhyolite and pyrrhotite-pyrite bearing iron-formation at the top and gabbro at the bottom.

In 1962-1968, Selco conducted an airborne EM survey.

In 1968-1971, Noranda-Selco. Noranda completed geophysical ground definition of previously outlined airborne anomalies and drilled holes OX-22, -23 and OX-28 to -32 testing anomalies for base metals.

In 1973, Kerr Addison Mines Ltd. (AF 92039) carried out a base-metal exploration program in the area and completed magnetic and VLF-EM on three small grids. The survey detected one weak EM conductor zone associated with a magnetic

anomaly west of Echimamish River. The zone was tested previously by Noranda's drill hole OX-23.

In 1975-1976, Exploration Operation Branch (AF 92145) carried out an exploration program consisting of ground magnetic, EM and VLF-EM surveys, bedrock and soil sampling, and geological mapping in the area:

1) Geophysical surveys:

The ground magnetic and EM surveys were completed on two grids (Grid 1 and Grid 2), and were followed up by VLF-EM survey on selected anomalous areas. The magnetic readings were taken at 100 foot intervals along the cross lines with 400 feet separation between lines. The EM readings were taken on 100 foot intervals along the lines with 300 foot coil-to-coil separation. Data from both the magnetic and EM surveys were plotted at 1":400' scale.

The VLF-EM survey was carried out on six selected grid areas.

a) As a result of the surveys, 9 EM anomalies were identified in the areas, some of them associated with magnetic highs. Because of lack of geological information at the time, no drilling targets were proposed.

b) The gabbro dyke located on northwest side of Contact Lake is associated with a strong magnetic anomaly and a very weak conductor.

c) The gabbro dykes occurring in the area between Hightowl Lake and Henderson Lake are associated with a series of northwest trending magnetic highs.

2) Geochemical survey:

The bedrock samples were collected, where possible, at systematic grid intervals in selected and preferred areas. The soil samples were collected at systematic grid intervals in selected and target areas. The samples were assayed for Cu, Zn, Pb and Mo by AA and colorimetry, and a limited number of samples were analyzed for Au and Ag by fire assay. The correlation between the magnetic and EM anomalies and the geochemical data was not well established for the limited number samples and the few analyzed elements.

3) Geological mapping:

A detailed mapping project was carried out at 1"=1/4 mile scale. The metavolcanic and metasedimentary rocks occur in areas within the Hayes River Group. The metavolcanic are mainly andesite and basalt with minor dacitic and pyroclastic units. The metasedimentary rocks consist mainly of thin greywacke and shaly units, occur sporadically and intermittently, and are intercalated within the metavolcanic rocks. A gabbro plug with off-shooting dykes has intruded into the centre of the sequence between Henderson, Contact, Marakesh and Pine lakes.

Sulphide mineralization is commonly located in thin quartz-rich pods or zones in the metasediments or metavolcanics. The quartz-rich zones are usually less than 10 feet wide and less than 50 feet long, and contain sporadic and intermittent disseminated, semimassive to massive sulphides, consisting of galena, sphalerite, stibnite, chalcopyrite and pyrite.

In 1984-1985, a joint venture between Kennco Exploration Ltd. and Claude Resources Inc. (AF 93299, 93843):

1) completed a compilation of work in the area and re-established three grids on the ground (Grid A = Grid 1 of EOB; Grid B = Grid 2 of EOB; Grid C was located along Echmamish River to correspond to the Robo and Bergun grid);

2) completed ground magnetic and VLF-EM surveys, and geological mapping on Grid A, B and C areas, and geochemical soil sampling in selected grid areas; the soil samples were analyzed for Au, Ag, As, Sb, Cu, Pb and Zn;

3) investigated the old trenches, showings and mineralized zones, and collected samples for Au, Ag, As, Sb, Cu, Pb and Zn; and

4) conducted prospecting, geological mapping, and bedrock and soil sampling in the Halfway Creek area (Grid C); the samples were analyzed for Au.

Highlights of the results:

- 1) A
- 2) B

In 1989-1990, Noranda Exploration Company Limited (AF 93889, 93891, 93893, 93898, 93890):

1) completed a compilation of work, claim staking, reconnaissance and geological mapping in the area;

2) established two grids (Con and Robo) on the ground;

3) completed ground magnetometer and Max-Min surveys on the Robo grid and magnetometer and IP surveys on the Con grid;

4) conducted geological mapping/prospecting of the Robo grid and follow-up of the IP anomalies on the Con grid; and

5) completed humus and bedrock geochemical sampling on the Robo grid and the O'Day showing.

Highlights of the results:

- 1) A
- 2) B

Most Detailed Mapping	AF 93299
Sketch Map Figure#	Yes
Regional Mapping	1:250 000 scale (Bedrock Geology Compilation Map Series, Cross Lake, NST 63I, 1996).

GEOCHEMISTRY

Geochemistry	none
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Selected Bibliography

Bell, C.K. 1962: Cross Lake map area, Manitoba; Geological Survey of Canada, Paper 61-22.

Theyer, P. 1980: Stratigraphic setting of selected ultramafic bodies in the Superior and Churchill provinces and certain aspects of nickel copper deposits in the Thompson nickel belt; Manitoba Mineral Resources Division, Economic Report ER79-2, p. 18, 56, Map ER 79-23A.

UTM	Location and Access	SIZE
Easting 395750 Northing 6016750 Zone 15	Accessibility Fixed-wing Locality 1 Superior Province - Gods Lake Domain Locality 2 Gods Lake Greenstone Belt	Area (km2) Maximum Dimensions

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Unknown
Geochemical Classification Unknown
General Classification Ultramafic
Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Isolated ultramafic bodies
Host Rocks Mafic tuff, andesite and greywacke
Layering Features Unknown
Metamorphic Grade Amphibolite facies

PREVIOUS EXPLORATION

Geophysical Surveys Airborne magnetic/EM and ground magnetic/EM
Assessment Files 91169, 93923, 91629

Mineral Occurrences

Pyrrhotite, pyrite

MAPPING

Sketch Map Figure# No
Regional Mapping 1:250 000 Scale (Bedrock Geology Compilation Map Series, Oxford House, NST 53L, 1987)
Type Section Figure# No

GEOCHEMISTRY

Geochemistry none

Selected Bibliography

Bell, C.K. 1962: Cross Lake map area, Manitoba; Geological Survey of Canada, Paper 61-22.
 Elbers, F.J. 1972: Beaver Hill Lake - Goose Lake area; in Summary of Geological Fieldwork, 1972; Manitoba Mines Branch, Geological Paper 3/72, p.
 Elbers, F.J. and Gilbert, H.P. 1972: Munro Lake area (Greenstones project); in 1972 Manitoba Mines Branch, (Summary of Geological Field Work), Geological Paper 3/72, p. 39-40.
 Elbers, F.J. and Marten, B.E. 1973: Kanuchuan Rapids, Manitoba Mines Branch, Prel. Map 1973H-12.
 Macek, J.J. and Trueman, D.L. 1972: Beaver Hill Lake Mafic Complex; Manitoba Mines Branch, Prel. Map 1972A-1.
 Rousell, D.H. 1965: Geology of the Cross Lake area; Manitoba Mines Branch, Publication 62-4.
 Scoates, R.F.J., D.L. Trueman and Macek, J.J. 1972: Ultramafic Rocks Project; in Summary of Geological Fieldwork 1972; Manitoba Mines Branch, Geol. Paper 3/72, p. 45-48.

UTM	Location and Access	SIZE
Easting 372750	Accessibility Fixed-wing	Area (km2)
Northing 6030250	Locality 1 Superior Province - Gods Lake Domain	Maximum Dimensions
Zone 15	Locality 2 Gods Lake Greenstone Belt	

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Unknown
 Geochemical Classification Unknown
 General Classification Ultramafic
 Other Classification Unknown

GEOLOGY

Principal Rock Types Serpentinized peridotite
 Host Rocks Mafic tuff, andesite and greywacke
 Layering Features Unknown

PREVIOUS EXPLORATION

Assessment Files 92668, 92669, 92670

Mineral Occurrences

Pyrrhotite, pyrite

MAPPING

Sketch Map Figure# No
 Regional Mapping 1:250 000 Scale (Bedrock Geology Compilation Map Series, Oxford House, NST 53L, 1987)
 Type Section Figure# No

GEOCHEMISTRY

Geochemistry none

Selected Bibliography

Elbers, F.J. 1972: Beaver Hill Lake-Goose Lake area; in Summary of Geological Fieldwork, 1972; Manitoba Mines Branch, Geological Paper 3/72, p.
 Elbers, F.J. and Marten, B.E. 1973: Kanuchuan Rapids, Manitoba Mines Branch, Prel. Map 1973H-12.
 Macek, J.J. and Trueman, D.L. 1972: Beaver Hill Lake Mafic Complex; Manitoba Mines Branch, Prel. Map 1972A-1.
 Scoates, R.F.J., Trueman D.L. and Macek, J.J. 1972: Ultramafic Rocks Project; in Summary of Geological Fieldwork 1972; Manitoba Mines Branch, Geol. Paper 3/72, pp. 45-48.

UTM	Location and Access	SIZE
Easting 386500	Accessibility Scheduled aircraft and boat	Area (km2)
Northing 5953250	Locality 1 Superior Province - Island Lake Domain	Maximum Dimensions
Zone 15	Locality 2 Island Lake Greenstone Belt	

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types	Massive ultramafic rocks characterized by asbestos veins and talc schist
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PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Ames (1975), Federal-provincial aeromagnetic map series #7274G, Island Lake, Manitoba-Ontario (53E)

UTM	Location and Access	SIZE
Easting 359500 Northing 6049000 Zone 15	Accessibility Fixed-wing Locality 1 Superior Province - Gods Lake Domain Locality 2 Munro Lake Greenstone Belt	Area (km2) Maximum Dimensions >40 m x 8 km

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Unknown
Geochemical Classification Unknown
General Classification Ultramafic
Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Serpentinized peridotite, serpentinite and carbonate-chlorite-serpentine schist.
Host Rocks Ultramafic body in contact with andesitic tuff, tuff, carbonate-talc schist and quartzite.
Layering Features Unknown
Metamorphic Grade Amphibolite facies

PREVIOUS EXPLORATION

Geophysical Surveys IP, ground magnetic/EM and airborne magnetic/EM
Assessment Files 91416, 92005, 91179, 93683, 93895, 93901

Mineral Occurrences

Pyrrhotite, pyrite, chalcopyrite

A sheared and carbonatized sample from a small island (2 x 3 m) at the east end of Reekie Lake contains 10% carbonate veins, 2% chalcopyrite, 2% magnetite and greater than 0.5% hematite with 3.8 g/t Au over 0.4 m. Resampling of this outcrop resulted in an assay of 340 ppb Au over 0.3 m. The sample was described as the wall rock to a 3 cm wide brecciated carbonate vein containing 50% magnetite and 5% chalcopyrite. The discrepancy in gold values may be due to the nugget effect.

Exploration History

In 1963, Falconbridge Nickel Mines Ltd. (AF 91416) carried out AFmag-longwire and magnetometer surveys along the Reekie Lake, at 100 foot intervals on picket lines spaced 400 feet apart along a cut base line. The surveys detected a series of east trending magnetic anomalies associated with a continuous and weak afmag conductive zone.

In 1968, Falconbridge Nickel Mines Ltd. (AF 92005, 91179) completed 6 holes along Reekie Lake, all of which encountered ultramafic (ultrabasic) rocks. According to the drill core, the ultramafic bodies ranges in horizontal width from about 40m to greater than 107m and may be over 8 km long.

- 1) Hole RE-1 intersected 460 feet of ultramafic intrusive rocks (from 336 to 796 feet), consisting of serpentinite, serpentinized peridotite and serpentine schist.
- 2) Hole RE-2 intersected 183 feet of ultramafic intrusive rocks (from 271 to 454 feet), consisting of talc-carbonate-chlorite schist and black serpentinite.
- 3) Hole RE-4 intersected 170 feet of ultrabasic intrusive rocks (from 310 to 480 feet), consisting of carbonate-talc schist, serpentinite and carbonate-rich serpentinite.
- 4) Hole RE-5 intersected 260 feet of green to black serpentinite (from 296 to 556 feet).
- 5) Hole RE-6 intersected 191 feet of serpentinized peridotite (from 596 to 787 feet).
- 6) Hole RE-7 intersected 268 feet of ultrabasic intrusive rocks (from 394 to 662 feet), consisting of carbonate-chlorite-serpentine schist and green to black serpentinite.

The ultramafic intrusion is in contact with andesitic tuff, tuff, carbonate-talc schist and quartzite. The AFmag and magnetic

anomalies were interpreted as being caused by the ultramafic body and the serpentinization of the rocks. The assays are not available in the assessment file.

In 1977, Manitoba Mineral Resources Ltd. (AF 93683) conducted an airborne EM survey, with flight lines spaced 1320 feet apart. The survey showed a weak, continuous EM anomaly associated with a magnetic high along Reekie Lake.

In 1990-1991, Noranda Exploration Co. Ltd. (AF 93895, 93901) carried out a gold exploration program, consisting of a ground magnetic survey, an IP survey and detailed geological mapping on three grids along Reekie Lake.

Geophysical surveys:

The total magnetic field measurements were recorded at 12.5m intervals along lines spaced 200m apart. The ultramafic intrusion is associated with an east-trending magnetic anomaly. The IP survey used an in-line pole-pole configuration, with readings taken at 25 m intervals along the lines.

Geochemical survey:

A total of 229 humus samples were taken in the three grid areas with 50m intervals along the lines and 400m intervals between the lines, and analyzed for 27 elements.

A total 123 rock samples were taken from outcrop and analyzed by ICP, XRF, AA, AFS and fire assay for many elements and oxides. Four samples were analyzed by atomic fluorescence spectrometry (AFS) for Pd and Pt.

Geological mapping:

A detail mapping and prospecting was preformed in the Reekie Lake area at a scale of 1:5000.

Highlight of the results:

1. After examination of the results of the IP survey, nine drill targets were recommended but failed to outline any significant disseminated sulphide occurrences or resistive anomalies that are associated with Au mineralization in the carbonized ultramafic bodies.
2. No significant Au anomalies were detected in humus samples.
3. Over 10% of the rock samples contain Au greater than 100 ppb.
4. A sheared and carbonized sample from the east end of Reekie Lake on a small island (2x3m) contains 10% carbonate veins, 2% chalcopyrite, 2% magnetite and >0.5% hematite with 3.8 g/t Au over 0.4 m. Resampling of this outcrop resulted in an assay of 340 ppb Au over 0.3 m. The sample was described as the wall rock to a 3 cm wide brecciated carbonate vein containing 50% magnetite and 5% chalcopyrite. The discrepancy in gold values may be caused by the nugget effect.

MAPPING

Most Detailed Mapping	1:50,000 Munro Lake, 53L/11, Map GR83-1-11
Sketch Map Figure#	No
Regional Mapping	1:250,000 Bedrock Geology Compilation Map Series, Oxford House, NST 53L, 1987;
Type Section Figure#	No

GEOCHEMISTRY

Geochemistry Whole-rock Geochemistry (no REE) and PGE Analyses

Geochemical Features and PGE Abundances

See AF 93901 (Noranda Exploration)

Selected Bibliography

- Theyer, P., 1980: Stratigraphic setting of selected ultramafic bodies in the Superior and Churchill provinces and certain aspects of nickel copper deposits in the Thompson nickel belt; Economic Geology Report (Winnipeg) (ER79-2), p. 17, 53.
- Scoates, R.F.J., 1971a: Ultramafic Rocks Project; in Summary of Geological Fieldwork 1971; Man. Mines Br., Geol. Paper 6/71, p. 55.
- Gilbert, H.P., 1985: Geology of the Keen Lake-Gods Lake Area; Manitoba Energy and Mines, Geological Report GR83-1B

UTM	Location and Access	SIZE
Easting 355500 Northing 6052500 Zone 15	Accessibility Fixed-wing Locality 1 Superior Province - Gods Lake Domain Locality 2 Munro Lake Greenstone Belt	Area (km2) Maximum Dimensions approx. 2500 x 50 m

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Sill
Geochemical Classification Unknown
General Classification Mafic-Ultramafic
Other Classification Unknown

GEOLOGY

Principal Rock Types Peridotite, serpentized peridotite, serpentinite and gabbro.
Host Rocks metasediments and metavolcanics of Munro Lake greenstone belt (unnamed supracrustal rocks).
Layering Features Unknown

PREVIOUS EXPLORATION

Geophysical Surveys Airborne magnetic/EM and ground magnetic/EM
Assessment Files 91416, 92005, 93683, 92171, 92172

Mineral Occurrences

Chalcopyrite, pyrrhotite, pyrite

Exploration History

In 1963, Falconbridge Nickel Mines Ltd. (AF 91416) carried out afmag-longwire and magnetometer surveys along the Rifle Lake, and both readings of afmag and magnetometer have been taken at 100 feet intervals along picket lines spaced 400 feet along a cut base line. The surveys detected four east-west trending and weak afmag conductive zones, some of which are associated with the magnetic anomalies.

In 1968, Falconbridge Nickel Mines Ltd. (AF 92005) drilled five holes along Rifle Lake, and three of them encountered ultramafic rocks. According to the drill data, the ultramafic body (sill?) ranges in horizontal width from about 32 to 52m and may be over 2.5km long.

1. Hole R-1 intersected 216.9 feet long serpentized peridotite and serpentinite from 427.6 to 644.5 ft. interval, no sulphides were observed.
2. Hole R-2 intersected 225.7 feet long serpentized peridotite and sheared serpentinite from 167.8 to 393.5 ft. interval, no sulphides were observed.
3. Hole R-5 intersected 137.0 feet long serpentinite and talc-serpentine schist from 178-315 ft. interval. The ultramafic body is in contact with argillite-biotite and biotite-sericite schists, basic tuff-argillite and argillite, and feldspathic quartzite of Munro Lake greenstone belt (unnamed supracrustal rocks). The afmag and magnetic anomalies were interpreted as being caused by the ultramafic body and the serpentization of the rocks. The assays are not available in the assessment file.

In 1977-1979, Manitoba Mineral Res. Ltd. (AF 93683, 92171, 92172) carried out a base metal exploration program in the area between Munro Lake, Colen Lake and Reekie Lake. The company completed an airborne EM survey in the area, a ground horizontal loop EM survey on 8 grid areas and 19 diamond drill holes. Drill core samples were assayed for Au and Ni.

Four holes encountered mafic-ultramafic rocks.

1. Hole 164-2 is located about 2 miles west of Rifle Lake, and intersected 93.9 feet long greenish-grey, medium- to coarse-grained gabbro from 4.0 to 97.9 feet interval, 11.1 feet long sulphides mineralized zone from 97.9 to 109.0 feet interval and

ended in metasediment. The gabbro contains trace py and po and some massive bands of po and blebs py from 59.7 to 61.8 interval. The sulphidemineralized zone contains po bands and stringers up to 2 " long with 1-2% py.

2. Hole 164-5 is located about 1 mile north of Rifle Lake, and intersected 113.5 feet long dark green, medium- to coarse-grained and porphyritic gabbro from 10-123.5 feet interval, and po, py and cpy mineralized intermediate to mafic volcanic tuff from 123.5 to 196.0 ft.

3. Hole 164-12 is located about ¼ mile south of Munro Lake and 2 miles northeast of Rifle Lake, and it intersected fine-grained basalt from 23.0 to 124.4 feet interval and medium-grained peridotite from 124.4 to 159.0 feet interval. The basalt contains trace py and po generally with a 9.3 feet long sulphides mineralized zone (5-10% po + py in bands and stringers) from 105.0-114.3 feet interval. The peridotite is slightly serpentinized, and contains trace, disseminated po and py.

4. Hole 164-21 is located about ¼ mile south of Munro Lake and 1.5 miles northwest of Rifle Lake, and it intersected 114.2 long greenish-grey, medium-grained gabbro, 14.3 feet long sulphides mineralized zone from 118.2 to 132.5 feet interval and basalt from 132.5 to 176.0 feet interval. The sulphides mineralized zone contains 5-10% po and trace to 2% py in bands and stringers.

MAPPING

Most Detailed Mapping	1:50,000 Munro Lake, 53L/11, Map GR83-1-11
Sketch Map Figure#	No
Regional Mapping	1:250,000 Bedrock Geology Compilation Map Series, Oxford House, NST 53L, 1987;
Type Section Figure#	No

GEOCHEMISTRY

Selected Bibliography

Barry, G.S., 1962: Geology of the Munro Lake Area; Man. Mines Br., Pub. 61-1 (with accompanying Map 61-1).
Gilbert, H.P., 1985: Geology of the Keen Lake-Gods Lake Area; Manitoba Energy and Mines, Geological Report GR83-1B
Theyer, P., 1980: Stratigraphic setting of selected ultramafic bodies in the Superior and Churchill provinces and certain aspects of nickel copper deposits in the Thompson nickel belt; Economic Geology Report (Winnipeg) (ER79-2), p. 17, 53.

UTM	Location and Access	SIZE
Easting 348000	Accessibility Fixed-wing	Area (km2)
Northing 6051250	Locality 1 Superior Province - Gods Lake Domain	Maximum Dimensions
Zone 15	Locality 2 Munro Lake Greenstone Belt	

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Unknown
 Geochemical Classification Unknown
 General Classification Ultramafic
 Other Classification Greenstone belt

GEOLOGY

Principal Rock Types highly altered, recrystallized ultramafic rocks comprising abundant hornblende and serpentine
 Host Rocks metasediments and metavolcanics of the Munro Lake greenstone belt (unnamed supracrustal rocks).
 Layering Features Unknown
 Metamorphic Grade Amphibolite facies

PREVIOUS EXPLORATION

Geophysical Surveys Airborne magnetic/EM and ground magnetic/EM
 Assessment Files 91180, 93683, 92171

Exploration History

In 1971, Falconbridge Nickel Mines Ltd. (AF 91180) carried out ground magnetic and afmag surveys along the north shore of western Colen Lake (Claim Blocks 2079 and 2078). The magnetometer and afmag reading were taken at 400 feet intervals on picket lines spaced 400 feet along a cut baseline.

In 1977 to 1978, Manitoba Mineral Resources Ltd. (AF 93683, 92171) conducted an airborne EM survey in the area with 1320 feet spacing of the flight lines. The area displays a poor EM conductivity and has good magnetic association. It probably is caused by pyrrhotite in the bedrock. A follow-up ground horizontal loop EM survey was completed in the area (grid M-2) during 1978, and detected two east-west trending EM conductors.

MAPPING

Most Detailed Mapping 1:50,000 Munro Lake, 53L/11, Map GR83-1-11
 Sketch Map Figure# No
 Regional Mapping 1:250,000 Bedrock Geology Compilation Map Series, Oxford House, NST 53L, 1987;
 Type Section Figure# No

GEOCHEMISTRY

Geochemistry none

Selected Bibliography

Scoates, R.F.J., 1971: Ultramafic Rocks Project; in Summary of Geological Fieldwork 1971; Man. Mines Br., Geol. Paper 6/71, p. 55.

Theyer, P., 1980: Stratigraphic setting of selected ultramafic bodies in the Superior and Churchill provinces and certain aspects of nickel copper deposits in the Thompson nickel belt; Economic Geology Report (Winnipeg) (ER79-2), p. 17, 53.

UTM	Location and Access	SIZE
Easting 386500 Northing 6092500 Zone 15	Accessibility Fixed-wing Locality 1 Superior Province - Gods Lake Domain Locality 2 Oxford Lake - Knee Lake Greenstone Belt	Area (km2) 1.5 Maximum Dimensions 0.1 x 1.5 km

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Unknown
General Classification Ultramafic
Other Classification Greenstone belt

GEOLOGY

Principal Rock Types serpentized peridotite
Host Rocks Mafic subvolcanic and felsic-intermediate volcanic rocks of Hayes River Group.
Layering Features Unknown
Metamorphic Grade Amphibolite facies

Synoptic Geology

The ultramafic body is spatially associated with gabbro

PREVIOUS EXPLORATION

MAPPING

Most Detailed Mapping 1:50,000 Knee Lake, 53L/15, Map GR83-1-7;
Sketch Map Figure# No
Regional Mapping 1:250,000 Bedrock Geology Compilation Map Series, Oxford House, NST 53L, 1987;
Type Section Figure# No

GEOCHEMISTRY

Geochemistry none

Selected Bibliography

Scoates, R.F.J., 1971: Ultramafic Rocks Project; in Summary of Geological Fieldwork 1971; Man. Mines Br., Geol. Paper 6/71, pp. 51-55.
 Gilbert, H.P. and Elbers, F.J. 1972: Parker Lake-Knee Lake Oxforde House Area; Summary of Geological Fieldwork; Man. Mines Br., Geol. Paper 2/72, pp. 36.
 Gilbert, H.P., 1985: Geology of the Knee-Lake-Gods Lake Area; Manitoba Energy and Mines, Geological Report GR83-1b, p. 7, 64-70.
 Theyer, P., 1980: Stratigraphic setting of selected ultramafic bodies in the Superior and Churchill provinces and certain aspects of nickel copper deposits in the Thompson nickel belt; Economic Geology Report (Winnipeg) (ER79-2), p.19, 53.

UTM	Location and Access	SIZE
Easting 384750 Northing 6084750 Zone 15	Locality 1 Superior Province - Gods Lake Domain Locality 2 Oxford Lake - Knee Lake Greenstone Belt	Area (km2) 0.05 Maximum Dimensions approx. 50 m x 1 km

AGE DATA
Age Archean

CLASSIFICATION
Intrusion Type Unknown Geochemical Classification Unknown General Classification Ultramafic Other Classification Greenstone belt

GEOLOGY
Principal Rock Types serpentized peridotite Host Rocks gabbro and felsic-intermediate volcanics of Hayes River Group. Layering Features Unknown Metamorphic Grade Amphibolite facies
Synoptic Geology The southeast side of the ultramafic body is in contact with gabbro.

PREVIOUS EXPLORATION

MAPPING
Most Detailed Mapping 1:50,000 Knee Lake, 53L/15, Map GR83-1-7; Sketch Map Figure# No Regional Mapping 1:250,000 Bedrock Geology Compilation Map Series, Oxford House, NST 53L, 1987; Type Section Figure# No

GEOCHEMISTRY
Geochemistry none Whole-rock Analyses Numbers 2.342 to 2.347

Selected Bibliography

Gilbert, H.P. and Elbers, F.J. 1972: Parker Lake-Knee Lake Oxforde House Area; Summary of Geological Fieldwork; Man. Mines Br., Geol. Paper 2/72, p. 36.

Gilbert, H.P. 1985: Geology of the Knee-Lake-Gods Lake Area; Manitoba Energy and Mines, Geological Report GR83-1b, p. 7, 64-70.

UTM	Location and Access	SIZE
Easting 378000 Northing 6084750 Zone 15	Accessibility Fixed-wing Locality 1 Superior Province - Gods Lake Domain Locality 2 Oxford Lake - Knee Lake Greenstone Belt	Area (km2) Maximum Dimensions drilled thickness 26m

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Unknown
Geochemical Classification Unknown
General Classification Ultramafic
Other Classification Greenstone belt

GEOLOGY

Principal Rock Types serpentized peridotite
Host Rocks metamorphosed mafic volcanic rocks of Hayes River Group
Layering Features Unknown
Metamorphic Grade Amphibolite facies
Deformation Moderately to steeply plunging folds with ENE to ESE trend.

Synoptic Geology

The ultramafic body is associated with a gabbro sill at it southern flank.

PREVIOUS EXPLORATION

Assessment Files 91191, 91193

Mineral Occurrences

Pyrrhotite

Exploration History

In 1972, Selco Mining Corporation Ltd. (AF 91191, 91193) completed ground magnetic survey in the area. The magnetic readings were taken at 50 x 400 ft. grid base. The ultramafic intrusion is associated with a large magnetic high.

The company drilled DDH OX-7 about 2 km northeast of Pain Killer Bay and intersected 85 ft. of only peridotite (265-350 ft. interval). The peridotite is dark green, medium grained, serpentized and is cross-cut by serpentine, talc and magnetite veinlets. The pyrrhotite occurs as angular inclusions in the veinlets and as very small stringers scattered in 4-5 parts of the drill core.

MAPPING

Most Detailed Mapping 1:50,000 Knee Lake, 53L/15, Map GR83-1-7;
Sketch Map Figure# No
Regional Mapping 1:250,000 Bedrock Geology Compilation Map Series, Oxford House, NST 53L, 1987;
Type Section Figure# No

GEOCHEMISTRY

Whole-rock Analyses Numbers 2.342 to 2.347

Selected Bibliography

Gilbert, H.P., 1985: Geology of the Knee-Lake-Gods Lake Area; Manitoba Energy and Mines, Geological Report GR83-1b, p. 7, 64-70.

Theyer, P. 1980: Stratigraphic setting of selected ultramafic bodies in the Superior and Churchill provinces and certain aspects of nickel copper deposits in the Thompson nickel belt; Economic Geology report (Winnipeg) (ER79-2), p. 19, 55.

UTM	Location and Access	SIZE
Eastings 375000 Northings 6082750 Zone 15	Accessibility Fixed-wing Locality 1 Superior Province - Gods Lake Domain Locality 2 Oxford Lake - Knee Lake Greenstone Belt	Area (km2) 0.2 Maximum Dimensions 1 x 0.2 km

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Unknown
General Classification Ultramafic
Other Classification Greenstone belt

GEOLOGY

Principal Rock Types serpentized peridotite and serpentinite.
Host Rocks gabbro and felsic-intermediate volcanics of Hayes Lake Group.
Layering Features Unknown
Metamorphic Grade Amphibolite facies
Deformation Moderately to steeply plunging folds with ENE to ESE trending in the area.

Synoptic Geology

The primary textures were preserved in the serpentized peridotite.
 The ultramafic body is associated with gabbro sill at it southern flank.

PREVIOUS EXPLORATION

Mineral Occurrences

It rarely contains some very fine-grained and disseminated sulphides.

MAPPING

Most Detailed Mapping 1:50,000 Knee Lake, 53L/15, Map GR83-1-7;
Sketch Map Figure# No
Regional Mapping 1:250,000 Bedrock Geology Compilation Map Series, Oxford House, NST 53L, 1987;
Type Section Figure# No

GEOCHEMISTRY

Geochemistry none

Selected Bibliography

Barry, G.S., 1959: Geology of the Oxford House-Knee Lake Area; Man. Mines Br., Pub. 58-3 (with accompanying maps 58-3A and 58-3B).
 Gilbert, H.P. and F.J. Elbers, 1972: Parker Lake-Knee Lake Oxforde House Area; Summary of Geological Fieldwork; Man. Mines Br., Geol. Paper 2/72, p. 36.
 Scoates, R.F.J., 1971: Ultramafic Rocks Project; in Summary of Geological Fieldwork 1971; Man. Mines Br., Geol. Paper 6/71, p. 54.
 Gilbert, H.P., 1985: Geology of the Knee-Lake-Gods Lake Area; Manitoba Energy and Mines, Geological Report GR83-1b, p. 7, 64-70.
 Theyer, P., 1980: Stratigraphic setting of selected ultramafic bodies in the Superior and Churchill provinces and certain

aspects of nickel copper deposits in the Thompson nickel belt; Economic Geology Report (Winnipeg) (ER79-2), p.19, 55.

UTM

Easting 370250
Northing 6082250
Zone 15

Location and Access

Accessibility Fixed-wing
Locality 1 Superior Province - Gods Lake Domain
Locality 2 Oxford Lake - Knee Lake Greenstone Belt

SIZE

Area (km2)
Maximum Dimensions Drilled thickness 60-120m

AGE DATA**Age**

Archean

CLASSIFICATION

Intrusion Type Unknown
Geochemical Classification Unknown
General Classification Ultramafic
Other Classification Greenstone belt

GEOLOGY

Principal Rock Types serpentized peridotite, peridotite
Host Rocks rhyolite and intermediate volcanic of Hayes River Group
Layering Features Unknown
Metamorphic Grade Amphibolite facies
Deformation Moderately to steeply plunging folds with ENE to ESE trending in the area.

PREVIOUS EXPLORATION

Geophysical Surveys Ground magnetic and EM
Assessment Files 91190, 91192, 91193, 93566, 93585

Mineral Occurrences

Pyrrhotite, pyrite

Exploration History

The ultramafic body is located 4 km west of Pain Killer Bay, north side of south Knee Lake.

In 1960, Canadian Nickel Company, Ltd. (AF 91192) drilled one hole (BH 15470) on the shore of the lake on the claim Nee 22. The hole intersected 392 feet of only serpentized peridotite. The serpentized peridotite contains 7% po in stringers from 113 to 235 ft. intervals, 10-12% po in stringers and disseminated from 382-457 ft. intervals and 5-7% po in stringers from 457-505 ft. intervals (the abundance of stringers within peridotite is not known). The assays are not available in the assessment file.

In 1972, Selco Mining Corporation Ltd. (AF 91193, 91190) completed ground magnetic survey in the area. The magnetic readings were taken at 50 ft. intervals along the lines and 400 ft. separation between the lines (50 x 400 ft.). The ultramafic intrusion is associated with several large magnetic high features. Selco Mining Corporation Ltd. drilled two holes in the area, DDH OX-6 and DDHOX-5B are located about 1500 ft. west and 5000 ft. southwest, respectively, of BH 15470 drilled by Canadian Nickel Company, Ltd. Both holes ended in serpentinite and the assays of the core samples are not available in the assessment file.

1. DDH OX-6 encountered 198 feet of serpentized peridotite from 103-301 ft. intervals, and contains trace pyrrhotite. Minor pyrrhotite was noted in several dark coloured sections of peridotite.
2. DDH OX-5B encountered andesite from 105.2-122 ft. interval and 283 ft. long serpentized peridotite from 122-405 ft. interval. The peridotite is massive in general, and the medium-grained texture only occurs in 2-3 sections of drill core. The pyrrhotite occurs in the fractures and small veins as "platy flecks" associated with shear planes.

In 1988, Noranda Exploration Co., Ltd. (AF 93566, 93585) carried out a gold exploration program and completed magnetic and horizontal loop EM on the Lake Grid property (Phil 17 claim) located on the north side of Knee Lake. The magnetic field readings were based on 12.5 x 100m grids. The horizontal loop EM readings were taken at 25m intervals along the line with

100m separation of the cable. The ultramafic body is associated with the magnetic anomaly and the weakly conductive anomaly.

DDH Knee 88-3 was drilled on the property about 250 m south of BH 15470. The hole was supposed to intersect a horizontal loop EM conduct at the ultramafic and intermediate volcanic contact within the Hayes River Group. The hole encountered dark green/gray-black, fine-grained serpentinitized peridotite from 37.0-69.5m interval, gray-black, fine-grained peridotite from 69.5-112.0m interval, and intermediate volcanic and rhyolite from 112.0-143.7m interval. The serpentinitized peridotite and peridotite are crosscut by numerous veinlets which consist of dolomite, magnetite, serpentine and minor hematite, pyrite and pyrrhotite. The drill core samples were sent to TSL and analyzed by neutron activation and ICP. Three samples of magnetite, pyrrhotite (1-2%) and pyrite mineralized serpentinitized peridotite and peridotite from intervals 50.0-51.4, 62.0-63.0 and 77.5-78.5m were assayed for Pt and Pd with <10-20 ppb Pt and 2-10 ppb Pd. Seventeen serpentinitized peridotite and peridotite samples from 41.5 to 69.0 and from 77.5 to 112.0 intervals were assayed for multiple elements by ICP. The Ni content ranged from 870 to 2500 ppm Ni, and the Au content ranges from <6 to 19 ppb Au in the samples.

MAPPING

Most Detailed Mapping	1:50,000 Oxford Lake, 53L/14, Map GR83-1-6; 1:50,000 Knee Lake, 53L/15, Map GR83-1-7;
Sketch Map Figure#	No
Regional Mapping	1:250,000 Bedrock Geology Compilation Map Series, Oxford House, NST 53L, 1987;
Type Section Figure#	No

GEOCHEMISTRY

Geochemistry	Base Metal Assay and PGE Analyses
Whole-rock Analyses Numbers	2.342 to 2.347

Geochemical Features and PGE Abundances

DDH Knee 88-3: Three samples of magnetite, pyrrhotite (1-2%) and pyrite mineralized serpentinitized peridotite and peridotite from intervals 50.0-51.4, 62.0-63.0 and 77.5-78.5m were assayed for Pt and Pd with <10-20 ppb Pt and 2-10 ppb Pd. (see assessment files)

Selected Bibliography

Barry, G.S., 1959: Geology of the Oxford House-Knee Lake Area; Man. Mines Br., Pub. 58-3 (with accompanying maps 58-3A and 58-3B).

Scoates, R.F.J., 1971: Ultramafic Rocks Project; in Summary of Geological Fieldwork 1971; Man. Mines Br., Geol. Paper 6/71, p. 54.

Gilbert, H.P. and F.J. Elbers, 1972: Parker Lake-Knee Lake Oxford House Area; Summary of Geological Fieldwork; Man. Mines Br., Geol. Paper 2/72, p. 36.

Theyer, P., 1980: Stratigraphic setting of selected ultramafic bodies in the Superior and Churchill provinces and certain aspects of nickel copper deposits in the Thompson nickel belt; Economic Geology Report (Winnipeg) (ER79-2), p.19, 55.

Gilbert, H.P., 1985: Geology of the Knee-Lake-Gods Lake Area; Manitoba Energy and Mines, Geological Report GR83-1b, p. 7, 64-70.

UTM	Location and Access	SIZE
Easting 367500	Accessibility Fixed-wing	Area (km2) 0.7
Northing 6083000	Locality 1 Superior Province - Gods Lake Domain	Maximum Dimensions 0.1 x 0.7 km
Zone 15	Locality 2 Oxford Lake - Knee Lake Greenstone Belt	

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Unknown
 Geochemical Classification Unknown
 General Classification Ultramafic
 Other Classification Greenstone belt

GEOLOGY

Principal Rock Types serpentinite, peridotite-pyroxenite
 Host Rocks gabbro and felsic-intermediate volcanics of Hayes Lake Group.
 Other Igneous Features displays a crude concentric zoning; core: fine-grained serpentinite; intermediate zone: medium-grained serpentinitized peridotite-pyroxenite; outer zone: fine-grained serpentinite;
 Metamorphic Grade Amphibolite facies
 Deformation The body is mildly sheared and fractured.

Synoptic Geology

The ultramafic body is associated with a gabbro sill at its southern flank. The outer zone of fine-grained serpentinite was strongly foliated and crosscut by the asbestos and harsh picrolite-magnetite veinlets near the outer margins.

PREVIOUS EXPLORATION

Mineral Occurrences

Very fine-grained and disseminated sulphides are developed sporadically throughout the body but do not exceed one percent of the rock.

MAPPING

Most Detailed Mapping 1:50,000 Oxford Lake, 53L/14, Map GR83-1-6;
 Sketch Map Figure# No
 Regional Mapping 1:250,000 Bedrock Geology Compilation Map Series, Oxford House, NST 53L, 1987;
 Type Section Figure# No

GEOCHEMISTRY

Geochemistry none
 Whole-rock Analyses Numbers 2.342 to 2.347

Selected Bibliography

Barry, G.S., 1959: Geology of the Oxford House-Knee Lake Area; Man. Mines Br., Pub. 58-3 (with accompanying maps 58-3A and 58-3B).
 Gilbert, H.P. and F.J. Elbers, 1972: Parker Lake-Knee Lake Oxforde House Area; Summary of Geological Fieldwork; Man. Mines Br., Geol. Paper 2/72, pp. 36.
 Scoates, R.F.J., 1971: Ultramafic Rocks Project; in Summary of Geological Fieldwork 1971; Man. Mines Br., Geol. Paper

6/71, p. 54.

Theyer, P., 1980: Stratigraphic setting of selected ultramafic bodies in the Superior and Churchill provinces and certain aspects of nickel copper deposits in the Thompson nickel belt; Economic Geology Report (Winnipeg) (ER79-2), p.19, 55.

Gilbert, H.P., 1985: Geology of the Knee-Lake-Gods Lake Area; Manitoba Energy and Mines, Geological Report GR83-1b, p. 7, 64-70.

UTM	Location and Access	SIZE
Easting 332250 Northing 6085250 Zone 15	Accessibility Fixed-wing Locality 1 Superior Province - Gods Lake Domain Locality 2 Oxford Lake - Knee Lake Greenstone Belt	Area (km2) 0.04 Maximum Dimensions approx. 200 m x 20 m

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Sill
Geochemical Classification Unknown
General Classification Ultramafic
Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Peridotite
Host Rocks pillowed basalt and andesite of Hayes River Group
Layering Features Unknown
Metamorphic Grade Amphibolite facies
Deformation slightly fractured and sheared.

Synoptic Geology

Barry (1960) reported:

A small body of peridotite is intrusive into the volcanic series on the north side Bleak Island. It is a fine- to medium-grained rock with a dark grey mottled weathered surface. The rock consists of serpentinized pyroxene and olivine and minor amounts of plagioclase, carbonate, and iron oxides. The contacts of this body with the volcanic rocks were not observed but its field position suggests an oval-shaped intrusion with irregular borders. The peridotite is only slightly fractured and sheared. Slickensided serpentine and minor picrolite occur along some fractures. Several carbonate veinlets have been noted.

Hubregtse (1985) reported:

The ultramafic sill on Bleak Island contains dusty, pseudomorphic chlorite aggregates, which exhibit a peculiar blue-orange pleochroism. The X-ray pattern and the optical properties closely match the characteristics of a chrome-chlorite (J. Macek, pers. comm.), perhaps kochubeiite or kammererite.

Theyer (1980) concluded:

The ultramafic body is a peridotite sill that cuts an intravolcanic gabbroic sill. The gabbroic sill is overlain by an oligomictic conglomerate layer in which the clasts are largely derived from the gabbro and to a minor extent from an adjacent rhyolitic stock. The relationship between this erosional surface and the emplacement of the ultramafic lens is not resolved, since ultramafic components have not been found in the conglomerate (Hubregtse, pers. comm.). The evidence suggests that an ultramafic intrusive or extrusive (?) episode occurred after emplacement of the gabbro and possibly after the weathering of the latter intrusion.

PREVIOUS EXPLORATION

Mineral Occurrences

Very fine-grained, disseminated sulphides are rare (Scoates, 1971)

MAPPING

Most Detailed Mapping 1:50,000 Carghill Island, 53L/13, Map GR83-1-5;
Sketch Map Figure# No
Regional Mapping 1:250,000 Bedrock Geology Compilation Map Series, Oxford House, NST 53L, 1987;
Type Section Figure# No

GEOCHEMISTRY

Geochemistry	none
PGE Analyses Numbers	1.1026

Selected Bibliography

- Barry, G.S., 1960: Geology of the Western Oxford Lake-Carghill Island Area; Man. Mines Br., Pub. 59-2, p. 17.
- Hubregtse, J.J.M.W., 1985: Geology of the Oxford Lake-Carrot River area; Manitoba Energy and Mines, Geological Report 83-1A, p. 8.
- Scoates, R.F.J., 1971: Ultramafic Rocks Project; in Summary of Geological Fieldwork 1971; Man. Mines Br., Geol. Paper 6/71, p. 54.
- Theyer, P., 1980: Stratigraphic setting of selected ultramafic bodies in the Superior and Churchill provinces and certain aspects of nickel copper deposits in the Thompson nickel belt; Economic Geology Report (Winnipeg) (ER79-2), p.19, 55

UTM	Location and Access	SIZE
Easting 318250 Northing 6078000 Zone 15	Accessibility Fixed-wing Locality 1 Superior Province - Gods Lake Domain Locality 2 Oxford Lake - Knee Lake Greenstone Belt	Area (km2) Maximum Dimensions

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Sill
Geochemical Classification Unknown
General Classification Ultramafic
Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Serpentinized peridotite
Host Rocks gabbro and pillowed porphyritic andesite and basalt of Hayes River Group
Layering Features Unknown
Metamorphic Grade Amphibolite facies

PREVIOUS EXPLORATION

MAPPING

Most Detailed Mapping 1:50,000 Carghill Island, 53L/13, Map GR83-1-5;
Sketch Map Figure# No
Regional Mapping 1:250,000 Bedrock Geology Compilation Map Series, Oxford House, NST 53L, 1987;
Type Section Figure# No

GEOCHEMISTRY

PGE Analyses Numbers 1.1026

Selected Bibliography

Hubregtse, J.J.M.W., 1985: Geology of the Oxford Lake-Carrot River area; Manitoba Energy and Mines, Geological Report 83-1A.

