

**MINK NARROWS COPPER DEPOSIT
LAKE ATHAPAPUSKOW - MANITOBA**

**A Thesis
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**by
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ABSTRACT

The Mink Narrows copper deposit of Copper Reef Mines (1973) Ltd., is one of several massive sulphide deposits in the Flin Flon region, northern Manitoba. It outcrops on a small reef off the north shore of Lake Athapapuskow, 14 miles southeast of Flin Flon.

The vertical sheet-like deposit occurs in basic metavolcanic rocks of the Amisk Group and is approximately parallel to the contact of a nearby granodioritic intrusion.

The host rocks have been recrystallized and later affected by minor retrograde metamorphism. Adjacent to the intrusion, the metavolcanics have been fractured. An alteration zone of sericite, chlorite, carbonate and quartz is associated with the deposit.

Pyrite, pyrrhotite, chalcopyrite and sphalerite, are the major metallic minerals within the deposit and are present as both massive and disseminated sulphides. Consistent zonation of copper and zinc is not present within the deposit, however zoning occurs in several of the hole intersections.

Metamorphism of the sulphides is indicated by their recrystallization, replacement and cataclastic features.

Two main genetic possibilities exist for the deposit, either emplacement by hydrothermal fluids from the granodiorite intrusion, or by activities related to the volcanism.



TABLE OF CONTENTS

	<u>Page</u>
ABSTRACT	i
LIST OF FIGURES	iv
LIST OF TABLES	iv
LIST OF PLATES	v
ACKNOWLEDGEMENTS	vii
OBJECTIVES	1
INTRODUCTION	2
Previous Work	2
Regional Geological Mapping	2
Mink Narrows Copper Deposit	7
General Geology	7
Regional Geology of Flin Flon Area	7
Local Geology of the Deposit	9
SELECTION OF SAMPLES	12
MINK NARROWS COPPER DEPOSIT	13
Geometrical & Structural Features of the Deposit	13
Geology of the Host Metavolcanic Rocks	18
The Mineralogical Alteration Adjacent to the Deposit	24
Chemical Composition	26
Description of the Mineralization	32
Massive Sulphides	33
Disseminated Sulphides	42
Copper and Zinc Distribution	46

	<u>Page</u>
Gold and Silver Distribution	58
Ore Genesis	58
SUMMARY	60
CONCLUSION	61
REFERENCES	62
APPENDICES	64

LIST OF FIGURES

		<u>Page</u>
Figure 1	Geology of Flin Flon Region (after Froese, 1968), and location of Mink Narrows copper deposit.	4
Figure 2	Location of Mink Narrows copper deposit on Lake Athapapuskow.	5
Figure 3	Diamond drill hole locations.	8
Figure 4	Section 32W.	14
Figure 5	Section 34W.	15
Figure 6	Section 36W.	16
Figure 7	Contour plot of true thickness.	17
Figure 8a&b	Plot of chemical analyses in drill hole MN5.	28,29
Figure 9a&b	Plot of chemical analyses in drill hole MN10.	30,31
Figure 10a-g	Plot of copper & zinc distribution and Cu/Cu + Zn ratios.	47-53
Figure 11	Contoured plot of percentage copper times true thickness (ft.).	56
Figure 12	Contoured plot of percentage zinc times true thickness (ft.).	57

LIST OF TABLES

Table 1	Copper and zinc deposits in the Flin Flon Region.	6
Table 2	Table of formations of the Flin Flon Region (after Bailes, 1971).	10
Table 3	Comparison of composition of basaltic lava flows.	27
Table 4	Cu/Cu + Zn ratios of the copper and zinc deposits in the Flin Flon Region.	55

