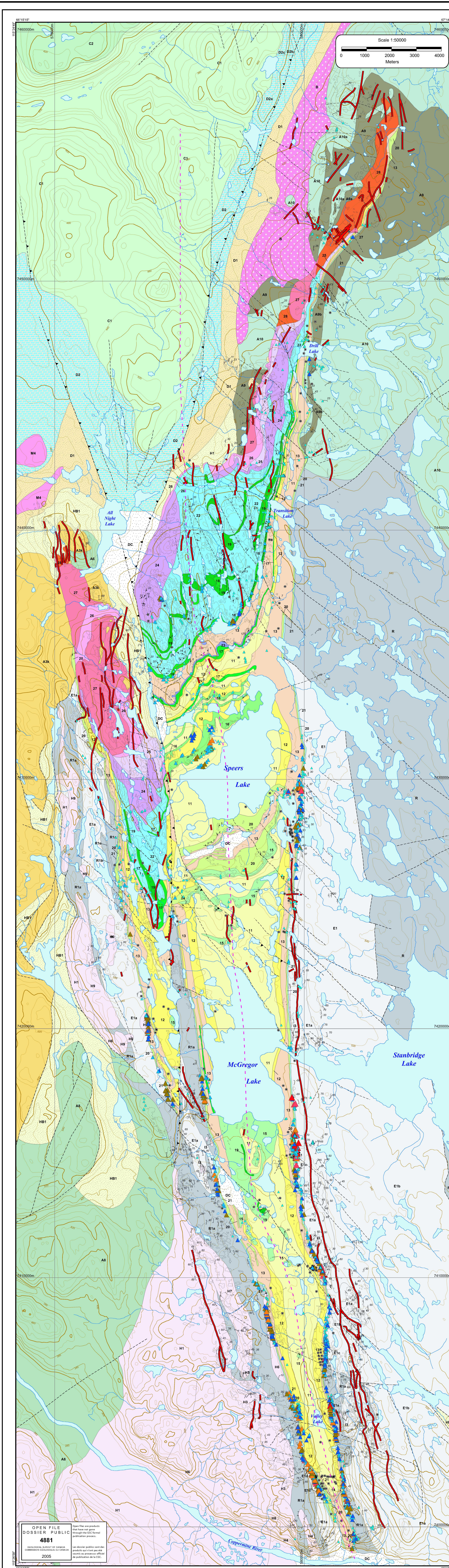




Geological Survey of Canada
Commission Géologique du Canada

GEOLOGY OF THE MUSKOX INTRUSION and Associated Ni + Cu Occurrences Open File 4881

by : Larry Hulbert, GSC, Ottawa and Musko Minerals Limited



Legend

Quaternary	DC No Outcrop - Drift cover	Homy Bay Group	HB1 Big Bear Formation: feldspathic sandstone, conglomerate
	Mackenzie Dykes (undivided)	Hepburn Intrusive Suite	H3 biotite gabbro, pegmatitic granite
		H8 hornblende-biotite diorite, pegmatitic granite	
		H7 alkali	
		H6 hornblende-biotite-quartz diorite	
		H4 biotite-hornblende tonalite	
		H3 biotite granodiorite	
		H1 biotite granite	
		Reclus Group	R Undivided Asiak/Fontano Formation
		R1 Undivided Asiak Formation: quartz-feldspathic gneiss	
		R1a quartz-feldspar-biotite gneiss, migmatite	
		R1b quartz-biotite-sillimanite, schist	
		R1c amphibolite gneiss	
		Epworth Group	E1 Odjick Formation
		E1a quartz-feldspar gneiss, migmatite	
		E1b quartz-feldspar-mica schist	
		E1c granite, quartz diorite, granitoid metasediments, migmatite	
		E1d hornfels	
		Akaiicho Group	A10 Undivided Valiant and Starbridge Formations
		A10a metabasalt, metagabbro	
		A9 Undivided Drift Formation: greywacke sandstone, metagabbro	
		A9a quartz-mica schist	
		A9b quartzite	
		A8 Undivided Aglerok/Talferk Formations: metabasalt, metagabbro	
		A6 Nassinok Subgroup	
		A3k Olark Sills: rhyolite	
		B Basement Complex: granite, granodiorite	