UTM	Location and Access	SIZE
Easting 318500 Northing 6075250 Zone 15	Accessibility Fixed-wing Locality 1 Superior Province - Gods Lake Domain Locality 2 Oxford Lake - Knee Lake Greenstone Belt	Area (km2) 0.14 Maximum Dimensions approx. 50m x 2.7km

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Sill
Geochemical Classification Komatiitic
General Classification Ultramafic
Other Classification Greenstone belt

GEOLOGY

Principal Rock Types peridotite
Host Rocks north: contact with gabbro of Hayes River Group; south: contact with porphyritic tonalite and minor porphyritic granodiorite of Bayly Lake Complex.
Layering Features Unknown
Igneous Textures Spinifex
Metamorphic Grade Amphibolite facies

Synoptic Geology

Hubregtse (1985) reported:

The ultramafic rocks on High Rock Island display rare spinifex and cumulate textures. Random, feathered crystallites, up to 4 cm in length, define a spinifex texture indicating either extrusion or intrusion of the peridotites at a very shallow level.

In thin section the spinifex crystallites consist of elongate aggregates of chlorite, and green and colourless amphibolites.

Ilmenite with rims of sphene, and other opaque minerals occur throughout the rock.

The geological setting of this ultramafic body is strikingly similar to that of the Peridotite Island body. At High Rock Island the ultramafic rocks are also in contact with an iron formation and are overlain by basalt.

Theyer (1980) concluded:

This ultramafic outcrop is part of a differentiated layered ultramafic that is concordant with an underlying iron formation and an overlying variolitic pillow lava. It has been traced along strike for a distance of approximately 3 km and is up to 150 metres wide.

Spinifex textures and partial assimilation of the underlying iron formation, forming local accumulations of hornblendites occur in the ultramafic. In this sections the spinifex textures in the ultramafic are displayed by elongate chlorite and amphibolite aggregates.

Geochemistry data show that this ultramafic is of tholeiitic affinity but very close to a komatiitic composition.

PREVIOUS EXPLORATION

Geophysical Surveys Airborne magnetic and EM
Assessment Files 94092, 94086, 94087

Mineral Occurrences

Au up to 830 ppb over 1.5m in a talc altered ultramafic (DDH OXF 88-4, Noranda).

The ultramafic rocks contain trace py, Au up to 700 ppb over 1.5m in ultramafic rock (DDH OXF 91-1, Noranda).

Exploration History

In 1990-1991, Noranda Exploration Company, Limited completed ground magnetic and Max-Min surveys, geological prospecting and mapping, and four drill holes.

DDH OXF91-1 encountered 27.2m ultramafic rock.

MAPPING

Most Detailed Mapping 1:50,000 Carghill Island, 53L/13, Map GR83-1-5;

Sketch Map Figure#	No
Regional Mapping	1:250,000 Bedrock Geology Compilation Map Series, Oxford House, NST 53L, 1987;
Type Section Figure#	No

GEOCHEMISTRY

Geochemistry	Whole-rock Geochemistry (no REE)
PGE Analyses Numbers	1.1026

Geochemical Features and PGE Abundances

Limited whole-rock analyses (Chemex) are given in AF 94087 (Noranda Exploration).

Selected Bibliography

Hubregtse, J.J.M.W., 1985: Geology of the Oxford Lake-Carrot River area; Manitoba Energy and Mines, Geological Report 83-1A, p. 7-8.

Theyer, P., 1980: Stratigraphic setting of selected ultramafic bodies in the Superior and Churchill provinces and certain aspects of nickel copper deposits in the Thompson nickel belt; Economic Geology Report (Winnipeg) (ER79-2), p.19, 55

UTM	Location and Access	SIZE
Easting 310000 Northing 6071750 Zone 15	Accessibility Fixed-wing Locality 1 Superior Province - Gods Lake Domain Locality 2 Oxford Lake - Knee Lake Greenstone Belt	Area (km2) 0.14 Maximum Dimensions approx. 180 x 750 m

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Sill
Geochemical Classification Unknown
General Classification Ultramafic
Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Serpentinized dunitic to peridotitic rocks
Host Rocks meta-gabbro and metasedimentary to the northwest, and a granodiorite-quartz diorite of Bayly Lake Complex to south.
Layering Features Unknown
Metamorphic Grade Amphibolite facies

Synoptic Geology

Barry (1960) reported:

An oval-shaped body of serpentinite and some related gabbro occurs along the south shore of Oxford Lake and adjacent reefs south of Hayes Island. The rock as a whole weathers dark greenish brown or, where more iron is present, reddish brown. It is predominantly massive with minor sheared and schistose phases. In thin section it is composed of 70 to 75 percent serpentine, 20 to 25 percent calcite, and minor talc, epidote, and iron oxides.

Hubregtse (1985) concluded:

Several reefs and smaller islands in Lynx Bay are underlain by ultramafic rocks. Some cumulate textures of olivine, up to 2 cm, are readily visible on glacially polished coarse-grained outcrops. Where contacts are exposed, the ultramafics are always fault-bounded against the surrounding tonalitic rock units of Bayly Lake Complex. The composition is mainly dunitic, but ranges to peridotitic. Serpentine-coated shear zones and slickensides, particularly in the metaperidotites near the east shore of Lynx Bay, indicate that the ultramafic bodies were affected by northeast-trending left-lateral shearing (see Structure). The ultramafic rocks, however, also display an older, east-trending foliation which is conformable with the structural trend of the Hayes River Group.

It is unclear whether the ultramafic rocks in Lynx Bay are part of the Hayes River Group or are younger. It is conceivable that the Lynx Bay ultramafics and the High Rock Island peridotite are part of a single ultramafic body, which was segmented by left-lateral fault movements.

PREVIOUS EXPLORATION

MAPPING

Most Detailed Mapping 1:50,000 Carghill Island, 53L/13, Map GR83-1-5;
Sketch Map Figure# No
Regional Mapping 1:250,000 Bedrock Geology Compilation Map Series, Oxford House, NST 53L, 1987;
Type Section Figure# No

GEOCHEMISTRY

Geochemistry none
PGE Analyses Numbers 1.1026

Selected Bibliography

Barry, G.S., 1960: Geology of the Western Oxford Lake-Carghill Island Area; Man. Mines Br., Pub. 59-2, p. 17.

Hubregtse, J.J.M.W., 1985: Geology of the Oxford Lake-Carrot River area; Manitoba Energy and Mines, Geological Report 83-1A, p. 8.

Scoates, R.F.J. 1971: Ultramafic rocks project; Manitoba Department of Mines, Resources and Environmental Management, Mines Branch, Summary of Geological Field Work, 1971, Geological Paper 6/71, p. 54.

UTM	Location and Access	SIZE
Easting 670800 Northing 5970650 Zone 14	Accessibility Fixed-wing Locality 1 Superior Province - Island Lake Domain Locality 2 Ponask River Sill	Area (km2) Maximum Dimensions

AGE DATA

CLASSIFICATION

Intrusion Type	Sill
General Classification	Ultramafic

GEOLOGY

Synoptic Geology

Refers to several occurrences of ultramafic rocks reported in Theyer (1980). Regional geology is described by Ermanovics (1973).

PREVIOUS EXPLORATION

MAPPING

Sketch Map Figure#	Yes
Regional Mapping	ER 79-2-4F
Type Section Figure#	No

GEOCHEMISTRY

Geochemistry	none
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Selected Bibliography

Theyer, P., 1980: Stratigraphic setting of selected ultramafic bodies in the Superior and Churchill provinces and certain aspects of nickel copper deposits in the Thompson nickel belt; Economic Geology Report (Winnipeg) (ER79-2), p. 17, 53.
Ermanovics, I.F. 1973: Precambrian geology of the Norway House and Grand Rapids map-area; Geological Survey of Canada, Paper 72-29, 27p.

Name of Intrusion	Clangula Lake 1	Ref ID.	60
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UTM	Location and Access	SIZE
Easting 692300	Accessibility Boat	Area (km2)
Northing 5672000	Locality 1 Superior Province - southeastern Manitoba	Maximum Dimensions 100m x 100 m
Zone 14	Locality 2 Rice Lake Belt	

AGE DATA

Age	Archean
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CLASSIFICATION

GEOLOGY

Principal Rock Types	serpentinized ultramafic
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PREVIOUS EXPLORATION

Assessment Files	C.A.F. 91226;
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MAPPING

Most Detailed Mapping	Davies (1951)
Sketch Map Figure#	No
Regional Mapping	Davies (1951)
Type Section Figure#	No

GEOCHEMISTRY

Geochemistry	none
PGE Analyses Numbers	1.023 to 1.075

Selected Bibliography

Davies, J.F., 1951: Geology of the Manigotagan-Rice River Area, Rice Lake Mining Division, Manitoba; Man. Mines Br., Pub. 50-2.

Wright, J.F., 1932c: Geology and Mineral Deposits, Southeastern Manitoba; GSC, Mem. 169.

UTM	Location and Access	SIZE
Easting 691500 Northing 5672500 Zone 14	Accessibility Boat Locality 1 Superior Province - southeastern Manitoba Locality 2 Rice Lake Belt	Area (km2) Maximum Dimensions 150 m x 150 m

AGE DATA
Age Archean

CLASSIFICATION
Intrusion Type Plug Geochemical Classification Unknown General Classification Ultramafic Other Classification Greenstone belt

GEOLOGY
Principal Rock Types peridotite Host Rocks Amphibolite, pyroxenite Layering Features Unknown

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

McRitchie, W.D., 1971: The petrology and environment of the acidic plutonic rocks of the Wanipigow-Winnipeg Rivers region, SE Manitoba; in Geology and Geophysics of the Rice Lake Region Southeastern Manitoba.

Davies, J.F., 1951: Geology of the Manigotagan-Rice River Area, Rice Lake Mining Division, Manitoba; Man. Mines Br., Pub. 50-2.

UTM	Location and Access	SIZE
Easting 702350 Northing 5672300 Zone 14	Accessibility All-weather road Locality 1 Superior Province - southeastern Manitoba Locality 2 Rice Lake Belt	Area (km2) Maximum Dimensions 200 m x 150 m

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Plug
General Classification Ultramafic
Other Classification Greenstone belt

GEOLOGY

Principal Rock Types serpentized peridotite
Host Rocks Hornblende plagioclase gneiss
Layering Features Unknown
Metamorphic Grade Greenschist facies

Synoptic Geology

This serpentized peridotite plug is part of a chain of ultramafic plugs stretching from Lake Winnipeg to north of western Wanipigow Lake.

PREVIOUS EXPLORATION

Assessment Files C.A.F. 91224

Mineral Occurrences

Minor amounts of disseminated pyrite in peridotite.

Exploration History

The Newmont Mining Company drilled in 1962 a 267 m long hole intersecting hornblende plagioclase gneiss and peridotite.

MAPPING

Most Detailed Mapping Russell (1948)
Sketch Map Figure# No
Regional Mapping Russell (1948)
Type Section Figure# No

GEOCHEMISTRY

Geochemistry none

Selected Bibliography

Davies, J.F., 1951: Geology of the Manigotagan-Rice River Area, Rice Lake Mining Division, Manitoba; Man. Mines Br., Pub. 50-2.
 Karup Moller (1958)

UTM	Location and Access	SIZE
Easting 700000	Accessibility All-weather road	Area (km2)
Northing 5669500	Locality 1 Superior Province - southeastern Manitoba	Maximum Dimensions 200 m x 150 m
Zone 14	Locality 2 Rice Lake Belt	

AGE DATA
Age Archean

CLASSIFICATION
Intrusion Type Plug
General Classification Ultramafic
Other Classification Greenstone belt

GEOLOGY
Principal Rock Types peridotite
Host Rocks diorite
Layering Features Unknown

PREVIOUS EXPLORATION

MAPPING
Most Detailed Mapping Russell (1948)
Regional Mapping Russell (1948)

GEOCHEMISTRY

Selected Bibliography

Russell, G.A., 1948: Geology of the Wallace Lake Area, Rice Lake Mining Division; Man. Mines Br., Prel. Rept. 48-3.

UTM	Location and Access	SIZE
Easting 697800 Northing 5670000 Zone 14	Accessibility All-weather road Locality 1 Superior Province - southeastern Manitoba Locality 2 Rice Lake Belt	Area (km2) Maximum Dimensions

AGE DATA
Age Archean

CLASSIFICATION
Intrusion Type Sill Geochemical Classification Unknown General Classification Ultramafic Other Classification Greenstone belt

GEOLOGY
Principal Rock Types serpentinized pyroxenite

PREVIOUS EXPLORATION
Mineral Occurrences none Exploration History none

MAPPING
Most Detailed Mapping Russell (1948) Sketch Map Figure# No Regional Mapping Russell (1948) Type Section Figure# No

GEOCHEMISTRY

Selected Bibliography

Russell, G.A., 1948: Geology of the Wallace Lake Area, Rice Lake Mining Division; Man. Mines Br., Prel. Rept. 48-3.

UTM	Location and Access	SIZE
Easting 695500	Accessibility Boat	Area (km2)
Northing 5670500	Locality 1 Superior Province - southeastern Manitoba	Maximum Dimensions
Zone 14	Locality 2 Rice Lake Belt	

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types serpentized ultrabasic

PREVIOUS EXPLORATION

Assessment Files C.A.F. 91222

MAPPING

GEOCHEMISTRY

UTM	Location and Access	SIZE
Easting 703800	Accessibility All-terrain vehicles/snowmobile	Area (km2)
Northing 5676300	Locality 1 Superior Province - southeastern Manitoba	Maximum Dimensions unknown (drill hole intersection)
Zone 14	Locality 2 Rice Lake Belt	

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Unknown
 Geochemical Classification Unknown
 General Classification Ultramafic
 Other Classification Greenstone belt

GEOLOGY

Principal Rock Types serpentized peridotite
 Host Rocks Gneiss and greenstones
 Layering Features Unknown
 Igneous Textures none reported

PREVIOUS EXPLORATION

Assessment Files C.A.F. 91221

Mineral Occurrences

Ni

MAPPING

Most Detailed Mapping Russell (1949)
 Sketch Map Figure# No
 Regional Mapping Russell (1949)
 Type Section Figure# No

GEOCHEMISTRY

Geochemistry none

Recommendations

Traces of millerite reported in an approximately 75 m long drillhole intersection of serpentized peridotite. Drillhole collared on English Lake, no outcrops of ultramafic rocks were observed on the shore. Not an attractive target for the exploration of PGE.

Selected Bibliography

Russell, G.A. 1949: Geology of the English Brook Area; Manitoba Department of Mines and Natural Resources, Mines Branch, 22 p.

UTM	Location and Access	SIZE
Easting 670050	Accessibility Boat	Area (km2)
Northing 5696500	Locality 1	Maximum Dimensions
Zone 14	Locality 2	

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types altered fractured peridotite

PREVIOUS EXPLORATION

Mineral Occurrences
Ni

MAPPING

GEOCHEMISTRY

Name of Intrusion	Saxton Lake1	Ref ID.	68
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UTM	Location and Access	SIZE
Easting 302500	Locality 1 Locality 2	Area (km2)
Northing 5664000		Maximum Dimensions
Zone 15		

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types	serpentinized ultramafic lense
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PREVIOUS EXPLORATION

Assessment Files	not yet reviewed
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MAPPING

GEOCHEMISTRY

Selected Bibliography

Davies, J.F., 1949: Geology of the Wanipigow Lake Area, Rice Lake Division, Manitoba; Man. Mines Br., Prel. Rept. 48-2.
Scoates, R.F.J. 1971: Ultramafic rocks of the Rice Lake greenstone belt; in Geology and Geolphysics of the Rice Lake Region
Southeastern Manitoba (Project Pioneer), Man. Mines Br., Pub. 71-1, Rept. 7, pp. 189-201.

UTM Easting 301800 Northing 5664500 Zone 15	Location and Access Locality 1 Locality 2	SIZE Area (km2) Maximum Dimensions
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AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types serpentinitized ultramafic lense

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Davies, J.F., 1949: Geology of the Wanipigow Lake Area, Rice Lake Division, Manitoba; Man. Mines Br., Prel. Rept. 48-2.
Scoates, R.F.J. 1971: Ultramafic rocks of the Rice Lake greenstone belt; in Geology and Geolphysics of the Rice Lake Region Southeastern Manitoba (Project Pioneer), Man. Mines Br., Pub. 71-1, Rept. 7, pp. 189-201.

UTM Easting 298500 Northing 5665500 Zone 15	Location and Access Locality 1 Locality 2	SIZE Area (km2) Maximum Dimensions
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AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types serpentinitized ultramafic lense

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Davies, J.F., 1949: Geology of the Wanipigow Lake Area, Rice Lake Division, Manitoba; Man. Mines Br., Prel. Rept. 48-2.
Scoates, R.F.J. 1971: Ultramafic rocks of the Rice Lake greenstone belt; in Geology and Geolphysics of the Rice Lake Region Southeastern Manitoba (Project Pioneer), Man. Mines Br., Pub. 71-1, Rept. 7, pp. 189-201.

UTM	Location and Access	SIZE
Easting 337000	Accessibility All-weather road	Area (km2)
Northing 5654800	Locality 1 Superior Province - southeastern Manitoba	Maximum Dimensions
Zone 15	Locality 2 Rice Lake Belt	

AGE DATA

Age Archean

CLASSIFICATION

GEOLOGY

Principal Rock Types serpentized ultramafic lense

PREVIOUS EXPLORATION

Assessment Files not yet reviewed

MAPPING

GEOCHEMISTRY

Selected Bibliography

Scoates, R.F.J., 1968: Mafic and ultramafic rocks of the Bissett area; in Summary of Geological Fieldwork, 1968; Man. Mines Br., Geol. Paper 3/68, p. 14-17.

UTM	Location and Access	SIZE
Easting 690000	Accessibility Boat	Area (km2)
Northing 5675000	Locality 1 Superior Province - southeastern Manitoba	Maximum Dimensions
Zone 14	Locality 2 Rice Lake Belt	

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types serpentine schist

PREVIOUS EXPLORATION

Assessment Files 91233, 91242, 91086

Mineral Occurrences

Ni

MAPPING

GEOCHEMISTRY

Selected Bibliography

Ermanovics (1969);
Scoates, R.F.J., 1969a: Ultramafic Rocks of Manitoba; Man. Mines Br., Prel. Map No. 1969A.
Scoates, R.F.J., 1969b: Ultramafic Project; in Summary of Geological Fieldwork, 1969; Man. Mines Br., Geol. Paper 4/69, p. 90-101.
McRitchie and Weber (1971);

UTM	Location and Access	SIZE
Easting 708100	Accessibility Boat	Area (km2)
Northing 5674500	Locality 1 Superior Province - southeastern Manitoba	Maximum Dimensions
Zone 14	Locality 2 Rice Lake Belt	

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types serpentized pyroxenite

PREVIOUS EXPLORATION

Assessment Files 91214

MAPPING

GEOCHEMISTRY

<div>UTM</div> <div><div>Easting</div><div>708000</div></div> <div><div>Northing</div><div>5668900</div></div> <div><div>Zone</div><div>14</div></div>	<div>Location and Access</div> <div><div>Accessibility</div><div>All-weather road</div></div> <div><div>Locality 1</div><div>Superior Province - southeastern Manitoba</div></div> <div><div>Locality 2</div><div>Rice Lake Belt</div></div>	<div>SIZE</div> <div><div>Area (km2)</div></div> <div><div>Maximum Dimensions</div></div>
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AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types

serpentinized pyroxenite

PREVIOUS EXPLORATION

Assessment Files

91214

MAPPING

GEOCHEMISTRY

<div>UTM</div> <div><div>Easting</div><div>707850</div><div>Northing</div><div>5674500</div><div>Zone</div><div>14</div></div>	<div>Location and Access</div> <div><div>Accessibility</div><div>Boat</div><div>Locality 1</div><div>Superior Province - southeastern Manitoba</div><div>Locality 2</div><div>Rice Lake Belt</div></div>	<div>SIZE</div> <div><div>Area (km2)</div><div>Maximum Dimensions</div></div>
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AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types

serpentinized pyroxenite

PREVIOUS EXPLORATION

Assessment Files

91215

Mineral Occurrences

Ni

MAPPING

GEOCHEMISTRY

UTM	Location and Access	SIZE
Easting 705500	Accessibility All-weather road	Area (km2)
Northing 5668000	Locality 1 Superior Province - southeastern Manitoba	Maximum Dimensions
Zone 14	Locality 2 Rice Lake Belt	

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types serpentinitized pyroxenite

PREVIOUS EXPLORATION

Assessment Files 91216, 91218, 91219

MAPPING

GEOCHEMISTRY

UTM	Location and Access	SIZE
Easting 294000	Accessibility All-weather road	Area (km2)
Northing 5666000	Locality 1 Superior Province - southeastern Manitoba	Maximum Dimensions
Zone 15	Locality 2 Rice Lake Belt	

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types serpentinitized ultramafic lens

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Davies, J.F., 1949: Geology of the Wanipigow Lake Area, Rice Lake Division, Manitoba; Man. Mines Br., Prel. Rept. 48-2.
Scoates, R.F.J., 1971d: Ultramafic rocks of the Rice Lake greenstone belt; in Geology and Geophysics of the Rice Lake Region Southeastern Manitoba (Project Pioneer), Man. Mines Br., Pub. 71-1, Rept. 7, pp. 189-201.

Name of Intrusion	Clangula Lake (Wanipigow River)	Ref ID.	78
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UTM	Location and Access	SIZE
Easting 691000 Northing 5671500 Zone 14	Accessibility Boat Locality 1 Superior Province - southeastern Manitoba Locality 2 Rice Lake Belt	Area (km2) Maximum Dimensions 150 m x 50 m

AGE DATA	
Age	Archean

CLASSIFICATION	
Intrusion Type	Plug
Geochemical Classification	Unknown
General Classification	Ultramafic
Other Classification	Greenstone belt

GEOLOGY	
Principal Rock Types	peridotite
Host Rocks	Amphibolite, quartz diorite
Layering Features	Unknown

PREVIOUS EXPLORATION	
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MAPPING	
Most Detailed Mapping	Davies (1951)
Regional Mapping	Davies (1951)

GEOCHEMISTRY	
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Selected Bibliography

Davies, J.F., 1951: Geology of the Manigotagan-Rice River Area, Rice Lake Mining Division, Manitoba; Man. Mines Br., Pub. 50-2.

UTM	Location and Access	SIZE
Easting 347700	Locality 1 Superior Province - southeastern Manitoba	Area (km2)
Northing 5650000	Locality 2 Rice Lake Belt	Maximum Dimensions
Zone 15		

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types hornblendite

PREVIOUS EXPLORATION

Assessment Files not yet reviewed

MAPPING

GEOCHEMISTRY

Selected Bibliography

McRitchie, W.D. 1971: The petrology and environment of the acidic plutonic rocks of the Wanipigow-Winnipeg Rivers region, southeastern Manitoba; in Geology and Geophysics of the Rice Lake Region, Southeastern Manitoba (Project Pioneer), Manitoba Mines Branch Publication 71-1, Report

UTM	Location and Access	SIZE
Easting 342500	Accessibility All-weather road	Area (km2)
Northing 5512000	Locality 1 Superior Province - southeastern Manitoba	Maximum Dimensions
Zone 15	Locality 2 Falcon Lake - West Hawk Lake area	

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types peridotite

PREVIOUS EXPLORATION

Assessment Files Not yet reviewed; 91071

Mineral Occurrences

Ni, Fe

MAPPING

GEOCHEMISTRY

UTM	Location and Access	SIZE
Easting 338800	Accessibility All-weather road	Area (km2)
Northing 5518300	Locality 1 Superior Province - southeastern Manitoba	Maximum Dimensions
Zone 15	Locality 2 Falcon Lake - West Hawk Lake area	

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types hypersthene - pyroxenite

PREVIOUS EXPLORATION

Assessment Files not yet reviewed

MAPPING

GEOCHEMISTRY

Selected Bibliography

Springer 1952

UTM	Location and Access	SIZE
Easting 383000	Accessibility Fixed-wing	Area (km2)
Northing 6048000	Locality 1 Superior Province - Gods Lake Domain	Maximum Dimensions from 4.1m to 10.8m long in drill core
Zone 15	Locality 2 Munro Lake Greenstone Belt	

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Unknown
 Geochemical Classification Unknown
 General Classification Ultramafic
 Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Peridotite
 Host Rocks directly in contact with a diorite which is interbanded with iron formation, talc, and chlorite schist surrounded by amphibolite schist and granodiorite.
 Layering Features Unknown
 Metamorphic Grade Amphibolite facies

PREVIOUS EXPLORATION

Geophysical Surveys Airborne magnetic and EM
 Assessment Files 91178, 93683

Exploration History

In 1961, Canadian Nickel Company Ltd. (AF 91178) completed two holes (Hole No. 20756 and 20757) in the north Vermilyea Lake area on Chubb 5 and Chub 14 claims, respectively. Hole 20756 encountered 34.2 feet long peridotite from 271.8 to 306.0 feet interval. Hole 20757 encountered 35.5 and 13.5 feet long peridotite from 553.5 to 589.0 and from 599.9 to 613.0 feet intervals, respectively. The peridotite is directly in contact with a diorite which is interbanded with iron formation and talc-chlorite schists. The assays are not available in the assessment file.

In 1977, Manitoba Mineral Resources Ltd. (AF 93683) conducted an airborne EM survey in the area with 1320 feet spacing of the flight lines. The area displays a poor EM response but does have good magnetic association. The latter is probably due to ultramafic rocks.

MAPPING

Regional Mapping 1:250,000 Bedrock Geology Compilation Map Series, Oxford House, NST 53L, 1987; 1:50,000 Vermilyea Lake, 53L/10, Map GR83-1-12;

GEOCHEMISTRY

Selected Bibliography

Theyer, P., 1980: Stratigraphic setting of selected ultramafic bodies in the Superior and Churchill provinces and certain aspects of nickel copper deposits in the Thompson nickel belt; Economic Geology Report (Winnipeg) (ER79-2), p. 53.

UTM

Easting 294500
Northing 5483500
Zone 15

Location and Access

Accessibility Winter road
Locality 1 Superior Province - southeastern Manitoba
Locality 2 Falcon Lake - West Hawk Lake area

SIZE

Area (km2)
Maximum Dimensions 566 feet long in drill core

AGE DATA

Age not known

CLASSIFICATION

Intrusion Type Unknown
Geochemical Classification Unknown
General Classification Ultramafic
Other Classification Unknown

GEOLOGY

Principal Rock Types serpentized peridotite and serpentized peridotite-pyroxenite
Host Rocks Mafic to felsic volcanics and sedimentary rocks
Layering Features Unknown

PREVIOUS EXPLORATION

Geophysical Surveys Ground EM
Assessment Files 93480, 91069, 93378

Mineral Occurrences

In 1962, Selco Exploration (AF 91069, 93480) drilled Spike-1 encountered 566 ft. serpentized peridotite and serpentized peridotite-pyroxenite in the hole on Spike 8 claim.

In 1984, MMR-File Explorco Ltd. Joint venture (AF 93378) completed ground EM on six separate grids, and drilled eight holes in the area. Hole 49A-2 encountered 11m ultramafic rock and it contains minor pyrite. The drill core samples were analyzed for Cu, Zn, Ag and Au.

MAPPING**GEOCHEMISTRY**

UTM	Location and Access	SIZE
Easting 501092 Northing 6202403 Zone 14	Accessibility Fixed-wing Locality 1 Trans-Hudson Orogen - Kisseynew Domain Locality 2	Area (km2) Maximum Dimensions

AGE DATA

Age not known

CLASSIFICATION

General Classification Ultramafic

GEOLOGY

Principal Rock Types Serpentinized Peridotite and pyroxenite

PREVIOUS EXPLORATION

Assessment Files Not reviewed

Mineral Occurrences

Ni ? UM body centred under Osik Lake.
 Um float, geochemical and geophysical signature for hidden UM body.

Exploration History

Discovered by DiLabio & Kaszycki in 1988. DiLabio and Kaszychi postulated the presence of two ultramafic units under the lake surface to explain the anomaly in the vicinity of the magnetic high. High nickel levels in the UM rocks in this study prompted follow-up by Cominco. Canfor Mines, Sherit Gordon Ltd., Cominco, 1994-95. All previous assessment work was carried out to the east and west of the lake.
 More recent drilling by Canmine Resources.

MAPPING

Sketch Map Figure# No
Regional Mapping GSC Map 7025G; Man Min Res. Maps 78-3-13, -14
Type Section Figure# No

GEOCHEMISTRY

Geochemical Features and PGE Abundances

The ultramafic rocks have high MgO (21-37% hydrous) and low Ni contents compared to TNB and low S contents (100-400 ppm). Pelitic gneisses in the area are sulphide-rich.

UTM	Location and Access	SIZE
Easting 411000 Northing 6058729 Zone 14	Accessibility Boat Locality 1 Trans-Hudson Orogen - Flin Flon-Snow Lake Domain Locality 2 Flin Flon Belt	Area (km2) 10 Maximum Dimensions 4.5-5.0 x 2.5-3.0 km

AGE DATA

Age Proterozoic

CLASSIFICATION

Intrusion Type Stock
General Classification Mafic-Ultramafic
Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Gabbro, pyroxenite, troctolite, quartz gabbro, anorthosite
Host Rocks Granodiorite and mafic metavolcanic rocks
Layering Features Local modal layering
Other Igneous Features Agmatitic contact zones, local mafic pegmatite veins/pods
Deformation syntectonic

Synoptic Geology

See Young and Ayers (1984). A multiphase differentiated gabbroic intrusion with locally well-developed modal layering. Multiple periods of magma emplacement into the chamber are recorded by local autobreccia zones.

PREVIOUS EXPLORATION

Assessment Files Not reviewed

Mineral Occurrences

Disseminated to local massive Cu-Fe-Ni sulphide mineralization.
 Sulphides may be related to volcanic rock xenoliths.

Exploration History

Not reviewed

MAPPING

Most Detailed Mapping See Young and Ayers (1984)
Sketch Map Figure# Yes
Regional Mapping G.S.C. Map 906A
Type Section Figure# No

GEOCHEMISTRY

Selected Bibliography

Young, J., Ayres, L.D. 1984: Character of mafic-ultramafic rocks in the Flin Flon - Snow Lake area, Manitoba; Progress Report.
 Harrison, J.M. 1949: Geology and mineral deposits of the File-Tramping lakes area, Manitoba; Geological Survey of Canada. Memoir 250, inc. Map 906A.
 Stanton, M.S. 1949: Tramping Lake, Manitoba; Geological Survey of Canada. Map 906A.

UTM	Location and Access	SIZE
Easting 427736	Accessibility All-weather road	Area (km2) 15
Northing 6076610	Locality 1 Trans-Hudson Orogen - Flin Flon-Snow Lake Domain	Maximum Dimensions 10 x 1.5 km
Zone 14	Locality 2	

AGE DATA

Age Proterozoic

CLASSIFICATION

Intrusion Type Plug

General Classification Mafic-Ultramafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Peridotite to gabbro-diorite pluton with concordant anorthosite pods

Host Rocks Metavolcanics of the Flin Flon - Snow Lake Belt

Layering Features Local modal layering

Synoptic Geology

See Williams (1966) and Ayers and Young (1989). Teardrop shaped outcrop pattern. Concentrically zoned body with outer peridotite zone enclosing increasingly more mafic towards to centre of the intrusion. Local rhythmic modal layering.

PREVIOUS EXPLORATION

Assessment Files Not reviewed

Mineral Occurrences

Unmineralized pluton cuts off VMS deposit.

Exploration History

Exploration has focussed on adjacent VMS deposits (Chisel Lake Mine).

MAPPING

Most Detailed Mapping Williams (1966)

Sketch Map Figure# Yes

Regional Mapping 1:250,000 scale (Bedrock Geology of Manitoba Compilation Map Series, NTS 63K)

Type Section Figure# Yes

GEOCHEMISTRY

Geochemistry Whole-rock Geochemistry, including REE and PGE Analyses

PGE Analyses Numbers 1.0172, 1.1425

Whole-rock Analyses Numbers 2.169, 2.833

Selected Bibliography

Ayres, L.D., Young, J., 1989: Characterization of mafic-ultramafic intrusive rocks in the Flin Flon-Snow Lake area, Manitoba; in Investigations by the Geological Survey of Canada in Manitoba and Saskatchewan during the 1984-1989 Mineral Development Agreements, , ed(s). A.G. Galley; Geological Survey of Canada, Open File 2133, p. 64-68.

Young, J., Ayres, L.D. 1984: Character of mafic-ultramafic rocks in the Flin Flon - Snow Lake area, Manitoba; Progress Report.

Harrison, J.M. 1949: Geology and mineral deposits of the File-Tramping lakes area, Manitoba; Geological Survey of Canada. Memoir 250, inc. Map 906A.

Williams, H. 1966: Geology and mineral deposits of the Chisel Lake Map area, Manitoba; Geological Survey of Canada. Memoir 342.

UTM	Location and Access	SIZE
Easting 400028 Northing 6055279 Zone 14	Accessibility All-weather road Locality 1 Trans-Hudson Orogen - Flin Flon-Snow Lake Domain Locality 2 Flin Flon Belt	Area (km2) 40 Maximum Dimensions 10 km x 4 km

AGE DATA

Age	Proterozoic
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CLASSIFICATION

Intrusion Type	Sill
General Classification	Mafic

GEOLOGY

Principal Rock Types	Gabbro, pyroxenite, leucogabbro, anorthosite, peridotite and tonalite
Host Rocks	Mafic metavolcanic
Layering Features	Local modal layering
Igneous Textures	Autobreccia
Other Igneous Features	Steeply dipping, west-facing sill
Deformation	Pre-tectonic, subvolcanic

Synoptic Geology
 See Williamson (1995) for details. Subdivided into a Lower (melagabbro and pyroxenite), Middle (melagabbro to anorthosite) and Upper (quartz-bearing pyroxenite to gabbro) zones (Williamson, 1995).

PREVIOUS EXPLORATION

Assessment Files	Not reviewed.
Mineral Occurrences	Not reviewed.
Exploration History	Not reviewed.

MAPPING

Most Detailed Mapping	See Williamson (1995)
Sketch Map Figure#	Yes
Regional Mapping	1:250 000 scale (NTS 63K; Bedrock Geology of Manitoba Compilation Series Map)
Type Section Figure#	No

GEOCHEMISTRY

Geochemistry	Whole-rock Geochemistry, including REE and PGE Analyses
PGE Analyses Numbers	1.1107 to 1.1299
Whole-rock Analyses Numbers	2.598 to 2.790

Recommendations
 Local anomalously high PGE contents were recognized by Williamson (1995) and may indicate a favourable magmatic environment in the Reed Lake intrusion for concentrating PGE.

Selected Bibliography
 Young, J., Ayres, L.D. 1984: Character of mafic-ultramafic rocks in the Flin Flon - Snow Lake area, Manitoba; Progress Report.
 Harrison, J.M. 1949: Geology and mineral deposits of the File-Tramping lakes area, Manitoba; Geological Survey of Canada.

Memoir 250, inc. Map 906A.

Rousell, D.H. 1970: Geology of the Iskwassum Lake area (east half), Manitoba; Manitoba Mines Br., Publication 66-3.

Williamson, B.L. 1993: Petrologic studies of the Reed Lake Gabbro and Claw Lake Gabbroic Complex; Manitoba Energy and Mines, Geological Services, Report of activities 1993, p. 119.

Williamson, B.L., Eckstrand, O.R. 1995: A Summary of new contributions in the Reed Lake Mafic Complex; Manitoba Energy and Mines, Geological Services, Report of activities 1995, p. 61-70.

UTM	Location and Access	SIZE
Easting 330796 Northing 6077354 Zone 14	Accessibility All-weather road Locality 1 Trans-Hudson Orogen - Flin Flon-Snow Lake Domain Locality 2 Flin Flon Belt	Area (km2) Maximum Dimensions 15 km long x 1.2 km thick

AGE DATA

CLASSIFICATION

Intrusion Type Sill

GEOLOGY

Principal Rock Types Multiphase gb, qz diorite, tonalite sill.
Host Rocks metavolcanics
Layering Features Local modal layering
Igneous Textures Local country rock inclusions and gabbro pegmatite veins and pods
Other Igneous Features Steeply dipping, east-facing lenticular sill
Deformation prefolding

Synoptic Geology

See Bailes and Syme (1989). Suddivided into a gabbronorite zone, a gabbro zone, an oikocrystic (poikilitic) gabbronorite zone, a transition gabbro unit, a gabbro pegmatite unit, a ferrogabbro zone, a quartz ferrodiorite/ferrotonalite zone and a leucotonalite zone. Total thickness is approx. 1.25 km (maximum exposed).

PREVIOUS EXPLORATION

Assessment Files Not reviewed

Mineral Occurrences

Not reviewed

Exploration History

Not reviewed

MAPPING

Most Detailed Mapping 1:20 000 scale (Bailes and Syme, 1989).
Sketch Map Figure# Yes
Regional Mapping 1:250 000 scale (Bedrock Geology of Manitoba Compilation Map Series, NTS 63K)
Type Section Figure# Yes

GEOCHEMISTRY

Geochemistry Whole-rock Geochemistry, including REE and PGE Analyses
PGE Analyses Numbers 1.1003 to 1.1025
Whole-rock Analyses Numbers 2.510 to 2.551

Geochemical Features and PGE Abundances

See Tables 1 and 2 and Bailes and Syme (1989)

Recommendations

One of the largest, well-preserved mafic intrusions in the Flin Flon region. Exploration of the transition zone and associated pegmatitic gabbro and ferroan mafic rocks for deuteritic and/or oxide-related PGE mineralization should be undertaken.

Selected Bibliography

Bailes, A.H., Syme, E.C. 1980: White Lake-Mikanagan Lake project; Manitoba Min. Res. Div., Report of field activities 1979, p. 43-50.

Bailes, A.H., Syme, E.C., 1989: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Services, Geological Report 87-1, 313p.

Bateman, J.D., Harrison, J.M. 1945: Mikanagan Lake, Manitoba; Geological Survey of Canada. Map 832A.

Young, J., Ayres, L.D. 1984: Character of mafic-ultramafic rocks in the Flin Flon - Snow Lake area, Manitoba; Progress Report.

Young, J., Ayers, L.D. 1985: Characterization of mafic-ultramafic rocks in the Flin Flon-Snow Lake area, Manitoba; Dept. of Earth Sciences, University of Manitoba.

UTM	Location and Access	SIZE
Easting 541322 Northing 6122589 Zone 14	Locality 1 Locality 2	Area (km2) Maximum Dimensions

AGE DATA

CLASSIFICATION

General Classification Ultramafic

GEOLOGY

Principal Rock Types UM intrusion at fault junction
Host Rocks migmatite

PREVIOUS EXPLORATION

Mineral Occurrences
Ni-bearing diss po, pn in UM intrusion at junction of two faults along Setting L.-Ospwagan L. fault zone

MAPPING

Regional Mapping G.S.C.prelim. Map 54-13

GEOCHEMISTRY

Selected Bibliography
Canadian Nickel Co. Ltd. Internal report
Noranda MJay Ray Syndicate and W.M. RobertInternal report
Quinn, H.A. 1953: Preliminary map 54-13, Nelson House, Manitoba, sheet 63-O; Geological Survey of Canada.

Name of Intrusion		Kipahigan Lake Plug	Ref ID.	90
UTM		Location and Access		SIZE
Easting	681798			Area (km2) 0.07
Northing	6147793			Maximum Dimensions 105 x 75 m
Zone	14			
AGE DATA				
CLASSIFICATION				
General Classification		Ultramafic		
GEOLOGY				
Principal Rock Types		pyroxenite to wehrlite		
Host Rocks		Nokomis Gp. paragneiss rock		
Deformation		shear zone		
PREVIOUS EXPLORATION				
Mineral Occurrences				
Diss py, cpy, po, violarite, mar				
MAPPING				
Regional Mapping		Man. Mines Br. Map 61-6		
GEOCHEMISTRY				

Selected Bibliography

Netolitzk, R.K. 1967: Geology of the Kipahigan Lake Cu-Ni sulfide deposit, Saskatchewan; M.Sc. thesis, University of Saskatchewan.

Pyke, M.N. 1965: The geology of the Nemei Lake area (east half), Saskatchewan; Saskatchewan Dept. Min. Res., Report 97.

Pollock, G.D. 1964: Geology of the Duval Lake area; Manitoba Mines Br., Publication 61-6, inc. map 61-6.

UTM	Location and Access	SIZE
Easting 322889	Locality 1 Locality 2	Area (km2)
Northing 6277982		Maximum Dimensions
Zone 14		

AGE DATA

CLASSIFICATION

General Classification	Ultramafic
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GEOLOGY

Principal Rock Types	Serp. peridotite to pyroxenite
Host Rocks	metased-metavolcanics

PREVIOUS EXPLORATION

Mineral Occurrences

Diss to ms py, po, cpy, sph, ga

MAPPING

Regional Mapping	Map No. 4, Masn. Mines Br.
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GEOCHEMISTRY

Selected Bibliography

Milligan, G.C. 1952: Geology of the Laurie Lake area; Manitoba Mines Br., Publication 50-7.

Lyon, S.R. 1966: Wide activity spurs Manitoba expansion; Western Miner, v. 39, p. 107.

Milligan, G.C. 1960: Geology of the Lynn Lake District, Granville Lake Mining Division, Manitoba; Manitoba Mines Br., Publication 57-1, inc. Map No. 4 Laurie Lake geology

UTM	Location and Access	SIZE
Easting 375899 Northing 6302724 Zone 14	Accessibility All-weather road Locality 1 Trans-Hudson Orogen - Lynn Lake Domain Locality 2 Lynn Lake Greenstone Belt	Area (km2) Maximum Dimensions 3.6 x 1.5 km

AGE DATA

Age	Proterozoic
Geochronological Data	mineral.- 1705 to 2045 Ma

CLASSIFICATION

Intrusion Type	Plug
General Classification	Mafic
Other Classification	Greenstone belt

GEOLOGY

Principal Rock Types	Gabbro
Host Rocks	Wasekwan Group volcanic-sedimentary
Layering Features	Local modal layering
Other Igneous Features	Pipe-like differentiated intrusion

Synoptic Geology

See Pinsent (1980) for details. See Gilbert et al. (1980) for regional geology. Type location for the "Lynn Lake gabbros". Host of the first nickel mine in Manitoba. This record includes two plug-like mafic-ultramafic intrusions with massive sulphide deposits, the A and EL plugs (Pinsent, 1980). Related to sill-like, more mafic intrusions (e.g., Cartwright Lake) within the Wasekwan Group in the Lynn Lake area.

PREVIOUS EXPLORATION

Mineral Occurrences

Host to the A

MAPPING

Most Detailed Mapping	1:50 000 scale (Gilbert et al., 1980) and plans and sections from mines (Pinsent, 1980).
Sketch Map Figure#	Yes
Regional Mapping	1:250 000 scale (NTS 64C)
Type Section Figure#	Yes

GEOCHEMISTRY

Geochemistry	Base Metal Assay and PGE Analyses
PGE Analyses Numbers	1.0488 to 1.0701

Geochemical Features and PGE Abundances

See Table 1. Relatively PGE-poor massive Ni-Cu sulphides from A and EL plugs.