LIST OF PLATES

		<u>Page</u>
Plate 1	View looking southeast showing the reef outcrop of the Mink Narrows copper deposit.	3
Plate 2	Recrystallized metavolcanic rock. C62. 80X.	19
Plate 3	Hornblende porphyroblast. C56. 80X.	19
Plate 4	Carbonate vein cutting hornblende porphyroblast. C55. 110X.	21
Plate 5	Fractured and displaced hornblende porphyroblast. C56. 110X.	21
Plate 6	Sheared carbonate vein. C56. 110X.	22
Plate 7	Chlorite-filled fracture within metavolcanic rock. C70.	22
Plate 8	Hornblende and plagioclase highly altered to epidote and sericite. C76. 80X.	23
Plate 9	Biotite-rich rock near intrusion. C84. 80X.	23
Plate 10	Chlorite replacing magnetite in alteration zone. C73. 80X.	25
Plate 11	Sheared pyrite. C53. 31X.	34
Plate 12	Chalcopyrite replacing pyrite. C30. 31X.	34
Plate 13	Pyrite with annealed texture. C30 31X.	35
Plate 14	Anhedral pyrite with sphalerite. C52. 31X.	37
Plate 15	Sphalerite replacing pyrite. C52. 162.5X.	37
Plate 16	Euhedral pyrite replacing chalcopyrite and anhedral pyrite. C52. 44X.	38
Plate 17	Pyrrhotite with annealed texture. Partial X-nicols. C28. 36X.	38
Plate 18	Pyrite metablast in pyrrhotite. C28. 47X.	39
Plate 19	Chalcopyrite replacing pyrrhotite. C72. 31X	39

	<u>Page</u>
Plate 20 Sheared contact between pyrite and pyrrhotite. C28. 31X.	40
Plate 21 Fractured and displaced pyrite metablast in pyrrhotite. C28. 40X.	40
Plate 22 Pyrite and pyrrhotite occurring together. C29. 31X.	41
Plate 23 Chalcopyrite replacing pyrrhotite and pyrite. C29. 31X.	43
Plate 24 Sphalerite replacing chalcopyrite and pyrite. C29. 47X.	43
Plate 25 Separate pyrite crystals with chalcopyrite as found in disseminated sulphides. C26. 31X.	44
Plate 26 Clusters of pyrite crystals and chalcopyrite as found in disseminated sulphides. C26. 31X.	44
Plate 27 Pyrite, pyrrhotite and chalcopyrite in a sulphide vein within the disseminated sulphides. C73. 31X.	45

APPENDICES

I	SAMPLE LOCATIONS	65
II	CHEMICAL ANALYSES OF TWO SAMPLES FROM DRILL HOLE MN12	66
III	CHEMICAL ANALYSES OF SAMPLES FROM DRILL HOLE MN5	67
IV	CHEMICAL ANALYSES OF SAMPLES FROM DRILL HOLE MN10	69

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OBJECTIVES

The character of the Mink Narrows copper deposit is somewhat exceptional in the Flin Flon region of northern Manitoba. It is the only deposit that is located adjacent to a granitic intrusion and one of several located in basic metavolcanic rocks.

The primary objective of the thesis is to describe the geology of the rocks containing the deposit, the mineralization and the distribution of the metallic minerals within the deposit.

Having established a reasonably sound descriptive background of the deposit, the genetic possibilities of the mineralization are considered.

INTRODUCTION

The Mink Narrows copper deposit is one of several massive sulphide bodies in the Flin Flon region of Manitoba. It is located 14 miles southeast of Flin Flon and outcrops on a small, partially submerged reef amongst a group of islands near the north shore of Lake Athapapuskow (Figs. 1 & 2).

The sheet-like deposit occurs in basic metavolcanic rocks adjacent to a granodioritic intrusion. Several of the earlier drill holes show that the tabular deposit is approximately parallel to the contact of the intrusion, ranging from 10 feet to over 150 feet from the contact.

The mineralization of the deposit consists of chalcopyrite and sphalerite associated with pyrite and pyrrhotite.

Table 1 gives some characteristics of the neighbouring copper-zinc deposits in the region.

PREVIOUS WORK

Regional Geological Mapping

The region in which the deposit is located has been mapped several times by members of the Geological Survey of Canada. Bruce (1918), first mapped the Flin Flon area and established a system of stratigraphic nomenclature which has been only moderately altered to this day. Buckham (1944), has fairly accurately mapped the general area around the deposit.



Plate 1 View looking southeast showing the reef out-
crop of the Mink Narrows copper deposit.