Ni+Cu Assays In Grab Samples (ppm)

▲	150,000 to 230,000
▲	100,000 to 150,000
▲	55,000 to 100,000
▲	25,000 to 55,000
▲	15,000 to 25,000
▲	7,000 to 15,000
▲	3,000 to 7,000
▲	0 to 3,000

Explanatory Notes

This map represents a new synthesis and compilation of the Geology of the Muskox Intrusion and associated Ni+Cu Occurrences. The new GIS map is the product of a collaborative research program between Musko Minerals Ltd. and the Geological Survey of Canada (GSC). Since the discovery of the intrusion in 1956 by R. Vaux of the Canadian Nickel Company (NICO) a number of outstanding mapping programs have taken place on the Muskox Intrusion, however, knowledge and availability of some of these maps has only been made recently and incorporated into this project. The authors would like to acknowledge the major contribution made by the pioneering mapping programs of the Canadian Nickel Company (NICO) and later programs of the Geological Survey of Canada (Smith 1961, Smith et al., 1967), and Equinox Resources Ltd. and International Platinum Corp. (1988-89) towards the development of this new map and GIS product.

Although the prevailing geology of the intrusion north of the Coppermine River has not changed significantly from that of Smith et al., 1967 (Map 1213A) a number of new features have been introduced and others updated to be current as of 2004. Map 1213A was found to be an excellent representation of the geology of the Muskox Intrusion, however it proved to be insufficiently accurate in its location to meet the demands of a modern exploration program which utilized accurate GPS survey and geophysical mapping data. Therefore, a new cartographic project was undertaken employing modern, high precision GIS surveying and topographic bases, as well as all sources of pertinent mineral exploration information dating back to the discovery of the intrusion. Geographically distinct features on these earlier maps, and the location of old diamond drill holes were GPS surveyed in the field to aid in the accuracy of the new map. Apart from Smith's original map series, which were considerably more detailed than the final publication version (Map 1213A), an invaluable source of information, and in some cases more detailed geological maps came from a sequence of fourteen original field mapsheets generously provided by NICO. These maps span the length of the main intrusion north of the Coppermine River. This map information as well as detailed maps from the records of Equinox Resources Ltd. (1988-1989) and International Platinum Corp. (1988-1989) formed the framework for the new map. Areas of glacial overland further details defining the intrusive contact, cumulative stratigraphic thicknesses and continuity and faulting were interpreted from the aeromagnetic signatures based on a high precision airborne geophysical survey conducted over the intrusion in 1998 at 200m and in some areas 100m line spacing. Additional geological information was also obtained from the records of 241 diamond drill holes scattered throughout the map area.