Selected Bibliography

Allan, J.D. 1950: The Lynn Lake nickel area, Manitoba; Trans. Can. Inst. Min. and Met., v.53, p. 343-348.
 Coats, C.J.A., Quirke, T.T. 1972: Geology and mineral deposits of the Flin Flon, Lynn Lake and Thompson areas, Manitoba, and the Churchill-Superior front of the western Precambrian Shield; International Geol. Congress, 24th
 Gilbert, H.P., Syme, E.C., Zwanzig, H.V., 1980: Geology of the metavolcanic and volcanoclastic metasedimentary rocks in the Lynn Lake area; Manitoba Energy and Mines, Mineral Resources Division, Geological Paper 80-1, 118p.

Hulbert, L.J., 1978: Geology of the Fraser Lake gabbro complex, Manitoba; M.Sc. thesis, University of Regina.
Milligan, G.C., 1960: Geology of the Lynn Lake district; Manitoba Mines and Natural Resources, Mines Branch, Publication 57-1, 317p.
Pinsent, R.H., 1980: Nickel-copper mineralization in the Lynn Lake gabbro; Manitoba Energy and Mines, Mineral Resources Division, Economic Geology Report 79-3.

Turek, A. 1967: Age of sulfide mineralization at Lynn Lake, Manitoba; Canadian Journal of Earth Sciences, v. 4.

UTM	Location and Access	SIZE
Easting 397852 Northing 6281310 Zone 14	Accessibility Fixed-wing Locality 1 Trans-Hudson Orogen - Lynn Lake Domain Locality 2 Lynn Lake Greenstone Belt	Area (km2) Maximum Dimensions

AGE DATA

Age Proterozoic

CLASSIFICATION

Intrusion Type Sill
General Classification Mafic
Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Gabbro
Host Rocks Deformed sill within metavolcanics

Synoptic Geology

Possibly part of the Lynn Lake gabbro suite (Pinsent, 1980; Milligan, 1965). See Syme (1977) and Milligan for local geology.

PREVIOUS EXPLORATION

Assessment Files Not reviewed

Mineral Occurrences

Not reviewed

Exploration History

Not reviewed

MAPPING

Most Detailed Mapping See Syme (1977) and Gilbert et al. (1980)
Sketch Map Figure# No
Regional Mapping 1:250 000 scale (NTS 64C)
Type Section Figure# No

GEOCHEMISTRY

Geochemistry Base Metal Assay and PGE Analyses
PGE Analyses Numbers 1.1306 to 1.1338

Geochemical Features and PGE Abundances

See Table 1

Selected Bibliography

Campbell, F.H.A. 1972: Stratigraphic and structural studies in the Granville Lake-Lynn Lake region; Manitoba Mines Br., Publication 71-2A.
 Gilbert, H.P., Syme, E.C., Zwanzig, H.V., 1980: Geology of the metavolcanic and volcanoclastic metasedimentary rocks in the Lynn Lake area; Manitoba Energy and Mines, Mineral Resources Division, Geological Paper 80-1, 118p.
 Milligan, G.C., 1960: Geology of the Lynn Lake district; Manitoba Mines and Natural Resources, Mines Branch, Publication 57-1, 317p., 16 maps.
 Pinsent, R.H. 1977: The Lynn Lake Ni-Cu deposits; Manitoba Dept. Mines, Resources and Environment, Rpt. of field activities
 Syme, R. 1976: Geology of the southern Lynn Lake greenstone belt; Manitoba Min. Res. Div., Rpt. of field activities.
 Syme, E.C., 1977: Sickle Lake-Hughes Lake area; Manitoba Department of Mines, Resources and Environmental

UTM	Location and Access	SIZE
Easting 644858 Northing 6524743 Zone 14	Locality 1 Locality 2	Area (km2) Maximum Dimensions

AGE DATA

Geochronological Data 2745 and 2636 Ma

CLASSIFICATION

General Classification Mafic

GEOLOGY

Principal Rock Types Diabase dyke
Host Rocks black shale

PREVIOUS EXPLORATION

Mineral Occurrences
Contains up to 0.17% Ni.

MAPPING

GEOCHEMISTRY

Selected Bibliography

Milligan, G.C. 1955: Lower Seal River, Manitoba; Manitoba Mines Br., Summary report.
Schledewitz, D.C.P. 1975: Seal River project; Manitoba Min. Res. Div., Summary of fieldwork 1974.
Gale, G.H. Baldwin, D.A. and Koo, J. 1980: A geological evolution of Precambrian massive sulfide deposits potential in Manitoba; Manitoba Mines Br., Economic Geology Report ER 79-1, map ER 79-1-23.

UTM	Location and Access	SIZE
Easting 371452		Area (km2)
Northing 6534566	Locality 1	Maximum Dimensions
Zone 15	Locality 2	

AGE DATA

Geochronological Data 2745 and 2636 Ma

CLASSIFICATION

GEOLOGY

PREVIOUS EXPLORATION

Mineral Occurrences

Cr and Ba anomalies

MAPPING

GEOCHEMISTRY

Selected Bibliography

Gale, G.H. Baldwin, D.A. and Koo, J. 1980: A geological evolution of Precambrian massive sulfide deposits potential in Manitoba; Manitoba Mines Br., Economic Geology Report ER 79-1, map ER 79-1-23.
NMI Index 2

UTM Easting 372696 Northing 6337940 Zone 14	Location and Access Locality 1 Locality 2	SIZE Area (km2) Maximum Dimensions
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AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types	Gabbro
Host Rocks	biotite schist

PREVIOUS EXPLORATION

Mineral Occurrences
Diss py, po containing up to .11% Ni, .1% Cu

MAPPING

Regional Mapping	G.S.C. Map 1001A
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GEOCHEMISTRY

Selected Bibliography
NMI Index 2
Gadd, N.R. 1950: Geological Survey of Canada. Map 1001A.

Name of Intrusion	Melvin Lake Intrusion	Ref ID.	99
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UTM	Location and Access	SIZE
Easting 423437	Accessibility Fixed-wing	Area (km2) 16
Northing 6331365	Locality 1 Trans-Hudson Orogen - Lynn Lake Domain	Maximum Dimensions 8 km x 2 km
Zone 14	Locality 2 Lynn Lake Greenstone Belt	

AGE DATA

Age Proterozoic

CLASSIFICATION

Intrusion Type Unknown

General Classification Mafic-Ultramafic

Other Classification Unknown

GEOLOGY

Principal Rock Types Gabbronorite, leucogabbronorite, norite, anorthosite and diorite

Host Rocks Migmatitic gneiss (paragneiss) and granitoid rocks

Igneous Textures Local pegmatitic hornblende gabbro units

Other Igneous Features Igneous lamination defined by alignment of plagioclase long axes

Synoptic Geology

See Gilbert (1993). Differentiated, orthopyroxene-rich mafic intrusion.

PREVIOUS EXPLORATION

Assessment Files Not reviewed

Mineral Occurrences

Ni in po in anorthosite.

Exploration History

Limited surface exploration for PGE-Cu-Ni mineralization by Strider Resources Ltd. in 1998/99

MAPPING

Most Detailed Mapping Gilbert (1993)

Regional Mapping 1:250 000 scale (NTS 64C)

GEOCHEMISTRY

Geochemical Features and PGE Abundances

See Gilbert (1993). Local Ti-rich subunits (ilmenite locally present).

Selected Bibliography

Davies, J.F. Bannatyne, B.B., Barry, G.S. and McCabe, H.R. 1962: Geology and mineral resources of Manitoba; Manitoba Mines Br., p. 126.

Hunter, H.E., 1952: Geology of the Melvin Lake area; Manitoba Mines Br., Publication 51-5.

Gilbert, H.P., 1993: Geology of the Barrington Lake-Melvin Lake-Fraser Lake area; Manitoba Energy and Mines, Geological Services, Geological report 87-3, 97p.

Name of Intrusion	Missi Rapid	Ref ID.	100
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UTM Easting 548719 Northing 6350055 Zone 14	Location and Access Locality 1 Locality 2	SIZE Area (km2) Maximum Dimensions
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AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types	Schist?
Host Rocks	Biotite schist

PREVIOUS EXPLORATION

Mineral Occurrences
Disseminated pyrite, pyrrhotite and chalcopyrite with up to 0.05% Cu and 0.17% Ni

MAPPING

GEOCHEMISTRY

Selected Bibliography
Cranstone, J.R. 1972: Geology of the South Indian Lake area, northeastern portion; Manitoba Mines Br., Publication 71-2J.
Quinn, H.A. 1956: Mineral occurrences between Chipewyan and Herb lakes, Manitoba; Precambrian, v. 29, p. 13.

UTM	Location and Access	SIZE
Easting 453081	Locality 1	Area (km2)
Northing 6331726	Locality 2	Maximum Dimensions 2.5 ml x 100 ft
Zone 14		

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types	Granodiorite
Host Rocks	gneiss

PREVIOUS EXPLORATION

Mineral Occurrences
Diss py, po, cpy (Ni, Cu) in gneiss and intrusion

MAPPING

GEOCHEMISTRY

Selected Bibliography

Quinn, H.A. 1956: Mineral occurrences between Chipewyan and Herb lakes, Manitoba; Precambrian, v. 29, p. 13.

Hinds, R.W. 1972: Geology of the Opachanau Lake-Fraser Lake-Lemay Island area; Manitoba Mines Br., Publication 71-2G, p. 39-43.

UTM	Location and Access	SIZE
Easting 411790 Northing 6060662 Zone 14	Locality 1 Locality 2	Area (km2) Maximum Dimensions

AGE DATA

CLASSIFICATION

General Classification Mafic

GEOLOGY

Principal Rock Types Norite, gabbro, qtz gabbro
Host Rocks gneiss and schist

PREVIOUS EXPLORATION

Mineral Occurrences
Diss po, cpy, mar in intrusions; up to .13% Cu, .23% Ni.

MAPPING

GEOCHEMISTRY

Selected Bibliography

Wright, J.F. 1931: Geology and mineral deposits of a part of northwest Manitoba; Geological Survey of Canada, Summ. Rpt. 1930, pp. 74, 101-106.
Harrison, J.M. 1949: Geology and mineral deposits of the File-Tramping lakes area, Manitoba; Geological Survey of Canada. Memoir 250, inc. Map 906A.

Name of Intrusion	Jackpot	Ref ID.	105
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UTM Easting 410944 Northing 6061327 Zone 14	Location and Access Locality 1 Locality 2	SIZE Area (km2) Maximum Dimensions
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AGE DATA

CLASSIFICATION

General Classification	Mafic-Ultramafic
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GEOLOGY

Principal Rock Types	Pyroxenite, gabbro, qtz gabbro, peridotite
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PREVIOUS EXPLORATION

Mineral Occurrences
Diss to ms po, cpy; 1.01% Ni, .32% Cu

MAPPING

GEOCHEMISTRY

Selected Bibliography

Wright, J.F. 1931: Geology and mineral deposits of a part of northwest Manitoba; Geological Survey of Canada, Summ. Rpt. 1930, pp. 74, 101-106.
Harrison, J.M. 1949: Geology and mineral deposits of the File-Tramping lakes area, Manitoba; Geological Survey of Canada. Memoir 250, inc. Map 906A.

Name of Intrusion

Cabin #9

Ref ID.

106

UTM

Easting 413486
Northing 6059423
Zone 14

Location and Access

Locality 1
Locality 2

SIZE

Area (km2)
Maximum Dimensions

AGE DATA

CLASSIFICATION

General Classification

Mafic-Ultramafic

GEOLOGY

Principal Rock Types

Norite, gabbro, qz gabbro, amphibolite

PREVIOUS EXPLORATION

Mineral Occurrences

Diss po with .27% Ni, ~3% sulphides

MAPPING

GEOCHEMISTRY

Selected Bibliography

Dumas, J.K. Cabin claims, NW 9, 63 K; Assessment file. Manitoba Min. Res. Div.

UTM	Location and Access	SIZE
Easting 415820 Northing 6058699 Zone 14	Locality 1 Locality 2	Area (km2) Maximum Dimensions

AGE DATA

CLASSIFICATION

General Classification Mafic

GEOLOGY

Principal Rock Types Gabbro
Host Rocks Granitic to volcanic rocks

PREVIOUS EXPLORATION

Mineral Occurrences
Diss to ms py, cpy, po

MAPPING

GEOCHEMISTRY

Selected Bibliography

Harrison, J.M. 1949: Geology and mineral deposits of the File-Tramping lakes area, Manitoba; Geological Survey of Canada. Memoir 250, inc. Map 906A.
Bailes, A.H. 1979: Preliminary compilation of the geology of the Snow Lake - Flin Flon - Sherridon area; Manitoba Mines Br., Geology Paper 1/71.

UTM	Location and Access	SIZE
Easting 440951	Accessibility Boat	Area (km2)
Northing 6074562	Locality 1 Trans-Hudson Orogen - Flin Flon-Snow Lake Domain	Maximum Dimensions
Zone 14	Locality 2	

AGE DATA

CLASSIFICATION

General Classification Mafic

GEOLOGY

Principal Rock Types Qtz gabbro, porphyritic
Host Rocks metasediments
Deformation Intrusion plunges 45 degrees N along syncline

PREVIOUS EXPLORATION

Mineral Occurrences
Veinlets containing po, cpy, pn.

MAPPING

GEOCHEMISTRY

Selected Bibliography

Wright, J.F. 1931: Geology and mineral deposits of a part of northwest Manitoba; Geological Survey of Canada, Summ. Rpt. 1930, pp. 74, 101-106.
Bell, C.K. 1978: Wekusko Lake map area; Memoir 384, p. 73.
Russell, G.A. 1957: Structural studies of the Snow Lake - Herb Lake area; Manitoba Mines Br., Publication 55-3, p. 27-28.

UTM	Location and Access	SIZE
Easting 455715 Northing 6090869 Zone 14	Locality 1 Locality 2	Area (km2) 7.5 Maximum Dimensions 6.4 X 0.75 km

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types	Qtz gabbro
Host Rocks	granite dykes

PREVIOUS EXPLORATION

Mineral Occurrences
Veinlet & diss po, cpy. Cu+Ni approx. .5-1%

MAPPING

GEOCHEMISTRY

Selected Bibliography

Wright, J.F. 1931: Geology and mineral deposits of a part of northwest Manitoba; Geological Survey of Canada, Summ. Rpt. 1930, pp. 74, 101-106.
Northern Miner; Nov. 15 195p. 25

UTM	Location and Access	SIZE
Easting 442225 Northing 6069476 Zone 14	Accessibility Boat Locality 1 Trans-Hudson Orogen - Flin Flon-Snow Lake Domain Locality 2	Area (km2) Maximum Dimensions

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types	Gabbro
Host Rocks	Andesite of Amisk Group
Deformation	Sheared contact with andesite

PREVIOUS EXPLORATION

Mineral Occurrences

Diss po, py, cpy minor po stringers.

MAPPING

GEOCHEMISTRY

Selected Bibliography

Wright, J.F. 1931: Geology and mineral deposits of a part of northwest Manitoba; Geological Survey of Canada, Summ. Rpt. 1930, pt. 74, p.101-106.

Russell, G.A. 1957: Structural studies of the Snow Lake -Herb Lake area; Manitoba Mines Br., Publication 55-3, p. 27-28.

UTM	Location and Access	SIZE
Easting 503013	Accessibility Fixed-wing	Area (km2)
Northing 6053127	Locality 1	Maximum Dimensions
Zone 14	Locality 2	

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types	Sheared serpentinite
Host Rocks	metavolcano-sedimentary

PREVIOUS EXPLORATION

Mineral Occurrences

Diss po, py, pn, millerite. Amax DDH: up to .16% Ni between 155' and 395'.

MAPPING

GEOCHEMISTRY

Selected Bibliography

Assessment file Reservation 26; Manitoba Ministry of Natural Resources.

UTM	Location and Access	SIZE
Easting 453491	Locality 1	Area (km2)
Northing 6082236	Locality 2	Maximum Dimensions
Zone 14		

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types Gabbro

Deformation pre-folding

PREVIOUS EXPLORATION

Mineral Occurrences

Diss po, cpy

MAPPING

GEOCHEMISTRY

Selected Bibliography

Wright, J.F. 1931: Geology and mineral deposits of a part of northwest Manitoba; Geological Survey of Canada, Summ. Rpt. 1930, pp. 74, 101-106.

Russell, G.A. 1957: Structural studies of the Snow Lake - Herb Lake area; Manitoba Mines Br., Publication 55-3, p. 27-28.

UTM	Location and Access	SIZE
Easting 452663		Area (km2) 7.6
Northing 6081410	Locality 1	Maximum Dimensions 6.4 X 1.2 km
Zone 14	Locality 2	

AGE DATA

CLASSIFICATION

General Classification Mafic

GEOLOGY

Principal Rock Types Qtz gabbro
Host Rocks gneisses

PREVIOUS EXPLORATION

Mineral Occurrences
Ms to diss py, cpy, po. Mineralized zone 300X75 ft.

MAPPING

GEOCHEMISTRY

Selected Bibliography

Wright, J.F. 1931: Geology and mineral deposits of a part of northwest Manitoba; Geological Survey of Canada, Summ. Rpt. 1930, pp. 74, 101-106.

Davies, J.F. Bannatyne, B.B., Barry, G.S. and McCabe, H.R. 1962: Geology and mineral resources of Manitoba; Manitoba Mines Br., p. 126.

Bailes, A.H. 1979: Preliminary compilation of the geology of the Snow Lake - Flin Flon - Sherridon area; Manitoba Mines Br., Geology Paper 1/71.

Bell, C.K. 1978: Wekusko Lake map area; Memoir 384, p. 73.

UTM	Location and Access	SIZE
Easting 318754 Northing 6079215 Zone 14	Accessibility All-weather road Locality 1 Trans-Hudson Orogen - Flin Flon-Snow Lake Domain Locality 2 Flin Flon Belt	Area (km2) Maximum Dimensions 1.5 km x 0.75 km

AGE DATA

Age Proterozoic

CLASSIFICATION

Intrusion Type Unknown
General Classification Mafic
Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Gabbro, quartz diorite; includes small occurrences of serpentinized peridotite and clinopyroxenite in the same area
Host Rocks Metasedimentary rocks of the Flin Flon Belt
Layering Features Massive/modally uniform
Other Igneous Features Rare gabbroic pegmatite pods

Synoptic Geology

See Bailes and Syme (1989)

PREVIOUS EXPLORATION

Assessment Files Not reviewed

Mineral Occurrences

In the spatially associated ultramafic rocks, strong talc-carbonate-serpentine altered contact is associated with disseminated chr, mgt, po.

Exploration History

Not reviewed

MAPPING

Most Detailed Mapping 1:20 000 scale (Bailes and Syme, 1989)
Sketch Map Figure# No
Regional Mapping 1:250 000 scale (Bedrock Geology of Manitoba Compilation Map Series, NTS 63K)
Type Section Figure# No

GEOCHEMISTRY

Geochemistry Whole-rock Geochemistry, including REE and PGE Analyses
PGE Analyses Numbers 1.0226 to 1.0228
Whole-rock Analyses Numbers 2.241 to 2.244

Geochemical Features and PGE Abundances

See Tables 1 and 2

Selected Bibliography

Bailes, A.H., Syme, E.C., 1989: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Services, Geological Report 87-1, 313p.
 Williams, H. 1966: Geology and mineral deposits of the Chisel Lake Map area, Manitoba; Geological Survey of Canada.

Memoir 342.

Russell, G.A. 1957: Structural studies of the Snow Lake - Herb Lake area; Manitoba Mines Br., Publication 55-3, p. 27-28.

Scoates, R.F.J. 1969: Summary of geological fieldwork, ultramafic project; Manitoba Mines Br., Geological Paper 4/69.

Tanton, T.L. 1941: Flin Flon, Saskatchewan and Manitoba; Geological Survey of Canada Map 632A.

UTM	Location and Access	SIZE
Easting 340955 Northing 6048087 Zone 14	Accessibility All-weather road Locality 1 Trans-Hudson Orogen - Flin Flon-Snow Lake Domain Locality 2 Flin Flon Belt	Area (km2) Maximum Dimensions

AGE DATA

Age Proterozoic

CLASSIFICATION

Intrusion Type Unknown
General Classification Mafic-Ultramafic
Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Peridotite, Gabbro
Host Rocks metavolcanic

Synoptic Geology

Poorly exposed mafic and buried ultramafic rocks along the southeastern shoreline of Athapapuskow Lake. See Bailes and Syme for descriptions of mafic intrusions in this part of the Flin Flon Belt.

PREVIOUS EXPLORATION

Mineral Occurrences

not reviewed

Exploration History

not reviewed

MAPPING

Most Detailed Mapping 1:20 000 scale (Bailes and Syme, 1989)
Sketch Map Figure# No
Regional Mapping 1:250 000 scale (Bedrock Geology of Manitoba Compilation Series, NTS 63K)
Type Section Figure# No

GEOCHEMISTRY

PGE Analyses Numbers 1.0216-1.0218;1.1300;1.393-1.1398;1.0482-1.0487;
Whole-rock Analyses Numbers 2.000 to 2.020 and 2.355 to 2.358 + 2.791 to 2.792

Geochemical Features and PGE Abundances

see Tables 1 and 2. Included here are analyses for the Schist Creek gabbro (Table 1, analyses # 1.1300 to 1.1305).

Selected Bibliography

Bailes, A.H., Syme, E.C., 1989: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Services, Geological Report 87-1, 313p.
 Scoates, R.F.J. 1969: Summary of geological fieldwork, ultramafic project; Manitoba Mines Br., Geological Paper 4/69.

UTM	Location and Access	SIZE
Easting 317978	Accessibility All-weather road	Area (km2)
Northing 6067053	Locality 1	Maximum Dimensions
Zone 14	Locality 2	

AGE DATA

CLASSIFICATION

General Classification Mafic

GEOLOGY

Principal Rock Types Gabbro
Host Rocks metavolcanic

PREVIOUS EXPLORATION

Mineral Occurrences
Ms py, po, cpy lenses. Remobilization of cpy evident.

MAPPING

GEOCHEMISTRY

Selected Bibliography

Gale, G.H. Baldwin, D.A. and Koo, J. 1980: A geological evolution of Precambrian massive sulfide deposits potential in Manitoba; Manitoba Mines Br., Economic Geology Report ER 79-1, map ER 79-1-23.
Scoates, R.F.J. 1969: Summary of geological fieldwork, ultramafic project; Manitoba Mines Br., Geological Paper 4/69.
Scoates, R.F.J. 1971: The mineral potential of ultramafic rocks of Manitoba; Manitoba Mines Br., Geological Paper 3/71

UTM	Location and Access	SIZE
Easting 382077 Northing 6050669 Zone 14	Accessibility Boat Locality 1 Trans-Hudson Orogen - Flin Flon-Snow Lake Domain Locality 2 Flin Flon Belt	Area (km2) Maximum Dimensions Approximately 5 km x 300 m

AGE DATA

Age Proterozoic

CLASSIFICATION

Intrusion Type Sill
General Classification Mafic-Ultramafic
Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Peridotite, pyroxenite, gabbro
Host Rocks mafic metavolcanics rocks (McDougalls Point basalt)
Layering Features Modally graded/weakly differentiated

Synoptic Geology

See Ayers and Young (1989) and Syme (1994). A stratiform mafic-ultramafic intrusion. Complex deformation and intense talc-carbonate alteration of ultramafic rocks. Possibly part of a much larger stratiform mafic-ultramafic intrusion (Syme, 1994).

PREVIOUS EXPLORATION

Assessment Files Not reviewed

Mineral Occurrences

Rare sulphides in talcose rock.

Exploration History

Not reviewed

MAPPING

Most Detailed Mapping 1:50 000 scale (GSC, 1983)
Sketch Map Figure# Yes
Regional Mapping 1:250 000 scale (Bedrock Geology of Manitoba Compilation Map Series, NTS 63K)
Type Section Figure# No

GEOCHEMISTRY

Selected Bibliography

Ayres, L.D., Young, J., 1989: Characterization of mafic-ultramafic intrusive rocks in the Flin Flon-Snow Lake area, Manitoba; in Investigations by the Geological Survey of Canada in Manitoba and Saskatchewan during the 1984-1989 Mineral Development Agreements, ed(s). A.G. Galley; Geological Survey of Canada, Open File 2133, p. 64-68.
 Davies, J.F. Bannatyne, B.B., Barry, G.S. and McCabe, H.R. 1962: Geology and mineral resources of Manitoba; Manitoba Mines Br., p. 126.
 Hess, H.H. 1955: Serpentinities, orogeny and epeirogeny in crust of the Earth; Geological Society of America, Special Paper 62, p. 391-408.
 Hunt, G.H. 1970: Geology of the Iskwasum Lake area; Manitoba Mines Br., Publication 65-3.
 Scoates, R.F.J. 1969: Summary of geological fieldwork, ultramafic project; Manitoba Mines Br., Geological Paper 4/69.
 Geological Survey of Canada 1983: Iskwasum Lake, Manitoba; Geological Survey of Canada, Geophysical Series Map,

Map C20341G, Scale 1:50 000.

Syme, E.C., 1994: Supracrustal rocks of the Iskwasum Lake area (NTS 63K/10W); Manitoba Energy and Mines, Geological Services, Report of activities 1994, p. 47-56.

UTM

Easting 841000
Northing 6193000
Zone 14

Location and Access

Accessibility Helicopter
Locality 1 Superior Boundary Zone and Pikwitonei Domain
Locality 2 Fox River Belt

SIZE

Area (km²) 500
Maximum Dimensions 260 x 2 km

AGE DATA

Age Proterozoic
Geochronological Data 1883 +/- 1.5 Ma (Heaman et al., 1986)

CLASSIFICATION

Intrusion Type Sill
Geochemical Classification Komatiitic
General Classification Mafic-Ultramafic
Other Classification Marginal rift basin

GEOLOGY

Principal Rock Types Dunite, peridotite, pyroxenite, gabbro, anorthosite
Host Rocks Middle sedimentary formation, Fox River Belt
Layering Features Megacyclic Units
Igneous Textures Olivine, pyroxene and plagioclase cumulates. Commonly medium- to coarse-grained.
Other Igneous Features Rare pyroxene megacrysts (see Peck et al., 1999).

Synoptic Geology

Scoates (1981, 1990) provides comprehensive geological descriptions of the Fox River Belt, including a 1:50 000 scale map of the western part of the belt and a review of exploration and previous mapping.

The Paleoproterozoic Fox River Belt is a ca. 250 km long and 10 to 15 km wide, east-striking, north-dipping and north-facing supracrustal succession containing both the conformable, ca. 2 km thick Fox River Sill and a series of smaller, stratiform, sill-like ultramafic-mafic intrusions (Lower differentiated intrusions). Across the belt, metamorphic grades increase systematically from prehnite-pumpellyite facies in the north to greenschist facies in the south. No evidence has been found for major folding or faulting. Minor structures observed to date include discontinuous shear and brittle deformation zones that are typically parallel to bedding and flow contacts. To the south, the Fox River Belt is in contact (possibly faulted) with intermediate gneisses and granodiorite, both assumed to be of Archean age and recording at least one episode of amphibolite facies metamorphism. The contact between the Fox River Belt and paragneisses of presumed Proterozoic age that occur to the north is not exposed.

The supracrustal sequence within the Fox River Belt comprises two komatiitic basalt formations (Lower and Upper volcanic formations) and three sedimentary formations (Lower, Middle and Upper sedimentary formations). The Lower and Upper volcanic formations comprise multiple <10 to >30 m thick massive, pillowed and compound flow units that lack significant amounts of interflow sedimentary rocks. Detailed volcanological descriptions of measured sections obtained from both of these formations are given in Scoates (1981) and Syme et al. (1999).

The three sedimentary sequences recognized within the Fox River Belt are poorly exposed and have only rarely been intersected by drilling. Based on limited available data, they appear to comprise abundant, thin-bedded, fine-grained clastic sedimentary rocks (distal marine or lacustrine facies; mudstone, argillite, pyritic argillite and siltstone) and subordinate amounts of chemical sedimentary rocks (starved basin marine or lacustrine facies; sulphide and oxide facies banded iron formation and subordinate dolomitic limestone).

The Lower differentiated intrusions are typically <1 to 20 km long and <500 m thick. They are extremely well differentiated (dunite to anorthosite) stratiform intrusions and were emplaced within the upper part of the Lower sedimentary formation (Fig. GS-12-1).

The Fox River Sill, with an age of 1883 +/- 1.5 Ma (Heaman et al., 1986), was emplaced within a relatively thin metasedimentary sequence (Middle sedimentary formation). It has an average true thickness of ca. 2 km, and has a strike length, based on the interpretation of airborne magnetic data (Scoates, 1990), of >250 km; its third dimension is at least several kilometres. These dimensions show the Fox River Sill to be one of the largest stratiform ultramafic-mafic intrusions on Earth (cf. Scoates, 1990). Gravity data support an interpretation that the sill widens at depth and dips moderately to steeply to the north (Scoates, 1990). The sill comprises four major sub-units, viz. (from base to top): 1) the Marginal Zone, a ca. 300 m thick sequence containing 3 cyclic units having a lower olivine-rich zone, a central pyroxene-rich zone and an upper plagioclase-rich zone; 2) the Lower Central Layered Zone, a ca. 1 km thick sequence comprising multiple, decametre-scale

cyclic units containing a thick dunite-peridotite unit grading into an uppermost clinopyroxene-rich (+/- plagioclase) unit; 3) the Upper Central Layered Zone, a ca. 1 km thick sequence comprising at least 20 cyclic units containing variable proportions olivine and clinopyroxene +/- orthopyroxene +/- plagioclase; 4) The Hybrid Roof Zone, averaging 50 m in thickness and containing a variety of quartz and granophyre-bearing ultramafic to mafic rock types, xenoliths of the overlying Middle sedimentary formation rocks and derivative aplite and granophyre melt inclusions (Scoates, 1990).

PREVIOUS EXPLORATION

Geophysical Surveys	Airborne magnetic/EM and ground magnetic/EM
Assessment Files	93695

Mineral Occurrences

Disseminated pyrrhotite and chalcopyrite mineralization containing up to 5 ppm combined Pd + Pt, 2% Cu and approximately 1% Ni was identified in surface outcrops of the Marginal Zone in the Great Falls outcrop area. This occurrence is described in Peck et al. (1999). , and in drill core from the Fox River sill.

Exploration History

Most of the previous exploration in the belt was conducted by INCO Limited and focused on the potential for large massive Ni sulphide deposits at the base of the Fox River Sill (Thompson-type deposits). The earliest, major exploration was conducted by INCO Limited between the mid 1950s until the mid 1970s, and involved geophysical surveys (ground and airborne magnetic and electromagnetic) and diamond drilling. Also in the 1970s, Falconbridge explored the western end of the Fox River Belt for Ni sulphide deposits (Atkinson Lake area). In the mid- to late-1980s, B.P. Minerals explored for platinum-group elements (PGE) in the Fox River Sill and completed a detailed airborne magnetic survey that covers a large portion of the Fox River Belt. In the early 1990s, Westminer Limited (currently Western Mining International Limited) completed a small drill program that tested coincident magnetic and electromagnetic anomalies in the western part of the Fox River Belt along the contact between the Lower volcanic formation and the Lower sedimentary formation. In 1999, Falconbridge Limited acquired permits covering most of the Fox River sill.

MAPPING

Most Detailed Mapping	Scoates (1990)
Sketch Map Figure#	Yes
Regional Mapping	1:50 000 (Scoates, 1990)
Type Section Figure#	Yes

GEOCHEMISTRY

Geochemistry	Whole-rock Geochemistry, including REE and PGE Analyses
PGE Analyses Numbers	1.0273 to 1.0363
Whole-rock Analyses Numbers	2.272

Geochemical Features and PGE Abundances

See Scoates (1990), Schwann (1989) and Naldrett et al. (1994). Currently there is insufficient, published geochemical data to develop geochemical exploration models for PGE in the Fox River sill. As shown by Schwann (1989) and B.P. Minerals geologists, the lower 600 m of the Upper Central Layered Zone contains anomalously high PGE contents that are associated with local concentrations of Fe-Cu-Ni sulphides. Details of the geochemistry of this mineralization are given in Schwann (1989) and Naldrett et al. (1994). Additional PGE-rich sulphide mineralization was discovered in 1999 in outcrops in the Fox River (Great Falls area) by Falconbridge Limited, Manitoba Geological Survey and Geological Survey of Canada staff (see Peck et al., 1999), including a 20 cm-thick net-textured sulphide band containing up to 5 g/t combined Pd+Pt (Peck et al., 1999).

Recommendations

The Fox River sill is one of the largest mafic-ultramafic intrusions on earth. The enormous size of the complex, coupled with its stratiform, mafic-ultramafic character, limited PGE exploration, favourable geology and known PGE mineralization (e.g., Schwann, 1989; Naldrett et al., 1994; Peck et al., 1999) make it a very prospective, PGE exploration target.

Selected Bibliography

Eckstrand, O.R., Grinenko, L.N., Krouse, H.R., Paktunc, A.D., Schwann, P.L., Scoates, R.F.J., 1989: Preliminary data on sulphur isotopes and Sp/S ratios, and the source of sulphur in magmatic sulphides from the Fox River sill, Molson Dykes, and Thompson nickel deposits, northern Manitoba; Geological Survey of Canada, Current Research, Part C, Paper 89-1C, p. 235-242.

Heaman, L.M., Machado, N., Krogh, T.E., Weber, W., 1986: Precise U-Pb zircon ages for the Molson dyke swarm and the Fox River sill; constraints for early Proterozoic crustal evolution in northeastern Manitoba, Canada; Contributions to Mineralogy

and Petrology, v. 94, no. 1, p. 82-89.

Naldrett, A.J., Asif, M., Scoates, R.F.J., Eckstrand, O.R. and Schwann, P.L., 1994. Platinum-group elements at Fox River sill, Manitoba, Canada. Implications with respect to influxes of fresh magma and exploration for PGE deposits. *Institution of Mining and Metallurgy*, v. 103, p. B10 to B21.

Peck, D.C., Huminicki, M., Wegleitner, C., Theyer, P., Olshefsky, K., Potter, L., Hulbert, L., Scoates, R.F.J. 1999: Lithostratigraphic framework for Platinum-group element-copper-nickel sulphide mineralization in the marginal zone of the Fox River sill (Parts of NTS 53M/16 and 53N/13); Manitoba Industry, Trade and Mines, Geological Services, Report of Activities 1999, p. 46-50.

Schwann, P.L., 1989: Petrography, geochemistry and platinum-group element distribution of part of the upper central layered zone, main layered series, Fox River Sill, northeastern Manitoba; M.Sc. thesis, Carleton University.

Scoates, R.F.J. 1981: Volcanic rocks of the Fox River Belt, northwestern Manitoba; Manitoba Energy and Mines, Mineral Resources Division, Geological Report 81-1, 109p. 1 map @ 1:50 000.

Scoates, R.F.J. 1990: The Fox River sill, northeastern Manitoba - a major stratiform intrusion; Manitoba Energy and Mines, Geological Services, Geological Report 82-3, 192p. 1 map @ 1:50 000.

Syme, E.C., Peck, D.C., Wegleitner, C., 1999: Volcanic stratigraphy of selected sections in the Fox River Belt (Parts of NTS 53M/16 and 53N/13); Manitoba Industry, Trade and Mines, Geological Services, Report of activities 1999, p. 51-60.

Name of Intrusion	Russell Lake	Ref ID.	120
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UTM	Location and Access	SIZE
Easting 344765 Northing 6227230 Zone 14	Locality 1 Locality 2	Area (km2) Maximum Dimensions 500 x 100 m

AGE DATA

CLASSIFICATION

General Classification	Ultramafic
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GEOLOGY

Principal Rock Types	Hornblende peridotite
Host Rocks	Kisseynew paragneiss-migmatite

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Theyer, P. 1980: Stratigraphic setting of selected U.M. bodies in Superior and Churchill provinces; Manitoba Dept. of Energy and Mines, Min. Res. Div., Economic Geology Report ER 79-2.

McRitchie, W.D. 1975: Russell Lake south; Summary of geological fieldwork 1975. Manitoba Mines Br., Geological Paper 2/75, p. 19-22.

Lenton, P.G. 1981: Geology of the McKnight-McCallum lakes area; Mineral Res. Div., Geological Report GR 79-1 and map GR 79-1-3.

UTM	Location and Access	SIZE
Easting 327888	Locality 1 Locality 2	Area (km2)
Northing 6274586		Maximum Dimensions
Zone 14		

AGE DATA

CLASSIFICATION

General Classification	Ultramafic
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GEOLOGY

Principal Rock Types	Ultramafic lenses
Host Rocks	Wasekwan Gp. mafic flows.

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

McRitchie, W.D. 1975: Russell Lake south; Summary of geological fieldwork 1975. Manitoba Mines Br., Geological Paper 2/75, p. 19-22.

Zwanzig, H.V. 1976: Laurie Lake area (Fox Lake project); Rept. of field activities 1976. Manitoba Min. Res. Div., p. 26-32.

UTM	Location and Access	SIZE
Easting 320338	Locality 1 Locality 2	Area (km2)
Northing 6262548		Maximum Dimensions
Zone 14		

AGE DATA

CLASSIFICATION

General Classification	Ultramafic
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GEOLOGY

Principal Rock Types	Ultramafic lenses
Host Rocks	migmatitic metasedimentary rock

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Theyer, P. 1980: Stratigraphic setting of selected U.M. bodies in Superior and Churchill provinces; Manitoba Dept. of Energy and Mines, Min. Res. Div., Economic Geology Report ER 79-2.

Zwanzig, H.V. Wielezynski 1975: Geology of Kamuchawie area;

UTM	Location and Access	SIZE
Easting 489639 Northing 6219791 Zone 14	Accessibility Fixed-wing Locality 1 Locality 2	Area (km2) Maximum Dimensions

AGE DATA

CLASSIFICATION

Intrusion Type	Sill
General Classification	Ultramafic

GEOLOGY

Principal Rock Types	Ultramafic sill
Host Rocks	Wasekwan Gp amphibolite-gneiss rock

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Theyer, P. 1980: Stratigraphic setting of selected U.M. bodies in Superior and Churchill provinces; Manitoba Dept. of Energy and Mines, Min. Res. Div., Economic Geology Report ER 79-2.

Elphick, S.C. 1972: Geology of Mynarski-Notigi lakes area; Manitoba Mines Br., Publication 71-2C.

Wright, G.M. 1953: Uhlman Lake map area, Manitoba; Geological Survey of Canada, Paper 53-12.

UTM	Location and Access	SIZE
Easting 427393 Northing 6215754 Zone 14	Locality 1 Locality 2	Area (km2) Maximum Dimensions ~4X.7 km

AGE DATA

CLASSIFICATION	
Intrusion Type	Sill
General Classification	Mafic

GEOLOGY	
Principal Rock Types	Quartz diorite to gabbro
Host Rocks	migmatitic metasedimentary rocks

PREVIOUS EXPLORATION

Mineral Occurrences
 Sulphide zone on S shore Suwannee L.- 250X25 ft, py, po

MAPPING

GEOCHEMISTRY

Selected Bibliography

Campbell, F.H.A. 1972: Stratigraphic and structural studies in the Granville Lake-Lynn Lake region; Manitoba Mines Br., Publication 71-2A.

Barry, G.S. Gait, R.I. 1966: Geology of the Suwannee Lake area; Manitoba Mines Br., Publication 64-2.

UTM	Location and Access	SIZE
Easting 469517	Accessibility All-weather road	Area (km2)
Northing 6302443	Locality 1	Maximum Dimensions 1400X1250 m
Zone 14	Locality 2	

AGE DATA

CLASSIFICATION

Intrusion Type Dyke

GEOLOGY

Principal Rock Types Diabase
Host Rocks pegmatitic monzonite

PREVIOUS EXPLORATION

Mineral Occurrences

Dyke trend 130 deg, 40-50% hbd.

MAPPING

GEOCHEMISTRY

Selected Bibliography

Hinds, R.W. 1972: Geology of the Opachanau Lake-Fraser Lake-Lemay Island area; Manitoba Mines Br., Publication 71-2G, p. 39-43.
Thomas, K.A. 1972: Geology of the S. Indian Lake area, southeastern portion; Manitoba Mines Br., Publication 71-2H, p. 13.

UTM	Location and Access	SIZE
Easting 510089 Northing 6332028 Zone 14	Locality 1 Locality 2	Area (km2) Maximum Dimensions 700X650 m

AGE DATA

CLASSIFICATION

Intrusion Type	Sill
General Classification	Mafic

GEOLOGY

Principal Rock Types	Gabbro to diorite
Host Rocks	paragneiss and orthoamphibolite rocks

PREVIOUS EXPLORATION

Mineral Occurrences
Minor diss to ms py, po, cpy

MAPPING

GEOCHEMISTRY

Selected Bibliography

Hinds, R.W. 1972: Geology of the Opachanau Lake-Fraser Lake-Lemay Island area; Manitoba Mines Br., Publication 71-2G, p. 39-43.

Thomas, K.A. 1972: Geology of the S. Indian Lake area, southeastern portion; Manitoba Mines Br., Publication 71-2H, p. 13.

Frohlinger, T.G. 1972: Geology of the Southern Indian Lake area, central portion; Manitoba Mines Br., Publication 71-2I.

Frohlinger, T.G. Cranstone, J.R. xxxx: Pine Lake map 71-2-16; Manitoba Dept. of Mines.

UTM	Location and Access	SIZE
Easting 520178	Locality 1	Area (km2)
Northing 6332065	Locality 2	Maximum Dimensions 700X650 m
Zone 14		

AGE DATA

CLASSIFICATION

General Classification Mafic

GEOLOGY

Principal Rock Types Diorite
Host Rocks anatexite

PREVIOUS EXPLORATION

Mineral Occurrences
Minor diss to ms py, po, cpy. UM intrusion 4 km to SW

MAPPING

GEOCHEMISTRY

Selected Bibliography

Thomas, K.A. 1972: Geology of the S. Indian Lake area, southeastern portion; Manitoba Mines Br., Publication 71-2H, p. 13.
Frohlinger, T.G. 1972: Geology of the Southern Indian Lake area, central portion; Manitoba Mines Br., Publication 71-2I.
Frohlinger, T.G. Cranstone, J.R. xxxx: Pine Lake map 71-2-16; Manitoba Dept. of Mines.

UTM	Location and Access	SIZE
Easting 479596	Accessibility All-weather road	Area (km2)
Northing 6285684	Locality 1	Maximum Dimensions 1300X300 m
Zone 14	Locality 2	

AGE DATA

CLASSIFICATION

General Classification Ultramafic

GEOLOGY

Principal Rock Types Peridotite
Host Rocks qtz monzonite-granite rocks

PREVIOUS EXPLORATION

Mineral Occurrences
minor sulphides

MAPPING

GEOCHEMISTRY

Selected Bibliography

Hinds, R.W. 1972: Geology of the Opachanau Lake-Fraser Lake-Lemay Island area; Manitoba Mines Br., Publication 71-2G, p. 39-43.
Thomas, K.A. 1972: Geology of the S. Indian Lake area, southeastern portion; Manitoba Mines Br., Publication 71-2H, p. 13.
Frohlinger, T.G. 1972: Geology of the Southern Indian Lake area, central portion; Manitoba Mines Br., Publication 71-2I.
Thomas, K.A. Hinds, R.W. and Frohlinger, T.G. xxxx: Lemay Island map 71-2-12; Manitoba Mines Br.