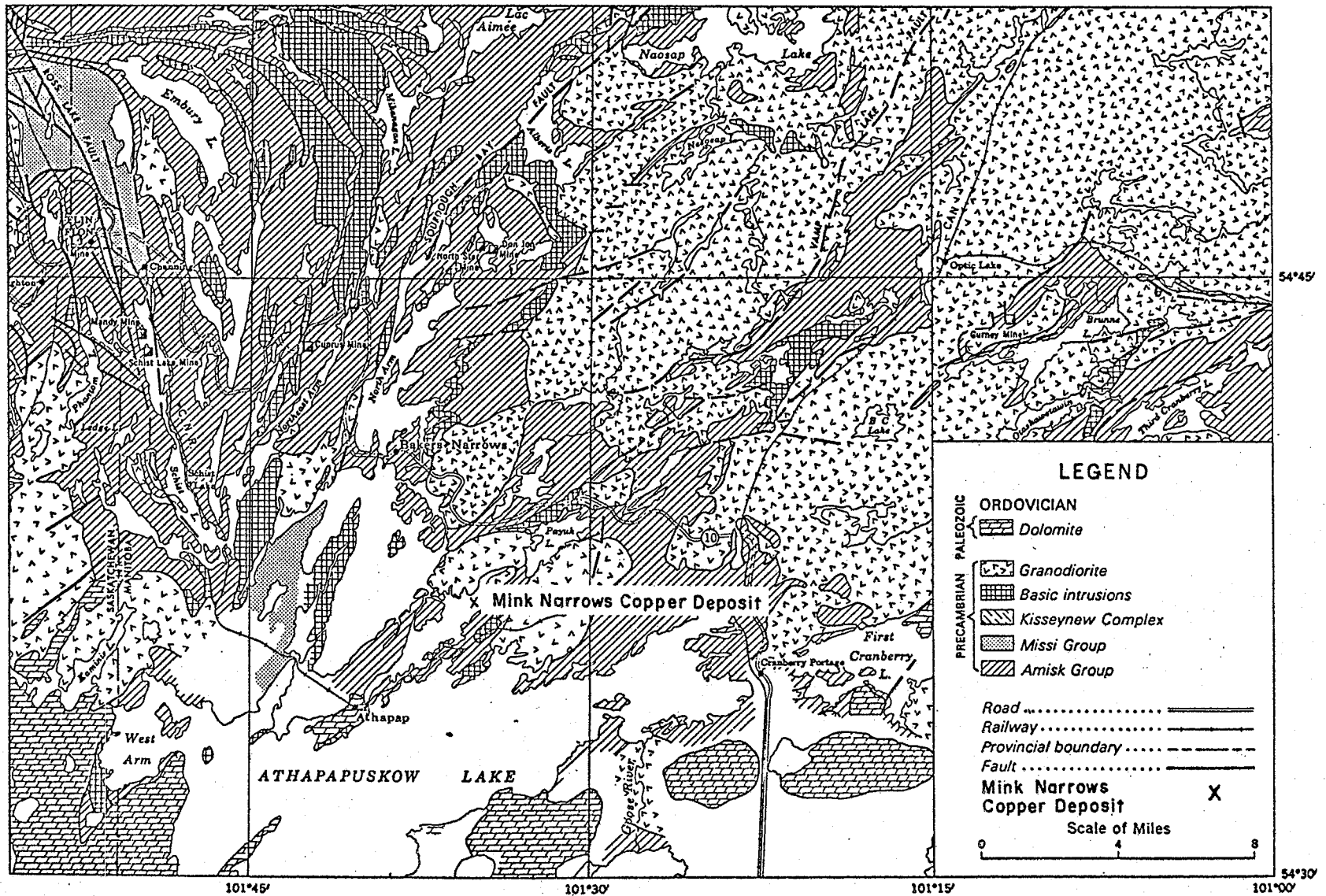
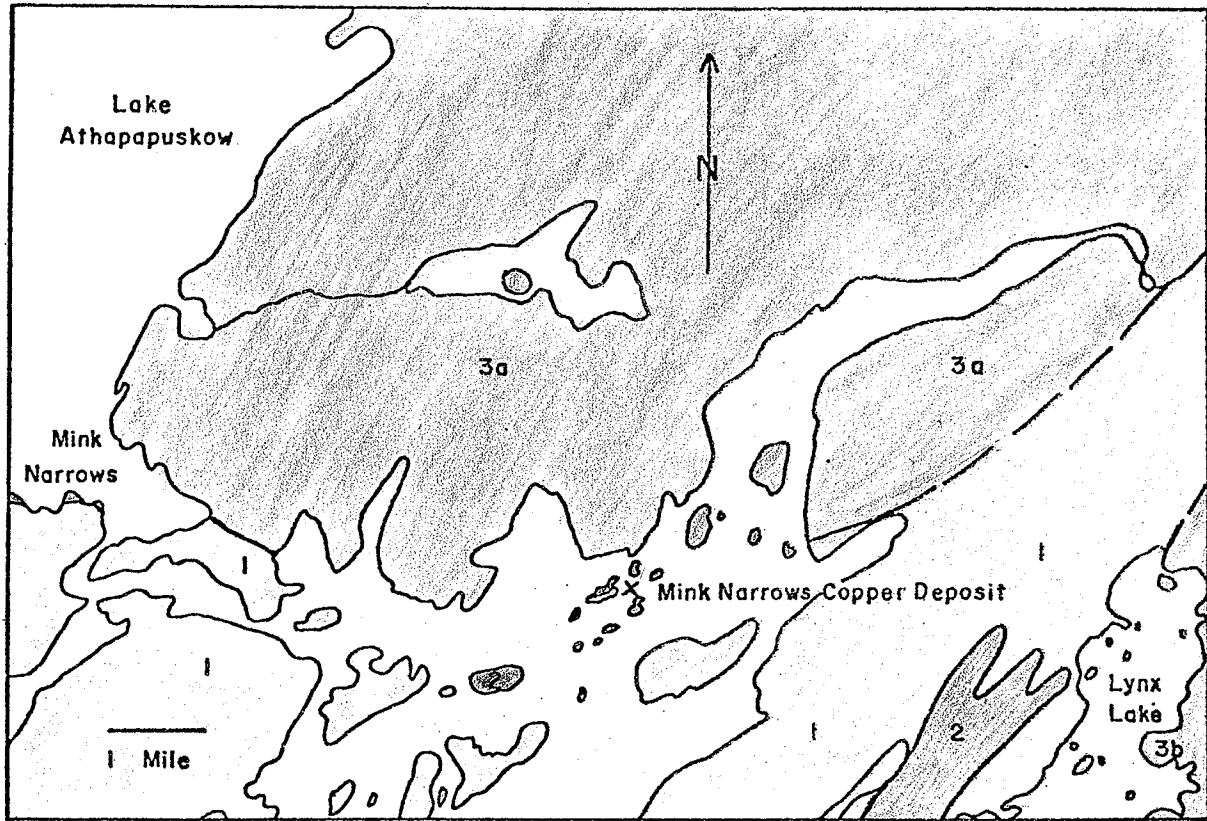