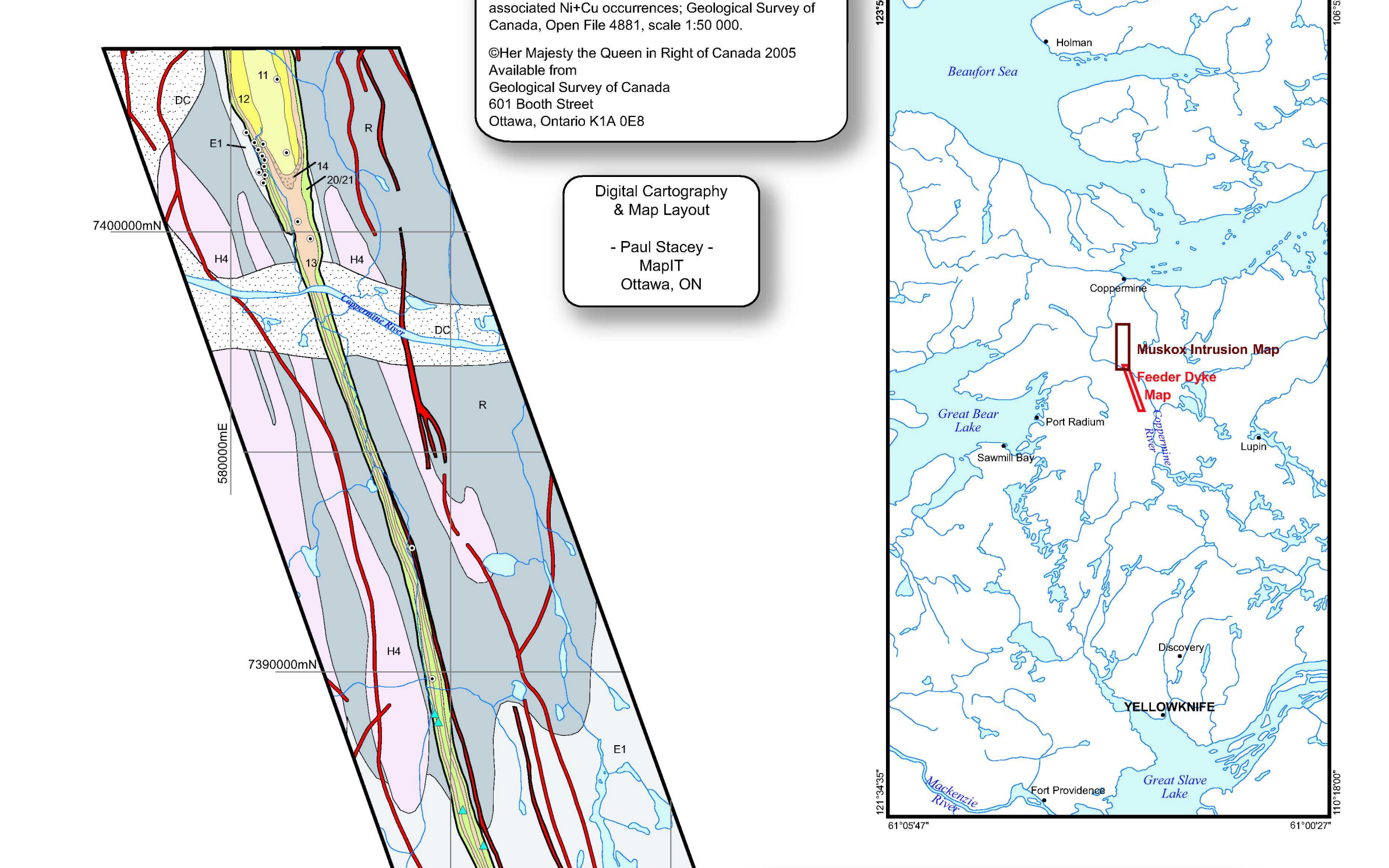
Lithological nomenclature employed in the legend for mafic and ultramafic rocks of the Muskox Intrusion is essentially the same as that of Smith et al., 1967; however, the rock name "hornblende gabbro" has been replaced by gabbroite and "picrite" by feldspathic peridotite. The Paleoproterozoic country rock nomenclature has been adopted from Hoffman 1984, Baragar and Donaldson, 1973, and it replaces Smith's "Mesoproterozoic", "Mesoproterozoic" and "Granitic" Rocks and Homby Bay Group divisions, respectively. The Mesoproterozoic Coppermine River Group legend nomenclature has been modified from Baragar and Donaldson, 1973.

The base hydrological outlines were digitized from 1:50K National Topographic maps and detailed, generalized and annotated coverage of the area. Elevation contours over and proximal to the intrusion were derived from laser altimeter readings collected during the airborne geophysical surveys; those of the most detail areas have been obtained from digitized topographic map contours.

The Muskox Intrusion maps "Feeder Dyke" Coppermine South and Spider-Elder Lakes Area represent the regional geology of the feeder dyke and detailed geology of this body in the Spider-Elder Lakes area, respectively. The regional map has been modified from that of Smith et al., 1967 (Map 1214A) and Hoffman 1984 (Map 1576A), whereas the Spider-Elder Lakes map is based on mapping of L. Hulbert and Equinox Resources Ltd.