UTM Easting 536773 Northing 6384288 Zone 14	Location and Access Locality 1 Locality 2	SIZE Area (km2) Maximum Dimensions
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AGE DATA

CLASSIFICATION

General Classification Mafic

GEOLOGY

Principal Rock Types Gabbro transitional to int. intr.
Host Rocks metatexite to monzonite

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Cranstone, J.R. 1972: Geology of the South Indian Lake area, northeastern portion; Manitoba Mines Br., Publication 71-2J.
Frohlinger, T.G. Cranstone, J.R. xxxx: Pine Lake map 71-2-16; Manitoba Dept. of Mines.
Cranstone, J.R. 1969: Moss Lake (east half), Map 71-2-20;
Cranstone, J.R. 1969a: Hammond Point, Map 71-2-21;
Cranstone, J.R. 1970: Southern Indian Lake, northern and eastern areas; Summary of geological fieldwork 1970. Manitoba Mines Br., Geological Paper 4/70.

UTM	Location and Access	SIZE
Easting 346609	Locality 1	Area (km2)
Northing 6412872	Locality 2	Maximum Dimensions
Zone 14		

AGE DATA

CLASSIFICATION

General Classification Mafic

GEOLOGY

Principal Rock Types Diorite to gabbro
Host Rocks granodiorite-tonalite
Deformation Sheared intrusion

PREVIOUS EXPLORATION

Mineral Occurrences
Minor po, py with trace Ni, Cu.

MAPPING

GEOCHEMISTRY

Selected Bibliography

Davies, J.F. Bannatyne, B.B., Barry, G.S. and McCabe, H.R. 1962: Geology and mineral resources of Manitoba; Manitoba Mines Br., p. 126.
Quinn, H.A. 1956: Mineral occurrences between Chipewyan and Herb lakes, Manitoba; Precambrian, v. 29, p. 13.
Gadd, N.R. 1949: Preliminary map and descriptive notes, Brochet Lakes, Manitoba; Geological Survey of Canada, Paper 49-12.

UTM	Location and Access	SIZE
Easting 384201 Northing 6543447 Zone 15	Locality 1 Locality 2	Area (km2) Maximum Dimensions 2500X100 ft

AGE DATA

CLASSIFICATION	
Intrusion Type	Sill
General Classification	Mafic

GEOLOGY	
Principal Rock Types	Gabbro
Host Rocks	metavolcanics.

PREVIOUS EXPLORATION

Mineral Occurrences
 Minor diss and ms po, py, cpy

MAPPING

GEOCHEMISTRY

Selected Bibliography

Gale, G.H. Baldwin, D.A. and Koo, J. 1980: A geological evolution of Precambrian massive sulfide deposits potential in Manitoba; Manitoba Mines Br., Economic Geology Report ER 79-1, map ER 79-1-23.

Davies, J.F. Bannatyne, B.B., Barry, G.S. and McCabe, H.R. 1962: Geology and mineral resources of Manitoba; Manitoba Mines Br., p. 126.

Johnston, A.W. 1935: A geological reconnaissance of Seal River, northern Manitoba; Geological Survey of Canada, Paper 35-2.

UTM Easting 667299 Northing 5956500 Zone 14	Location and Access Locality 1 Locality 2	SIZE Area (km2) Maximum Dimensions
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AGE DATA

CLASSIFICATION

Intrusion Type	Dyke
General Classification	Mafic

GEOLOGY

Principal Rock Types	Gabbro
Host Rocks	metavolcanics

PREVIOUS EXPLORATION

Mineral Occurrences
Diss py, po in gabbro

MAPPING

GEOCHEMISTRY

Selected Bibliography

Milligan, G.C. 1955: Lower Seal River, Manitoba; Manitoba Mines Br., Summary report.
Schledewitz, D.C.P. 1975: Seal River project; Manitoba Min. Res. Div., Summary of fieldwork 1974.

UTM Easting 665878 Northing 6513325 Zone 14	Location and Access Locality 1 Locality 2	SIZE Area (km2) Maximum Dimensions
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AGE DATA

CLASSIFICATION

Intrusion Type	Dyke
General Classification	Mafic

GEOLOGY

Principal Rock Types	Gabbro
Host Rocks	metavolcanic and granitic rocks

PREVIOUS EXPLORATION

Mineral Occurrences
Diss py, po in gabbro

MAPPING

GEOCHEMISTRY

Selected Bibliography

Milligan, G.C. 1955: Lower Seal River, Manitoba; Manitoba Mines Br., Summary report.
Schledewitz, D.C.P. 1975: Seal River project; Manitoba Min. Res. Div., Summary of fieldwork 1974.
Bostock, H.H. 1967: Geology of Hudson Bay lowlands; Geological Survey of Canada, Paper 67-60.

UTM	Location and Access	SIZE
Easting 461554 Northing 6248056 Zone 14	Locality 1 Locality 2	Area (km2) Maximum Dimensions largest 5000X400 m

AGE DATA

CLASSIFICATION	
Intrusion Type	Sill
General Classification	Mafic

GEOLOGY	
Principal Rock Types	Hornblendite gabbro
Host Rocks	metavolcanic and granitic rocks
Other Igneous Features	Large and smaller lensoid intrusions

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Gilbert, H.P. 1974: Karsakuwigamak Lake project; Summary of geological fieldwork. Manitoba Min. Res. Div., Geological Paper 2/74, p. 17-20.

Baldwin, D.A. 1979: Ruttan Lake, Karaskuwigamak Lake, Eagle Lake project; Manitoba Min. Res. Div., Report of field activities 1979.

Pearse, G. 1964: Geology of the Pemichigaman Lake area (east half); Manitoba Mines Br., Publication 61-3.

UTM	Location and Access	SIZE
Easting 590305	Locality 1	Area (km2)
Northing 6355275	Locality 2	Maximum Dimensions
Zone 14		

AGE DATA

CLASSIFICATION

General Classification Mafic

GEOLOGY

Principal Rock Types Gabbro
Host Rocks granite and gneiss to migmatite

PREVIOUS EXPLORATION

Mineral Occurrences
Trace cpy.

MAPPING

GEOCHEMISTRY

Selected Bibliography

McRitchie, W.D. 1978: GS-5 Northern Indian Lake; Report of field activities 1978. Manitoba Dept. of Mines, Resources and Environmental Management.
Kretz, R. 1958: Geology of North Indian Lake, Manitoba; Geological Survey of Canada, Preliminary map 2-1959.

Name of Intrusion	Stag Lake	Ref ID.	140
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UTM Easting 412997 Northing 6257495 Zone 14	Location and Access Locality 1 Locality 2	SIZE Area (km2) Maximum Dimensions 5700X2000 m
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AGE DATA

CLASSIFICATION

General Classification	Mafic
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GEOLOGY

Principal Rock Types	Hornblendite-metapyroxenite
Host Rocks	paragneiss and schist

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Campbell, F.H.A. 1972: Geology of the Turnbull Lake (west half) area; Manitoba Mines Br., Publication 71-2D.

UTM	Location and Access	SIZE
Easting 486749	Accessibility All-weather road	Area (km2)
Northing 6289397	Locality 1	Maximum Dimensions
Zone 14	Locality 2	

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types	Amphibolite to hb+di gneiss
Host Rocks	qtz monzonite

PREVIOUS EXPLORATION

Mineral Occurrences

Diss po, cpy in hb+di gneiss; .045% Cu, tr Ni

MAPPING

GEOCHEMISTRY

Selected Bibliography

Hinds, R.W. 1972: Geology of the Opachanau Lake-Fraser Lake-Lemay Island area; Manitoba Mines Br., Publication 71-2G, p. 39-43.

Thomas, K.A. Hinds, R.W. and Frohlinger, T.G. xxxx: Lemay Island map 71-2-12; Manitoba Mines Br.

UTM	Location and Access	SIZE
Easting 438926	Accessibility Boat	Area (km2)
Northing 6295356	Locality 1 Trans-Hudson Orogen - Lynn Lake Domain	Maximum Dimensions
Zone 14	Locality 2 Lynn Lake Greenstone Belt	

AGE DATA

Age Proterozoic

CLASSIFICATION

Intrusion Type Unknown

General Classification Mafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Hb gabbro, gabbro

Host Rocks mafic metavolcanics

Deformation foliated intrusion

Synoptic Geology

See Milligan (1960), Gilbert (1993) and Pinsent (1980). Part of the Pre-Sickle suite of mafic intrusions (Lynn Lake gabbros).

PREVIOUS EXPLORATION

Mineral Occurrences

Diss py, po and tr cpy

MAPPING

Most Detailed Mapping See Milligan (1960)

Sketch Map Figure# No

Regional Mapping 1:250 000 (Bedrock Geology of Manitoba Compilation Series, NTS 64C)

Type Section Figure# No

GEOCHEMISTRY

Selected Bibliography

Gilbert, H.P., 1993: Geology of the Barrington Lake-Melvin Lake-Fraser Lake area; Manitoba Energy and Mines, Geological Services, Geological report 87-3, 97p.

Hinds, R.W. 1972: Geology of the Opachanau Lake-Fraser Lake-Lemay Island area; Manitoba Mines Br., Publication 71-2G, p. 39-43.

Kilburn, L.C. 1956: Geology of the MacBride Lake area; Manitoba Mines Br., Publication 55-2.

Milligan, G.C., 1960: Geology of the Lynn Lake district; Manitoba Mines and Natural Resources, Mines Branch, Publication 57-1, 317p.

Pinsent, R.H., 1980: Nickel-copper mineralization in the Lynn Lake gabbro; Manitoba Energy and Mines, Mineral Resources Division, Economic Geology Report 79-3, 138p.

UTM	Location and Access	SIZE
Easting 324783 Northing 6066073 Zone 14	Locality 1 Locality 2	Area (km2) Maximum Dimensions 10000X330 m

AGE DATA

CLASSIFICATION

Intrusion Type	Sill
General Classification	Mafic

GEOLOGY

Principal Rock Types	Gabbro, qtz diorite at base of sill
Host Rocks	E-facing pyroclastic rocks
Other Igneous Features	Sill contains igneous layering topping to west.
Deformation	intruded after recumbent folding

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Bailes, A.H., Syme, E.C. 1980: White Lake-Mikanagan Lake project; Manitoba Min. Res. Div., Report of field activities 1979, p. 43-50.

Gale, G.H. Baldwin, D.A. and Koo, J. 1980: A geological evolution of Precambrian massive sulfide deposits potential in Manitoba; Manitoba Mines Br., Economic Geology Report ER 79-1, map ER 79-1-23.

UTM	Location and Access	SIZE
Easting 401203 Northing 6253392 Zone 14	Accessibility Fixed-wing Locality 1 Trans-Hudson Orogen - Lynn Lake Domain Locality 2 Lynn Lake Greenstone Belt	Area (km2) Maximum Dimensions 25 metres wide

AGE DATA

Age Proterozoic

CLASSIFICATION

Intrusion Type Sill
General Classification Mafic

GEOLOGY

Principal Rock Types Gabbro-diorite
Host Rocks metasedimentary
Other Igneous Features Diorite has chilled margins.

Synoptic Geology

See Milligan (1951).

PREVIOUS EXPLORATION

Assessment Files not reviewed

Mineral Occurrences

not reviewed

Exploration History

not reviewed

MAPPING

Most Detailed Mapping See Milligan (1951)
Sketch Map Figure# No
Regional Mapping 1:250 000 (Bedrock Geology of Manitoba Compilation Series, NTS 64C)
Type Section Figure# No

GEOCHEMISTRY

Selected Bibliography

Cranstone, D.A. 1968: Geology of the Watt Lake area (east half); Manitoba Mines Br., Publication 61-5, p. 21.
 Fawley, A.P. 1949: Geology of the Sickle Lake area; Manitoba Mines Br., Publication 48-6.
 Milligan, G.C. 1951: Geology of the Beaucage Lake area; Manitoba Mines Br., Publication 57-1.

UTM	Location and Access	SIZE
Easting 399891 Northing 6237648 Zone 14	Accessibility Fixed-wing Locality 1 Trans-Hudson Orogen - Lynn Lake Domain Locality 2	Area (km2) Maximum Dimensions

AGE DATA

CLASSIFICATION

General Classification Mafic

GEOLOGY

Principal Rock Types Gabbro to granite differentiate

Host Rocks Sickle Group metasedimentary rocks

Other Igneous Features Differentiated, basal gabbro transitional to granitic roof

Deformation NW strike, SW dip

PREVIOUS EXPLORATION

MAPPING

Most Detailed Mapping Zwanzig (1984)

Regional Mapping Zwanzig (1984)

GEOCHEMISTRY

PGE Analyses Numbers 1.0398 to 1.0414

Selected Bibliography

Cranstone, D.A. 1964: Petrology of the Granville Lake gabbro; M.Sc. thesis, University of Manitoba, 150 p.

Cranstone, D.A. 1968: Geology of the Watt Lake area (east half); Manitoba Mines Br., Publication 61-5, p. 21.

Norman, G.W.H. 1934: Granville Lake District, N. Manitoba; Geological Survey of Canada, Summary Report (1933), Part C, p. 23-41.

Zwanzig, H.V., 1984: Granville Lake: provisional compilation map; Manitoba Energy and Mines, Mineral Resources, Preliminary Map 1984C-2

UTM	Location and Access	SIZE
Easting 427928	Accessibility Fixed-wing	Area (km2)
Northing 6295253	Locality 1 Trans-Hudson Orogen - Lynn Lake Domain	Maximum Dimensions Approx. 10 km x 2.5 km
Zone 14	Locality 2 Lynn Lake Greenstone Belt	

AGE DATA

Age Proterozoic

CLASSIFICATION

Intrusion Type Sill

General Classification Mafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Gabbro

Host Rocks Wasekwan Group supracrustal rocks

Other Igneous Features Zoned

Synoptic Geology

See Hunter (1954) for detailed description. One of several sill-like mafic intrusions belonging to the Lynn Lake gabbro suite.

PREVIOUS EXPLORATION

Assessment Files Not reviewed

Mineral Occurrences

Not reviewed

Exploration History

Not reviewed

MAPPING

Most Detailed Mapping 1:50 000 scale (Gilbert et al., 1980) and Gilbert (1993);

Sketch Map Figure# Yes

Type Section Figure# No

GEOCHEMISTRY

Geochemistry Base Metal Assay and PGE Analyses

PGE Analyses Numbers 1.1339 to 1.1388

Geochemical Features and PGE Abundances

See Table 1

Selected Bibliography

Gilbert, H.P., Syme, E.C., Zwanzig, H.V., 1980: Geology of the metavolcanic and volcanoclastic metasedimentary rocks in the Lynn Lake area; Manitoba Energy and Mines, Mineral Resources Division, Geological Paper 80-1, 118p.

Gilbert, H.P., 1993: Geology of the Barrington Lake-Melvin Lake-Fraser Lake area; Manitoba Energy and Mines, Geological Services, Geological report 87-3, 97p.

Hunter, H.E., 1954: Petrology of the Tow Lake gabbro, Barrington Lake area, northern Manitoba; Ph.D. thesis.

Hunter, H.E. 1958: A study of the Tow Lake gabbro; Manitoba Mines Br., Publication 53-5.

UTM	Location and Access	SIZE
Easting 379439 Northing 6170433 Zone 14	Locality 1 Locality 2	Area (km2) Maximum Dimensions 120 m long

AGE DATA

CLASSIFICATION

Intrusion Type	Sill
General Classification	Mafic

GEOLOGY

Principal Rock Types	Anorthositic gabbro
Host Rocks	metatexite and calc-silicate gneiss
Deformation	Cut by granodiorite

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Davies, J.F. 1948: The origin of the Cree Lake intrusives and basic gneisses; M.Sc. thesis, University of Manitoba.
McRitchie, W.D. 1971: Preliminary geological investigations of the Nelson House-Pukatawagan region (Burntwood project); Manitoba Mines Br., GP 2/71.

UTM	Location and Access	SIZE
Easting 332893	Locality 1 Locality 2	Area (km2)
Northing 6132974		Maximum Dimensions
Zone 14		

AGE DATA

CLASSIFICATION

General Classification	Ultramafic
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GEOLOGY

Principal Rock Types	Pyroxenite
Host Rocks	Kisseynew paragneiss

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Pollock, G.D. 1964: Geology of the Duval Lake area; Manitoba Mines Br., Publication 61-6, inc. map 61-6.

Davies, J.F. Bannatyne, B.B., Barry, G.S. and McCabe, H.R. 1962: Geology and mineral resources of Manitoba; Manitoba Mines Br., p. 126.

Pollock, G.D. 1965: Geology of the Russick Lake area; Manitoba Mines Br., Publication 63-2, inc. map 63-2.

UTM	Location and Access	SIZE
Easting 341752 Northing 6143788 Zone 14	Locality 1 Locality 2	Area (km2) 9 Maximum Dimensions 18 x 5 km

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types	Tonalite to diorite
Host Rocks	granodiorite-granite and migmatite
Deformation	Cut by granitic dykes

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Pollock, G.D. 1964: Geology of the Duval Lake area; Manitoba Mines Br., Publication 61-6, inc. map 61-6.
Pollock, G.D. 1965: Geology of the Russick Lake area; Manitoba Mines Br., Publication 63-2, inc. map 63-2.

UTM	Location and Access	SIZE
Easting 332319 Northing 6110716 Zone 14	Locality 1 Locality 2	Area (km2) 20 Maximum Dimensions 8 x 2.5 km

AGE DATA

CLASSIFICATION

General Classification Mafic

GEOLOGY

Principal Rock Types Diorite and pyroxenite intrusion
Host Rocks tonalite, migmatite and schist
Deformation Pyroxenite is pre- to syn-tectonic

PREVIOUS EXPLORATION

Mineral Occurrences
800X15 m of pyroxenite in diorite. Tr. diss cpy in pyroxenite.

MAPPING

GEOCHEMISTRY

Selected Bibliography

Pollock, G.D. 1964: Geology of the Duval Lake area; Manitoba Mines Br., Publication 61-6, inc. map 61-6.
Davies, J.F. 1948: The origin of the Cree Lake intrusives and basic gneisses; M.Sc. thesis, University of Manitoba.

UTM	Location and Access	SIZE
Easting 325000	Locality 1 Locality 2	Area (km2) 22.4
Northing 6107284		Maximum Dimensions 14 x 1.6 km
Zone 14		

AGE DATA

CLASSIFICATION

General Classification	Ultramafic
------------------------	------------

GEOLOGY

Principal Rock Types	Pyroxenite bodies, 10 pyroxenite bodies identified, ave. size 800X300 m.
Host Rocks	diorite and migmatitic schist.

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Pollock, G.D. 1964: Geology of the Duval Lake area; Manitoba Mines Br., Publication 61-6, inc. map 61-6.
Davies, J.F. 1948: The origin of the Cree Lake intrusives and basic gneisses; M.Sc. thesis, University of Manitoba.

Name of Intrusion	Krug Lake	Ref ID.	152
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UTM	Location and Access	SIZE
Easting 403452 Northing 6067789 Zone 14	Locality 1 Locality 2	Area (km2) Maximum Dimensions ~15X~3.5 km

AGE DATA

CLASSIFICATION

General Classification	Mafic
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GEOLOGY

Principal Rock Types	Gabbro
Host Rocks	mafic metavolcanics

PREVIOUS EXPLORATION

Mineral Occurrences

Sulphide-bearing shear zone cuts metagabbro E of Krug L.

MAPPING

GEOCHEMISTRY

Selected Bibliography

Harrison, J.M. 1949: Geology and mineral deposits of the File-Tramping lakes area, Manitoba; Geological Survey of Canada. Memoir 250, inc. Map 906A.
Rousell, D.H. 1970: Geology of the Iskwasum Lake area (east half), Manitoba; Manitoba Mines Br., Publication 66-3.

UTM	Location and Access	SIZE
Easting 387547 Northing 6075579 Zone 14	Accessibility Boat Locality 1 Trans-Hudson Orogen - Flin Flon-Snow Lake Domain Locality 2 Flin Flon Belt	Area (km2) 5 Maximum Dimensions 4 km x 1.2 km

AGE DATA

Age Proterozoic

CLASSIFICATION

Intrusion Type Sill
General Classification Mafic-Ultramafic
Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Gabbro
Host Rocks Mafic metavolcanic rocks of the Elbow Lake area (Flin Flon Belt)
Layering Features Local modal layering

Synoptic Geology

See Syme (1992). Subdivided into a layered series (gabbro, leucogabbro, anorthosite, pyroxenite) and a younger gabbro that contains locally abundant gabbroic pegmatite veins and pods. Ultramafic rocks (peridotite, pyroxenite) locally occur in the younger gabbro.

PREVIOUS EXPLORATION

Assessment Files Not reviewed

Mineral Occurrences

Not reviewed

Exploration History

Not reviewed

MAPPING

Most Detailed Mapping 1:20 000 scale (Syme and Whalen, 1992).
Sketch Map Figure# Yes
Regional Mapping 1:250,000 scale (Bedrock Geology of Manitoba Compilation Map Series, NTS 63K)
Type Section Figure# No

GEOCHEMISTRY

Geochemistry Whole-rock Geochemistry, including REE and PGE Analyses
PGE Analyses Numbers 1.0173 to 1.0184
Whole-rock Analyses Numbers 2.170 to 2.211

Geochemical Features and PGE Abundances

See Tables 1 and 2.

Selected Bibliography

McGlynn, J.C. 1959: Elbow-Heming lakes area, Manitoba; Geological Survey of Canada, Memoir 305.
 Robertson, D.S. 1950: Elbow Lake, Manitoba; Geological Survey of Canada, Paper 50-1.
 Stockwell, C.H. 1935: Gold deposits of Elbow-Morton area, northern Manitoba; Geological Survey of Canada, Memoir 186.
 Syme, E.C., 1992: Elbow Lake project - Part A : supracrustal rocks; Manitoba Energy and Mines, Geological Services,

Report of activities 1992, p. 32-46.

Syme, E.C., Whalen, J.B. 1992: Geology Elbow Lake, Manitoba (part of NTS 63K/15); Manitoba Energy and Mines, Geological Survey of Canada, Preliminary Map 1992F-1.

UTM	Location and Access	SIZE
Easting 404541	Locality 1 Locality 2	Area (km2) 11.5
Northing 6088730		Maximum Dimensions 7.2 km X 1.6 km
Zone 14		

AGE DATA

CLASSIFICATION

Intrusion Type	Sill
General Classification	Ultramafic

GEOLOGY

Principal Rock Types	Pyroxenite
Host Rocks	metavolcanics and gneiss

PREVIOUS EXPLORATION

Mineral Occurrences
Minor py

MAPPING

GEOCHEMISTRY

Selected Bibliography

Robertson, D.S. 1950: Elbow Lake, Manitoba; Geological Survey of Canada, Paper 50-1.
Bailes, A.H. 1980: Geology of the File Lake area; Manitoba Mines Br., Geological Report 79-1.

UTM	Location and Access	SIZE
Easting 407092 Northing 6088120 Zone 14	Accessibility Boat Locality 1 Trans-Hudson Orogen - Flin Flon-Snow Lake Domain Locality 2 Flin Flon Belt	Area (km2) Maximum Dimensions Approximately 18 km x 0.7 km; discontinuous

AGE DATA

Age Proterozoic

CLASSIFICATION

Intrusion Type Sill
General Classification Mafic

GEOLOGY

Principal Rock Types Gabbro,leucogabbro, ferrogabbro, ferrotonalite, granophytic felsic differentiates
Host Rocks tonalite to schist
Layering Features Local modal layering
Igneous Textures Roof melt zones
Other Igneous Features Differentiated mafic sill

Synoptic Geology

See Bailes (1980) for detailed descriptions. Conformable sill-like intrusions of gabbroic composition, emplaced into Amisk Group supracrustal sequences. Includes two ages of emplacement (Bailes, 1980). Locally these intrusions are differentiated from gabbro (base) to felsic granophyre (top) and display cm-scale rhythmic layering.

PREVIOUS EXPLORATION

Assessment Files Not reviewed
Mineral Occurrences
 Local, disseminated to massive po, py and minor cpy
Exploration History
 Not reviewed

MAPPING

Most Detailed Mapping 1:25,000 scale (Bailes, 1980)
Regional Mapping 1:250 000 scale (Bedrock Geology of Manitoba Compilation Series, NTS 63J and 63K)

GEOCHEMISTRY

Geochemistry Whole-rock Geochemistry, including REE and PGE Analyses
PGE Analyses Numbers 1.0427 to 1.0455
Whole-rock Analyses Numbers 2.283 to 2.297 and 2.298 to 2.326

Geochemical Features and PGE Abundances

See Tables 1 and 2 and Bailes (1980). Anomalously high and anomalously low PGE contents are present in samples collected by Bailes (1980) and re-analysed for this report.

Recommendations

The anomalously high and anomalously low background PGE contents obtained for samples collected by Bailes (1980) indicate a potential PGE concentrating mechanism has been operative during the emplacement and crystallization of the main Josland Lake intrusion.

Selected Bibliography

Bailes, A.H. 1980: Geology of the File Lake area; Manitoba Mines Br., Geological Report 79-1.
Shanks, R.J. Bailes, A.H. 1977: Missi Group rocks, Wekusko Lake area; Report of field activities 1977. Manitoba Min. Res. Div., p. 83-87.
Stockwell, C.H. 1935: Gold deposits of Elbow-Morton area, northern Manitoba; Geological Survey of Canada, Memoir 186.

Name of Intrusion	Loonhead Lake Gabbro (east)	Ref ID.	157
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UTM	Location and Access	SIZE
Easting 406082	Locality 1 Locality 2	Area (km2) 1
Northing 6090924		Maximum Dimensions 2 km x 0.5 k m
Zone 14		

AGE DATA

CLASSIFICATION

General Classification	Mafic
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GEOLOGY

Principal Rock Types	Gabbro
Host Rocks	gneisses
Other Igneous Features	Differentiated mafic rock

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Stockwell, C.H. 1935: Gold deposits of Elbow-Morton area, northern Manitoba; Geological Survey of Canada, Memoir 186.

Bailes, A.H. 1980: Geology of the File Lake area; Manitoba Mines Br., Geological Report 79-1.

Shanks, R.J. Bailes, A.H. 1977: "Missi Group" rocks, Wekusko Lake area; Report of field activities 1977. Manitoba Min. Res. Div., p. 83-87.

Name of Intrusion	Woosey Lake (Island)	Ref ID.	158
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UTM Easting 418051 Northing 6073993 Zone 14	Location and Access Locality 1 Locality 2	SIZE Area (km2) 1.35 Maximum Dimensions 4500 X 300 m
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AGE DATA	
Age	Proterozoic

CLASSIFICATION	
General Classification	Mafic

GEOLOGY	
Principal Rock Types	Gabbro to qtz diorite
Host Rocks	gneisses
Other Igneous Features	weakly layered

PREVIOUS EXPLORATION	
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MAPPING	
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GEOCHEMISTRY	
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Selected Bibliography

Bailes, A.H. 1980: Geology of the File Lake area; Manitoba Mines Br., Geological Report 79-1.
Shanks, R.J. Bailes, A.H. 1977: "Missi Group" rocks, Wekusko Lake area; Report of Field Activities 1977. Manitoba Min. Res. Div., p. 83-87.

UTM	Location and Access	SIZE
Easting 459401	Locality 1	Area (km2)
Northing 6085486	Locality 2	Maximum Dimensions 4500X500 m
Zone 14		

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types	Tonalite
Host Rocks	paragneiss

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Bailes, A.H. 1975: Geology of the Guay-Wimapedi lakes area; Manitoba Mines Br., Publication 75-2.

Name of Intrusion	Mayo Lake East	Ref ID.	160
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UTM	Location and Access	SIZE
Easting 445659	Locality 1	Area (km2)
Northing 6097688		Maximum Dimensions 0.5 X 0.1 km
Zone 14		
	Locality 2	

AGE DATA

CLASSIFICATION

General Classification	Ultramafic
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GEOLOGY

Principal Rock Types	Pyroxenite
Host Rocks	Herblet Lake complex gneiss

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

McRitchie, W.D. 1975: Russell Lake south; Summary of geological fieldwork 1975. Manitoba Mines Br., Geological Paper 2/75, p. 19-22.

Pollock, G.D. 1965: Geology of the Russick Lake area; Manitoba Mines Br., Publication 63-2, inc. map 63-2.

Bailes, A.H. 1975: Geology of the Guay-Wimapedi lakes area; Manitoba Mines Br., Publication 75-2.

UTM	Location and Access	SIZE
Easting 459536 Northing 6100323 Zone 14	Locality 1 Locality 2	Area (km2) 0.12 Maximum Dimensions 1.2 x 0.1 km

AGE DATA

CLASSIFICATION

General Classification Ultramafic

GEOLOGY

Principal Rock Types Orthopyroxenite
Host Rocks Missi Gp. Paragneiss

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

McRitchie, W.D. 1975: Russell Lake south; Summary of geological fieldwork 1975. Manitoba Mines Br., Geological Paper 2/75, p. 19-22.
Hunt, G.H. 1970: Geology of the Iskwasum Lake area; Manitoba Mines Br., Publication 65-3.
Bailes, A.H. 1975: Geology of the Guay-Wimapedi lakes area; Manitoba Mines Br., Publication 75-2.

UTM	Location and Access	SIZE
Easting 575187	Locality 1 Locality 2	Area (km2)
Northing 6358682		Maximum Dimensions 4000X500 m
Zone 14		

AGE DATA

CLASSIFICATION

General Classification Ultramafic

GEOLOGY

Principal Rock Types UM in qtz diorite to gabbro
Host Rocks gneiss and QF porphyry

PREVIOUS EXPLORATION

Mineral Occurrences
UM is component of mafic body. Diss cpy.

MAPPING

GEOCHEMISTRY

Selected Bibliography

Gale, G.H. Baldwin, D.A. and Koo, J. 1980: A geological evolution of Precambrian massive sulfide deposits potential in Manitoba; Manitoba Mines Br., Economic Geology Report ER 79-1, map ER 79-1-23.

Schledewitz, D.C.P. 1977: The Seal River area; Manitoba Mineral Res. Div., Open File report 77-3.

McRitchie, W.D. Peters J. 1978: Preliminary compilation of the Northern Indian Lake area (64H); Manitoba Min. Res. Div., preliminary map 1978M-1.

Lenton, P.G. Corkery, M.T. 1981: The lower Churchill River project; Manitoba Min. Res. Div., Open File Report OF 81-3, inc. map OF 81-3-1

Name of Intrusion	Strong Lake	Ref ID.	163
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UTM Easting 583050 Northing 6212232 Zone 14	Location and Access Locality 1 Locality 2	SIZE Area (km2) Maximum Dimensions
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AGE DATA

CLASSIFICATION

General Classification	Ultramafic
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GEOLOGY

Principal Rock Types	Peridotite
Host Rocks	granitoid gneiss and schist

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Gale, G.H. Baldwin, D.A. and Koo, J. 1980: A geological evolution of Precambrian massive sulfide deposits potential in Manitoba; Manitoba Mines Br., Economic Geology Report ER 79-1, map ER 79-1-23.

Corkery, M.T. 1978: Preliminary compilation of the Split Lake area (64A); Manitoba Min. Res. Div., prelim. map 1978 M-2.

Milligan, R. 1955: Split Lake, Manitoba; Geological Survey of Canada, Map 10 (1956).

UTM	Location and Access	SIZE
Easting 580834 Northing 6219612 Zone 14	Locality 1 Locality 2	Area (km2) Maximum Dimensions

AGE DATA

CLASSIFICATION

General Classification Mafic

GEOLOGY

Principal Rock Types Gabbro
Host Rocks granitic gneiss

PREVIOUS EXPLORATION

Mineral Occurrences
Ms py, po in metasediments ~1 km S of Rock L.

MAPPING

GEOCHEMISTRY

Selected Bibliography

Gale, G.H. Baldwin, D.A. and Koo, J. 1980: A geological evolution of Precambrian massive sulfide deposits potential in Manitoba; Manitoba Mines Br., Economic Geology Report ER 79-1, map ER 79-1-23.

Corkery, M.T. 1978: Preliminary compilation of the Split Lake area (64A); Manitoba Min. Res. Div., prelim. map 1978 M-2.

Milligan, R. 1955: Split Lake, Manitoba; Geological Survey of Canada, Map 10 (1956).

McRitchie, W.D. 1977: Hardy-Rock lakes region; Manitoba Min. Res. Div., Report of field activities 1977, Report GS-9.

UTM	Location and Access	SIZE
Easting 584399	Locality 1 Locality 2	Area (km2)
Northing 6349582		Maximum Dimensions 3X1 km
Zone 14		

AGE DATA

CLASSIFICATION

General Classification	Unknown
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GEOLOGY

Principal Rock Types	Granite (gabbro?)
Host Rocks	granite-granodiorite

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Cranstone, J.R. 1972: Geology of the South Indian Lake area, northeastern portion; Manitoba Mines Br., Publication 71-2J.

Lenton, P.G. Corkery, M.T. 1981: The lower Churchill River project; Manitoba Min. Res. Div., Open File Report OF 81-3, inc. map OF 81-3-1.

McRitchie, W.D. 1977a: Reindeer Lake - Southern Indian Lake regional correlation; Manitoba Min. Res. Div., Report of field activities 1977, Report GS-2.

UTM	Location and Access	SIZE
Easting 613551 Northing 6420831 Zone 14	Locality 1 Locality 2	Area (km2) Maximum Dimensions ~5X1 km

AGE DATA

CLASSIFICATION

General Classification Unknown

GEOLOGY

Principal Rock Types Granite (gabbro?)
Host Rocks granite-granodiorite

PREVIOUS EXPLORATION

Exploration History
Originally iden. as gabbro within Chipewayan Batholith

MAPPING

GEOCHEMISTRY

Selected Bibliography

Lenton, P.G. Corkery, M.T. 1981: The lower Churchill River project; Manitoba Min. Res. Div., Open File Report OF 81-3, inc. map OF 81-3-1

Kretz, R. 1967: Granite and pegmatite studies at Northern Indian lake, Manitoba; Geological Survey of Canada, Bulletin 148.

UTM	Location and Access	SIZE
Easting 502030 Northing 6307898 Zone 14	Locality 1 Locality 2	Area (km2) Maximum Dimensions 5000X500 m

AGE DATA

CLASSIFICATION

General Classification Mafic

GEOLOGY

Principal Rock Types Gabbro to diorite
Host Rocks granite to tonalite

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Lenton, P.G. Corkery, M.T. 1981: The lower Churchill River project; Manitoba Min. Res. Div., Open File Report OF 81-3, inc. map OF 81-3-1
Haugh, I. 1969 Geology of the Split Lake area; Manitoba Mines Br., Publication 65-2.

UTM	Location and Access	SIZE
Easting 391282	Accessibility All-weather road	Area (km2)
Northing 6303748	Locality 1 Trans-Hudson Orogen - Lynn Lake Domain	Maximum Dimensions
Zone 14	Locality 2 Lynn Lake Greenstone Belt	

AGE DATA

Age Proterozoic

CLASSIFICATION

General Classification Mafic

GEOLOGY

Principal Rock Types Gabbro
Host Rocks volcanic-intrusive rocks

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Gale, G.H. Baldwin, D.A. and Koo, J. 1980: A geological evolution of Precambrian massive sulfide deposits potential in Manitoba; Manitoba Mines Br., Economic Geology Report ER 79-1, map ER 79-1-23.
Gilbert, H.P. 1977: Lynn Lake area; Report of field activities 1977. Manitoba Mnes Br., p. 37-46.
Keay, J.P. Zwanzig, H.V. 1977: Geology of the Eager Lake area; Report of field activities 1977. Manitoba Min. Res. Div., p. 26-30.

UTM	Location and Access	SIZE
Easting 340451	Locality 1 Locality 2	Area (km2)
Northing 6277527		Maximum Dimensions
Zone 14		

AGE DATA

CLASSIFICATION

General Classification Mafic

GEOLOGY

Principal Rock Types Gabbro
Host Rocks Volcanic and sedimentary rocks

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Gale, G.H. Baldwin, D.A. and Koo, J. 1980: A geological evolution of Precambrian massive sulfide deposits potential in Manitoba; Manitoba Mines Br., Economic Geology Report ER 79-1, map ER 79-1-23.
Cranstone, D.A. 1968: Geology of the Watt Lake area (east half); Manitoba Mines Br., Publication 61-5, p. 21.
Gilbert, H.P. 1977: Lynn Lake area; Report of field activities 1977. Manitoba Mnes Br., p. 37-46.

Name of Intrusion	Black Trout Lake diorite	Ref ID.	170
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UTM		Location and Access		SIZE	
Easting	387242	Accessibility	Fixed-wing	Area (km2)	50
Northing	6266733	Locality 1	Trans-Hudson Orogen - Lynn Lake Domain	Maximum Dimensions	10 km x 5 km
Zone	14	Locality 2	Lynn Lake Greenstone Belt		

AGE DATA

Age	Proterozoic
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CLASSIFICATION

Intrusion Type	Sill
General Classification	Mafic

GEOLOGY

Principal Rock Types	Diorite, gabbro
Host Rocks	Tonalite, granodiorite

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Bailes, A.H. 1980: Geology of the File Lake area; Manitoba Mines Br., Geological Report 79-1.
Gale, G.H. Baldwin, D.A. and Koo, J. 1980: A geological evaluation of Precambrian massive sulfide deposits potential in Manitoba; Manitoba Mines Br., Economic Geology Report ER 79-1, map ER 79-1-23.
McRitchie, W.D. 1974: The Sickie-Wasekwan debate; a review. Manitoba Mines Br., Geological Paper 1/74.

UTM	Location and Access	SIZE
Easting 484074 Northing 6113152 Zone 14	Locality 1 Locality 2	Area (km2) Maximum Dimensions

AGE DATA

CLASSIFICATION

General Classification Mafic

GEOLOGY

Principal Rock Types Gabbro
Host Rocks paragneisses

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Gale, G.H. Baldwin, D.A. and Koo, J. 1980: A geological evolution of Precambrian massive sulfide deposits potential in Manitoba; Manitoba Mines Br., Economic Geology Report ER 79-1, map ER 79-1-23.

Baldwin, D.A. Frohlinger, T.G. and Kendrick, G. 1979: Geology of the Nelson House-Pukatawagan region (Burntwood project); Manitoba Min. Res. Div., Geology maps 87-3-1 to 78-3-22

Quinn, H.A. 1954: Nelson House, Manitoba; Geological Survey of Canada, preliminary map 54-12.

Frohlinger, T.G. 1971: Hall Lake - Wapisiu Lake area; Summary of geological fieldwork 1971. Manitoba Mines Br., Geological Paper 6/71, p. 35-43.

UTM	Location and Access	SIZE
Easting 393608 Northing 6105119 Zone 14	Locality 1 Locality 2	Area (km2) Maximum Dimensions

AGE DATA

CLASSIFICATION

General Classification Mafic

GEOLOGY

Principal Rock Types Gabbro
Host Rocks paragneiss

PREVIOUS EXPLORATION

Mineral Occurrences
Two bodies ~1 km apart. Semims to ms po, py at contact? with paragneiss

MAPPING

GEOCHEMISTRY

Selected Bibliography

Gale, G.H. Baldwin, D.A. and Koo, J. 1980: A geological evolution of Precambrian massive sulfide deposits potential in Manitoba; Manitoba Mines Br., Economic Geology Report ER 79-1, map ER 79-1-23.

Bailes, A.H. 1975: Geology of the Guay-Wimapedi lakes area; Manitoba Mines Br., Publication 75-2.

Baldwin, D.A. Frohlinger, T.G. and Kendrick, G. 1979: Geology of the Nelson House-Pukatawagan region (Burntwood project); Manitoba Min. Res. Div., Geology maps 87-3-1 to 78-3-22

Harrison, J.M. 1949a: Kississing area, Manitoba; Geological Survey of Canada, Map 970A.

McRitchie, W.D. Frohlinger, T.G., Baldwin, D.A. and Zwanzig, H.V. 1973: Burntwood project; Summary of geological fieldwork 1973. Manitoba Mines Br., GP 2/73, p. 9-10.

UTM	Location and Access	SIZE
Easting 384190 Northing 6151746 Zone 14	Locality 1 Locality 2	Area (km2) 202 Maximum Dimensions 45 x 7 km

AGE DATA

CLASSIFICATION

General Classification Mafic

GEOLOGY

Principal Rock Types Gabbro
Host Rocks paragneiss and migmatite

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Gale, G.H. Baldwin, D.A. and Koo, J. 1980: A geological evolution of Precambrian massive sulfide deposits potential in Manitoba; Manitoba Mines Br., Economic Geology Report ER 79-1, map ER 79-1-23.

Bailes, A.H. 1975: Geology of the Guay-Wimapedi lakes area; Manitoba Mines Br., Publication 75-2.

Baldwin, D.A. Frohlinger, T.G. and Kendrick, G. 1979: Geology of the Nelson House-Pukatawagan region (Burntwood project); Manitoba Min. Res. Div., Geology maps 87-3-1 to 78-3-22

Harrison, J.M. 1949a: Kississing area, Manitoba; Geological Survey of Canada, Map 970A.

McRitchie, W.D. Frohlinger, T.G., Baldwin, D.A. and Zwanzig, H.V. 1973: Burntwood project; Summary of geological fieldwork 1973. Manitoba Mines Br., GP 2/73, p. 9-10.

UTM	Location and Access	SIZE
Easting 366691 Northing 6165235 Zone 14	Locality 1 Locality 2	Area (km2) 28 Maximum Dimensions 14 x 2 km

AGE DATA

CLASSIFICATION

General Classification Mafic

GEOLOGY

Principal Rock Types Gabbro
Host Rocks paragneiss

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Gale, G.H. Baldwin, D.A. and Koo, J. 1980: A geological evolution of Precambrian massive sulfide deposits potential in Manitoba; Manitoba Mines Br., Economic Geology Report ER 79-1, map ER 79-1-23.

Bailes, A.H. 1975: Geology of the Guay-Wimapedi lakes area; Manitoba Mines Br., Publication 75-2.

Baldwin, D.A. Frohlinger, T.G. and Kendrick, G. 1979: Geology of the Nelson House-Pukatawagan region (Burntwood project); Manitoba Min. Res. Div., Geology maps 87-3-1 to 78-3-22

Harrison, J.M. 1949a: Kississing area, Manitoba; Geological Survey of Canada, Map 970A.

McRitchie, W.D. Frohlinger, T.G., Baldwin, D.A. and Zwanzig, H.V. 1973: Burntwood project; Summary of geological fieldwork 1973. Manitoba Mines Br., GP 2/73, p. 9-10.

UTM	Location and Access	SIZE
Easting 326592 Northing 6161071 Zone 14	Locality 1 Locality 2	Area (km2) Maximum Dimensions 13X3 km

AGE DATA

CLASSIFICATION

General Classification Mafic

GEOLOGY

Principal Rock Types Gabbro
Host Rocks paragneiss-migmatite

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Gale, G.H. Baldwin, D.A. and Koo, J. 1980: A geological evolution of Precambrian massive sulfide deposits potential in Manitoba; Manitoba Mines Br., Economic Geology Report ER 79-1, map ER 79-1-23.

Bailes, A.H. 1975: Geology of the Guay-Wimapedi lakes area; Manitoba Mines Br., Publication 75-2.

Baldwin, D.A. Frohlinger, T.G. and Kendrick, G. 1979: Geology of the Nelson House-Pukatawagan region (Burntwood project); Manitoba Min. Res. Div., Geology maps 87-3-1 to 78-3-22

Harrison, J.M. 1949a: Kississing area, Manitoba; Geological Survey of Canada, Map 970A.

McRitchie, W.D. Frohlinger, T.G., Baldwin, D.A. and Zwanzig, H.V. 1973: Burntwood project; Summary of geological fieldwork 1973. Manitoba Mines Br., GP 2/73, p. 9-10.

UTM	Location and Access	SIZE
Easting 352673 Northing 6154547 Zone 14	Locality 1 Locality 2	Area (km2) 28 Maximum Dimensions 14 x 2 km

AGE DATA

CLASSIFICATION

General Classification Mafic

GEOLOGY

Principal Rock Types Gabbro
Host Rocks paragneiss-migmatite

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Gale, G.H. Baldwin, D.A. and Koo, J. 1980: A geological evolution of Precambrian massive sulfide deposits potential in Manitoba; Manitoba Mines Br., Economic Geology Report ER 79-1, map ER 79-1-23.