Fig. 1 Geology of Flin Flon Region (After Froese, 1968) and location of Mink Narrows copper deposit.



LEGEND





-  Granite
-  Granodiorite
-  Metagabbro
-  Basaltic Metavolcanic Flows and Tuffs

Fig. 2 Location of Mink Narrows copper deposit on Lake Athapapuskow

TABLE 1

COPPER AND ZINC DEPOSITS
IN THE FLIN FLON REGION

Name	% Cu	% Zn	Total Tons (M.)	Host Rock	Stage
Flin Flon	2.3	4.6	64	Andesite & quartz porphyry	Producing
Schist Lake	4.5	4.6	.81	Andesite	Producing
Flexar	3.2	0.5	-	Intermediate lava flows	Producing
White Lake	1.9	4.4	-	Felsic tuff	Producing
Birch Lake	6.2	-	0.28	Intermediate lava flows	Mined Out
Mandy	7.5	9.4	0.14	Volcanic breccia	Mined Out
Cuprus	3.25	6.4	0.51	Andesite & tuff	Mined Out
North Star	6.1	-	0.26	Dacite & andesite	Mined Out
Don Jon	3.1	-	0.09	Dacite & quartz porphyry	Mined Out
Coronation	4.2	-	1.4	Basalt flows & tuff	Mined Out
Centennial	2.1	2.6	1.4		Developing
Pine Bay	1.3	-	1.5	Qtz. porphyry & basalt lavas	Deposit
Mink Narrows	1.5	0.5	0.5	Basalt flows	Deposit