Ni+Cu mineral occurrences represents a database compiled from the records of Equinox Resources Ltd., International Platinum Corp., Musko Minerals Ltd. and L. Hulbert.

- #### References
- Baragar, W.R.A. and Donaldson, J.A., 1973. Coppermine and Dismal Lakes Massifs; Geological Survey of Canada, Paper 71-39, 20 p. Maps 1337 and 1338A.
 - Findlay, J.M. 1989. Report on the geotectonic potential of the Muskox Intrusion. NWT, International Platinum Corp. DIAND Assessment file 082708.
 - Findlay, J.M. and Kovacs, A., 1986. Geological, Geophysical and Geochronological Report on the Muskox project, Klondike Region, NWT. Report of Muskox Holdings Ltd. 1146.
 - Gilling, F.W. 1988. Report on the geology and geochemistry of the Muskox property, Coppermine River area, NWT, International Platinum Exploration Canada Inc. DIAND Assessment file 082295.
 - Gilling, F.W. 1988. Report on the geology and geochemistry of the Muskox property, Coppermine River area, NWT, International Platinum Exploration Canada Inc. DIAND Assessment file 082295.
 - Hoffman, P.F., 1984. Geology, Northern Inland of Wopmay Orogen, District of Mackenzie, Northwest Territories, Geological Survey of Canada, Map 1576A, scale 1:250,000.
 - Page, J.W. and Culbert, R.R., 1989. Geophysical and Geochronological Report on the Muskox project, NWT, Equinox Resources Ltd. DIAND Assessment file 082522.
 - Page, J.W., Culbert, R.R. and Martin, L.S., 1988. Geochronological and Geophysical and Drill Program Reports on the Muskox project, NWT, Equinox Resources Ltd. DIAND Assessment file 082522.
 - Smith, C.H., 1961. Notes on the Muskox Intrusion, Coppermine River area, District of Mackenzie, Geological Survey of Canada, Paper 61-25.
 - Smith, C.H., Irvine, T.N. and Findlay, D.C. 1967. Geological maps of the Muskox Intrusion, Geological Survey of Canada, Maps 1213A and 1214A.



Map Details

Main - Muskox Intrusion Map
Scale 1 : 50 000
Universal Transverse Mercator Projection
Datum: NAD 27, Zone 11

Inset - Muskox Intrusion "Feeder Dyke" Coppermine South
Scale 1 : 100 000
Universal Transverse Mercator Projection
Datum: NAD 27, Zone 11

Inset - Muskox Intrusion "Feeder Dyke" Spider Eider Lakes Area
Scale 1 : 10 000
Universal Transverse Mercator Projection
Datum: NAD 27, Zone 11

Muskox Intrusion "Feeder Dyke" Coppermine South

Diamond drill hole
DC Drift cover
Mackenzie Dykes
Intusion margins

Muskox Intrusion
2021 gabbroite & olivine gabbroite
14 feldspathic peridotite breccia
13 "picrite" (melanocratic olivine gabbroite to feldspathic peridotite, with coarse grained orthopyroxene olocysts)
12 peridotite
11 dunite

Hepburn Intrusive Suite
H7 alkali
H4 biotite-hornblende tonalite

Reclus Group
R Undivided Asiak / Fontano Formations

Epworth Group
E1 Undivided Odjick Formation: pelite, quartzite, dolomite

Muskox Intrusion "Feeder Dyke" Spider - Eider Lakes Area

Legend
Mackenzie Dyke (Late)
Mackenzie Dyke (Early)

Muskox Feeder Dyke
21 gabbroite (very fine to fine grained con tact facies)
20 olivine gabbroite (fine to medium grained, iron green rich)
20a olivine gabbroite (fine to medium grained, iron green rich) with mafic rock and con of megacrystic olivine crystallizing sulphides
13 feldspathic peridotite to melano cratic olivine gabbroite with coarse orthopyroxene clinopyroxene (Cpx)

Hepburn Intrusive Suite
H7 alkali

Epworth Group
E1 undivided Odjick Formation (pelite, quartzite, dolomite)

geoscan outline
geoscan < 1 m
fault

outcrop
road house
muskeg

limit of mapping

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