Bailes, A.H. 1975: Geology of the Guay-Wimapedi lakes area; Manitoba Mines Br., Publication 75-2.

Baldwin, D.A. Frohlinger, T.G. and Kendrick, G. 1979: Geology of the Nelson House-Pukatawagan region (Burntwood project); Manitoba Min. Res. Div., Geology maps 87-3-1 to 78-3-22

Harrison, J.M. 1949a: Kississing area, Manitoba; Geological Survey of Canada, Map 970A.

McRitchie, W.D. Frohlinger, T.G., Baldwin, D.A. and Zwanzig, H.V. 1973: Burntwood project; Summary of geological fieldwork 1973. Manitoba Mines Br., GP 2/73, p. 9-10.

UTM	Location and Access	SIZE
Easting 371938 Northing 6165078 Zone 14	Locality 1 Locality 2	Area (km2) 19 Maximum Dimensions 9.5 X 2 km

AGE DATA

CLASSIFICATION

General Classification Mafic

GEOLOGY

Principal Rock Types Gabbro
Host Rocks paragneiss-migmatite

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Gale, G.H. Baldwin, D.A. and Koo, J. 1980: A geological evolution of Precambrian massive sulfide deposits potential in Manitoba; Manitoba Mines Br., Economic Geology Report ER 79-1, map ER 79-1-23.

Bailes, A.H. 1975: Geology of the Guay-Wimapedi lakes area; Manitoba Mines Br., Publication 75-2.

Baldwin, D.A. Frohlinger, T.G. and Kendrick, G. 1979: Geology of the Nelson House-Pukatawagan region (Burntwood project); Manitoba Min. Res. Div., Geology maps 87-3-1 to 78-3-22

Harrison, J.M. 1949a: Kississing area, Manitoba; Geological Survey of Canada, Map 970A.

McRitchie, W.D. Frohlinger, T.G., Baldwin, D.A. and Zwanzig, H.V. 1973: Burntwood project; Summary of geological fieldwork 1973. Manitoba Mines Br., GP 2/73, p. 9-10.

UTM	Location and Access	SIZE
Easting 365983 Northing 6176394 Zone 14	Locality 1 Locality 2	Area (km2) 24 Maximum Dimensions 24 x 1 km

AGE DATA

CLASSIFICATION

General Classification Mafic

GEOLOGY

Principal Rock Types Gabbro
Host Rocks paragneiss/schist

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Gale, G.H. Baldwin, D.A. and Koo, J. 1980: A geological evolution of Precambrian massive sulfide deposits potential in Manitoba; Manitoba Mines Br., Economic Geology Report ER 79-1, map ER 79-1-23.

Bailes, A.H. 1975: Geology of the Guay-Wimapedi lakes area; Manitoba Mines Br., Publication 75-2.

Baldwin, D.A. Frohlinger, T.G. and Kendrick, G. 1979: Geology of the Nelson House-Pukatawagan region (Burntwood project); Manitoba Min. Res. Div., Geology maps 87-3-1 to 78-3-22

Harrison, J.M. 1949a: Kississing area, Manitoba; Geological Survey of Canada, Map 970A.

McRitchie, W.D. Frohlinger, T.G., Baldwin, D.A. and Zwanzig, H.V. 1973: Burntwood project; Summary of geological fieldwork 1973. Manitoba Mines Br., GP 2/73, p. 9-10.

Name of Intrusion		Barnett Lake	Ref ID.	179
UTM		Location and Access		SIZE
Easting	334228	Locality 1 Trans-Hudson Orogen - Kiseynew Domain Locality 2		Area (km2)
Northing	6168203			Maximum Dimensions
Zone	14			
AGE DATA				
Age		Proterozoic		
CLASSIFICATION				
General Classification		Mafic		
Other Classification		Unknown		
GEOLOGY				
Principal Rock Types		Gabbro		
Host Rocks		paragneiss		
Synoptic Geology				
See Baldwin et al. (1979)				
PREVIOUS EXPLORATION				
Assessment Files		not reviewed		
Mineral Occurrences				
not reviewed				
Exploration History				
not reviewed				
MAPPING				
GEOCHEMISTRY				

Selected Bibliography

Baldwin, D.A. Frohlinger, T.G. and Kendrick, G. 1979: Geology of the Nelson House-Pukatawagan region (Burntwood project); Manitoba Min. Res. Div., Geology maps 87-3-1 to 78-3-22

Harrison, J.M. 1949a: Kisseying area, Manitoba; Geological Survey of Canada, Map 970A.

McRitchie, W.D. Frohlinger, T.G., Baldwin, D.A. and Zwanzig, H.V. 1973: Burntwood project; Summary of geological fieldwork 1973. Manitoba Mines Br., GP 2/73, p. 9-10.

Name of Intrusion	Luci Lake	Ref ID.	180
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UTM	Location and Access	SIZE
Easting 347489	Locality 1 Locality 2	Area (km2)
Northing 6063764		Maximum Dimensions 5.5X1.5 km
Zone 14		

AGE DATA

CLASSIFICATION

General Classification	Mafic
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GEOLOGY

Principal Rock Types	Gabbro
Host Rocks	mafic metavolcanic

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Gale, G.H. Baldwin, D.A. and Koo, J. 1980: A geological evolution of Precambrian massive sulfide deposits potential in Manitoba; Manitoba Mines Br., Economic Geology Report ER 79-1, map ER 79-1-23.area, Manitoba; Geological Survey of Canada, Map 970A.

Kalliokoski, J. 1949: Weldon Bay area Manitoba; Geological Survey of Canada, Paper 49-5.

Price, D. 1977: Flin Flon, Snow Lake geology, CIM field trip; Hudson Bay Mining and Smelting Co. Ltd., Flin Flon, Manitoba, 55 p.

Stockwell, C.H. 1960: Flin Flon-Mandy Lake area, Manitoba and Saskatchewan; Geological Survey of Canada, Map 1078A.

UTM	Location and Access	SIZE
Easting 431739 Northing 6057998 Zone 14	Locality 1 Locality 2	Area (km2) Maximum Dimensions ~5.5X3 km

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types	Diorite to gabbro
Host Rocks	dolostone?
Other Igneous Features	Diabasic texture, roof pendants, contact breccia.

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Harrison, J.M. 1949: Geology and mineral deposits of the File-Tramping lakes area, Manitoba; Geological Survey of Canada. Memoir 250, inc. Map 906A.

Gale, G.H. Baldwin, D.A. and Koo, J. 1980: A geological evolution of Precambrian massive sulfide deposits potential in Manitoba; Manitoba Mines Br., Economic Geology Report ER 79-1, map ER 79-1-23.

UTM	Location and Access	SIZE
Easting 470500 Northing 6081000 Zone 14	Accessibility All-weather road Locality 1 Trans-Hudson Orogen - Flin Flon-Snow Lake Domain Locality 2 Snow Lake Belt	Area (km2) Maximum Dimensions Up to 10 km long x 400 m wide

AGE DATA

Age Proterozoic

CLASSIFICATION

Intrusion Type Sill
General Classification Mafic-Ultramafic
Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Pyroxenite, peridotite and melagabbro in ultramafic sill; gabbro in mafic sill
Host Rocks Missi Group metavolcanic and metasedimentary rocks
Igneous Textures Orbicular gabbro in mafic intrusion
Deformation Folded

Synoptic Geology

See Bailes (1985). This occurrence includes both a mafic and an ultramafic sill-like intrusion occurring in the Saw Lake area of the Snow Lake part of the Flin Flon - Snow Lake Belt that are exposed along the Grass River (units 10 and 11 in Bailes, 1985). The intrusions occur along the contact between the metavolcanic rocks and meta-quartzite of the Missi Group (Bailes, 1985). These intrusions may be stratigraphically equivalent to the Josland Lake Sills (Bailes, 1985). The ultramafic sill is principally composed of orthopyroxenite.

PREVIOUS EXPLORATION

Assessment Files Not reviewed

Mineral Occurrences

Not reviewed

Exploration History

Not reviewed

MAPPING

Most Detailed Mapping 1:50 000 scale (Bailes, 1985)
Sketch Map Figure# No
Regional Mapping 1:250 000 scale (Bedrock Geology of Manitoba Compilation Map Series, NTS 63J)
Type Section Figure# No

GEOCHEMISTRY

Geochemistry Base Metal Assay and PGE Analyses
PGE Analyses Numbers 1.0415 to 1.0419

Geochemical Features and PGE Abundances

See Table 1

Selected Bibliography

Bailes, A.H., 1985: Geology of the Saw Lake area; Manitoba Energy and Mines, Geological Report 83-2, 47p. 1 map @ 1:50 000.

Harrison, J.M. 1949: Geology and mineral deposits of the File-Tramping lakes area, Manitoba; Geological Survey of Canada. Memoir 250, inc. Map 906A.

Gale, G.H. Baldwin, D.A. and Koo, J. 1980: A geological evolution of Precambrian massive sulfide deposits potential in Manitoba; Manitoba Mines Br., Economic Geology Report ER 79-1, map ER 79-1-23.

UTM	Location and Access	SIZE
Easting 436784 Northing 6072764 Zone 14	Accessibility All-weather road Locality 1 Trans-Hudson Orogen - Flin Flon-Snow Lake Domain Locality 2 Snow Lake Belt	Area (km2) Maximum Dimensions

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types	Peridotite
Host Rocks	granitic to metasedimentary rocks

PREVIOUS EXPLORATION

Mineral Occurrences

Minor ms po, py stringers assoc. with U M

MAPPING

GEOCHEMISTRY

Selected Bibliography

Gale, G.H. Baldwin, D.A. and Koo, J. 1980: A geological evolution of Precambrian massive sulfide deposits potential in Manitoba; Manitoba Mines Br., Economic Geology Report ER 79-1, map ER 79-1-23.

Frarey, M.J. 1948: Crowduck Bay, Manitoba; Geological Survey of Canada, Paper 48-22.

Davidson, W.L. 1977: Wekusko Lake, Manitoba; Geological Survey of Canada, Map 1423A.

Shanks, R.J. Bailes, A.H. 1977: "Missi Group" rocks Wekusko Lake area; Report of field activities 1977, Manitoba Min. Res. Div., p. 83-87.

UTM	Location and Access	SIZE
Easting 363653	Accessibility All-weather road	Area (km2)
Northing 6065104	Locality 1 Trans-Hudson Orogen - Flin Flon-Snow Lake Domain	Maximum Dimensions 6400X400 m
Zone 14	Locality 2	

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types	Gabbro
Host Rocks	metavolcanic and dioritic rocks

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Podolsky, T. 1951: Preliminary map Cranberry Portage (east half), Manitoba; Geological Survey of Canada, Paper 51-17.
Podolsky, T. 1957: Cranberry Portage (west half); Geological Survey of Canada, map 26 (1957).

UTM		Location and Access		SIZE	
Easting	753519	Accessibility	All-weather road	Area (km2)	0.072
Northing	5610789	Locality 1	Superior Province - southeastern Manitoba	Maximum Dimensions	1.75 km x 50 m
Zone	14	Locality 2	Bird River Sill		

AGE DATA	
Age	Archean

CLASSIFICATION	
Intrusion Type	Sill
Geochemical Classification	Tholeiitic - Low Ti
General Classification	Mafic-Ultramafic
Other Classification	Rifted Archean basement

GEOLOGY	
Principal Rock Types	Peridotite, gabbro

PREVIOUS EXPLORATION	
Assessment Files	not yet reviewed

MAPPING

GEOCHEMISTRY

UTM	Location and Access	SIZE
Easting 317050 Northing 6041400 Zone 15	Accessibility Fixed-wing Locality 1 Superior Province - Gods Lake Domain Locality 2 Max Lake Belt	Area (km2) 75 Maximum Dimensions 1.5 km x 15 km

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Sill
Geochemical Classification Unknown
General Classification Mafic
Other Classification Ocean floor

GEOLOGY

Principal Rock Types Gabbro, subordinate melagabbro, amphibolite, pyroxenite
Host Rocks Basalt and tonalite-granodiorite
Layering Features Local modal layering
Igneous Textures Massive
Other Igneous Features Local basalt xenoliths. A magnetite-rich diorite layer at the north side of the sill is believed to have formed by assimilation of iron formation at the roof of the intrusion.
Metamorphic Grade Amphibolite facies
Deformation Predates two regional folding events.

Synoptic Geology

A massive gabbro sill with only minor amounts of ultramafic (pyroxenite) and feldspar-rich rock types. Appears to postdate an early folding event. Up to 1.5 km wide (true thickness not known) and open along strike beyond type area (Gilbert, 1999). Contains major enclaves of older mafic volcanic breccia and oxide facies iron formation.

PREVIOUS EXPLORATION

MAPPING

Most Detailed Mapping Gilbert (1999)
Sketch Map Figure# Yes
Regional Mapping Hubregtse (1985)
Type Section Figure# No

GEOCHEMISTRY

Geochemistry none

Recommendations

Investigate the degree of chemical interaction between the enclave of oxide facies iron formation and the sill rocks.

Selected Bibliography

Gilbert, H.P., 1999. Southeast Max Lake Area. Manitoba Industry, Trade and Mines, Geological Survey, Report of Activities, p. 84-93 (detailed geology of the central part of the Max Lake Belt with petrological description of the sill); Hubregtse, J.J.M.W., 1985. Geology of the Oxford Lake-Carrot River area. Geological Report GR83-1a, 73p (regional geology at 1:50,000 scale).

UTM	Location and Access	SIZE
Easting 315600 Northing 6042050 Zone 15	Accessibility Fixed-wing Locality 1 Superior Province - Gods Lake Domain Locality 2 Max Lake Belt	Area (km2) 0.6 Maximum Dimensions 0.3 km x 2 km

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Sill
Geochemical Classification Tholeiitic - Low Ti
General Classification Mafic
Other Classification Ocean floor

GEOLOGY

Principal Rock Types Gabbro, subordinate melagabbro, amphibolite, pyroxenite
Host Rocks Basalt and tonalite-granodiorite
Layering Features Local modal layering
Other Igneous Features Cm-scale grain size layering in pyroxenite and local gabbro pegmatite intrusions occur at the northern margin of the sill
Metamorphic Grade Amphibolite facies
Deformation Predates two regional folding events.

Synoptic Geology

A gabbro sill with minor amounts of ultramafic (pyroxenite) and feldspar-rich rock types. Appears to postdate an early folding event. Up to 300 m wide (true thickness not known) and 2 km long (Gilbert, 1999). Emplaced into basalt sequence.

PREVIOUS EXPLORATION

MAPPING

Most Detailed Mapping Gilbert (1999)
Sketch Map Figure# Yes
Regional Mapping Hubregtse (1985)
Type Section Figure# No

GEOCHEMISTRY

Geochemistry Whole-rock Geochemistry, including REE and PGE Analyses
PGE Analyses Numbers 1.0479 to 1.0481
Whole-rock Analyses Numbers 2.352 to 2.354

Geochemical Features and PGE Abundances

Low-Ti tholeiitic composition.

Recommendations

Investigate possible effects of assimilation of proximal oxide facies iron formations.

Selected Bibliography

Gilbert, H.P., 1999. Southeast Max Lake Area. Manitoba Industry, Trade and Mines, Geological Survey, Report of Activities, p. 84-93 (detailed geology of the central part of the Max Lake Belt with petrological description of the sill); Hubregtse, J.J.M.W., 1985. Geology of the Oxford Lake-Carrot River area. Geological Report GR83-1a, 73p (regional geology at 1:50,000 scale).

UTM	Location and Access	SIZE
Easting 359000 Northing 6055000 Zone 15	Accessibility Fixed-wing Locality 1 Superior Province - Gods Lake Domain Locality 2 Munro Lake Greenstone Belt	Area (km2) Maximum Dimensions 10.5m long in the drill core

AGE DATA

Age Proterozoic

CLASSIFICATION

Intrusion Type Sill
General Classification Ultramafic
Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Peridotite
Host Rocks basalt (mafic subvolcanic ?) of Munro Lake greenstone belt (unnamed supracrustal rocks).
Layering Features Unknown
Metamorphic Grade Amphibolite facies

PREVIOUS EXPLORATION

Geophysical Surveys Airborne magnetic/EM and ground magnetic/EM
Assessment Files 93683, 92171, 92172

Mineral Occurrences

Po, Py

Exploration History

also see Vivian Lake (Rifle Lake) record.

In 1977-1979, Manitoba Mineral Res. Ltd. (AF 93683, 92171, 92172) carried out a base metal exploration program in the area between Munro Lake, Colen Lake and Reekie Lake. The company completed an airborne EM survey in the area, a ground horizontal loop EM survey on 8 grid areas and 19 diamond drill holes. Drill core samples were assayed for Au and Ni.

Hole 164-12 is located about ¼ mile south of Munro Lake and 2 miles northeast of Rifle Lake, and it intersected fine-grained basalt from 23.0 to 124.4 feet interval and medium-grained peridotite from 124.4 to 159.0 feet interval. The basalt contains trace py and po generally with a 9.3 feet long sulphides mineralized zone (5-10% po + py in bands and stringers) from 105.0-114.3 feet interval. The peridotite is slightly serpentinized, and contains trace, disseminated po and py.

MAPPING

Regional Mapping 1:250,000 Bedrock Geology Compilation Map Series, Oxford House, NST 53L, 1987; 1:50,000 Munro Lake, 53L/11, Map GR83-1-11.

GEOCHEMISTRY

UTM	Location and Access	SIZE
Easting 383990	Accessibility Scheduled aircraft and boat	Area (km2) 0.6
Northing 5977457	Locality 1 Superior Province - Island Lake Domain	Maximum Dimensions 3 km x200m
Zone 15	Locality 2 Island Lake Greenstone Belt	

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Flow
 Geochemical Classification Komatiitic
 General Classification Ultramafic
 Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Dunite, peridotite, pyroxenite
 Host Rocks Mafic intrusive and extrusive rocks (Hayes River group)/ Conglomerates and sandstones (Island Lake group)
 Layering Features Unknown
 Igneous Textures Olivine ad and orthocumulates; peridotite; spinifex textures in places
 Metamorphic Grade Greenschist facies

Synoptic Geology

A suite of komatiitic ultramafic rocks occur in a stratigraphic position between the Hayes River Group and the Island Lake "Series" of rocks. Spinifex textures have been observed in outcrops adjacent to Linklater Island. The Canadian Nickel Company

A detailed review of the exploration history is given in Mineral Inventory Card 53E/15 Ni1. This property was first staked in 1952 and optioned by the Canadian Nickel Company Limited who conducted an AEM survey over the area in 1957 as Airborne Permit 19 (A.F. 91624). Results of this survey led to the staking of a group of claims that were assigned to the International Nickel Company of Canada, Limited in 1958. Approximately 12 800 m of diamond drilling were completed from 1956 to 1960. In 1972, International Nickel Company of Canada Limited conducted an AEM survey under Airborne Permit 102 (A.F. 91694). In 1976 the status of an Explored Area Lease (E.A.L. 13) was granted for a group of claims and subsequently was converted into a Mineral Lease (M.L.-8) in 1995 (Fig. 7).

PREVIOUS EXPLORATION

Geophysical Surveys Airborne magnetic/EM and ground magnetic/EM
 Assessment Files 91624; 91694

Mineral Occurrences

"Low grade" Ni Cu mineralization. Tonnage and grade is confidential information.

Exploration History

A "low grade" Ni Cu mineralization (Quinn, 1960) located in sheared peridotite east of Linklater Island was drilled (12800 m) by the Canadian Nickel Company in the years 1956 until 1960. The company was granted an Explored Area Lease (E.A.L. 13) for this area that was converted into a Mineral Lease (M.L.-8) in 1995. Grades and tonnages of this mineralization are confidential company-held information.

MAPPING

Most Detailed Mapping Theyer, (1977)
 Regional Mapping Neale, K.L. and Weber, W. (1981), Preliminary Map 1981 I-1, 1:20 000

GEOCHEMISTRY

Geochemistry Whole-rock Geochemistry (no REE)
 PGE Analyses Numbers 1.0424 to 1.0426

Whole-rock Analyses Numbers 2.279 to 2.281

Geochemical Features and PGE Abundances

Komatiites

Recommendations

Analyses for PGE of selected rock samples

Selected Bibliography

- Neale, K.L. and Weber, W. 1981: Island Lake - Cochrane Bay, Manitoba Department of Energy and Mines, Preliminary Map 1981 I-1, 1:20 000
- Quinn, H.A. 1960: Island Lake, Manitoba - Ontario; Geological Survey of Canada, Map 26-1960 with descriptive notes.
- Theyer, P. 1985: Ultramafic rocks of the Island Lake area; Manitoba Energy and Mines, Geological Services, Geological Paper 84-1, 29p.

UTM	Location and Access	SIZE
Easting 442400 Northing 6028500 Zone 15	Accessibility Winter road Locality 1 Superior Province - Gods Lake Domain Locality 2 Sharpe Lake Greenstone Belt	Area (km2) Maximum Dimensions Approx. 560 X 5600m

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Unknown
Geochemical Classification Unknown
General Classification Ultramafic
Other Classification Greenstone belt

GEOLOGY

Principal Rock Types serpentized dunite and clinopyroxene-peridotite
Host Rocks andesitic tuff, andesite of Hayes River Group.
Layering Features Unknown
Metamorphic Grade Greenschist facies
Deformation shearing zone

PREVIOUS EXPLORATION

Geophysical Surveys Airborne magnetic/EM and ground magnetic/EM
Assessment Files 91806

Mineral Occurrences

Pyrite rarely occurs in the talc-carbonate veinlet.
 Drill core samples of the ultramafic rocks from DDH 3 contain 2-16 ppm Cu, 12-300 ppm Zn and 0.13-0.26% Ni.

Exploration History

In 1936, the region was mapped the GSC (Downie, 1938).

In 1971 to 1972, Freeport Canadian Exploration Co. (AF 91806) carried out an exploration program in the area between Webber Lake and Sharpe Lake.

- Conducted airborne magnetic and EM surveys in the area and discovered a very strong magnetic anomaly with good conductors located west of the Sharpe Lake area.
- Completed ground magnetic and EM surveys on C, C2-6 grids located west of the Sharpe Lake. These surveys confirmed the airborne magnetic/EM anomalies. The ground magnetic and EM conductive anomalies are likely caused by the ultramafic body and serpentinization of the rock, respectively.
- Four drill holes (DDH 3, 4, 5 and 6) intersected serpentinized ultramafic rocks on grid C2 west of Sharpe Lake. Pyrite rarely occurs in the talc-carbonate veinlet. Drill core samples of the ultramafic rocks from DDH 3 contain 2-16 ppm Cu, 12-300 ppm Zn and 0.13-0.26% Ni.
- Completed a detailed petrography study (F.J. Wicks, 1972). The primary ultramafic rocks were dunites and clinopyroxene-peridotites which were composed of the primary minerals:olivine, clinopyroxene and chromite. The rocks have been subjected to primary and secondary stage serpentinization.

MAPPING

GEOCHEMISTRY

Selected Bibliography

Southard, G.G., 1977: Exploration history, compilation and review, including exploration data from cancelled assessment files, for the Gods, Knee and Oxford Lake areas, Manitoba; Manitoba Department of Mines, Resources and Environmental Management, Mineral Resources Division, Open File Report 77/5, p. 36 and Map Sheet 53K/5NE.

UTM	Location and Access	SIZE
Easting 366400	Accessibility Fixed-wing	Area (km2) 7
Northing 6082500	Locality 1 Superior Province - Gods Lake Domain	Maximum Dimensions 1 X 7 km
Zone 15	Locality 2 Oxford Lake - Knee Lake Greenstone Belt	

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Sill
 Geochemical Classification Unknown
 General Classification Mafic
 Other Classification Greenstone belt

GEOLOGY

Principal Rock Types gabbro
 Host Rocks Mafic or felsic metavolcanics of Hayes River Group and metamorphosed tuff and lapilli-tuff rocks of Oxford Lake Group
 Layering Features Unknown
 Metamorphic Grade Amphibolite facies
 Deformation strongly deformed.

PREVIOUS EXPLORATION

MAPPING

Most Detailed Mapping 1:50,000 Oxford House, 53L/14, Map GR83-1-6.
 Regional Mapping 1:250,000 Bedrock Geology Compilation Map Series, Oxford House, NST 53L, 1987.

GEOCHEMISTRY

PGE Analyses Numbers 1.0470 to 1.0475
 Whole-rock Analyses Numbers 2.342 to 2.347

Selected Bibliography

Gilbert, H.P., 1985: Geology of the Knee Lake-Gods Lake area; Manitoba Energy and Mines, Geological Services, Geological Report 83-1B, p. 9.

UTM	Location and Access	SIZE
Easting 388600 Northing 6091800 Zone 15	Accessibility Fixed-wing Locality 1 Superior Province - Gods Lake Domain Locality 2 Oxford Lake - Knee Lake Greenstone Belt	Area (km2) 6.5 Maximum Dimensions 1.1 X 6.4km

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Unknown
Geochemical Classification Unknown
General Classification Mafic
Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Hornblende gabbro
Host Rocks Massive basalt, minor andesite and tuff of Hayes River Group
Layering Features Unknown
Metamorphic Grade Amphibolite facies

Synoptic Geology

Barry (1959) described "An elongated intrusion body of hornblende gabbro ---, trends north ---. Textural and compositional variations occur throughout the intrusion. Essentially it is a medium- to coarse-grained, mottled, medium grey rock, composed of 30 to 60 percent plagioclase and 40 to 70 percent hornblende. Outcrops of amphibolite consisting of 70 percent or more hornblende are common.

Thin section sample from a large gabbro body located west of Opischikona Narrows (Gibert, 1985), shows that the amphibole is commonly twinned and poikiloblastic and contains sporadically clinopyroxene relicts and/or brown biotite.

PREVIOUS EXPLORATION

Mineral Occurrences

sulphides

MAPPING

Most Detailed Mapping 1:50,000 Knee Lake, 53L/15, Map GR83-1-7.
Regional Mapping 1:250,000 Bedrock Geology Compilation Map Series, Oxford House, NST 53L, 1987.

GEOCHEMISTRY

PGE Analyses Numbers 1.0470 to 1.0475
Whole-rock Analyses Numbers 2.342 to 2.347

Selected Bibliography

Barry, G.S., 1959: Geology of the Oxford House-Knee Lake area; Manitoba Mines and Natural Resources, Mines Branch, Publication 58-3, p. 26.
 Gilbert, H.P., 1985: Geology of the Knee Lake-Gods Lake area; Manitoba Energy and Mines, Geological Services, Geological Report 83-1B, p. 9.

UTM	Location and Access	SIZE
Easting 381800 Northing 6097700 Zone 15	Accessibility Fixed-wing Locality 1 Superior Province - Gods Lake Domain Locality 2 Oxford Lake - Knee Lake Greenstone Belt	Area (km2) Maximum Dimensions

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Sill
General Classification Mafic
Other Classification Greenstone belt

GEOLOGY

Principal Rock Types gabbro
Host Rocks It is in contact with basalt, andesite and basic tuff of Hayes River Group in northwest, and felsic to intermediate volcanic rocks of Hayes River Group to the south side.
Layering Features Modally graded/weakly differentiated
Igneous Textures Plagioclase megacrysts

Synoptic Geology

Small gabbroic bodies hosted by Hayes River Group metabasalt, including plagioclase megacrystic and glomerocrystic mafic flows. The gabbroic bodies are exposed in outcrops along the south shore of Cinder Lake. The gabbroic rocks display similar compositions to the enclosing basalts and the two rock suites are believed to be coeval and cogenetic. The gabbros also locally contain megacrysts of plagioclase. Diffuse modal grading is developed in some of the plagioclase-phyric gabbro bodies.

PREVIOUS EXPLORATION

Assessment Files Not reviewed

Mineral Occurrences

Not reviewed

Exploration History

Not reviewed

MAPPING

Most Detailed Mapping 1:50 000 scale (Gilbert, 1985)
Sketch Map Figure# No
Regional Mapping 1:250,000 scale (Bedrock Geology of Manitoba Compilation Map Series, NTS 53L)
Type Section Figure# No

GEOCHEMISTRY

Selected Bibliography

Gilbert, H.P., 1985: Geology of the Knee Lake-Gods Lake area; Manitoba Energy and Mines, Geological Services, Geological Report 83-1B, 76p.
 Syme, E.C., Corkery, M.T., Lin, S., Skulski, T., Jiang, D., 1998: Geological investigations in the Knee Lake area, northern Superior Province (parts of NTS 53L/15 and 53M/2); Manitoba Energy and Mines, Geological Services, Report of activities 1998, p. 88-95.

UTM		Location and Access		SIZE	
Easting	426800	Accessibility	Scheduled aircraft and boat	Area (km2)	6
Northing	6069400	Locality 1	Superior Province - Gods Lake Domain	Maximum Dimensions	approx. 500m x 13km
Zone	15	Locality 2	Gods Lake Greenstone Belt		

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Sill
Geochemical Classification Unknown
General Classification Mafic
Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Hornblendite to dioritic rocks
Host Rocks Pillowed basalt and andesite of Hayes River Group.
Layering Features Unknown
Metamorphic Grade Amphibolite facies
Deformation shear zone

Synoptic Geology

The gabbro sill immediately north of Margaret Lake (on Elk Island)

Dix (1951) described:

On Elk Island several intrusive bodies have been traced for considerable distance. They conform in strike to the surrounding volcanics, and may be sills. The sill running through No. 1 and No. 2 shafts varies from a hornblendite with less than 20 percent plagioclase through a diabasic rock with 30-40 percent feldspar in lath-like crystals to a dioritic rock with as much as 60 percent feldspar. At places a shear zone, several feet in width, may be seen along the diorite-greenstone contact and may be confused with intruded tuff beds. A zoning, visible only on weathered surfaces, was noted at several points along this diorite sill -- light- and dark-colored bands several inches in width, somewhat crumpled, run parallel to the general strike. It has been suggested by M.B. Baker (Canadian Institute of Mining and Metallurgy Transactions 1935) that this zoning is due to magmatic differentiation. Epidote in stringers and blebs is also characteristic of the diorite.

The Large sill 3 km north of Elk Island

Dix (1951) described:

A large body of diorite cutting through the narrow part of the northeastern arm of Elk Island has a porphyritic zone paralleling the southern contact, becoming less porphyritic toward the north, and finally appearing to grade into pillowed basalt. The porphyritic nature is due to a development of feldspar phenocrysts as much as one and one half inches in length. The phenocrysts, where most abundant, comprise approximately 80 percent of the rock. The south contact is associated with magnetiferous slaty tuff and chert beds.

Gilbert (1985) described:

The gabbro is gradational northwards into pillow basalt; the southern margin of the sill is in contact with iron formation... Disseminated or strata-bound plagioclase phenocrysts (0.0-3cm) occur in the intrusion; these locally constitute up to 80 percent of anorthositic gabbro layers up to 75 cm thick.

PREVIOUS EXPLORATION**Mineral Occurrences**

The northern tuff is host to the sulphide-gold ore formerly mined by Gods Lake Gold Mines Limited (Baker 1935).

MAPPING

Most Detailed Mapping 1:31,680 Gods Lake Area, Map 47-4, 1948.

Selected Bibliography

Dix, W.F., 1951: Geology of the Gods Lake area, Gods Lake division, Manitoba; Manitoba Mines and Natural Resources, Mines Branch, Preliminary Report, Publication 47-4, p. 5.

Gilbert, H.P., 1985: Geology of the Knee Lake-Gods Lake area; Manitoba Energy and Mines, Geological Services, Geological Report 83-1B, p. 9.

Name of Intrusion	Chataway Lake	Ref ID.	198
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UTM	Location and Access	SIZE
Easting 420000	Accessibility Fixed-wing	Area (km2) 5
Northing 6047900	Locality 1 Superior Province - Gods Lake Domain	Maximum Dimensions 1 km x 5 km
Zone 15	Locality 2 Gods Lake Greenstone Belt	

AGE DATA	
Age	Archean

CLASSIFICATION	
Intrusion Type	Sill
General Classification	Mafic
Other Classification	Greenstone belt

GEOLOGY	
Principal Rock Types	Gabbro
Host Rocks	Basalt, minor andesite, related sills, minor basic tuff of Hayes River Group.
Layering Features	Unknown

PREVIOUS EXPLORATION	
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MAPPING	
Most Detailed Mapping	1:50,000 Gods Lake, 53L/9, Map GR83-1-13.
Regional Mapping	1:250,000 Bedrock Geology Compilation Map Series, Oxford House, NST 53L, 1987.

GEOCHEMISTRY	
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Selected Bibliography

Gilbert, H.P., 1985: Geology of the Knee Lake-Gods Lake area; Manitoba Energy and Mines, Geological Services, Geological Report 83-1B.

UTM	Location and Access	SIZE
Easting 421900 Northing 6046500 Zone 15	Accessibility Fixed-wing Locality 1 Superior Province - Gods Lake Domain Locality 2 Gods Lake Greenstone Belt	Area (km2) 4 Maximum Dimensions approx. 550m x 1.3 km

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Sill
General Classification Mafic
Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Gabbro
Host Rocks Metamorphosed porphyritic rhyolite and dacite, minor related intrusions, pyroclastic rocks and minor mafic flows of Hayes River Group.

Synoptic Geology

Dix (1951) described:

Intrusive diorite outcrops in a long narrow zone on the west side of Knife Lake. The rock here is finer in grain size and contains a uniform percentage of feldspar, as much as 60 percent.

Intrusive diorite, conforming closely to the strike and dip of the basic flows, is difficult to distinguish from amphibolite. The amphibolites seem to represent the coarse-grained centres of the basalt and andesitic volcanics.

PREVIOUS EXPLORATION

Geophysical Surveys Airborne magnetic/EM and ground magnetic/EM
Assessment Files 92076, 93660

Mineral Occurrences

A well-developed zone of pyritized acid lava parallels the diorite for a distance of 1,500 feet along the west side of Knife Lake (Dix, 1951).

Po and py occur in mafic-felsic metavolcanics near north end of gabbro body (Gilbert, 1985).

Exploration History

In 1976-1978, Manitoba Mineral Resources Ltd. (AF 92076) drilled 33 hole in the area with little encouragement and hole 134-32 intersected 50 feet of gabbro.

In 1986-1987, Noranda Exploration Co. Ltd. (AF 93660) mapped and prospected in the area.

MAPPING

Most Detailed Mapping 1:50,000 Gods Lake, 53L/9, Map GR83-1-13.
Regional Mapping 1:250,000 Bedrock Geology Compilation Map Series, Oxford House, NST 53L, 1987.

GEOCHEMISTRY

Selected Bibliography

Dix, W.F., 1951: Geology of the Gods Lake area, Gods Lake division, Manitoba; Manitoba Mines and Natural Resources, Mines Branch, Preliminary Report, Publication 47-4, p. 5.
 Gilbert, H.P., 1985: Geology of the Knee Lake-Gods Lake area; Manitoba Energy and Mines, Geological Services, Geological Report 83-1B, p. 9.

UTM	Location and Access	SIZE
Easting 347700 Northing 6076500 Zone 15	Accessibility Fixed-wing Locality 1 Superior Province - Gods Lake Domain Locality 2 Oxford Lake - Knee Lake Greenstone Belt	Area (km2) 0.2 Maximum Dimensions approx. 400 X 500m

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Unknown
Geochemical Classification Unknown
General Classification Mafic

GEOLOGY

Principal Rock Types Metagabbro
Host Rocks Amphibole-biotite gneiss, feldspathic metagreywacke of Oxford Lake Group
Metamorphic Grade Amphibolite facies

Synoptic Geology

The gabbro intrusion is associated with the late orogenic event that occurred at Oxford Lake (post-Oxford Lake Group gabbro).

The intrusive relationships with Oxford Lake Group metasediments have been observed about 1.5 km west of the Laidlaw Creek outlet (Hubregtse, 1985). Metagreywacke xenoliths were found in the margin of the locally chilled metagabbro. Contact metamorphism of the Oxford Lake Group sediments was noticed in the area where a 5cm wide zone with random growth of amphibole in the metagreywacke borders the gabbro interface.

The petrography of the gabbro in the Oxford Lake-Carrot River region has been described by Hubregtse (1985), it appears that all primary minerals have been completely replaced under the microscope. Brown pleochroic hornblende, (probably pseudomorphous after clinopyroxene), is rimmed by colourless to light green amphibole, which also makes up most of the groundmass, with chlorite and minor quartz. Plagioclase phenocrysts are almost completely replaced by clinozoisite. Ilmenite-magnetite skeletons are surrounded by masses of leucoxene.

PREVIOUS EXPLORATION

MAPPING

Most Detailed Mapping 1:50,000 Oxford House, 53L/14, Map GR83-1-6.
Regional Mapping 1:250,000 Bedrock Geology Compilation Map Series, Oxford House, NST 53L, 1987.

GEOCHEMISTRY

Selected Bibliography

Barry, G.S., 1959: Geology of Oxford House-Knee Lake Area; Manitoba Mines and Natural Resources, Mines Branch, Publication 58-3, p. 26.

Hubregtse, J.J.M.W., 1985: Geology of the Oxford Lake-Carrot River area; Manitoba Energy and Mines, Geological Report 83-1A, p.56.

UTM	Location and Access	SIZE
Easting 330800 Northing 6078600 Zone 15	Accessibility Fixed-wing Locality 1 Superior Province - Gods Lake Domain Locality 2 Oxford Lake - Knee Lake Greenstone Belt	Area (km2) 0.2 Maximum Dimensions 250 X 1000m

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Dyke
Geochemical Classification Unknown
General Classification Mafic
Other Classification Unknown

GEOLOGY

Principal Rock Types Metagabbro
Host Rocks Metasediments and metavolcanics of Oxford Lake Group
Layering Features Unknown
Metamorphic Grade Amphibolite facies
Deformation strongly sheared

Synoptic Geology

The gabbro intrusion is probably associated with the late orogenic event that occurred at Oxford Lake (Gilbert and McShane, 1987). This intrusive relationships with Oxford Lake Group metasediments have been observed on southeast Carghill Island (Hubregtse, 1985).

The metagabbro is generally medium- to coarse-grained and medium to dark greenish grey on both the weathered and fresh surfaces (Barry, 1960). It is composed of approximately equal amounts of hornblende and plagioclase showing ophitic texture; some phases with well-developed lath-shaped plagioclase have an ophitic texture. The gabbro is cut by very fine-grained probably consanguineous diorite dykes and calcite veinlets.

The petrography of the gabbro in the Oxford Lake-Carrot River region has been described by Hubregtse (1985), it appears that all primary minerals have been completely replaced under the microscope. Brown pleochroic hornblende, (probably pseudomorphous after clinopyroxene), is rimmed by colourless to light green amphibole, which also makes up most of the groundmass, with chlorite and minor quartz. Plagioclase phenocrysts are almost completely replaced by clinozoisite. Ilmenite-magnetite skeletons are surrounded by masses of leucoxene.

PREVIOUS EXPLORATION

Mineral Occurrences

Minor disseminated pyrrhotite and chalcopyrite were observed (Barry, 1960)

MAPPING

Most Detailed Mapping 1:50,000 Carghill Island, 53L/13, Map GR83-1-5.
Regional Mapping 1:250,000 Bedrock Geology Compilation Map Series, Oxford House, NST 53L, 1987.

GEOCHEMISTRY

Selected Bibliography

Barry, G.S., 1960: Geology of the western Oxford Lake-Carghill Island area; Manitoba Mines and Natural Resources, Mines Branch, Publication 59-2, p. 17.

Hubregtse, J.J.M.W., 1985: Geology of the Oxford Lake-Carrot River area; Manitoba Energy and Mines, Geological Report 83-1A, p. 56.

Name of Intrusion		Carghill Channel (Oxford Lake West)		Ref ID.	202	
UTM		Location and Access		SIZE		
Easting	324000	Accessibility	Scheduled aircraft and boat		Area (km2)	20
Northing	6081200	Locality 1	Superior Province - Gods Lake Domain		Maximum Dimensions	approx. 1 X 20km
Zone	15	Locality 2	Oxford Lake - Knee Lake Greenstone Belt			
AGE DATA						
Age		Archean				
CLASSIFICATION						
Intrusion Type		Sill				
Geochemical Classification		Unknown				
General Classification		Mafic				
Other Classification		Greenstone belt				
GEOLOGY						
Principal Rock Types		Equigranular gabbro				
Host Rocks		Metamorphosed basalts, andesites and tuffs of Hayes River Group.				
Layering Features		Unknown				
Metamorphic Grade		Amphibolite facies				
PREVIOUS EXPLORATION						
MAPPING						
Most Detailed Mapping		1:50,000 Carghill Island, 53L/13, Map GR83-1-5.				
Regional Mapping		1:250,000 Bedrock Geology Compilation Map Series, Oxford House, NST 53L, 1987.				
GEOCHEMISTRY						

Selected Bibliography

Hubregtse, J.J.M.W., 1985: Geology of the Oxford Lake-Carrot River area; Manitoba Energy and Mines, Geological Report 83-1A, p.14-15.

UTM	Location and Access	SIZE
Easting 380563 Northing 5978296 Zone 15	Accessibility Scheduled aircraft and boat Locality 1 Superior Province - Island Lake Domain Locality 2 Island Lake Greenstone Belt	Area (km2) 0.2 Maximum Dimensions 100m x 200m

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Unknown
Geochemical Classification Komatiitic
General Classification Ultramafic
Other Classification Greenstone belt

GEOLOGY

Principal Rock Types dunite, peridotite
Host Rocks Hayes River group/ Island Lake series
Layering Features Massive/modally uniform
Igneous Textures unknown
Metamorphic Grade Greenschist facies
Deformation sheared

Synoptic Geology

Massive komatiitic dunite and peridotite in badly-exposed contact with detrital sediments of the Island Lake series, gabbro and mafic to intermediate volcanic rocks.

PREVIOUS EXPLORATION

Geophysical Surveys Airborne magnetic/EM and ground magnetic/EM
Assessment Files 91502, 92061

Mineral Occurrences

Disseminated and blebs of pyrite and chalcopyrite in drill core.

Exploration History

The Canadian Nickel Company Limited conducted an airborne EM survey over the Island Lake area in 1957 under Airborne Permit 19 (A.F. 91624). International Nickel Company of Canada Limited conducted an airborne EM survey over the area in 1972 under Airborne Permit 102 (A.F. 91694). Canadian Occidental Petroleum Limited Minerals Division, staked an area west of Linklater Island and conducted geological mapping (1:4800 scale) and a rock geochemical survey in 1974, (A.F. 91502). International Nickel Company of Canada Limited had identified the area as partially underlain by a sulphide-bearing ultramafic complex. The geological and geochemical surveys were followed by an EM and MAG survey in 1975 and by a three-hole (502 m) drilling program in 1976 (A.F. 92061).

MAPPING

Most Detailed Mapping Canadian Occidental Petroleum: AF 91502
Regional Mapping Neale, K.L. and Weber, W. (1981), Preliminary Map 1981 I-1, 1:20 000

GEOCHEMISTRY

Geochemistry Base Metal Assay
Whole-rock Analyses Numbers 2.282

Geochemical Features and PGE Abundances

Komatiites

Recommendations

Analyses for PGE of selected rock samples

Selected Bibliography

Neale, K.L. and Weber, W. 1981: Island Lake - Cochrane Bay, Manitoba Department of Energy and Mines, Preliminary Map 1981 I-1, 1:20 000

Quinn, H.A. 1960: Island Lake, Manitoba - Ontario; Geological Survey of Canada, Map 26-1960 with descriptive notes.

Theyer, P. 1985: Ultramafic rocks of the Island Lake area; Manitoba Energy and Mines, Geological Services, Geological Paper 84-1, 29p.