Data From:- Geology & Economic Minerals of Canada R.J.W. Douglas (Ed.) 1970
 Geology & Mineral Resources of Manitoba, J.F. Davies et al 1962
 Geology & Mineral Deposits of the Flin Flon Area, Sask. A.R. Byers et al 1965
 Canadian Mines Handbook, 1973-1974

Mink Narrows Copper Deposit

The Mink Narrows copper deposit was discovered prior to 1943 and initially called the Copper Reef Deposit.

The first recorded work was that of trenching and sampling of the exposed sulphide mineralization.

During 1943, Thompson Drilling and Mining Development Co. Ltd., drilled nine short diamond drill holes (CR1-7) in the vicinity of the deposit.

Further work was not done on the deposit until 1952-53 when Hudson Bay Mining and Smelting Company under an option agreement, drilled 25 holes (1-11, 16, 17, 20-27, 35-40) that outlined a small, low grade copper-zinc deposit.

In 1968, Falconbridge Nickel Mines optioned the claims covering the deposit plus claims covering the adjacent area. During the following year, nine deep, controlled holes, were drilled into the deposit (MN5-MN14). Fig. 3 gives the position of all the drill holes.

A fairly steep dipping sulphide body had been outlined to a depth of 1,760 feet with an estimated tonnage of 503,000 tons, averaging 1.5% Cu. and 0.50% Zn.

GENERAL GEOLOGY

Regional Geology of Flin Flon Area

The Mink Narrows copper deposit is in the Flin Flon region which is part of the Churchill structural province of the Precambrian Shield (Fig. 1). The oldest rocks, known as the Amisk Group, have a whole rock Rb/Sr date of 1775 ± 89 m.y. (Mukherjee et al, 1971). The Amisk Group consists