Theyer, P. (in prep.) Mineral deposits and occurrences in the Island Lake area; Manitoba Industry, Trade and Mines, Geological Services, Mineral Deposit series, Report 32.

UTM	Location and Access	SIZE
Easting 452700 Northing 6065500 Zone 15	Accessibility Scheduled aircraft and boat Locality 1 Superior Province - Gods Lake Domain Locality 2 Gods Lake Greenstone Belt	Area (km2) 2.5 Maximum Dimensions 1.5 X 4 km

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Sill
General Classification Mafic
Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Equigranular gabbro
Host Rocks Metamorphosed basalts, andesites and tuffs of Hayes River Group, and metamorphosed granodiorite, granite and tonalite of Bayly Lake Complex.
Layering Features Unknown
Metamorphic Grade Amphibolite facies

PREVIOUS EXPLORATION

MAPPING

Most Detailed Mapping 1:50,000 Pesanapisko Lake, 53k/12, Map GR83-1-14; 1:50,000 Yellowback Island, 53k/13, Map GR83-1-9.
Regional Mapping 1:50,000 Pesanapisko Lake, 53k/12, Map GR83-1-14; 1:50,000 Yellowback Island, 53k/13, Map GR83-1-9.

GEOCHEMISTRY

PGE Analyses Numbers 1.0392 to 1.0397
Whole-rock Analyses Numbers 2.273 to 2.275

Selected Bibliography

Gilbert, H.P., 1985: Geology of the Knee Lake-Gods Lake area; Manitoba Energy and Mines, Geological Services, Geological Report 83-1B, p. 20.

UTM	Location and Access	SIZE
Easting 444700 Northing 6086400 Zone 15	Accessibility Fixed-wing Locality 1 Superior Province - Gods Lake Domain Locality 2 Cross Lake Greenstone Belt	Area (km2) 1.7 Maximum Dimensions 900 X 2700 m

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Sill
Geochemical Classification Unknown
General Classification Mafic
Other Classification Unknown

GEOLOGY

Principal Rock Types Equigranular gabbro, porphyritic gabbro.
Host Rocks Amphibolite and amphibolite schist of Hayes River Group, and gneissoid tonalite of Bayly Lake Complex.

Synoptic Geology

Plagioclase megacrysts and aggregates up to 15 cm in diameter occur in one sill close to the northwest end of Yellowback Island (2.6 km south from the north shore of Gods Lake).

PREVIOUS EXPLORATION

MAPPING

Most Detailed Mapping 1:50,000 Yellowback Island, 53k/13, Map GR83-1-9.
Regional Mapping 1:50,000 Yellowback Island, 53k/13, Map GR83-1-9.

GEOCHEMISTRY

PGE Analyses Numbers 1.0392 to 1.0397
Whole-rock Analyses Numbers 2.273 to 2.275

Selected Bibliography

Gilbert, H.P., 1985: Geology of the Knee Lake-Gods Lake area; Manitoba Energy and Mines, Geological Services, Geological Report 83-1B, p. 20.

UTM	Location and Access	SIZE
Easting 423600 Northing 6089500 Zone 15	Accessibility Fixed-wing Locality 1 Superior Province - Gods Lake Domain Locality 2 Gods Lake Greenstone Belt	Area (km2) 0.5 Maximum Dimensions 400 X 2000m

AGE DATA
Age Archean

CLASSIFICATION
Intrusion Type Sill Geochemical Classification Unknown General Classification Mafic Other Classification Greenstone belt

GEOLOGY
Principal Rock Types Equigranular gabbro Host Rocks mafic to felsic metasedments and mafic to intermediate metavolcanics of Hayes River Group.

PREVIOUS EXPLORATION

MAPPING
Most Detailed Mapping 1:50,000 Mclvor Lake, 53L/16, Map GR83-1-9. Regional Mapping 1:250,000 Bedrock Geology Compilation Map Series, Oxford House, NST 53L, 1987.

GEOCHEMISTRY

Selected Bibliography

Gilbert, H.P., 1985: Geology of the Knee Lake-Gods Lake area; Manitoba Energy and Mines, Geological Services, Geological Report 83-1B, p. 20.

UTM	Location and Access	SIZE
Easting 400629 Northing 5958974 Zone 15	Accessibility Scheduled aircraft and boat Locality 1 Superior Province - Island Lake Domain Locality 2 Island Lake Greenstone Belt	Area (km2) 0.4 Maximum Dimensions 2 km X 200m

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Sill

General Classification Mafic-Ultramafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Megacrystic dunite; gabbro

Host Rocks Mafic volcanic rocks

Layering Features Local modal layering

Igneous Textures Ovoid to subhedral olivine pseudomorphs up to 3 cm in diameter, vaguely size-sorted; might be metamorphic olivines

Metamorphic Grade Greenschist facies

Synoptic Geology

An elongate body of olivine megacrystic dunite occurs as a sill between basalt and gabbro. In petrographic sections an approximately 15 % of anomalous chlorite may possibly be after plagioclase with the result that this rock may have been originally melagabbro.

PREVIOUS EXPLORATION

Geophysical Surveys Airborne magnetic/EM and ground magnetic/EM

Assessment Files A.F.91624; 91684; 91694; 92336

Mineral Occurrences

Ministik gold mine, also located on Henderson Island, but fracture-bound in younger tonalite.

Exploration History

Sherritt Gordon Mines Limited conducted an airborne EM and MAG survey over the area in 1970 under Airborne Permit 91 (A.F. 91684). International Nickel Company of Canada Limited conducted an AEM survey over the area in 1972 under Airborne Permit 102 (A.F. 91694). Barringer Research Limited conducted a combined MAG and EM survey over part of the occurrence on behalf of Canadian Occidental Petroleum Limited in 1974 (A.F. 92244). The property was restaked, trenched and sampled in 1978 (A.F. 92336), geologically investigated in 1979 (Theyer, 1979) and geologically mapped in 1983 (Gilbert and Weber, 1983). In 1984, the Midway Lake Minerals one

MAPPING

Most Detailed Mapping Gilbert, H.P and Weber, W. 1983.

Regional Mapping Gilbert, H.P and Weber, W. 1983

GEOCHEMISTRY

Geochemistry none

PGE Analyses Numbers 1.0420 to 1.0421

Whole-rock Analyses Numbers 2.279 to 2.281

Recommendations

No indications of sulphides and/or chromite within the mafic and ultramafic rock sequence. Poor prospect for PGE exploration.

Selected Bibliography

Gilbert, H.P and Weber, W. 1983: Island Lake project (parts of 53E/15, and 16); in Manitoba Department of Energy and Mines, Mineral Resources Division, Report of Field Activities 1983.

UTM	Location and Access	SIZE
Easting 383800	Accessibility Scheduled aircraft and boat	Area (km2) 0.3
Northing 5973500	Locality 1 Superior Province - Island Lake Domain	Maximum Dimensions 1500 m x 20 m
Zone 15	Locality 2 Island Lake Greenstone Belt	

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Unknown

General Classification Ultramafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Peridotite

Host Rocks Gabbro

Layering Features Unknown

Metamorphic Grade Greenschist facies

Synoptic Geology

Serpentinized peridotite outcropping on islands and reefs adjacent to gabbro but separated from it by a few tens of metres water.

PREVIOUS EXPLORATION

Geophysical Surveys Airborne magnetic and EM

Assessment Files 91624; 91694

Mineral Occurrences
none known

Exploration History

Canadian Nickel Company Limited conducted an AEM survey over the Island Lake area in 1957 under Airborne Permit 19 (A.F. 91624). International Nickel Company of Canada Limited conducted an AEM survey over the area in 1972 under Airborne Permit 102 (A.F. 91694)

MAPPING

Most Detailed Mapping Gilbert, H.P and Weber, W. 1983.

Sketch Map Figure# No

Regional Mapping Gilbert, H.P and Weber, W. 1983.

Type Section Figure# No

GEOCHEMISTRY

Geochemistry none

Whole-rock Analyses Numbers 2.282

Recommendations

No indications of sulphides and/or chromite within the mafic and ultramafic rock sequence. Poor prospect for PGE exploration.

Selected Bibliography

Gilbert, H.P and Weber, W. 1983: Island Lake project (parts of 53E/15, and 16); in Manitoba Department of Energy and Mines, Mineral Resources Division, Report of Field Activities 1983.

UTM	Location and Access	SIZE
Easting 392579	Accessibility Scheduled aircraft and boat	Area (km2) 0.01
Northing 5967934	Locality 1 Superior Province - Island Lake Domain	Maximum Dimensions 10 m x 100 m
Zone 15	Locality 2 Island Lake Greenstone Belt	

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Sill
 Geochemical Classification Unknown
 General Classification Mafic-Ultramafic
 Other Classification Greenstone belt

GEOLOGY

Principal Rock Types serpentized peridotite; talc schist; gabbro
 Host Rocks gabbro
 Layering Features Other
 Metamorphic Grade Greenschist facies
 Deformation shearfolding
 Synoptic Geology
 up to 10 m thick layer of serpentized peridotite with a sheared contact to adjacent gabbro.

PREVIOUS EXPLORATION

Geophysical Surveys Airborne magnetic and EM
 Assessment Files 91624

Mineral Occurrences
 none known

Exploration History
 none on record

MAPPING

Most Detailed Mapping Weber et al. (1982) Preliminary map 1982 I-4.
 Sketch Map Figure# No
 Regional Mapping Weber et al. (1982) Preliminary map 1982 I-4.
 Type Section Figure# No

GEOCHEMISTRY

Geochemistry none
 Whole-rock Analyses Numbers 2.279 to 2.281

Recommendations

not a target for the exploration of PGE

Selected Bibliography

Weber, W., Gilbert, H.P., Neale, K.L. and McGregor, C.R. 1982: Island Lake Project; in Manitoba Mineral Resources Division, Report of Field Activities, 1982, p. 34-43.

<div>UTM</div> <div><div><div>Easting</div><div>391228</div></div><div><div>Northing</div><div>5964198</div></div><div><div>Zone</div><div>15</div></div></div>	<div>Location and Access</div> <div><div><div>Accessibility</div><div>Scheduled aircraft and boat</div></div><div><div>Locality 1</div><div>Superior Province - Island Lake Domain</div></div><div><div>Locality 2</div><div>Island Lake Greenstone Belt</div></div></div>	<div>SIZE</div> <div><div>Area (km2)</div><div>Maximum Dimensions</div></div>
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<div>AGE DATA</div> <div><div>Age</div><div>Archean</div></div>

CLASSIFICATION

GEOLOGY

PREVIOUS EXPLORATION

<div>Geophysical Surveys</div>	<div>Airborne magnetic and EM</div>
<div>Assessment Files</div>	<div>91624</div>

MAPPING

GEOCHEMISTRY

UTM	Location and Access	SIZE
Easting 426644 Northing 5965183 Zone 15	Accessibility Scheduled aircraft and boat Locality 1 Superior Province - Island Lake Domain Locality 2 Island Lake Greenstone Belt	Area (km2) 4 Maximum Dimensions 4km x 1 km

AGE DATA
Age Archean

CLASSIFICATION
Intrusion Type Sill Geochemical Classification Unknown General Classification Mafic-Ultramafic Other Classification Greenstone belt

GEOLOGY
Principal Rock Types peridotite Host Rocks Polymictic conglomerate of the Island Lake "Series". Most of the occurrence covered by water. Layering Features Unknown Metamorphic Grade Greenschist facies

Synoptic Geology
 DDH Rita 1 intersected dark coloured, graphitic, mafic volcanic rocks and 96 m of ultramafic rocks. DDH Rita 2 intersected mafic volcanic rocks and 46 m of ultramafic rocks (A.F. 92288). DDH 6 intersected graphitic tuff and quartzite (A.F. 91402).

PREVIOUS EXPLORATION
Geophysical Surveys Airborne magnetic and EM Assessment Files 91624; 91144; 91402

Mineral Occurrences
 In places concentrations of up to 3% disseminated pyrite and pyrrhotite within peridotite.

Exploration History
 Canadian Nickel Company Limited conducted an AEM survey over the Island Lake area in 1957 under Airborne Permit 19 (A.F. 91624). Canadian Aero Mineral Surveys Limited carried out an airborne EM and MAG survey over the area on behalf of Kerr Addison Mines Limited in 1965 (A.F. 91144). Kerr Addison Mines Limited drilled a hole (20.5 m) to test an EM and MAG anomaly (A.F. 91402) The Rita group of claims was first staked in 1970 and assigned to Cominco Limited. Sherritt Gordon Mines Limited conducted an airborne EM and MAG survey over the area in 1970 under Airborne Permit 91 (A.F. 91684). International Nickel Company of Canada Limited conducted an AEM survey over the area in 1972 under Airborne Permit 102 (A.F. 91694). Cominco Limited conducted a VLF-EM and MAG survey in the area in 1972 (A.F. 92324); and drilled two holes (338 m) in 1974 (A.F. 92288).

MAPPING

GEOCHEMISTRY
Whole-rock Analyses Numbers 2.282

Recommendations
 Analyze existing rock samples for PGE.

Selected Bibliography
 Gilbert, H.P. 1985: Loonfoot Island; Manitoba Energy and Mines, Preliminary Map 1985 I-3, 1:20 000 scale.
 Theyer, P. 1980: Ultramafic rocks, nickel occurrences and interpreted stratigraphic relationships; Manitoba Energy and Mines,

Mineral Resources Division, Map ER79-2-1 to ER79-2-13, Scale 1:50 000.

Theyer, P. 1985: Ultramafic rocks of the Island Lake area; Manitoba Energy and Mines, Geological Services, Geological Paper 84-1, 29p.

UTM	Location and Access	SIZE
Easting 429530 Northing 59557537 Zone 15	Accessibility Scheduled aircraft and boat Locality 1 Superior Province - Island Lake Domain Locality 2 Island Lake Greenstone Belt	Area (km2) 2.1 Maximum Dimensions 7 km x 0.3 km

AGE DATA
Age Archean

CLASSIFICATION
Intrusion Type Sill Geochemical Classification Unknown General Classification Ultramafic Other Classification Greenstone belt

GEOLOGY
Principal Rock Types peridotite; pyroxenite; melagabbro Host Rocks mafic to felsic extrusive and intrusive derivatives/ epiclastic sedimentary rocks/ argillite and chert Layering Features Modally graded/weakly differentiated Igneous Textures Tectonically disturbed suite of gabbro, melagabbro, pyroxenite peridotite, dunite. Other Igneous Features 2 to 3 cm thick chromite layer located between gabbro and pyroxenite. Indistinct acicular lamellae in one outcrop tentatively interpreted as spinifex textures. Metamorphic Grade Greenschist facies Deformation shear folding Synoptic Geology Several rock lenses varying from olivine cumulate to peridotite, pyroxenite and melagabbro are included in this cluster. The occurrence of chromite as disseminations and as a layer between melagabbro and pyroxenite indicates modal stratification.

PREVIOUS EXPLORATION
Geophysical Surveys Airborne magnetic and EM Assessment Files 91624; (91652 report, 91144 map) Mineral Occurrences Chromite, disseminated pyrite, pyrrhotite

Exploration History Canadian Nickel Company Limited conducted an AEM survey over the Island Lake area in 1957 under Airborne Permit 19 (A.F. 91624). Godard (1963b) reported on the prospecting activities in this area. Canadian Aero Mineral Surveys Limited carried out an airborne EM and MAG survey over the area on behalf of Kerr Addison Mines Limited in 1965 (A.F. 91652 report; A.F. 91144 map). Kerr Addison Mines Limited conducted an airborne EM and MAG survey over the area in 1965 (A.F. 91144). International Nickel Company of Canada Limited conducted an AEM survey over the area in 1972 under Airborne Permit 102 (A.F. 91694).

MAPPING
Most Detailed Mapping Theyer, 1985 Regional Mapping Theyer, 1985

GEOCHEMISTRY
Geochemistry Whole-rock Geochemistry (no REE) Whole-rock Analyses Numbers 2.279 to 2.281

Recommendations

Disseminated chromite and chromite layers plus disseminated pyrite and pyrrhotite indicate that this area merits further investigation for PGE

Selected Bibliography

Theyer, P. 1985: Ultramafic rocks of the Island Lake area; Manitoba Energy and Mines, Geological Services, Geological Paper 84-1, 29p.

UTM	Location and Access	SIZE
Easting 444380 Northing 5954000 Zone 15	Accessibility Scheduled aircraft and boat Locality 1 Superior Province - Island Lake Domain Locality 2 Island Lake Greenstone Belt	Area (km2) 0.9 Maximum Dimensions 180 m x 50 m

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Flow
Geochemical Classification Komatiitic
General Classification Ultramafic
Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Ultramafic to mafic sill and flows including melagabbro, peridotite, olivine cumulate, spinifex textured flow top breccia
Host Rocks Island wholly underlain by rock types enumerated above
Layering Features Other
Igneous Textures spinifex textured flow top breccia and rubble
Other Igneous Features Two discrete flows including massive cumulate, spinifex textured and flow top breccia were distinguished.
Metamorphic Grade Greenschist facies
Deformation none apparent

Synoptic Geology

Island underlain by melagabbro, subhedral megacrystic olivine cumulate capped by spinifex textured flow rocks and spectacular outcrops of flow top breccia. A noticeable increase in the length of spinifex lamellae to the south is interpreted to mean that stratigraphic tops are to the north. The occurrence of pyroxene and olivine spinifex suggests that two separate ultramafic flows are present.

PREVIOUS EXPLORATION

Geophysical Surveys Airborne magnetic and EM
Assessment Files 91624

Mineral Occurrences
 none known

Exploration History
 none

MAPPING

Most Detailed Mapping Theyer (1985)
Regional Mapping Godard (1963)

GEOCHEMISTRY

Geochemistry none
Whole-rock Analyses Numbers 2.282

Recommendations

No indication of sulphides or chromite. Poor exploration target for PGE.

Selected Bibliography

Godard, J.D. 1963: Geology of the Sagawitchewan Bay area; Manitoba Mines Branch, Publication 60-2.

Theyer, P. 1985: Ultramafic rocks of the Island Lake area; Manitoba Energy and Mines, Geological Services, Geological Paper 84-1, 29p.

UTM	Location and Access	SIZE
Easting 421250 Northing 5959500 Zone 15	Accessibility Scheduled aircraft and boat Locality 1 Superior Province - Island Lake Domain Locality 2 Island Lake Greenstone Belt	Area (km2) 28 Maximum Dimensions 2 km x 14 km

AGE DATA
Age Archean

CLASSIFICATION
Intrusion Type Sill General Classification Mafic Other Classification Greenstone belt

GEOLOGY
Principal Rock Types gabbro; melagabbro; leucogabbro; granophyric gabbro Host Rocks basalt (Hayes River group) Layering Features Local modal layering Metamorphic Grade Greenschist facies

Synoptic Geology
 Massive, large multiphase gabbro body containing enclaves of basalt, greywacke, conglomerate and chert interpreted as roof pendants (Gilbert, 1985).

PREVIOUS EXPLORATION
Geophysical Surveys Airborne magnetic and EM Assessment Files 91624 Mineral Occurrences Sporadic occurrences of disseminated pyrite. Exploration History none

MAPPING
Most Detailed Mapping Gilbert (1985) Regional Mapping Gilbert (1985)

GEOCHEMISTRY
PGE Analyses Numbers 1.1407 Whole-rock Analyses Numbers 2.279 to 2.281

Recommendations
 Detailed prospecting for sulphides and /or chromite. Geological investigations to determine the main lithologies and magmatic history of the gabbroic intrusion.

Selected Bibliography
 Gilbert, H.P. 1985a: Geological investigations in the Island Lake-Stevenson Lake area; in Manitoba Energy and Mines, Geological Services, Mines Branch, Mineral Resources Division, Report of Field Activities, 1985, p. 187-199.
 Gilbert, H.P. 1985b: Loonfoot Island; Manitoba Energy and Mines, Preliminary Map 1985 I-3, 1:20 000 scale.

UTM	Location and Access	SIZE
Easting 397333 Northing 5961408 Zone 15	Accessibility Scheduled aircraft and boat Locality 1 Superior Province - Island Lake Domain Locality 2 Island Lake Greenstone Belt	Area (km2) 14 Maximum Dimensions 14 km x 1 km

AGE DATA
Age Archean

CLASSIFICATION
Intrusion Type Unknown General Classification Mafic Other Classification Greenstone belt

GEOLOGY
Principal Rock Types Gabbro; hornblendite; minor quartz diorite; very minor peridotite. Host Rocks Mafic volcanic rocks Layering Features Local modal layering Igneous Textures In places acicular to plumose hornblende (after pyroxene) akin to harrisitic textures. Metamorphic Grade Greenschist facies Synoptic Geology Extensive gabbroic sill with ultramafic and intermediate enclaves. Scarce sulphides observed.

PREVIOUS EXPLORATION
Geophysical Surveys Airborne magnetic and EM Assessment Files 91624 Mineral Occurrences none known Exploration History none

MAPPING
Most Detailed Mapping Gilbert and Weber (1983) Regional Mapping Gilbert and Weber (1983)

GEOCHEMISTRY
Geochemistry none Whole-rock Analyses Numbers 2.279 to 2.281

Recommendations
 This gabbroic sill has seen only superficial investigations of its mineral potential. The scarcity of sulphides and or chromite appear to suggest that it is an exploration target of low priority.

Selected Bibliography
 Gilbert, H.P and Weber, W. 1983: Island Lake project (parts of 53E/15, and 16); in Manitoba Department of Energy and Mines, Mineral Resources Division, Report of Field Activities 1983.

UTM	Location and Access	SIZE
Easting 424427	Accessibility Scheduled aircraft and boat	Area (km2) 0.3
Northing 5963947	Locality 1 Superior Province - Island Lake Domain	Maximum Dimensions 1.2 km x 0.25 km
Zone 15	Locality 2 Island Lake Greenstone Belt	

AGE DATA
Age Archean

CLASSIFICATION
Intrusion Type Sill
General Classification Ultramafic
Other Classification Greenstone belt

GEOLOGY
Principal Rock Types Olivine cumulate (dunite); peridotite
Host Rocks Basalt
Layering Features Other
Other Igneous Features Abundant ilmenite
Metamorphic Grade Greenschist facies
Deformation Shear zones
Synoptic Geology
Norrie Island ultramafic is a homogeneous, serpentinized olivine cumulate and peridotite characterized by zones with abundant ilmenite and hematite and surrounded by intensely carbonatized host rocks.

PREVIOUS EXPLORATION
Geophysical Surveys Airborne magnetic and EM
Assessment Files 91624
Mineral Occurrences
none
Exploration History
none specific to this body

MAPPING
Most Detailed Mapping Gilbert (1984)
Regional Mapping Gilbert (1984)

GEOCHEMISTRY
Geochemistry none
Whole-rock Analyses Numbers 2.282

Recommendations

Absence of sulphides and/or chromite makes this a target of low priority for PGE exploration.

Selected Bibliography

Gilbert, H.P. 1984: Island Lake project; in Manitoba Energy and Mines, Mineral Resources Division, Report of Field Activities, 1984, p. 120-125.

Gilbert, H.P. 1984: Loonfoot Island, Manitoba Department of Energy and Mines, Preliminary Map 1984 I-1, 1:20 000.

Theyer, P. 1980: Stratigraphic setting of selected ultramafic bodies in the Superior and Churchill provinces and certain aspects of nickel-copper deposits in the Thompson Nickel Belt; Manitoba Energy and Mines, Mineral Resources Division, Economic

Geology Report ER79-2, 71p.

Theyer, P. 1985: Ultramafic rocks of the Island Lake area; Manitoba Energy and Mines, Geological Paper 84-1, 29p.

UTM	Location and Access	SIZE
Easting 363200 Northing 6071900 Zone 15	Accessibility Fixed-wing Locality 1 Superior Province - Gods Lake Domain Locality 2 Oxford Lake - Knee Lake Greenstone Belt	Area (km2) 7 Maximum Dimensions approx. 1 x 7 km (or 0.9 x 22 km long)

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Sill
General Classification Mafic
Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Gabbro (diabase)
Host Rocks south in contact with pillowed porphyritic andesite and basalt of Hayes River Group, north in contact with metasediments of Oxford lake Group.
Layering Features Massive/modally uniform
Metamorphic Grade Amphibolite facies

Synoptic Geology

The gabbro is a dark greenish grey, mottled and massive rock with fine- to coarse-grained textures. It has sill-like body which is interbanded with sediments (Barry, 1959). Hornblende and plagioclase generally occur in more or less equidimensional grains, but distinctive ophitic textures are characteristic of the coarse-grained plagioclase phases. Microscopically, plagioclase laths occur in a groundmass of interstitial hornblende.

Several outcrops show typical streaky or lenticular differentiated bands, which may be easily mistaken for volcanic flow structures but on closer examination may identified as irregular horizons of alteration in an otherwise homogeneous hornblende gabbro.

Gilbert (1985) considered the rock in the south of Mickikanes Lake, is massive and foliated porphyritic diabase.

PREVIOUS EXPLORATION

MAPPING

Most Detailed Mapping 1:50,000 Oxford House, 53L/14, Map GR83-1-6.
Regional Mapping 1:250,000 Bedrock Geology Compilation Map Series, Oxford House, NST 53L, 1987.

GEOCHEMISTRY

Selected Bibliography

Barry, G.S., 1959: Geology of the Oxford House-Knee Lake area; Manitoba Mines and Natural Resources, Mines Branch, Publication 58-3, p. 26-27.
 Gilbert, H.P., 1985: Geology of the Knee Lake-Gods Lake area; Manitoba Energy and Mines, Geological Services, Geological Report 83-1B, p. 48-51.

UTM	Location and Access	SIZE
Easting 403029 Northing 5958352 Zone 15	Accessibility Scheduled aircraft and boat Locality 1 Superior Province - Island Lake Domain Locality 2 Island Lake Greenstone Belt	Area (km2) 0.5 Maximum Dimensions 1 km x 0.5 km

AGE DATA
Age Archean

CLASSIFICATION
Intrusion Type Unknown General Classification Ultramafic Other Classification Greenstone belt

GEOLOGY
Principal Rock Types peridotite Host Rocks granite gneiss, diorite, hornblende schist Layering Features Unknown Igneous Textures not known Other Igneous Features not known Metamorphic Grade Greenschist facies

Synoptic Geology
 Drill hole intersections of narrow (tens of centimetres) layers of serpentinized peridotite interlayered with granitic gneiss, dioritic gneiss and hornblende schist.

PREVIOUS EXPLORATION
Geophysical Surveys Airborne magnetic and EM Assessment Files 91624; 91684; 91156;
Mineral Occurrences Up to 7% pyrrhotite and pyrite occur adjacent to the serpentinized peridotite in amphibolite and hornblende schist.

Exploration History
 A complete review of the exploration history is given in Mineral Inventory Card 53E/16 Ni2. First staking of this property was by A.E. Storey in 1935; the claims were cancelled in 1936. Canadian Nickel Company Limited conducted an AEM survey in 1957 (A.F. 91624). Trenching and pitting were undertaken from 1959 to 1965 (Mineral Inventory Card 53E/16 Ni2). Phelps Dodge Corporation of Canada Limited optioned the property and conducted a 7-hole (197 m) drilling program in 1960 (A.F. 91156). Sherritt Gordon Mines Limited conducted an airborne EM and MAG survey over the area in 1970 under Airborne Permit 91 (A.F. 91684). International Nickel Company of Canada Limited conducted an AEM survey over the area in 1972 under Airborne Permit 102 (A.F. 91694). Barringer Research Limited conducted an HLEM and MAG survey in 1974.

MAPPING
Most Detailed Mapping Theyer (in press) Sketch Map Figure# No Regional Mapping Gilbert, (1985) Type Section Figure# No

GEOCHEMISTRY
Geochemistry Base Metal Assay Whole-rock Analyses Numbers 2.282

Recommendations

none

Selected Bibliography

Gilbert, H.P. 1985: Meegeesiwaseeson Island; Manitoba Energy and Mines, Preliminary Map 1985 I-4, 1:20 000.

Theyer, P. (in press): Mineral deposits and occurrences in the Island Lake area; Mineral Deposit Series Report 32, Manitoba Industry, Trade and Mines, Geological Services.

UTM	Location and Access	SIZE
Easting 538582	Accessibility Fixed-wing	Area (km2)
Northing 6497350	Locality 1 Trans-Hudson Orogen - Seal River Domain	Maximum Dimensions
Zone 14	Locality 2	

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types Altered leucogabbro

PREVIOUS EXPLORATION

Mineral Occurrences

Cu, Ni, disseminated sulphides in the altered leuco gabbro

MAPPING

Regional Mapping Map 64J, Tadoule Lake (topo), SC. 1:250 000; Surv. & Map. Br., Ottawa. Map 30-1962, Tadoule Lake (Geol), sc. 1:253 440 - accomp. marginal notes by Davison (1962); Geol. Surv. Can.

GEOCHEMISTRY

Selected Bibliography

Jenness, S.E., 1962, Field Work, 1961; Geological Survey of Canada., Information. Circular No. 5, P. 43.

UTM	Location and Access	SIZE
Easting 432129 Northing 6296871 Zone 15	Accessibility Fixed-wing Locality 1 Trans-Hudson Orogen - Leaf Rapids Domain Locality 2 Leaf Rapids Greenstone Belt	Area (km2) Maximum Dimensions

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Unknown
Geochemical Classification Unknown
General Classification Ultramafic
Other Classification Unknown

GEOLOGY

Principal Rock Types Serpentinized peridotite and proxenite
Host Rocks Precambrian gneiss, gabbro, diorite and granite
Layering Features Unknown
Metamorphic Grade Not defined

PREVIOUS EXPLORATION

Geophysical Surveys None
Assessment Files 91702, 91737

Mineral Occurrences

The peridotite and pyroxenite have lower nickel contents from trace amount to 0.05% in the drill core samples. The gabbro contains 0.01-0.03% Cu in the drill core samples.
 Po, Pent, Cpy for 90% of core between 807.5' and 808.3' in the DDH #6. elsewhere the peridotite contains trace amounts to few percent of sulphides in other parts of the drill core.

Exploration History

In 1961-1964, Kennco Exploration, (Canada) Ltd. completed airborne magnetic, ground gravity and magnetic surveys, and 17 drill holes in the area.

MAPPING

Sketch Map Figure# No
Regional Mapping 1:250,000 Scale, Kettle Rapids, NTS 54D; Man. Energy and Mines, Geol. Services, Bedrock Geology Compilation Map, Map 54D.
Type Section Figure# No

GEOCHEMISTRY

Geochemistry none

UTM		Location and Access		SIZE	
Easting	673050	Accessibility	All-weather road	Area (km²)	22.5
Northing	6235120	Locality 1	Superior Boundary Zone and Pikwitonei Domain	Maximum Dimensions	approx. 3 x 10 km
Zone	14	Locality 2	Thompson Nickel Belt		

AGE DATA

Age Archean

CLASSIFICATION

Geochemical Classification Unknown
General Classification Mafic-Ultramafic
Other Classification Unknown

GEOLOGY

Principal Rock Types Anorthosite, anorthositic gabbro and olivine peridotite
Host Rocks Amphibolite of Sickel Metamorphic Suite, Archean migmatite, hornblende and hornblende-biotite gneiss and Proterozoic and/or Archean migmatite, migmatitic Gneiss.
Layering Features Local modal layering
Igneous Textures Non-foliated phases contain well preserved pseudomorphs of original plagioclase megacrysts.
Other Igneous Features Most the rocks in the complex were recrystallized during regional metamorphic events.
Metamorphic Grade Granulite facies
Deformation Weakly foliated and bent twin lamellae in the plagioclase.

Synoptic Geology

Corkery (1985) concluded:

The anorthosite complex forms a north-northeast-trending body along the northwest shore of Split Lake within Indian Reserve 171. The main body is a dome with an anorthosite core surrounded by layered gabbroic anorthosite and anorthositic gabbro. Gabbro, and ultramafic inclusions and layers, were also observed in the border facies. In the southwestern portion of the complex, clotted tonalite to granodiorite dykes and apophyses units cut the anorthositic rocks. Locally the tonalite becomes abundant enough to produce agmatites of the anorthosite. Diabase dykes and irregular granitic dykes form late intrusions. The south end of the complex is truncated by a northeast-trending migmatite belt containing anorthosite inclusions. The inclusions range in size from a few centimetres to tens of metres and decrease in abundance to the northeast. Two several hundred metre exposures of anorthosite were mapped in the Clark Lake area.

Most rocks in the complex were recrystallized during regional metamorphic events. Anorthosite in the core of the complex is massive to weakly foliated. Non-foliated phases contain well-preserved pseudomorphs of original plagioclase megacrysts. As the margins are approached a weak foliation and vague lamination becomes apparent and this grades into layered gabbroic anorthosite and anorthositic gabbro. This layering is parallel to the margin of the complex. At the contact with the surrounding gneiss, dips are approximately 90°. Towards the massive core of anorthosite the dip becomes increasingly shallow (to about 45°) and within the anorthosite the foliation is very shallow indicating a domal configuration for the complex.

The anorthositic rocks contain plagioclase, amphibole, garnet, chlorite, epidote and rare biotite, calcite and paragonite. They are highly recrystallized and only a few pseudomorphs of the original plagioclase phenocrysts, generally about 1 by 4 cm, are preserved. Numerous ragged crystals of plagioclase with An₈₅₋₉₅ comprise the main portion of the rock and may represent original igneous minerals. Twinning is poorly defined, these crystals are fogged due to alteration to sericite, and included needles of amphibole are present. The plagioclase also shows numerous deformation features, the most common being bent twin lamellae and deformation-induced twinning. Late plagioclase of An₄₀ forms small rounded crystals generally associated with fractures.

Amphibole exists in two forms: pseudomorphs after pyroxene, and as small disc-shaped radiating bundles in the metamorphic fabric. Pseudomorphs after clinopyroxene comprise felted masses of pale green amphibole with minor biotite and numerous quartz inclusions.

Epidote grains up to 2 mm are a common alteration product throughout the anorthosite as well as white mica (paragonite), chlorite and fine green amphibole.

Some amphibolites occur as layers within the anorthositic gabbro, also a layered amphibolite occurs on the southeast margin of the complex. These amphibolites are interpreted as an associated metagabbro, but no direct evidence to indicate an intrusive gabbro relationship is lacking; therefore, these rock are referred to as amphibolite in the map.

PREVIOUS EXPLORATION

Geophysical Surveys Ground EM

Assessment Files AF 90925

Mineral Occurrences

In John Fleet Ni, Cu showing area (Ted claims):

Massive and Disseminated sulphides, mainly pyrrhotite in a Precambrian gabbro dyke with 1.32% Ni, 0.53% Cu over 8 feet.

Exploration History

In John Fleet Ni, Cu showing area (Ted claims):

In 1960-1961, Prosectors Airways Company, Ltd. (AF) conducted an EM survey in the area, and the survey report mentions an assay of 1.32% Ni and 0.53% Cu over 8 feet from John Feet Ni, Cu showing on northwest side of Ted 17, northern shore of Split Lake.

In 1965, a field party of Manitoba Mines Branch, could not locate the showing in the area (Haugh, 1969, p.67).

In Pit claims area:

Magnetic anomaly thought to be caused by a body of olivine peridotite and it is exposed in extreme southwest corner of the claim group (Haugh, 1969; Corkery, 1985).

MAPPING

Most Detailed Mapping 1:50,000 Scale, Split Lake, Map GR 82-1-1.

Sketch Map Figure# No

Regional Mapping 1:250,000 scale, Split Lake area, NTS 64A; Man. Energy and Mines, Geol. Services, Bedrock Geology Compilation Map, Map 64A; 1:250,000 Scale, Kettle Rapids, NTS 54D; Man. Energy and Mines, Geol. Services, Bedrock Geology Compilation Map, Map 54D.

Type Section Figure# No

GEOCHEMISTRY

Geochemistry Whole-rock Geochemistry (no REE)

Selected Bibliography

Haugh, I., 1969: Geology of the Split Lake area; Manitoba Mines and Natural Resources, Mines Branch, Publication 65-2, p. 67.

Corkery, M.T., 1985: Geology of the lower Nelson River project area; Manitoba Energy and Mines, Geological Services, Geological Report 82-1, p. 12-15 , 56, 59.

UTM	Location and Access	SIZE
Easting 381229 Northing 5971768 Zone 15	Accessibility Scheduled aircraft and boat Locality 1 Superior Province - Island Lake Domain Locality 2 Island Lake Greenstone Belt	Area (km2) 0.75 Maximum Dimensions 75 m x 10 m

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Unknown
Geochemical Classification Unknown
General Classification Ultramafic
Other Classification Greenstone belt

GEOLOGY

Principal Rock Types peridotite, talc schist
Host Rocks iron formation, slate
Layering Features Unknown

Synoptic Geology

Drill hole intersections up to 300 m long described in logs as peridotite and/or talc schist. There are no outcrops or core to inspect and verify.

PREVIOUS EXPLORATION

Geophysical Surveys Airborne magnetic and EM
Assessment Files 91152

Mineral Occurrences

"Sulphide streaks" in hosting sedimentary rocks.

Exploration History

Canico drilled three drill holes in 1956 to intersect the ultramafic rocks. Hostrocks were described as iron formation and slate.

MAPPING

Most Detailed Mapping none
Sketch Map Figure# No
Regional Mapping Weber, W., Gilbert, H.P., Neale, K.L. and McGregor, C.R. (1982)
Type Section Figure# No

GEOCHEMISTRY

Geochemistry none
Whole-rock Analyses Numbers 2.282

Geochemical Features and PGE Abundances

none

Recommendations

none

Selected Bibliography

Theyer, P. 1980: Ultramafic rocks, nickel occurrences and interpreted stratigraphic relationships; Manitoba Energy and Mines, Mineral Resources Division, Map ER79-2-1 to ER79-2-13, 1:50 000.
 Theyer, P. 1985: Ultramafic rocks of the Island Lake area; Manitoba Energy and Mines, Geological Paper 84-1, 29p.

Weber, W., Gilbert, H.P., Neale, K.L. and McGregor, C.R. 1982: Island Lake Project; in Manitoba Mineral Resources Division, Report of Field Activities, 1982, p. 34-43.

UTM	Location and Access	SIZE
Easting 383955 Northing 5969663 Zone 15	Accessibility Scheduled aircraft and boat Locality 1 Superior Province - Island Lake Domain Locality 2 Island Lake Greenstone Belt	Area (km2) 0.1 Maximum Dimensions 100 m x 10 m

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Unknown
Geochemical Classification Unknown
General Classification Ultramafic
Other Classification Greenstone belt

GEOLOGY

Principal Rock Types peridotite
Host Rocks siliceous siltstone and argillite
Layering Features Unknown

Synoptic Geology

A peridotite layer hosted in a sequence of metasedimentary rocks was intersected in this area. No outcrops or drill core are available.

PREVIOUS EXPLORATION

Geophysical Surveys Airborne magnetic and EM
Assessment Files 91153

Mineral Occurrences

none reported

Exploration History

Canico drilled one hole in 1960

MAPPING

Most Detailed Mapping Weber et al. (1982) Preliminary map 1982 I-4.
Sketch Map Figure# No
Regional Mapping Weber et al. (1982) Preliminary map 1982 I-4.
Type Section Figure# No

GEOCHEMISTRY

Geochemistry none
Whole-rock Analyses Numbers 2.282

Geochemical Features and PGE Abundances

none

Recommendations

not a target for PGE exploration

Selected Bibliography

Theyer, P. 1980: Ultramafic rocks, nickel occurrences and interpreted stratigraphic relationships; Manitoba Energy and Mines, Mineral Resources Division, Map ER79-2-1 to ER79-2-13, 1:50 000.
 Theyer, P. 1985: Ultramafic rocks of the Island Lake area; Manitoba Energy and Mines, Geological Paper 84-1, 29p.
 Weber, W., Gilbert, H.P., Neale, K.L. and McGregor, C.R. 1982: Island Lake Project; in Manitoba Energy and Mines, Mineral

UTM	Location and Access	SIZE
Easting 398338 Northing 5964241 Zone 15	Accessibility Scheduled aircraft and boat Locality 1 Superior Province - Island Lake Domain Locality 2 Island Lake Greenstone Belt	Area (km2) 0.1 Maximum Dimensions 0.1 km x 1 km

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Sill
General Classification Ultramafic
Other Classification Greenstone belt

GEOLOGY

Principal Rock Types peridotite, dunite
Host Rocks Igneous and sedimentary rocks of the Hayes River group
Layering Features Local modal layering
Other Igneous Features stratabound layer of ultramafic rocks at least partially extrusive
Metamorphic Grade Greenschist facies

Synoptic Geology

These occurrences of mainly olivine adcumulate are part of a series of stratabound ultramafic rocks suggested (Theyer 1985) to be in places extrusive.

PREVIOUS EXPLORATION

Geophysical Surveys Airborne magnetic and EM
Assessment Files 91152

Mineral Occurrences

none reported

Exploration History

none

MAPPING

Most Detailed Mapping Gilbert and Weber (1983)
Sketch Map Figure# No
Regional Mapping Gilbert and Weber (1983)
Type Section Figure# No

GEOCHEMISTRY

Whole-rock Analyses Numbers 2.282

Selected Bibliography

Gilbert, H.P and Weber, W. 1983: Island Lake project (parts of 53E/15, and 16); in Manitoba Department of Energy and Mines, Mineral Resources Division, Report of Field Activities 1983.
Theyer, P. 1980: Ultramafic rocks, nickel occurrences and interpreted stratigraphic relationships; Manitoba Energy and Mines, Mineral Resources Division, Map ER79-2-1 to ER79-2-13, 1:50 000.
Theyer, P. 1985: Ultramafic rocks of the Island Lake area; Manitoba Energy and Mines, Geological Paper 84-1, 29p.

UTM	Location and Access	SIZE
Easting 386490 Northing 5970811 Zone 15	Accessibility Scheduled aircraft and boat Locality 1 Superior Province - Island Lake Domain Locality 2 Island Lake Greenstone Belt	Area (km2) 0.4 Maximum Dimensions 200 m x 20 m

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Sill
Geochemical Classification Unknown
General Classification Ultramafic
Other Classification Greenstone belt

GEOLOGY

Principal Rock Types peridotite
Host Rocks Chlorite talc schist; mafic metavolcanic rocks
Layering Features Unknown
Metamorphic Grade Greenschist facies

Synoptic Geology

Approximately 150 m thick layer of peridotite. Other rocks intersected were greenstones, quartzite, carbonaceous rocks and talc-chlorite schist

PREVIOUS EXPLORATION

Geophysical Surveys Airborne magnetic and EM
Assessment Files 91153

Mineral Occurrences

none reported

Exploration History

Canico drilled one hole in this area in 1960

MAPPING

Most Detailed Mapping Weber et al. (1982) Preliminary map 1982 I-4.
Sketch Map Figure# No
Regional Mapping Weber et al. (1982) Preliminary map 1982 I-4.
Type Section Figure# No

GEOCHEMISTRY

Geochemistry none
Whole-rock Analyses Numbers 2.282

UTM	Location and Access	SIZE
Easting 754000 Northing 5462070 Zone 14	Accessibility All-weather road Locality 1 Superior Province - southeastern Manitoba Locality 2	Area (km2) Maximum Dimensions

AGE DATA

Age not known

CLASSIFICATION

Intrusion Type Unknown
Geochemical Classification Unknown
General Classification Ultramafic
Other Classification Unknown

GEOLOGY

Principal Rock Types Ultramafic rocks intersected by drilling
Host Rocks not well characterized; presumed to be the western extension of the Wabigoon Subprovince
Layering Features Unknown

Synoptic Geology

Ultramafic rocks intersected by drilling (Hole SEM-95-5; Indicator Explorations Ltd.). There is a north-trending series of circular to elliptical airborne magnetic anomalies extending northward into southeastern Manitoba (Moose Lake trend - Indicator Explorations Ltd.) that could be the continuation of a north-trending belt of largely drift-covered mafic-ultramafic intrusions occurring in northern Minnesota, referred to as the Warroad trend by Indicator Explorations Ltd. No bedrock exposure has been identified to date. The area is characterized by 30 to 60 m of Quaternary cover.

PREVIOUS EXPLORATION

Geophysical Surveys Airborne magnetic/EM and ground magnetic/EM
Assessment Files not yet reviewed

Exploration History

Several industry EM/magnetic anomalies have been recognized along this trend (not drill tested). Ground magnetic surveys and follow-up drilling by Indicator Explorations Ltd. (1995) on one bullseye magnetic target (drill hole SEM-95-5; Indicator Explorations Ltd.). Anomalous Ni-Cu values were obtained from bedrock and basal till from nearby Manitoba Government rotasonic drilling.

MAPPING

Most Detailed Mapping Not exposed
Sketch Map Figure# No
Regional Mapping McGregor et al. (1987)
Type Section Figure# No

GEOCHEMISTRY

Geochemistry Whole-rock Geochemistry (no REE)

Geochemical Features and PGE Abundances

Contact Indicator Explorations Ltd. for whole-rock analyses of drill cuttings from ultramafic rocks intersected in SEM-95-2.

Recommendations

Additional interpretation of airborne magnetic anomalies and follow up drilling is required to determine the size and composition of the ultramafic (mafic?) bodies that are known to be associated with the Moose Lake trend.

Selected Bibliography

Beakhouse, G.P., Stott, G.M, Blackburn, C.E., Breaks, F.W., Ayer, J., Stone, D., Farrow, C., Corfu, F. 1996: Western Superior Province; Geological Association of Canada, Mineralogical Association of Canada, Geological Association of Canada; Mineralogical Association of Canada; annual meeting, Winnipeg, MB, Field Trip Guidebook A5 and B6, 107p.

Klassen, R.W., Wyder, J.E., Bannatyne, B.B. 1970: Bedrock topography and geology of southern Manitoba; Geological Survey of Canada, Map 25-1970, Scale 1:500 000.

McGregor, C.R., Kowerchuk, D., Weber, W. 1987: Kenora, NTS 52E; Manitoba Energy and Mines, Minerals Division, Bedrock Geology Compilation Map, Preliminary Edition, Map 52E, Scale 1:250 000.

UTM	Location and Access	SIZE
Easting 317205	Accessibility Fixed-wing	Area (km2)
Northing 5977623	Locality 1 Superior Province - Gods Lake Domain	Maximum Dimensions
Zone 15	Locality 2	

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types	Gabbro-diorite
Host Rocks	Occurrence near contact between sediments of Hayes River Group and mixed gneisses; Ni and Cu are probably found in gabbro and diorite which may separate the sediments from the gneisses

PREVIOUS EXPLORATION

Geophysical Surveys	Ground EM
Mineral Occurrences	Ni, Cu

MAPPING

Most Detailed Mapping	Map 4084G, Stevenson Lake East (Aeromag), Sc. 1:63 360, Man. Mines Br. and GSC.
Regional Mapping	1:250 000 scale (Quinn, 1960)

GEOCHEMISTRY

Name of Intrusion		DUCK		Ref ID.	228
UTM Easting 330654 Northing 5579295 Zone 15		Location and Access Locality 1 Superior Province - southeastern Manitoba Locality 2		SIZE Area (km2) Maximum Dimensions	
AGE DATA					
CLASSIFICATION					
GEOLOGY					
Principal Rock Types		Gabbro and Metagabbro			
PREVIOUS EXPLORATION					
Geophysical Surveys		Ground magnetic and EM			
Assessment Files		not yet reviewed			
Mineral Occurrences Cu, Ni. Gabbro has heavy mineralization in some sections. Location is in an area of heavy mineralization that includes pyrite, pyrrhotite, chalcopyrite and pentlandite.					
Exploration History 6 trenches, 6 pits and 7 ddh's. Holes drilled on 60,800 and 61,000 gamma mag. Highs.on map 1194 g. Holes drilled in gabbro and through to pink microcline granite.					
MAPPING					
Most Detailed Mapping		1:31 680 scale (Trueman, 1972)			
Regional Mapping		1:250 000 scale (Bedrock Geology Compilation Map Series, Pointe du Bois, NTS 52L, 1987)			
GEOCHEMISTRY					

Selected Bibliography

Trueman, D.L., 1972: Geological compilation map of the Bird River area; Manitoba Mines Branch, Preliminary Map 1972. F-1, scale 1:31 680.

UTM	Location and Access	SIZE
Easting 703940	Accessibility All-weather road	Area (km2)
Northing 5674506	Locality 1 Superior Province - Uchi Domain	Maximum Dimensions
Zone 14	Locality 2 Rice Lake Belt	

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Unknown

General Classification Mafic-Ultramafic

Other Classification Unknown

GEOLOGY

Principal Rock Types Pyroxenite, gabbro, leucogabbro, melagabbro, anorthosite

Host Rocks Gneiss

Layering Features Other

Igneous Textures Intrusive breccia and pegmatitic gabbro veins

Synoptic Geology

See Weber (1990), Young and Theyer (1991) and Russell (1949). Complex brecciation of a mafic-ultramafic intrusion (English Lake magmatic complex). Broken by younger (?) tonalitic rocks.

PREVIOUS EXPLORATION

Geophysical Surveys Ground magnetic and EM

Assessment Files Not reviewed

Mineral Occurrences

Ni 0.86% max, Cu 1.26% max; cpy and pn, po noted as diss in pyroxenite. Intrusion outcrops for 200-300 ' along lake shore. Violarite and bravoite have been identified.

Showing consists of Cu-Ni outcropping on the se shore of English lake about 1000 m NE of mouth of harding CK.

Exploration History

Not reviewed

MAPPING

Most Detailed Mapping Russell, G.A. 1949: Geology of the English Brook Area

Sketch Map Figure# No

Regional Mapping Russell, G.A. 1949: Geology of the English Brook Area

Type Section Figure# No

GEOCHEMISTRY

Geochemistry Whole-rock Geochemistry, including REE and PGE Analyses

PGE Analyses Numbers 1.0229 to 1.0251

Whole-rock Analyses Numbers 2.245 to 2.244

Geochemical Features and PGE Abundances

See Tables 1 and 2

Recommendations

The potential for deuteric/breccia-hosted (Lac des Iles - type) PGE mineralization should be investigated.

Selected Bibliography

- Russell, G.A. 1949: Geology of the English Brook Area: Manitoba Department of Mines and Natural Resources, Preliminary Report and Map 48-3, Winnipeg, 1949.
- Kowerchuk, D., Weber, W., 1987: Pointe du Bois, NTS 52L; Manitoba Energy and Mines, Minerals Division, Bedrock Geology Compilation Map, Map 52L, Scale 1:250 000.
- Young, J., Theyer, P., 1990: Geology of mafic-ultramafic intrusive rocks in the English Lake area (NTS 62P/1); Manitoba Energy and Mines, Minerals Division, Report of Activities 1990, p. 111-113.
- Weber, W., 1990: Geological investigations in the English Brook area, southeastern Manitoba (NTS 62P/1); Manitoba Energy and Mines, Minerals Division, Report of Activities 1990, p. 98-99.

Name of Intrusion		RESERVE 1-18		Ref ID.	230
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UTM Easting 694869 Northing 5673319 Zone 14	Location and Access Locality 1 Superior Province - Uchi Domain Locality 2	SIZE Area (km2) Maximum Dimensions
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AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types Serpentinized Ultramafic Rocks

PREVIOUS EXPLORATION

Geophysical Surveys Ground EM

Assessment Files 91226, 91227, 91228.

Mineral Occurrences

Ni 1.44% Max. Au up to 34.97 g/t, Ag 6.86 g/t; Talc-serpentine rock with asbestos fibres. Ni in both millerite and garnierite. Free gold and moly. present. Average Ni value is 0.19%. Some surprisingly high gold values.

MAPPING

Most Detailed Mapping 1:31 680 scale (Russell, 1949)

Regional Mapping 1:250 000 scale (Bedrock Geology Compilation Map Series, 1987)

GEOCHEMISTRY

UTM	Location and Access	SIZE
Easting 324957 Northing 5664194 Zone 15	Locality 1 Superior Province - Uchi Domain Locality 2	Area (km2) Maximum Dimensions

AGE DATA

CLASSIFICATION

GEOLOGY

PREVIOUS EXPLORATION

Geophysical Surveys Airborne magnetic and EM

Mineral Occurrences

Mineralized shear zones in countryrock contain py, pn, po and cp in places. Small discontinuous sulphide zones in the mafic intrusion range from centimetres to 1 m width; generally pinching out within a few metres.
The most concentrated mineralization occurs on claim Pin 10.

MAPPING

Most Detailed Mapping 1:31 680 scale (Davies, 1950)
Regional Mapping 1:250 000 (Bedrock Geology Compilation Map Series, 1987)

GEOCHEMISTRY

UTM	Location and Access	SIZE
Easting364839	Locality 1Trans-Hudson Orogen - Lynn Lake Domain	Area (km2)
Northing6287812	Locality 2Lynn Lake Greenstone Belt	Maximum Dimensions
Zone14		

AGE DATA

CLASSIFICATION

GEOLOGY

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

UTM	Location and Access	SIZE
Easting 399548 Northing 6314182 Zone 14	Accessibility Fixed-wing Locality 1 Trans-Hudson Orogen - Lynn Lake Domain Locality 2 Lynn Lake Greenstone Belt	Area (km2) Maximum Dimensions

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types Drill hole intersections encountered metapyroxenite, hornblendite, anorthosite and gabbro.

Host Rocks Wasekawan metavolcanics and metasediments.

Synoptic Geology
 Pre-sickle gabbros that intrude the Wasekawan metavolcanics and metasediments.
 Fault striking in a N-S direction cuts gabbro body into two parts. West of fault gabbro is highly altered but less altered east of the fault.

PREVIOUS EXPLORATION

Geophysical Surveys Ground magnetic and EM

Mineral Occurrences
 Cu, Ni, Pt, Pd, Ti;
 Cu 0.42-0.92%, Ni 0.03%, Pt 0.06-0.31 g/t over 7 feet;
 Disseminated (over 1-3 feet) to massive (occasionally) sulphides (po, cp and py) in mafic to ultramafic intrusion, also massive pyrrhotite (minor Cu) bands in metasediments and metavolcanics. Magnetite is a common associate. DDH Ho. 10 on CB 2084 assayed 0.06-0.31 g/tonne Pd and 0.09 Pt from 231-238'. Up to 0.40% Ti and 0.06 % V2O5.
 Tonnage on massive sulphide samples over 0.5 feet.

MAPPING

GEOCHEMISTRY

UTM	Location and Access	SIZE
Easting 453360 Northing 6318230 Zone 14	Accessibility Fixed-wing Locality 1 Trans-Hudson Orogen - Lynn Lake Domain Locality 2 Lynn Lake Greenstone Belt	Area (km2) 18 Maximum Dimensions approx. 3 x 6 km

AGE DATA

CLASSIFICATION	
Intrusion Type	Plug
Geochemical Classification	Unknown
General Classification	Mafic-Ultramafic
Other Classification	Greenstone belt

GEOLOGY

Principal Rock Types	Gabbro, pyroxenite
Layering Features	Unknown

Synoptic Geology
 Geology and alteration (uralitization). Similar to Lynn Lake intrusion. Ultramafic rocks make up 10% of surface expression of intrusion. Gabbro is intruded by approx. 2.5 m wide pyroxenite dyke. Intrusion is pod shaped, max. dimensions approx. 3 x 6 km. Sulphides most abundant on shore of bay at western end of lake where they comprise up to 5% of pyroxenite host. Drilling cut occasional sulphides on RAT claims.

PREVIOUS EXPLORATION

Mineral Occurrences
 Minor disseminated chalopyrite, pyrrhotite and pyrite scattered throughout the plug.

MAPPING

GEOCHEMISTRY

UTM	Location and Access	SIZE
Easting 319760 Northing 6013670 Zone 14	Accessibility All-weather road Locality 1 Trans-Hudson Orogen - Flin Flon-Snow Lake Domain Locality 2	Area (km2) Maximum Dimensions

AGE DATA
Age Proterozoic Geochronological Data 1847+/-6 Ma (Cumming and Krstic (1991))

CLASSIFICATION
Intrusion Type Sill Geochemical Classification Komatiitic General Classification Ultramafic

GEOLOGY
Host Rocks Nome Gneiss Complex. Layering Features Local modal layering Igneous Textures Coarse-grained cumulate textures are predominant. Metamorphic Grade Amphibolite facies Synoptic Geology See Menard et al. (1996).

PREVIOUS EXPLORATION
Geophysical Surveys Airborne magnetic and EM Assessment Files 91707, 92080, 92471, 92473, 92755 Mineral Occurrences Past-producer (Ni-Cu)

Exploration History Deposit discovered in 1984 by Hudson Bay Exploration and Development. Mine was operated by Hudson Bay Mining and Smelting. Mine opened in 1988 and closed in 1993. Mine produced 2.57 million tons grading 1.79% Ni, 0.63% Cu (Menard et al., 1996). Ore also estimated to contain 0.6 g/t Pt, 0.5 g/t Pd and 0.1 g/t Au (Menard et al., 1996).
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MAPPING
Most Detailed Mapping Not exposed Sketch Map Figure# No Regional Mapping Lucas (1993) Type Section Figure# No

GEOCHEMISTRY
Geochemistry Whole-rock Geochemistry, including REE

Geochemical Features and PGE Abundances
 See detailed study by Menard et al. (1996).

Selected Bibliography
 Cumming, G.L. and Krstic, D., 1991. Geochronology at the Nome Lake Ni-Cu deposit, Flin Flon area, Manitoba, Canada: Thermal history of a metamorphic terrane. Canadian Journal of Earth Sciences, v. 28, p. 309-325.
 Lucas, S.B., NATMAP Shield Margin Project Working Group 1993: Geology of the Cormorant Lake sheet (NTS 63K),

Manitoba and Saskatchewan; Geological Survey of Canada, Manitoba Energy and Mines, Geological Services, Open File 2581, Bedrock Geology Compilation Map, Map 63K, 3 map. Scale 1:250 000.

Menard, T., Leshner, C.M., Stowell, H.H., Price, D.P., Pickell, J.R., Onstott, T.C., Hulbert, L. 1996: Geology, genesis, and metamorphic history of the Namew Lake Ni-Cu deposit, Manitoba; *Economic Geology*, v. 91, p. 1395-1414. Manitoba Industry, Trade and Mines, Mines Branch, Mineral Inventory File Number 1003. 63K/4 NW NI 1.

UTM	Location and Access	SIZE
Easting 328152 Northing 6094133 Zone 14	Locality 1 Trans-Hudson Orogen - Kisseynew Domain Locality 2	Area (km2) Maximum Dimensions

AGE DATA
Age Proterozoic

CLASSIFICATION
Intrusion Type Unknown Geochemical Classification Unknown General Classification Ultramafic Other Classification Unknown

GEOLOGY
Principal Rock Types Pyroxenite Host Rocks Kisseynew Gneisses

PREVIOUS EXPLORATION
Geophysical Surveys Airborne magnetic/EM and ground magnetic/EM Assessment Files 90393, 92423 Mineral Occurrences Disseminated pyrhotite and chalcopyrite in pyroxenite and norite

MAPPING
Sketch Map Figure# No Type Section Figure# No

GEOCHEMISTRY

UTM	Location and Access	SIZE
Easting 608768 Northing 6148287 Zone 14	Locality 1 Superior Boundary Zone and Pikwitonei Domain Locality 2	Area (km2) Maximum Dimensions

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types	Gabbro, peridotite
Host Rocks	Pikwitonei Domain gneisses
Layering Features	Unknown
Metamorphic Grade	Not defined

PREVIOUS EXPLORATION

Mineral Occurrences
Disseminated sulphides in gabbro and altered peridotite hosted by felsic gneiss.

MAPPING

Sketch Map Figure#	No
Regional Mapping	1:250 000. Sipiwesk. NTS 63P. Manitoba Bedrock Geology Map Series.
Type Section Figure#	No

GEOCHEMISTRY

Geochemistry	none
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UTM	Location and Access	SIZE
Easting 391600 Northing 6299500 Zone 15	Accessibility Fixed-wing Locality 1 Trans-Hudson Orogen - Lynn Lake Domain Locality 2 Lynn Lake Greenstone Belt	Area (km2) 4 Maximum Dimensions 1 x 4 km

AGE DATA
Age Proterozoic

CLASSIFICATION
Intrusion Type Sill General Classification Mafic Other Classification Arc

GEOLOGY
Host Rocks Basalt of the Wasekwan Group Metamorphic Grade Greenschist facies Deformation Large scale folding Synoptic Geology Regional geology described in Gilbert et al. (1980). Geology and mineralization associated with the Lynn Lake Mafic-Ultramafic Intrusions described by Pinsent (1980).

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY
Geochemistry Whole-rock Geochemistry, including REE and PGE Analyses PGE Analyses Numbers 1.0151 to 1.0160

Selected Bibliography

Gilbert, H.P., Syme, E.C., Zwanzig, H.V. 1980: Geology of the metavolcanic and volcanoclastic metasedimentary rocks in the Lynn Lake area; Manitoba Energy and Mines, Mineral Resources Division, Geological Paper 80-1, 118p.

Pinsent, R.H. 1980: Nickel-copper mineralization in the Lynn Lake gabbro; Manitoba Energy and Mines, Mineral Resources Division, Economic Geology Report 79-3, 138p.

UTM	Location and Access	SIZE
Easting 340000	Accessibility All-weather road	Area (km2) 9
Northing 5504000	Locality 1 Superior Province - southeastern Manitoba	Maximum Dimensions 5 x 2.5 km
Zone 15	Locality 2 Falcon Lake - West Hawk Lake area	

AGE DATA

Age not known

CLASSIFICATION

Intrusion Type	Cone sheet
Geochemical Classification	Alkaline
General Classification	Intermediate-mafic
Other Classification	Greenstone belt

GEOLOGY

Principal Rock Types	pyroxenite, gabbro, diorite, granodiorite, quartz monzonite
Host Rocks	Metavolcanic and metasedimentary rocks of the Lake of the woods greenstone belt (Wabigoon Subprovince)
Layering Features	Local modal layering
Igneous Textures	Variable grain size, pyroxene cumulates
Other Igneous Features	Rhythmic modal layering, graded layering, disrupted layering, breccia pipes, cognate inclusions and inclusions of country rock
Metamorphic Grade	Sub-greenschist facies
Deformation	Not deformed

Synoptic Geology

Detailed geological descriptions of the Falcon Lake intrusive complex (FLIC) are given by Tirschmann (1992), Mandziuk (1989) and Mandziuk et al. (1989). The regional geology is described by Davies (1954). The (FLIC) is a well-preserved concentrically-zoned intrusion having many features in common with Alaskan-type intrusions, including ovoidal shape (plan view), concentric-zoning of major subunits and a tholeiitic to alkaline geochemical composition. Emplaced into metavolcanic and metasedimentary rocks that represent the western extension of the Lake of the Woods greenstone belt in northwestern Ontario, the FLIC is an exceptionally well-preserved late- to post-tectonic intrusion dominated by gabbroic and dioritic rock types. The complex is subdivided into 4 gabbro units, a diorite-granodiorite unit and a quartz monzonite unit.

PREVIOUS EXPLORATION

Assessment Files not yet reviewed

Mineral Occurrences

Two breccia pipes occurring in the central part of the FLIC, the Sunbeam-Kirkland and Moonbeam pipes, are known to contain gold mineralization in association with sulphides developed in concentric fracture systems. Elsewhere in the FLIC, sulphide mineralization appears to be rare.

Exploration History

Restricted to sporadic gold exploration of the Sunbeam-Kirkland and Moonbeam breccia pipes. See Fingler (1991) for details.

MAPPING

Most Detailed Mapping	Mandziuk (1989) and Tirschmann (1992)
Sketch Map Figure#	Yes
Regional Mapping	Davies (1954)

GEOCHEMISTRY

Geochemistry	Whole-rock Geochemistry, including REE and PGE Analyses
PGE Analyses Numbers	1.0252 to 1.0272

Geochemical Features and PGE Abundances

The trace element geochemistry of all of the rocks in the FLIC is characterized by strong light rare-earth element enrichment relative to mantle.

Selected Bibliography

- Davies, J.F., 1954. Geology of the West Hawk Lake - Falcon Lake area. Manitoba Department of Mines and Natural Resources, Publication 53-4, 28 p.
- Fingler, J. 1991: Precious metal mineralization related to the Falcon Lake intrusive complex, southeastern Manitoba; M.Sc. thesis, University of Manitoba, Winnipeg, Manitoba.
- Mandziuk, W.S., 1989. Primary structures of the Falcon Lake intrusive complex, southeastern Manitoba. Unpublished M.Sc. Thesis, University of Manitoba, Winnipeg, Manitoba, 103 p.
- Mandziuk, W.S., Brisbin, W.C., Scoates, R.F.J. 1989: Igneous structures in the Falcon Lake intrusive complex, southeastern Manitoba; Canadian Mineralogist, v. 27, p. 81-92.
- Tirschmann, P.A., 1992. Geochemistry and fractional crystallization history of the Falcon Lake intrusive complex. Unpublished M.Sc. Thesis, University of Manitoba, Winnipeg, Manitoba, 191 p.

UTM	Location and Access	SIZE
Easting 434000	Accessibility Winter road	Area (km2)
Northing 5844000	Locality 1 Superior Boundary Zone and Pikwitonei Domain	Maximum Dimensions
Zone 14	Locality 2 Winnipegosis Komatiite Belt	

AGE DATA

Age Proterozoic

CLASSIFICATION

GEOLOGY

Principal Rock Types	Peridotite, pyroxenite, gabbro
Host Rocks	Metavolcanic and metasedimentary rocks of the Winnipegosis Belt
Layering Features	Local modal layering
Igneous Textures	Predominantly olivine and pyroxene cumulates
Metamorphic Grade	Sub-greenschist facies
Deformation	largely undeformed

Synoptic Geology

See record for the Thompson Nickel Belt intrusions (this report) and Theyer (1997). Not exposed at surface. All of the information obtained for these intrusions has been derived from detailed examination of Cominco Ltd. drill core for the Cedar Lake part of the belt.

PREVIOUS EXPLORATION

Assessment Files Not reviewed

Mineral Occurrences

Not reviewed

Exploration History

Not reviewed

MAPPING

Most Detailed Mapping	Theyer (1997)
Sketch Map Figure#	No
Type Section Figure#	No

GEOCHEMISTRY

Recommendations

See record for the Thompson Nickel Belt (this report)

Selected Bibliography

Theyer, P., 1997: Stratigraphy and lithologies of selected drill core from the Lake Winnipegosis komatiite belt (parts of NTS 63B, 63C and 63G); Manitoba Energy and Mines, Geological Services, Report of Activities 1997, p. 109-111.

UTM	Location and Access	SIZE
Easting 815000 Northing 6190800 Zone 14	Accessibility Helicopter Locality 1 Superior Boundary Zone and Pikwitonei Domain Locality 2 Fox River Belt	Area (km2) Maximum Dimensions 0.75 x 20 km

AGE DATA

Age Proterozoic

CLASSIFICATION

Intrusion Type Sill
General Classification Mafic-Ultramafic
Other Classification Marginal rift basin

GEOLOGY

Principal Rock Types Peridotite, pyroxenite, gabbro, anorthosite
Host Rocks Lower sedimentary formation, Fox River Belt
Layering Features Megacyclic Units
Igneous Textures Mainly medium- to coarse-grained olivine, pyroxene and plagioclase cumulates.
Metamorphic Grade Greenschist facies
Deformation Relatively undeformed

Synoptic Geology

See Scoates (1990). The lower intrusions (lower differentiated intrusions in Scoates, 1990) of the Fox River Belt have not been observed in outcrop. All data for these bodies has been obtained from Inco Limited drill core (Scoates, 1990). The intrusions range in length from <2 km to >20 km, and are typically 300 to 500 m thick. The intrusions are emplaced into the upper part of the Lower sedimentary formation of the Fox River Belt. They have sill-like morphologies in cross section and information gained from the few drill holes intersections of these intrusions suggests that they are strongly differentiated from predominantly ultramafic rocks at their base (south) to plagioclase-rich mafic rocks at their top (north). Detailed documentation of drill core intersecting the lower intrusions is given by Scoates (1990). They also appear to have a similar range of rock compositions to the Marginal Zone of the Fox River Sill (Scoates, 1990), which was shown by Peck et al. (1999) to be prospective for PGE-rich magmatic sulphide mineralization (see sample 98-99-202-1a, Tables 1 and 2).

PREVIOUS EXPLORATION

Mineral Occurrences

See Scoates (1990)

Exploration History

See Scoates (1990). The lower intrusions have received very little attention in comparison to the overlying Fox River Sill. These intrusions are highly prospective for both Ni-Cu and PGE-Cu-Ni mineralization.

MAPPING

Most Detailed Mapping 1:50 000 scale (Scoates, 1990)
Sketch Map Figure# Yes
Regional Mapping 1:50 000 scale (Scoates, 1990)
Type Section Figure# Yes

GEOCHEMISTRY

Geochemical Features and PGE Abundances

See Scoates (1990).

Recommendations

These intrusions are highly prospective for both Ni-Cu and PGE-Cu-Ni mineralization. Drilling by Falconbridge Limited (2000) has provided new drill core that will provide additional information on the geology and mineral potential of the lower intrusions.

Selected Bibliography

- Peck, D.C., Huminicki, M., Wegleitner, C., Theyer, P., Olshefsky, K., Potter, L., Hulbert, L., Scoates, R.F.J. 1999: Lithostratigraphic framework for Platinum-group element-copper-nickel sulphide mineralization in the marginal zone of the Fox River sill (Parts of NTS 53M/16 and 53N/13); Manitoba Industry, Trade and Mines, Geological Services, Report of activities 1999, p. 46-50.
- Scoates, R.F.J. 1981: Volcanic rocks of the Fox River Belt, northwestern Manitoba; Manitoba Energy and Mines, Mineral Resources Division, Geological Report 81-1, 109p. 1 map @ 1:50 000.
- Scoates, R.F.J. 1990: The Fox River sill, northeastern Manitoba - a major stratiform intrusion; Manitoba Energy and Mines, Geological Services, Geological Report 82-3, 192p. 1 map @ 1:50 000.

UTM	Location and Access	SIZE
Easting 531000 Northing 6096000 Zone 14	Accessibility All-weather road Locality 1 Superior Boundary Zone and Pikwitonei Domain Locality 2 Thompson Nickel Belt	Area (km2) Maximum Dimensions

AGE DATA

Age	Proterozoic
Geochronological Data	1.88 Ga (L. Hulbert, GSC , written communication, 1999)

CLASSIFICATION

Intrusion Type	Sill
Geochemical Classification	Komatiitic
General Classification	Ultramafic
Other Classification	Marginal rift basin

GEOLOGY

Principal Rock Types	Dunite, peridotite, orthopyroxenite; locally (rare) mafic components
Host Rocks	Generally occur within the Pipe Formation of the Ospwagan Group
Layering Features	Local modal layering
Igneous Textures	Principally olivine cumulates
Metamorphic Grade	Not uniform
Deformation	Generally highly deformed and commonly boudinaged and/or sheared

Synoptic Geology

See Bleeker (1990). This record relates to all ultramafic and mafic rocks in the Thompson Nickel Belt (TNB) and related mafic rocks (Peck et al., 1998). It also includes mafic-ultramafic intrusions occurring in the Winnipegosis Komatiite Belt, which occurs adjacent (east side of) the sub-Paleozoic, southward extension of the exposed parts of the TNB (Theyer, 1997), between the north end of Lake Winnipegosis and the William Lake area. A thorough study of the geology, metallogeny and petrogenesis of the TNB mafic and ultramafic intrusions commenced in 1997 (Canadian Mining Industry Research Organization Project (CAMIRO) 97E-02) and will be completed in 2001. The intrusions in the exposed parts of the TNB appear to have been emplaced as conformable sills within Fe- and, locally, S-rich metasedimentary rocks of the Pipe Formation within the regionally important Ospwagan Group supracrustal sequence. The original size and composition of these predominantly ultramafic intrusions remains unknown.

PREVIOUS EXPLORATION

Geophysical Surveys	Airborne magnetic/EM and ground magnetic/EM
Assessment Files	Not reviewed

Mineral Occurrences

Numerous Ni sulphide deposits and occurrences throughout the TNB, including many operating and post-producing mines (e.g., Thompson Mine, Birchtree Mine, Manibridge Mine).

Exploration History

Extensively explored by Inco Limited, Falconbridge Ltd., HBED Ltd., Cominco Ltd., Sherritt Gordon Ltd. and others, between 1950 to present.

MAPPING

Most Detailed Mapping	See Bleeker (1990) and related references
Sketch Map Figure#	No
Regional Mapping	Coats et al. (1972)
Type Section Figure#	No

GEOCHEMISTRY

Geochemical Features and PGE Abundances

A compilation of pre-existing and newly acquired geochemical data is being prepared as part of the CAMIRO TNB project.

Recommendations

It remains uncertain whether or not any of the mafic and ultramafic rocks in the TNB are prospective for PGE (principal metals) mineralization. Local PGE-rich Ni sulphide ores are present in the numerous mines and deposits in the TNB (Bleeker, 1990), but there appears to have been little systematic analysis of unmineralized (low S tenor) intrusions, especially the many small gabbroic sills that occur in the northern TNB and the mafic-ultramafic intrusions occurring in the Winnipegosis Belt and the sub-Paleozoic parts of the TNB. Given their komatiitic affinities (Bleeker, 1990), the TNB ultramafic bodies, particularly the more differentiated bodies and the mafic intrusions, could have been derived from PGE-rich parental magmas and the potential that some of these intrusions developed PGE mineralization should not be discounted. In addition, it is likely that the majority of TNB intrusions are coeval with the Cuthbert Lake suite of the Molson dyke swarm (1.883 Ga - Heaman et al., 1986). Given the recent discovery of Cu-PGE-rich sulphide mineralization at Cuthbert Lake and the presence of similar styles of sulphide mineralization in the northern part of Winterring Lake (see relevant records, this report), the area immediately to the east of the exposed parts of the TNB (e.g., Winterring Lake, Cuthbert Lake, Partridge Crop Lake) that contains numerous mafic-ultramafic dykes and intrusions of unknown primary morphology should be explored for both magmatic Ni-Cu sulphides and PGE-Cu-rich mineralization. It is possible that this area preserves incipient rift structures and associated (variably deformed) Proterozoic mafic-ultramafic intrusions and rift-basin sedimentary rocks (e.g., paragneiss exposed at Cuthbert Lake and Winterring Lake) that were contemporaneous with the main rifting and magmatism in the TNB.

Selected Bibliography

- Bleeker, W., 1990: Evolution of the Thompson Nickel Belt and its nickel deposits, Manitoba, Canada; Ph.D. thesis, University of New Brunswick, 444p.
- Coats, C.J.A., Quirke, T.T.Jr., Bell, C.K., Cranstone, D.A., Campbell, F.H.A. 1972: Geology and mineral deposits of the Flin Flon, Lynn Lake and Thompson areas, Manitoba and the Churchill-Superior front of the western Precambrian Shield; International Geological Congress, 24th, Guidebook, Field Excursion, p. A31-C31.
- Heaman, L.M., Machado, N., Krogh, T.E., Weber, W., 1986: Precise U-Pb zircon ages for the Molson dyke swarm and the Fox River sill; constraints for early Proterozoic crustal evolution in northeastern Manitoba, Canada; *Contributions to Mineralogy and Petrology*, v. 94, no. 1, p. 82-89.
- Peck, D.C., Layton-Matthews, D., Chandler, C., Freund, C.C., Heaman, L.M., 1998: Petrogenetic and metallogenic significance of mafic-ultramafic dykes and volcanic sequences in the Thompson Nickel Belt : preliminary results (parts of NTS 63J, 63O, and 63P); Manitoba Energy and Mines, Geological Services, Report of activities 1998, p. 49-55.
- Theyer, P., 1997: Stratigraphy and lithologies of selected drill core from the Lake Winnipegosis komatiite belt (parts of NTS 63B, 63C and 63G); Manitoba Energy and Mines, Geological Services, Report of Activities 1997, p. 109-111.

UTM	Location and Access	SIZE
Easting 680800 Northing 6159000 Zone 14	Accessibility Fixed-wing Locality 1 Superior Boundary Zone and Pikwitonei Domain Locality 2	Area (km2) Maximum Dimensions Approximately 8 x 0.5 km

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Unknown
Geochemical Classification Tholeiitic - Low Ti
General Classification Mafic
Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Gabbro, anorthosite
Host Rocks Basalt (amphibolite)
Layering Features Unknown
Metamorphic Grade Amphibolite facies
Deformation Massive to foliated

Synoptic Geology

See Peck et al. (1996). Principally anorthositic rocks underlain by amphibolite derived from basalt.

PREVIOUS EXPLORATION

Geophysical Surveys Airborne magnetic
Assessment Files Not reviewed

Mineral Occurrences

No sulphide occurrences were recognized by Peck et al. (1996).

Exploration History

Unknown

MAPPING

Most Detailed Mapping 1:50 000 (Weber, 1976)
Sketch Map Figure# Yes
Regional Mapping 1:250 000 scale (Bedrock Geology of Manitoba Compilation Map Series, NTS 63P)
Type Section Figure# No

GEOCHEMISTRY

Geochemistry Whole-rock Geochemistry, including REE and PGE Analyses
PGE Analyses Numbers 1.0000 to 1.0001
Whole-rock Analyses Numbers 2.021 to 2.026

Geochemical Features and PGE Abundances

See Tables 1 and 2. Samples collected by Peck et al. (1996). Similar major and trace element geochemistry to anorthositic rocks at Cauchon Lake (Ref ID. #255).

Selected Bibliography

Peck, D.C., Cameron, H.D.M., Layton-Matthews, D., Bishop, A., 1996: Geological investigations of Anorthosite, gabbro and pyroxenite occurrences in the Pikwitonei granulite domain and the Cross Lake region (parts of NTS 63I/6, 63J/7, 63J/8, 63P/5, 63P/6, 63P/7, 63P/8, 63P/9, 63P/11 and 63P/12); in Report of activities, Manitoba Energy and Mines, Geological Services, Report of activities 1996, p. 85-90.

Weber, W., 1976: Bear Head Lake (south half); Manitoba Mines, Resources and Environmental Management, Mineral Resources Division, Preliminary Map 1976U-3, Scale 1:50 000.

UTM	Location and Access	SIZE
Easting 601700 Northing 6156800 Zone 14	Accessibility Fixed-wing Locality 1 Superior Boundary Zone and Pikwitonei Domain Locality 2	Area (km2) Maximum Dimensions 160 km long x 60 m to >500 m wide

AGE DATA

Age	Proterozoic
Geochronological Data	1883 +/- 2 Ma (Heaman et al., 1986)

CLASSIFICATION

Intrusion Type	Dyke
Geochemical Classification	Tholeiitic - Low Ti
General Classification	Mafic-Ultramafic
Other Classification	Rifted Archean basement

GEOLOGY

Principal Rock Types	Peridotite, pyroxenite, gabbro, leucogabbro
Host Rocks	Pikwitonei Domain orthogneiss and paragneiss and retrogressed equivalents
Layering Features	Local modal layering
Igneous Textures	Predominantly equigranular cumulate textures involving olivine and orthopyroxene.
Other Igneous Features	Local pegmatitic gabbro veins and pods.
Metamorphic Grade	Not uniform
Deformation	Undeformed central portion of the dyke. Deformed, locally gneissic textured apophyses.

Synoptic Geology

The Cuthbert Lake dyke is one of the largest known intrusions belonging to the 1.883 Ga Molson dyke swarm (Scoates and Macek, 1978). Detailed description of the Cuthbert Lake dyke are provided by Scoates and Macek (1978), Paktunc (1983) and Paktunc (1989). Recent unpublished mapping by the Manitoba Geological Survey along the western shoreline of Cuthbert Lake confirmed the observations made by Paktunc (1983) that the Cuthbert Lake dyke is an intrusive complex that was originally fed by multiple, discrete injections of geochemically similar Mg-rich magma. The tectonic association of the Cuthbert Lake dyke appears to be similar to the main group of 1.883 Ga mafic-ultramafic Molson dykes that occur throughout the northwestern part of the Superior Province, e.g., the dykes were emplaced into extensional faults developed in Archean basement. The extent to which these faults may have evolved into rift basins warrants additional investigation, particularly given that some of the dykes, including the Cuthbert Lake dyke, intrude sulphide-facies iron formation (paragneiss) of unknown age. In summers where water levels on Cuthbert Lake are lower than normal (e.g., 1999), abundant outcrop can be observed on the western shoreline of Cuthbert Lake which reveal that the western margin of the dyke is made up of numerous, interconnected apophyses likely emanating from the core of the dyke (exposed on islands in the central part of the lake). Locally, these apophyses display planar modal layering, commonly cm-scale and rhythmic in nature. Similar features are recognized in other Molson dykes (Scoates and Macek, 1978), including the Nelson River dyke, which was briefly examined by Manitoba Geological Survey staff in 1999. The small apophyses of the Cuthbert Lake dyke that are exposed along the western shoreline of the lake vary from a few metres to tens of metres in width and, like the main dyke, strike north-northeasterly, although they show local variations in strike. These apophyses show variable degrees of minor folding, foliation (metamorphic) development and recrystallization (locally at the amphibolite facies) so that the Cuthbert Lake dyke was emplaced prior to at least one phase of Proterozoic deformation and high grade metamorphism. This observation has significance to exploration for Ni-Cu-PGE mineralization in the adjacent Wintering Lake and Partridge Crop Lake areas, where deformed gabbroic to pyroxenitic rocks of unknown age are emplaced into both orthogneiss and paragneiss of presumed (but not known) Archean age. In order to determine the age of both the mafic-ultramafic rocks and the host rocks, a detailed U-Pb geochronological study of the Superior Boundary Zone between Paint Lake and Cuthbert Lake and including Wintering and Partridge Crop lakes is needed.

PREVIOUS EXPLORATION

Geophysical Surveys	Airborne magnetic and EM
Assessment Files	Not reviewed. See related records for Cuthbert Lake area.

Mineral Occurrences

Historical trenches along the western shoreline of Cuthbert Lake expose disseminated Cu-Ni sulphide mineralization hosted by gabbroic to pyroxenitic rocks that are emplaced into both garnet-sulphide-bearing paragneiss and tonalitic orthogneiss. Sulphide mineralization includes disseminations of pyrrhotite and chalcopyrite, locally reaching abundances of up to 10%, in pyroxenite and gabbroic phases of the Cuthbert Lake dyke. Similar styles of Cu-PGE mineralization are reported from garnetiferous meta-pyroxenite exposed in historical trenches on the eastern shoreline Murray Island in the northern part of Wintering Lake (Ref ID #253, this report). In both areas, the host rocks are garnet and sulphide-rich paragneiss possibly representing metamorphosed sulphide facies iron formation.

Exploration History

Historical trenching (age not known) completed along the shoreline of Cuthbert Lake. Inco Limited conducted geophysical surveys and follow-up drilling of the Cuthbert Lake dyke as part of their regional Ni-Cu sulphide exploration program in the Superior Boundary Zone. Mr. E. Chaboyer (Thompson, Manitoba) completed surface prospecting of the Cuthbert Lake dyke in 1998 and 1999.

MAPPING

Most Detailed Mapping	Paktunc (1983)
Sketch Map Figure#	Yes
Regional Mapping	1:250 000 scale (Bedrock Geology of Manitoba Compilation Map Series, NTS 63P)
Type Section Figure#	Yes

GEOCHEMISTRY

Geochemistry	Whole-rock Geochemistry, including REE and PGE Analyses
PGE Analyses Numbers	1.0186 to 1.0201
Whole-rock Analyses Numbers	2.212 to 2.218

Geochemical Features and PGE Abundances

A detailed analysis of the geochemistry and metallogeny of the Cuthbert Lake dyke will be included in an ongoing investigation of the Molson dyke swarm (collaborative project involving the University of Alberta and the Manitoba Geological Survey). Previous data from mineral chemistry and whole-rock geochemistry studies of the dyke are discussed in Paktunc (1983, 1989) and Scoates and Macek (1978). Anomalously high PGE and Cu-Ni contents, including up to 3.38 g/t combined Pd+Pt+Au, including up to 1.67 g/t of Pd, and up to 1.4% Cu and 0.46% Ni (see Table 1) were obtained from surface samples collected by E. Chaboyer (Thompson, Manitoba) and D. Peck (Manitoba Geological Survey) from the western shoreline of Cuthbert Lake, in the vicinity of historical trenches along the western margin of the dyke. The data are reported here with the permission of Mr. E. Chaboyer. Additional PGE data were obtained for samples of the main part of the dyke during a reconnaissance lithogeochemical survey of the Cuthbert Lake area by Peck et al. (1996; see Table 1 in the current report). The latter data are principally from samples of a peridotite body that is exposed in a series of islands that relate to the central, ultramafic part of the Cuthbert Lake dyke. These data reflect a wide range of background PGE contents, from anomalously low (<1 ppb Pd) to relatively high background values of approximately 50 ppb combined Pd + Pt (Table 1). Whole-rock geochemical data for some of the samples listed in Table 1 are given in Table 2. The dyke appears to have been fed by Mg-rich, low-Ti tholeiitic (or fractionated komatiitic?) magma having trace element compositions similar to that of a depleted primitive mantle source.

Recommendations

Given the recently discovered (E. Chaboyer, Thompson, Manitoba) Cu-PGE mineralization along the western margin of the dyke (in association with garnet-sulphide paragneiss) and its potential genetic relationship with ultramafic magmatism in the Thompson Nickel Belt (e.g., Peck et al., 1998), additional exploration of the Cuthbert Lake dyke for PGE-Cu-Ni mineralization is recommended. In addition, the age of the host rocks to the Cuthbert Lake dyke is not known, and the possibility that the paragneiss is Proterozoic in age and analogous to sulphide-rich iron formation of the Ospwagan Group in the Thompson Nickel Belt should be investigated. Additional detailed mapping, surface exploration, drilling and metamorphic petrology studies will be needed to resolve the mineral potential, petrogenesis and tectonic setting of the Cuthbert Lake dyke. This work will also shed light on the regional implications for PGE-Cu-Ni mineralization in other, large Molson dykes.

Selected Bibliography

- Heaman, L.M., Machado, N., Krogh, T.E., Weber, W., 1986: Precise U-Pb zircon ages for the Molson dyke swarm and the Fox River sill; constraints for early Proterozoic crustal evolution in northeastern Manitoba, Canada; *Contributions to Mineralogy and Petrology*, v. 94, p. 82-89.
- Paktunc, A.D., 1983: Petrology and geochemistry of some ultramafic rocks of the Thompson Nickel Belt and the Cuthbert Lake dikes of the Pikwitonei region, northern Manitoba; Ph.D. thesis, University of Ottawa.
- Paktunc, A.D., 1987: Differentiation of the Cuthbert Lake ultramafic dikes and related mafic dikes; *Contributions to*

Mineralogy and Petrology, v. 97, p. 405-416.

Peck, D.C., Layton-Matthews, D., Chandler, C., Freund, C.C., Heaman, L.M., 1998: Petrogenetic and metallogenic significance of mafic-ultramafic dykes and volcanic sequences in the Thompson Nickel Belt : preliminary results (parts of NTS 63J, 63O, and 63P); Manitoba Energy and Mines, Geological Services, Report of activities 1998, p. 49-55.

Peck, D.C., Halden, N.M., Heaman, L.M., Corkery, M.T., Cameron, H.D.M., Toope, K., 1999: Field, geochemical and geochronological studies of Paleoproterozoic mafic and ultramafic dykes in the northwestern Superior Province, (Parts of NTS 63I, 63J, 63P); Manitoba Industry, Trade and Mines, Geological Services, Report of activities 1999, p. 97-101.