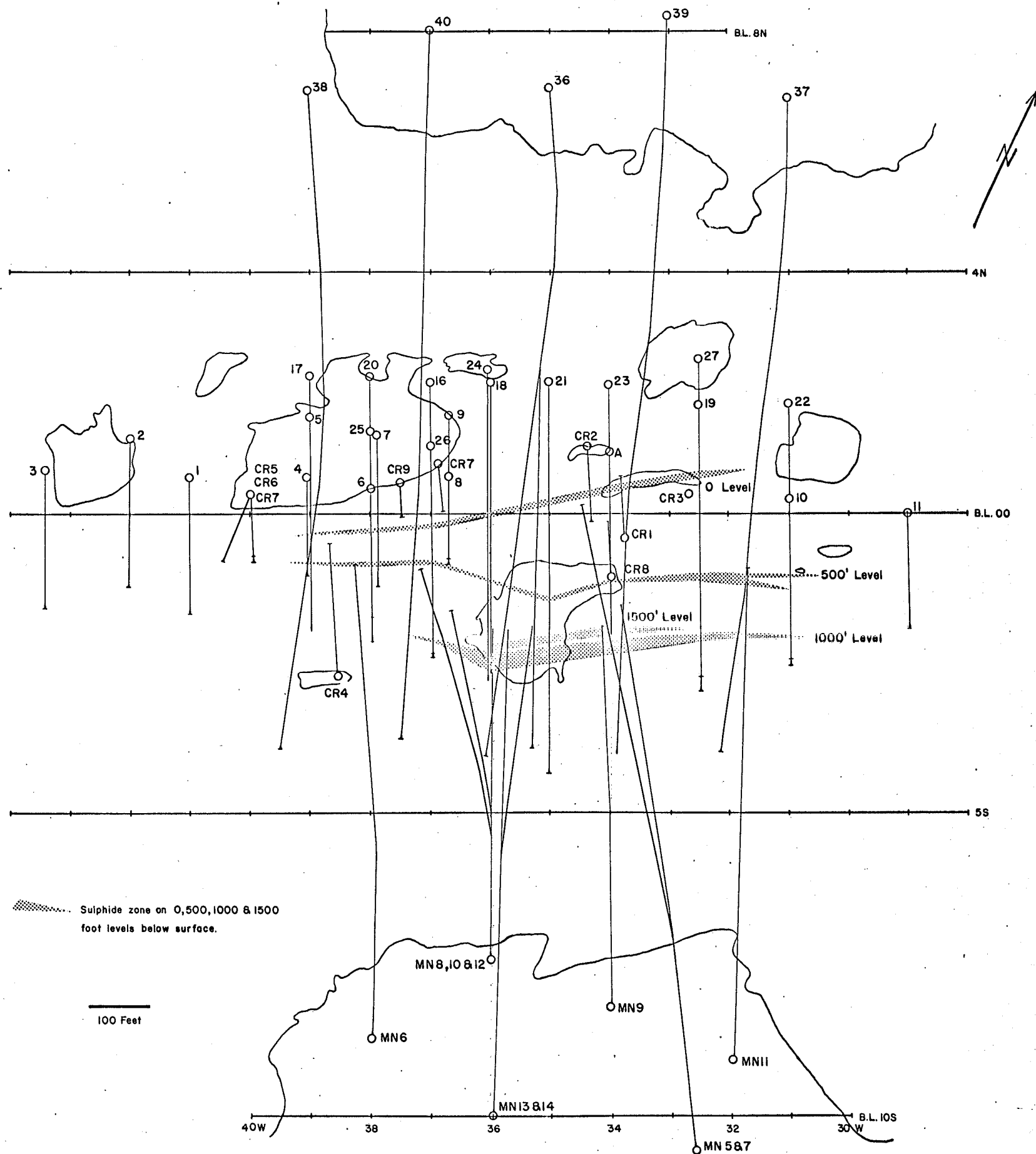


Figure 3 Diamond Drill Hole Locations

mainly of submarine volcanic flows (basalt, andesite, dacite, porphyritic andesite, quartz porphyry and flow breccia), with associated pyroclastic breccias and minor amounts of tuff. Conglomerate, greywacke and arkose, belonging to the Missi Group, were deposited on the eroded Amisk rocks and occur as small detached masses within the Amisk rocks.

East of Flin Flon, several pre-Missi granitic intrusions are believed to occur, indicating a pre-Missi orogeny. Porphyritic intrusive rocks, ranging in composition from diorite to granite form dikes, sills and small irregular bodies in Amisk volcanic rocks. They are thought to be closely related to the Amisk volcanic rocks and are commonly included within the Amisk Group. Basic intrusions of larger dimensions along with some ultrabasic rocks, are common in the volcanic rocks of the Amisk Group, and most of these intrusions are believed to be related to the same igneous activity.

All of the rocks from the above groups have been intruded by large masses of granite and granodiorite, subjected to regional metamorphism and deformation.

The Precambrian rocks are unconformably overlain by Upper Ordovician dolomitic limestone and dolomite in the southern part of the Flin Flon region.

A table of formations for the Flin Flon region is shown in Table 2.

Local Geology of the Deposit

The deposit is contained within basic metavolcanic rocks of the Amisk Group, consisting of pillow, flow, and

TABLE 2

TABLE OF FORMATIONS FOR FLIN FLON REGION
(After Bailes, 1971)

POST-MISSI INTRUSIVE GROUP

Intrusive rocks of variable composition related to the unit below.

Granodiorite and quartz diorite, generally gneissic. Large portions represent metamorphically granitized material.

INTRUSIVE CONTACT

MISSI GROUP

Arkose, greywacke, quartzite. Basal conglomerate common.

UNCONFORMITY

POST-AMISK INTRUSIVE GROUP

Gabbro and diorite with ultrabasic phases in places. Commonly differentiated. Includes rocks of several ages and diverse origins.

"Quartz-eye" granite.

INTRUSIVE CONTACT

AMISK GROUP

Argillite, greywacke, tuff. Turbidites common in eastern region.

Phyolite, dacite, quartz porphyry. Includes acidic crystal tuff and siliceous, carbonate-rich tuff.

Mafic to intermediate volcanic rocks: (a) pillowed varieties, and (b) fragmental varieties. Includes many small related intrusions.