Scoates, R.F.J., Macek, J.J., 1978: Molson dyke swarm; Manitoba Mines, Resources and Environmental Management, Mineral Resources Division, Geological Paper 78-1, 53p.

UTM	Location and Access	SIZE
Easting 584100 Northing 6142800 Zone 14	Accessibility Winter road Locality 1 Superior Boundary Zone and Pikwitonei Domain Locality 2	Area (km2) Maximum Dimensions Unknown

AGE DATA

Age	not known
Geochronological Data	Not available

CLASSIFICATION

Intrusion Type	Unknown
Geochemical Classification	Unknown
General Classification	Mafic-Ultramafic
Other Classification	Unknown

GEOLOGY

Principal Rock Types	Pyroxenite, gabbro and metamorphosed equivalents, including garnet-bearing pyroxenite and gabbro
Host Rocks	Pikwitonei Domain orthogneiss and paragneiss and retrogressed equivalents
Layering Features	Local modal layering
Igneous Textures	Principally metamorphic textures, including annealed, granoblastic textures and gneissic textures
Other Igneous Features	Local pods and veins of pegmatitic gabbro and diorite
Metamorphic Grade	Amphibolite facies
Deformation	Affected by at least one major folding event

Synoptic Geology

The geology of the Wintering Lake area is described by Hubregtse (1978). The mineral occurrences of the Wintering Lake area, including descriptions of historical Cu mineralization in trenches developed in the northern part of the lake, are described in Dawson (1952) and Peck et al. (1996). A brief account of the geology of the mafic and ultramafic rocks exposed in the northern part of Wintering Lake is given in Peck et al. (1996).

PREVIOUS EXPLORATION

Geophysical Surveys	Airborne magnetic and EM
Assessment Files	Not reviewed

Mineral Occurrences

Three historical copper showings are exposed in trenches in the northern part of Wintering Lake and are described by Dawson (1952) and Peck et al. (1996). These include (from south to north) the Murray Island, Nikko and Walter Johnson Cu occurrences. All of these occurrences appear to relate to local disseminated to semi-massive Fe-Cu-Ni sulphide mineralization developed in gabbroic and pyroxenite at the contact with older garnetiferous paragneiss and/or intermediate orthogneiss. See Dawson (1952) and Peck et al. (1996) for additional information.

Exploration History

The Wintering Lake area has been intermittently explored for Ni-Cu sulphide mineralization from prior to 1950 to present, including recent exploration (1990s) by Cominco Limited. Historical trenches associated with copper showings are present in low, shoreline outcrops or buried outcrops in the northern part of Wintering Lake (Dawson, 1952).

MAPPING

Most Detailed Mapping	1:50 000 scale (Hubregtse et al., 1978)
Sketch Map Figure#	No
Regional Mapping	1:250 000 scale (Bedrock Geology of Manitoba Compilation Map Series, NTS 63P)
Type Section Figure#	No

Geochemistry	Whole-rock Geochemistry, including REE and PGE Analyses
PGE Analyses Numbers	1.1408 to 1.1409
Whole-rock Analyses Numbers	2.802 to 2.810

Geochemical Features and PGE Abundances

One sample of semi-massive pyrrhotite and chalcopyrite obtained by Peck et al. (1996) from the Murray Island Cu-Ni occurrence returned 1.3 g/t Pd (see Table 1). New whole-rock geochemical data for samples collected by Peck et al. (1996) indicate that the least-altered mafic and ultramafic (pyroxenite) rocks exposed in the northern part of Wintering Lake (e.g., samples 98-99-323 and 98-99-337, Table 2) have similar major and trace element abundances to the Cuthbert Lake dyke (e.g., slightly-depleted in light rare-earth elements, low-Ti, wide range in MgO contents). These results indicate the importance of establishing the age of the mafic and ultramafic rocks in the Wintering Lake area, which are presumed to be Archean (e.g., Hubregtse et al., 1978).

Recommendations

The similarities between the mafic-ultramafic intrusions, their host rocks and their mineral occurrences at Wintering Lake and Cuthbert Lake indicates that the Wintering Lake intrusive gabbro-pyroxenite units could represent more deformed and thoroughly recrystallized equivalents of the Cuthbert Lake dyke. If this proves to be true, then additional mapping and exploration should be undertaken in northern Wintering Lake to determine whether or not additional PGE-rich Cu-Ni sulphides are present in the area and if the original mafic-ultramafic intrusions were dyke-like or sill-like. High precision U-Pb zircon geochronology should be undertaken to determine the age of the mafic and ultramafic intrusive rocks at Wintering Lake.

Selected Bibliography

- Dawson, A.S., 1952: Geology of the Partridge Crop Lake area; Manitoba Mines and Natural Resources, Mines Branch, Publication 41-1, 26p., 1 map @ 1:126 720.
- Hubregtse, J.J.M.W., 1978: Sipiwesk Lake-Landing Lake-Wintering Lake area; Manitoba Department of Mines, Resources and Environmental Management, Mineral Resources Division, Report of Field Activities 1978, p. 54-62.
- Hubregtse, J.J.M.W., Charbonneau, R., Culshaw, N.G., 1978: Wintering Lake; Manitoba Mines, Resources and Environmental Management, Mineral Resources Division, Preliminary Map 1978N-3, Scale 1:50 000.
- Peck, D.C., Cameron, H.D.M., Layton-Matthews, D., Bishop, A., 1996: Geological investigations of Anorthosite, gabbro and pyroxenite occurrences in the Pikwitonei granulite domain and the Cross Lake region (parts of NTS 63I/6, 63J/7, 63J/8, 63P/5, 63P/6, 63P/7, 63P/8, 63P/9, 63P/11 and 63P/12); in Report of activities, Manitoba Energy and Mines, Geological Services, Report of activities 1996, p. 85-90.

UTM	Location and Access	SIZE
Easting 622000 Northing 6131700 Zone 14	Accessibility Fixed-wing Locality 1 Superior Boundary Zone and Pikwitonei Domain Locality 2	Area (km2) Maximum Dimensions Unknown

AGE DATA

Age	Archean
Geochronological Data	Not available

CLASSIFICATION

Intrusion Type	Unknown
Geochemical Classification	Tholeiitic - Low Ti
General Classification	Mafic
Other Classification	Unknown

GEOLOGY

Principal Rock Types	Anorthosite, gabbro and pyroxenite and high-grade metamorphosed equivalents
Host Rocks	Intermediate orthogneiss and derived migmatite
Layering Features	Unknown
Metamorphic Grade	Granulite facies
Deformation	Complex polyphase folding and local development of shear zones

Synoptic Geology

The geology of the Landing Lake area is described by Hubregtse (1978). A brief description of mafic rocks occurring in the eastern part of Landing Lake is given by Peck et al. (1996). Scoates et al. (1978) describe Molson dykes occurring in the western part of the Lake. Most of the lake is poorly exposed but appears to be underlain by amphibolite facies and granulite facies orthogneiss and migmatite of Archean age. Anorthositic rocks of presumed Archean age were investigated by Peck et al. (1996) based on descriptions provided by Hubregtse (1978).

PREVIOUS EXPLORATION

Assessment Files	Not reviewed
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Mineral Occurrences

See Peck et al. (1996) and Hubregtse (1978).

Exploration History

Limited surface prospecting for Cu-Ni owing to low abundance of outcrop.

MAPPING

Most Detailed Mapping	1:50 000 scale (Hubregtse and Charbonneau, 1978)
Sketch Map Figure#	No
Regional Mapping	1:250 000 scale (Bedrock Geology of Manitoba Compilation Map Series, NTS 63P)
Type Section Figure#	No

GEOCHEMISTRY

Geochemistry	Whole-rock Geochemistry, including REE and PGE Analyses
PGE Analyses Numbers	1.0476 to 1.0478
Whole-rock Analyses Numbers	2.348 to 2.351

Geochemical Features and PGE Abundances

See Tables 1 and 2.

Recommendations

Additional surface prospecting of mafic and ultramafic intrusive rocks is required to determine the extent of these rock types in the area and if the rocks are prospective for PGE. This work should be undertaken in a year in which water levels on Landing Lake are significantly below normal levels.

Selected Bibliography

- Hubregtse, J.J.M.W., 1978: Sipiwesk Lake-Landing Lake-Wintering Lake area; Manitoba Department of Mines, Resources and Environmental Management, Mineral Resources Division, Report of Field Activities 1978, p. 54-62.
- Hubregtse, J.J.M.W. and Charbonneau, R., 1978: Landing Lake; Manitoba Mines, Resources and Environmental Management, Mineral Resources Division, Preliminary Map 1978N-4, Scale 1:50 000.
- Peck, D.C., Cameron, H.D.M., Layton-Matthews, D., Bishop, A., 1996: Geological investigations of Anorthosite, gabbro and pyroxenite occurrences in the Pikwitonei granulite domain and the Cross Lake region (parts of NTS 63I/6, 63J/7, 63J/8, 63P/5, 63P/6, 63P/7, 63P/8, 63P/9, 63P/11 and 63P/12); in Report of activities, Manitoba Energy and Mines, Geological Services, Report of activities 1996, p. 85-90.
- Scoates, R.F.J., Macek, J.J., 1978: Molson dyke swarm; Manitoba Mines, Resources and Environmental Management, Mineral Resources Division, Geological Paper 78-1, 53p.

UTM	Location and Access	SIZE
Easting 660500 Northing 6152400 Zone 14	Accessibility Fixed-wing Locality 1 Superior Boundary Zone and Pikwitonei Domain Locality 2	Area (km2) Maximum Dimensions 25 km x approximately 1 km

AGE DATA

Age	Archean
Geochronological Data	See Heaman et al. (1986)

CLASSIFICATION

Intrusion Type	Sill
Geochemical Classification	Tholeiitic - Low Ti
General Classification	Mafic
Other Classification	Rifted Archean basement

GEOLOGY

Principal Rock Types	Anorthosite and migmatized/deformed/metamorphosed equivalents. Local minor gabbro and pyroxenite layers.
Host Rocks	Orthogneiss and derived migmatite of the Pikwitonei Domain
Layering Features	Local modal layering
Igneous Textures	Obscured by metamorphism and deformation
Metamorphic Grade	Granulite facies
Deformation	The entire anorthosite complex is affected by a northeast-trending set of high strain zones. Significant boudinage and minor folding. Local migmatization.

Synoptic Geology

See Weber (1976a) and Peck et al. (1996). Abundant reworking of original textures in numerous northeasterly-trending high strain zones in the northwestern part of Cauchon Lake has obscured primary layering and textures in the anorthosite complex. The anorthosite complex is affected by granulite and/or upper amphibolite facies metamorphism.

PREVIOUS EXPLORATION

Geophysical Surveys	Airborne magnetic
Assessment Files	Not reviewed

Mineral Occurrences

Local disseminated pyrrhotite in gabbroic layers.

MAPPING

Most Detailed Mapping	1:50 000 scale (Weber, 1976b, c)
Sketch Map Figure#	Yes
Regional Mapping	1:250 000 scale (Bedrock Geology of Manitoba Compilation Map Series, NTS 63P)
Type Section Figure#	No

GEOCHEMISTRY

Geochemistry	Whole-rock Geochemistry, including REE and PGE Analyses
PGE Analyses Numbers	1.0161 to 1.0171
Whole-rock Analyses Numbers	2.158 to 2.168

Geochemical Features and PGE Abundances

Light-rare-earth enrichment in comparison to primitive mantle. Very aluminous compositions (locally in excess of 30% Al₂O₃; see Table 2) reflecting accumulation of calcic plagioclase.

Recommendations

Additional surface prospecting of anorthositic rocks is required to determine the extent of these rock types in the area and if the rocks are prospective for PGE. This work should be undertaken in a year in which water levels on Cauchon Lake are significantly below normal levels. Given the recent recognition of contact-type PGE mineralization in anorthositic layered intrusions of both Archean (e.g., Mayville intrusion, Manitoba; Peck et al., 1999) and Proterozoic age (Peck et al., 1993), all underexplored, large bodies of Archean megacrystic anorthosite such as the Cauchon Lake body warrant additional exploration for PGE.

Selected Bibliography

- Heaman, L.M., Machado, N., Krogh, T.E., Weber, W., 1986: Preliminary U-Pb zircon results from the Pikwitonei granulite terrain, Manitoba; Geological Association of Canada, Mineralogical Association of Canada, Canadian Geophysical Union, 1986 Joint Annual Meeting, Program with Abstracts, v. 11, p. 79.
- Peck, D.C., Cameron, H.D.M., Layton-Matthews, D., Bishop, A., 1996: Geological investigations of Anorthosite, gabbro and pyroxenite occurrences in the Pikwitonei granulite domain and the Cross Lake region (parts of NTS 63I/6, 63J/7, 63J/8, 63P/5, 63P/6, 63P/7, 63P/8, 63P/9, 63P/11 and 63P/12); in Report of activities, Manitoba Energy and Mines, Geological Services, Report of activities 1996, p. 85-90.
- Peck, D.C., James, R.S. and Chubb, P.T., 1993. Geological environments for PGE-Cu-Ni mineralization in the East Bull Lake intrusion, Ontario. Exploration and Mining Geology, v.2, p. 85-104.
- Peck, D.C., Theyer, P., Bailes, A.H., Chornoby, J., 1999: Field and lithogeochemical investigations of mafic and ultramafic rocks and associated Cu-Ni-PGE mineralization in the Bird River Greenstone belt (Parts of NTS 52L); Manitoba Industry, Trade and Mines, Geological Services, Report of activities 1999, p. 106-110.
- Weber, W., 1976a: Cauchon, Partridge Crop and Apussigamasi lakes area; Manitoba Department of Mines, Resources and Environmental Management, Mineral Resources Division, Geological Survey, Report of Field Activities 1976, p. 54-57.
- Weber, W., 1976b: Prud'homme Lake; Manitoba Mines, Resources and Environmental Management, Mineral Resources Division, Preliminary Map 1976U-1, Scale 1:50 000.
- Weber, W., 1976c: Goulet Lake; Manitoba Mines, Resources and Environmental Management, Mineral Resources Division, Preliminary Map 1976U-2, Scale 1:50 000.

UTM	Location and Access	SIZE
Easting 739500	Accessibility All-weather road	Area (km2)
Northing 5614500	Locality 1 Superior Province - southeastern Manitoba	Maximum Dimensions > 10 km x > 1 km
Zone 14	Locality 2	

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Lopolith
 Geochemical Classification Tholeiitic - Low Ti
 General Classification Mafic-Ultramafic
 Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Anorthosite, leucogabbro, gabbro, pyroxenite
 Host Rocks Basalt
 Layering Features Modally graded/weakly differentiated
 Igneous Textures Abundant megacrystic anorthosite, spectacular heterolithic magmatic breccia unit developed along the inferred base of the intrusion
 Other Igneous Features Varitextured and dendritic gabbro veins and pods
 Metamorphic Grade Amphibolite facies
 Deformation Relatively undeformed; local foliation development near lower contact with underlying basalt (shearing)

Synoptic Geology

See Peck et al. (1999) for a detailed description of the geology and mineral occurrences of the Mayville intrusion. The Mayville intrusion is principally composed of coarse-grained leucogabbro that grades to anorthosite and gabbro. Rare younging criteria such as modal and size graded layering, indicate that the intrusion is consistently north-facing. Planar, centimetre- and metre-scale modal layering is rarely developed. In the lowermost, exposed 150 m - 200 m of the southern part of the intrusion, irregular, inclusion-rich pyroxenite and melagabbro zones are developed (see below). The major lithostratigraphic units identified are (from base to top, with estimated true thickness shown in parenthesis - based on the type section for the central part of the Mayville intrusion, Peck et al., 1999, Fig. GS-27-2):

- (1) Heterolithic Breccia zone (>120 m; based not exposed), comprises irregular pods, veins and layers, <1 to 100 m thick, of melagabbro and pyroxenite that have intruded, eroded and entrained fragments of pre-existing, semi-consolidated poikilitic and plagioclase megaphyric leucogabbro. The breccia unit also contains veins of fine-grained gabbro and pods and veins of varitextured, medium-grained to pegmatitic gabbro and quartz diorite. Basalt xenoliths are rarely observed. Sulphide mineralization is erratically developed throughout the breccia zone (see below);
- (2) Lower Megacrystic zone (320 m), comprises alternating, decametre-thick, very-coarse-grained poikilitic and megacrystic leucogabbro subunits;
- (3) Central Layered zone (220 m), comprises centimetre- and metre-scale modal and grain size layering in megacrystic anorthosite and leucogabbro, coarse-grained, poikilitic gabbro and massive, medium- to coarse-grained leucogabbro;
- (4) Upper Megacrystic zone (110 m), similar to the Lower Megacrystic zone, but contains minor, centimetre-size partially digested, epidotized, granitic xenoliths;
- (5) Upper Massive zone (350 m), including a lower, coarse-grained poikilitic leucogabbro that grades upward into massive, medium-grained leucogabbro with increasing proportions of granitic xenoliths;
- (6) Gabbro zone (>20 m; top not exposed), comprises medium-grained gabbro with up to 15% centimetre- to metre-size granitic xenoliths and derived, interstitial granophyre (xenomelt).

The arrangement of rock types within the intrusion is typical of megacrystic anorthosite bodies that are described from other Archean granite-greenstone belts and to the basal, anorthositic parts of younger, ca. 2.48 Ga layered mafic intrusions in central Ontario (e.g., Peck et al., 1993). The geology of the intrusion can be explained by one or more pulses of Al-rich (hyperfeldspathic) basaltic magma that initially crystallized only plagioclase. Plagioclase crystallization led to enrichment of Mg and Fe in residual, interstitial magma that became denser than both the parental magma and the early-formed plagioclase crystals (primocrysts). The concentration of mafic rocks in the base of the intrusion and the presence of leucogabbro clasts in both pyroxenite and melagabbro in the Heterolithic Breccia zone may reflect ponding of dense, residual mafic liquid at the base of the intrusion.

PREVIOUS EXPLORATION

Geophysical Surveys	Airborne magnetic/EM and ground magnetic/EM
Assessment Files	Not reviewed

Mineral Occurrences

The Mayville intrusion hosts disseminated to semi-massive Cu-rich sulphide mineralization ("contact-type" mineralization) near its base. Maximum PGE abundances of 3 ppm were obtained by Peck et al. (1999) from the lower part of the mineralized zone, and values up to approx. 8 g/t combined Pd + Pt have been reported by Exploratus Limited. The rock types and sulphide mineralization in the Mayville intrusion have a striking resemblance to those developed in the lower parts of ca. 2.48 Ga anorthositic intrusions in central Ontario (East Bull Lake intrusive suite; Peck et al., 1993). Several of the East Bull Lake suite of intrusions contain broad zones of contact-type, PGE-rich sulphide mineralization that became a focus for significant PGE exploration programs in 1998. Field observations suggest that the Mayville intrusion represents a dynamic magma chamber in which large-scale convection promoted the migration of dense components (immiscible magmatic sulphides and residual Mg- and Fe-rich magma) toward the base of the chamber. The development of large convection cells is believed to be a critical stage in the formation of PGE-rich "contact-type" sulphide mineralization in anorthositic intrusions. The intrusion hosts and known copper-rich sulphide deposit (Mayville deposit) and several Cu-Ni-PGE occurrences (e.g., Hititrite showing; Theyer, 1986).

Exploration History

Intermittently explored for magmatic sulphide mineralization. Historical trenches in the eastern part of the intrusion. Drilling by several companies, including Gods Lake Gold Mines, Falconbridge and Exploratus. Ground magnetic and EM surveys. Trenches established in 1999 by Exploratus. Extensive lithogeochemical database (see Tables 1 and 2).

MAPPING

Most Detailed Mapping	1:10 000 (Macek, 1985)
Sketch Map Figure#	Yes
Regional Mapping	1:250 000 scale (Bedrock Geology of Manitoba Compilation Map Series, NTS 52L)
Type Section Figure#	Yes

GEOCHEMISTRY

Geochemistry	Whole-rock Geochemistry, including REE and PGE Analyses
PGE Analyses Numbers	1.0702 to 1.1002
Whole-rock Analyses Numbers	2.359 to 2.509

Geochemical Features and PGE Abundances

See Tables 1 and 2. In general, a significant correlation exists between Cu and PGE contents. The host rocks range from anorthosite to pyroxenite, and are characterized by low-Ti contents and primitive-mantle-like trace element contents.

Recommendations

In the opinion of the authors, the best known Archean analogue of contact-type PGE-Cu-Ni mineralization present in the Paleoproterozoic East Bull Lake suite of intrusions in Central Ontario.

Selected Bibliography

Macek, J.J., 1985: Cat Creek; Manitoba Energy and Mines, Geological Services, Preliminary Map 1985C-1, Scale 1:10 000.
Peck, D.C., James, R.S. and Chubb, P.T., 1993. Geological environments for PGE-Cu-Ni mineralization in the East Bull Lake intrusion, Ontario. *Exploration and Mining Geology*, v.2, p. 85-104.
Peck, D.C., Theyer, P., Bailes, A.H., Chornoby, J., 1999: Field and lithogeochemical investigations of mafic and ultramafic rocks and associated Cu-Ni-PGE mineralization in the Bird River Greenstone belt Parts of NTS 52L; Manitoba Industry, Trade and Mines, Geological Services, Report of activities 1999, p. 106-110.
Theyer, P. 1986: Platinum group elements in southeastern Manitoba; Manitoba Energy and Mines, Geological Services Branch, Report of Field Activities 1986, p.125-130.

Name of Intrusion	Benn Lake Intrusion	Ref ID.	258
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UTM	Location and Access	SIZE
Easting 327760	Accessibility Boat	Area (km2) 20
Northing 6075005	Locality 1 Trans-Hudson Orogen - Flin Flon-Snow Lake Domain	Maximum Dimensions > 10 km x 1.7 km
Zone 14	Locality 2 Flin Flon Belt	

AGE DATA

Age	Proterozoic
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CLASSIFICATION

Intrusion Type	Unknown
General Classification	Mafic
Other Classification	Greenstone belt

GEOLOGY

Principal Rock Types	Gabbro, gabbro
Host Rocks	Metavolcanic rocks of the Flin Flon greenstone belt
Layering Features	Unknown
Igneous Textures	Poikilitic gabbro
Metamorphic Grade	Greenschist facies

Synoptic Geology

See Bailes and Syme (1989) for details. The Benn Lake intrusion appears to be coeval and possibly comagmatic with the adjacent Mikanagan Lake sill, but appears to be more massive and does not appear to contain the evolved ferrodiorite/tonalite suite of rocks that occur in the upper parts of the Mikanagan Lake sill.

PREVIOUS EXPLORATION

Assessment Files	not reviewed
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Mineral Occurrences

not reviewed

Exploration History

not reviewed

MAPPING

Most Detailed Mapping	1:20 000 scale (Bailes and Syme (1989))
Regional Mapping	1:250 000 scale (Bedrock Geology of Manitoba Compilation Map Series, NTS 63K)

GEOCHEMISTRY

Geochemistry	Whole-rock Geochemistry, including REE and PGE Analyses
PGE Analyses Numbers	1.0002 to 1.0003
Whole-rock Analyses Numbers	2.027 to 2.029

Geochemical Features and PGE Abundances

see Tables 1 and 2

Selected Bibliography

Bailes, A.H., Syme, E.C., 1989: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Services, Geological Report 87-1, 313p.

UTM	Location and Access	SIZE
Easting 608500	Accessibility Fixed-wing	Area (km2) 20
Northing 6032000	Locality 1 Superior Province - Gods Lake Domain	Maximum Dimensions 8 km x > 1 km
Zone 14	Locality 2 Cross Lake Greenstone Belt	

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Sill
 Geochemical Classification Tholeiitic - Low Ti
 General Classification Mafic
 Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Leucogabbro, anorthosite, gabbro
 Host Rocks Metavolcanic rocks of the Cross Lake greenstone belt
 Layering Features Unknown
 Igneous Textures Megacrystic anorthosite
 Metamorphic Grade Amphibolite facies

Synoptic Geology

See Peck et al. (1996) for details. The anorthositic intrusion that occurs between Butterfly and Hairy Lakes within the southern part of the Cross Lake greenstone belt (NTS 63I) appears to be relatively massive in comparison to similar anorthositic bodies in the Cross Lake Belt (Peck et al., 1996). Abundant megacrystic anorthosite is the predominant lithology seen in outcrops of this intrusion, but this likely reflects the fact that more mafic rock types in the intrusion are less resistant to weathering and hence are poorly exposed (this is the case in the Pipestone Lake anorthosite complex).

PREVIOUS EXPLORATION

Assessment Files not reviewed

Mineral Occurrences

not reviewed

Exploration History

not reviewed - a strong north-trending linear (airborne) magnetic anomaly is associated with the intrusion

MAPPING

Most Detailed Mapping 1:20 000 scale (Corkery, 1996)
 Sketch Map Figure# No
 Regional Mapping 1:250 000 scale (Bedrock Geology of Manitoba Compilation Map Series, NTS 63I)
 Type Section Figure# No

GEOCHEMISTRY

Geochemistry Whole-rock Geochemistry, including REE and PGE Analyses
 PGE Analyses Numbers 1.0116 to 1.0136
 Whole-rock Analyses Numbers 2.145 to 2.151

Geochemical Features and PGE Abundances

see Tables 1 and 2

Recommendations

As is the case with all megacrystic anorthosite bodies in the Province of Manitoba, it is recommended that prospecting for contact-type (basal magmatic sulphide accumulations) PGE-Cu-Ni deposits be carried.

Selected Bibliography

Corkery, M.T., 1986: Butterfly Lake area; Manitoba Energy and Mines, Minerals Division, Preliminary Map 1986N-1, Scale 1:20 000.

Peck, D.C., Cameron, H.D.M., Layton-Matthews, D., Bishop, A., 1996: Geological investigations of Anorthosite, gabbro and pyroxenite occurrences in the Pikwitonei granulite domain and the Cross Lake region (parts of NTS 63I/6, 63J/7, 63J/8, 63P/5, 63P/6, 63P/7, 63P/8, 63P/9, 63P/11 and 63P/12); in Report of activities, Manitoba Energy and Mines, Geological Services, Report of activities 1996, p. 85-90.

UTM	Location and Access	SIZE
Easting 582750 Northing 6042450 Zone 14	Accessibility Boat Locality 1 Superior Province - Gods Lake Domain Locality 2 Cross Lake Greenstone Belt	Area (km2) Maximum Dimensions Approximately 1 km x >100 metres

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Sill
General Classification Ultramafic
Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Peridotite, pyroxenite
Host Rocks Basalt of the Pipestone Lake Group
Layering Features Local modal layering
Igneous Textures Cumulates (olivine cumulates)
Other Igneous Features Local chromite-rich schlieren
Metamorphic Grade Amphibolite facies

Synoptic Geology

See Rousell (1965). Little is known about the geology of this small ultramafic intrusion. It may be coeval with the host basalt units and/or the Pipestone Lake anorthosite complex, which occurs immediately to the south of this ultramafic body. It appears to be layered on a cm-scale, and is made up of peridotite with variable olivine:pyroxene ratios and chromite content.

PREVIOUS EXPLORATION

Assessment Files not reviewed

Mineral Occurrences

not reviewed - likely the source of the "pipestone" (serpentinite and/or talc-carboante altered ultramafic rocks sourced on Pipestone Lake from which the lake derives its name)

Exploration History

not reviewed

MAPPING

Most Detailed Mapping 1:20 000 scale (Corkery and Cameron, 1985)
Sketch Map Figure# No
Regional Mapping 1:250 000 scale (Bedrock Geology of Manitoba Compilation Map Series, NTS 63I)
Type Section Figure# No

GEOCHEMISTRY

Geochemistry Whole-rock Geochemistry, including REE and PGE Analyses
PGE Analyses Numbers 1.1399 to 1.1406
Whole-rock Analyses Numbers 2.793 to 2.801

Geochemical Features and PGE Abundances

see Tables 1 and 2

Recommendations

Given the anomalously low PGE values in the adjacent Pipestone Lake anorthosite complex (PLAC; Table 1), it is recommended that the West Pipestone Lake ultramafic intrusion be explored for PGE-Cu-Ni mineralization, given the possibility that it may be related to a missing, ultramafic component of the PLAC.

Selected Bibliography

Corkery, M.T., Cameron, H.D.M., 1985: Pipestone Lake; Manitoba Energy and Mines, Geological Services, Preliminary Map 1985N-2.

Rousell, D.H. 1965: The petrology of Archean and Proterozoic rocks at Cross Lake, Manitoba, and the effects of the Hudsonian orogeny; Ph.D. thesis, University of Manitoba, 178p.

UTM	Location and Access	SIZE
Easting 551000 Northing 6037000 Zone 14	Accessibility Boat Locality 1 Superior Boundary Zone and Pikwitonei Domain Locality 2 Cross Lake Greenstone Belt	Area (km2) 1000 Maximum Dimensions > 60 km long x > 20 km wide x >0.5 km thick

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Unknown
Geochemical Classification Tholeiitic - Low Ti
General Classification Mafic
Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Leucogabbro, gabbro, anorthosite, melagabbro, massive magnetite-ilmenite layers, oxide-rich gabbro
Host Rocks Orthogneiss of the Pikitonei Domain and supracrustal rocks of the Cross Lake greenstone belt
Layering Features Local modal layering
Metamorphic Grade Not uniform
Deformation Affected by regional-scale complex large-scale folding, producing complex dome and basin pattern involving the intrusion and basement gneiss and (younger?) granitic rocks

Synoptic Geology

The Kiskitto Lake intrusion is generally poorly exposed but a few areas of abundant outcrop are present to the north of the east end of Kiskitto Lake. The intrusion is also exposed on a few shoreline outcrops (north shore of the lake) and on isolated outcrop areas present in a vast string bog that extends north of the north shoreline of Kiskitto Lake. The regional geology is described by Bell (1978). The geology of the intrusion is described by McRitchie (1986) and Peck et al. (1996). Recent drill core studies (Peck, unpublished) based on core provided by Gossan Resources Ltd. show that the Kiskitto Lake intrusion is a complexly folded sill-like (?) body covering an area of approximately 10,000 km². It is also referred to as being part of the West Channel anorthosite complex and the Nelson River anorthosite complex (see McRitchie, 1986 and Bell, 1978). The maximum thickness of the intrusion is not known, but drilling by Gossan Resources Limited indicates that locally, the intrusion is at least 500 metres thick. The intrusion is well-layered (cm- to decametre-scale) and likely contains megacyclic units similar to those described for the Pipestone Lake anorthosite complex (PLAC; see Peck et al., 1994). The orthopyroxene-in isograd that defines the eastern boundary of the Pikwitonei Domain crosses the eastern part of the intrusion. For the most part, the rocks of the intrusion are recrystallized but preserve their megascopic primary textures. The central parts of the intrusion appear to have been metamorphosed at the granulite facies, whereas the western and eastern ends of the body appear to have been metamorphosed (retrogressed?) at lower temperatures (amphibolite facies). Megacrystic anorthosite and deformed equivalents (including "schollen" anorthosite gneiss and "enderbite" derived from anorthosite and leucogabbro) are the predominant rock type seen in the surface outcrops of the intrusion. However, Gossan Resources Ltd.'s drill core indicates that there is roughly and equal amounts of gabbroic and anorthositic rocks (interlayered) in the Kiskitto Lake intrusion, as is the case for the PLAC.

PREVIOUS EXPLORATION

Geophysical Surveys Airborne magnetic and ground magnetic
Assessment Files not reviewed

Mineral Occurrences

Massive and semi-massive magnetite-ilmenite mineralization hosted by layered gabbroic to anorthositic rocks intersected in drill holes completed by Gossan Resources Ltd. (1995/96).

Exploration History

Explored for magmatic Fe-Ti-V oxide mineralization by Gossan Resources Ltd. (1995/96). Airborne magnetic survey and follow-up diamond drilling.

MAPPING

Most Detailed Mapping	1:50 000 scale (Lenton et al., 1986)
Sketch Map Figure#	No
Regional Mapping	1:250 000 scale (Bedrock Geology of Manitoba Compilation Map Series, NTS 63J)
Type Section Figure#	No

GEOCHEMISTRY

Geochemistry	Whole-rock Geochemistry, including REE and PGE Analyses
PGE Analyses Numbers	1.0456 to 1.0469
Whole-rock Analyses Numbers	2.327 to 2.341

Geochemical Features and PGE Abundances

See Tables 1 and 2. Despite its apparently coeval and presumed comagmatic relationship to the adjacent Pipestone Lake anorthosite complex (PLAC), the Kiskitto Lake intrusion is characterized by extreme enrichment in light-rare-earth elements in comparison to primitive mantle, giving it an arc-like trace element geochemical signature distinct from the mantle-like signature of the PLAC. Oxide mineralization appears to be stratiform/magmatic, and is concentrated in melagabbroic layers.

Recommendations

The Kiskitto Lake intrusion appears to represent the largest anorthositic intrusion in Manitoba. Deformation associated with the collisional orogeny involving the Superior Boundary Zone and the Trans-Hudson Orogen has produced a complex fold pattern in the Kiskitto Lake area, making it very difficult to determine the original size and shape of the intrusion. Nevertheless, given that it can be generally classified as an Archean megacrystic anorthosite body, and given the presence of contact-type PGE-Cu-Ni mineralization in both the Mayville intrusion and Bird River Sill (Peck et al., 1999) in southeastern Manitoba (both having megacrystic anorthosite components), it is recommended that exploration for PGE-Cu-Ni mineralization in the Kiskitto Lake intrusion is warranted.

Selected Bibliography

- Bell, C.K., 1978: Geology, Wekusko Lake map area, Manitoba; Geological Survey of Canada, Memoir 384, 84p.
- Lenton, P.G., McRitchie, W.D., Corkery, M.T., Cameron, H.D.M., 1986: Kiskitto, Kiskittogisu, Playgreen lakes; Manitoba Energy and Mines, Minerals Division, Preliminary Map 1986N-2.
- McRitchie, W.D., 1986: Nelson River anorthosite studies; Manitoba Energy and Mines, Minerals Division, Report of Field Activities 1986, p. 152-166.
- Peck, D.C., Cameron, H.D.M., Layton-Matthews, D., Bishop, A., 1996: Geological investigations of Anorthosite, gabbro and pyroxenite occurrences in the Pikwitonei granulite domain and the Cross Lake region (parts of NTS 63I/6, 63J/7, 63J/8, 63P/5, 63P/6, 63P/7, 63P/8, 63P/9, 63P/11 and 63P/12); in Report of activities, Manitoba Energy and Mines, Geological Services, Report of activities 1996, p. 85-90.
- Peck, D.C., Messing, C., Halden, N.M., Chandler, C., 1998: New insights into the petrogenesis of the Pipestone Lake anorthosite complex and its Ti-V-Fe oxide deposits (parts of NTS 63I/5 and I/12); Manitoba Energy and Mines, Geological Services, Report of activities 1998, p. 127-134.

UTM	Location and Access	SIZE
Easting 876900 Northing 6075000 Zone 15	Accessibility Fixed-wing Locality 1 Superior Province - Gods Lake Domain Locality 2 Edmund - Stull Greenstone Belt	Area (km2) Maximum Dimensions

AGE DATA
Age Archean

CLASSIFICATION
Intrusion Type Unknown
General Classification Mafic
Other Classification Greenstone belt

GEOLOGY
Principal Rock Types Gabbroic rocks, layered
Host Rocks Supracrustal rocks of the Edmund-Margaret Lakes Belt
Layering Features Local modal layering

Synoptic Geology
Several occurrences of layered gabbroic rocks are described by Corkery (1996a). Most of these intrusions are thin (< 100 m) sills or dykes composed of fine- to medium-grained gabbro, emplaced into basalt sequences.

PREVIOUS EXPLORATION
Assessment Files not reviewed
Mineral Occurrences not reviewed
Exploration History not reviewed

MAPPING
Most Detailed Mapping 1:20 000 scale (Corkery, 1996b)
Sketch Map Figure# No
Type Section Figure# No

GEOCHEMISTRY
Geochemistry Whole-rock Geochemistry, including REE and PGE Analyses
PGE Analyses Numbers 1.0219 to 1.0222
Whole-rock Analyses Numbers 2.233 to 2.236

Geochemical Features and PGE Abundances
See Tables 1 and 2.

Selected Bibliography
Corkery, M.T., 1996a: Geology of the Edmund Lake area (53K/11NE); in Report of activities, Manitoba Energy and Mines, Geological Services, Report of activities 1996, p. 11-13.
Corkery, M.T., 1996b: Edmund Lake; Manitoba Energy and Mines, Preliminary Map 1996S-1.

UTM	Location and Access	SIZE
Easting 380300	Accessibility Boat	Area (km2) 5
Northing 6074600	Locality 1 Trans-Hudson Orogen - Flin Flon-Snow Lake Domain	Maximum Dimensions 5.3 km x 1.3 km
Zone 14	Locality 2 Flin Flon Belt	

AGE DATA

Age Proterozoic

CLASSIFICATION

Intrusion Type Sill

General Classification Mafic-Ultramafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Gabro, subordinate dunite, peridotite and pyroxenite

Host Rocks Claw Lake basalts

Layering Features Local modal layering

Igneous Textures Local gabbro pegmatite pods, some large, layered mafic pegmatite bodies occur in the intrusion

Deformation Locally cut by major shear zones

Synoptic Geology

See Syme (1991). Similar to Limestone Narrows complex and other subvolcanic mafic-ultramafic intrusions in the Flin Flon belt. Possibly part of a larger layered intrusion (see Syme, 1991).

PREVIOUS EXPLORATION

Assessment Files not reviewed

Mineral Occurrences

not reviewed

Exploration History

not reviewed

MAPPING

Most Detailed Mapping 1:20 000 scale (Syme and Whalen, 1991)

Sketch Map Figure# No

Regional Mapping 1:250 000 scale (Bedrock Geology of Manitoba Compilation Map Series, NTS 63K)

Type Section Figure# No

GEOCHEMISTRY

Geochemistry Whole-rock Geochemistry, including REE and PGE Analyses

PGE Analyses Numbers 1.0223 to 1.0225

Whole-rock Analyses Numbers 2.237 to 2.240

Geochemical Features and PGE Abundances

See Tables 1 and 2.

Selected Bibliography

Syme, E.C., 1991: Elbow Lake project - Part A : supracrustal rocks and structural setting; Manitoba Energy and Mines, Minerals Division, Report of activities 1991, p. 14-27.

Syme, E.C., Whalen, J.B., 1991: Elbow Lake (part of NTS 63K/15W); Manitoba Energy and Mines, Geological Survey of

UTM	Location and Access	SIZE
Easting 371800 Northing 6295600 Zone 14	Accessibility Boat Locality 1 Trans-Hudson Orogen - Lynn Lake Domain Locality 2 Lynn Lake Greenstone Belt	Area (km2) 10 Maximum Dimensions 5 km x >2 km

AGE DATA

Age Proterozoic

CLASSIFICATION

Intrusion Type Unknown
General Classification Mafic-Ultramafic
Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Gabbro, pyroxenite, peridotite
Host Rocks Wasekwan Group supracrustal rocks
Other Igneous Features See Hulbert (1978)
Metamorphic Grade Greenschist facies

Synoptic Geology

Part of the Lynn Lake suite of mafic-ultramafic sills and plugs (Pre-Sickle suite - Gilbert et al., 19994). See Hulbert (1978) for detailed description of the body and its Ni-Cu mineralization. Regional geology described in Milligan (1960) and Gilbert et al. (1980).

PREVIOUS EXPLORATION

Assessment Files Not reviewed

Mineral Occurrences

Not reviewed. See Hulbert (1978) and Pinsent (1980).

Exploration History

Not reviewed

MAPPING

Most Detailed Mapping 1:50 000 scale (Gilbert et al., 1980)
Sketch Map Figure# Yes
Regional Mapping 1:250 000 scale (Bedrock Geology of Manitoba Compilation Map Series, NTS 64C)
Type Section Figure# Yes

GEOCHEMISTRY

Geochemistry Base Metal Assay and PGE Analyses
PGE Analyses Numbers 1.0363 to 1.0391

Selected Bibliography

Gilbert, H.P., Syme, E.C., Zwanzig, H.V., 1980: Geology of the metavolcanic and volcanoclastic metasedimentary rocks in the Lynn Lake area; Manitoba Energy and Mines, Mineral Resources Division, Geological Paper 80-1, 118p.
Hulbert, L.J., 1978: Geology of the Fraser Lake gabbro complex, Manitoba; M.Sc. thesis, University of Regina.
Milligan, G.C., 1960: Geology of the Lynn Lake district; Manitoba Mines and Natural Resources, Mines Branch, Publication 57-1, 317p.
Pinsent, R.H., 1980: Nickel-copper mineralization in the Lynn Lake gabbro; Manitoba Energy and Mines, Mineral Resources

Name of Intrusion	Hook Lake Intrusion	Ref ID.	265
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UTM	Location and Access	SIZE
Easting 319780	Accessibility Boat	Area (km2)
Northing 6064360	Locality 1 Trans-Hudson Orogen - Flin Flon-Snow Lake Domain	Maximum Dimensions
Zone 14	Locality 2 Flin Flon Belt	

AGE DATA

Age	Proterozoic
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CLASSIFICATION

Intrusion Type	Sill
General Classification	Mafic
Other Classification	Greenstone belt

GEOLOGY

Principal Rock Types	Gabbronorite, ferrogabbro, leucotonalite
Host Rocks	Basaltic sequences of the Flin Flon Belt

Synoptic Geology

Differentiated, Y-shaped gabbroic intrusion with a similar range of rock types to the Mikanagan Lake Sill (Bailes and Syme, 1989), i.e., gabbronorite, ferrogabbro and leucotonalite.

PREVIOUS EXPLORATION

Assessment Files	Not reviewed
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Mineral Occurrences

Not reviewed

Exploration History

Not reviewed

MAPPING

Most Detailed Mapping	1:20 000 scale (Bailes and Syme, 1989)
Regional Mapping	1:250 000 scale (Bedrock Geology of Manitoba Compilation Map Series, NTS 63K)

GEOCHEMISTRY

Geochemistry	Whole-rock Geochemistry, including REE and PGE Analyses
PGE Analyses Numbers	1.0422 to 1.0423
Whole-rock Analyses Numbers	2.276 to 2.278

Selected Bibliography

Bailes, A.H., Syme, E.C., 1989: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Services, Geological Report 87-1, 313p.

UTM	Location and Access	SIZE
Easting 323487 Northing 6067849 Zone 14	Accessibility Boat Locality 1 Trans-Hudson Orogen - Flin Flon-Snow Lake Domain Locality 2 Flin Flon Belt	Area (km2) Maximum Dimensions Approx. 1.5 km x 1 km

AGE DATA

Age Proterozoic

CLASSIFICATION

Intrusion Type Unknown
General Classification Mafic-Ultramafic

GEOLOGY

Principal Rock Types Gabbro, pyroxenite

Synoptic Geology

See Bailes and Syme (1989)

PREVIOUS EXPLORATION

Assessment Files Not reviewed

Mineral Occurrences

Not reviewed

Exploration History

Not reviewed

MAPPING

Most Detailed Mapping 1:20 000 scale (Bailes and Syme, 1989)
Sketch Map Figure# No
Regional Mapping 1:250 000 scale (Bedrock Geology of Manitoba Compilation Map Series, NTS 63K)
Type Section Figure# No

GEOCHEMISTRY

Geochemistry Whole-rock Geochemistry, including REE and PGE Analyses
PGE Analyses Numbers 1.1410 and 1.1411
Whole-rock Analyses Numbers 2.811 to 2.814

Geochemical Features and PGE Abundances

See Tables 1 and 2

Selected Bibliography

Bailes, A.H., Syme, E.C., 1989: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Services, Geological Report 87-1, 313p.