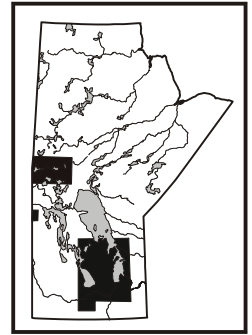


INDUSTRIAL MINERALS INVESTIGATIONS AND COREHOLE DRILLING PROGRAM 1999

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SUMMARY

Industrial minerals investigations were carried out for Cretaceous bentonite in the Morden-Miami area, Cretaceous kaolinic clay in the Sylvan area and Cretaceous shales in the Porcupine Hills/Duck Mountain/Riding Mountain area. Field trips were arranged for mineral industry representatives to Precambrian and Paleozoic carving and dimension stone sites in southern Manitoba. New carbonate outcrops in Manitoba's Capital Region were documented. A garnet sand occurrence was sampled at Clearwater Lake.

INTRODUCTION

Industrial minerals investigations in southern Manitoba have consisted of documentation of Paleozoic dimension stone outcrops and Cretaceous shale occurrences. Details of the sampling of Cretaceous shales in the Porcupine Hills/Duck Mountain/Riding Mountain (PDR) area are described in Bamburak (GS-28, this volume). In addition, new outcrops were added to the inventory of Manitoba's Capital Region. Garnetiferous sand located at Clearwater Lake, northeast of The Pas, was also sampled.

Field trips were arranged for industry clients to sites of Precambrian and Paleozoic carving and dimension stone sites and to occurrences of Cretaceous clay.

Eight coreholes were completed in the Lake St. Martin and Porcupine Hills areas for stratigraphic/industrial mineral purposes utilizing the Branch's wireline drill.

INDUSTRIAL MINERALS INVESTIGATIONS

Bentonite

From 1939 to December 1990, Pembina Mountain Clays Limited produced the only non-swelling natural and activated calcium montmorillonite clays in Canada. The bentonite was quarried by a contractor, on a seasonal basis from May to October, from approximately 20 sites situated 30 km northwest of Morden. The main processing plant was in Winnipeg; and the drying and crushing plant was in Morden (Bamburak, 1996).

Over the past three years, numerous industry clients have been taken to the previous quarry sites and those sites with future potential. Small bulk samples have been collected, and these are available for evaluation by industry representatives. At present, Crown land with the best potential has been removed from staking, pending a serious proposal for development. Bentonite has been sampled since 1997 as part of the Black Shale study (Bamburak, GS-28, this volume).

In 1998, bentonite beds within the Deerwood Wildlife Management area (northwest of Morden) were examined. It was concluded that the beds at this locality are too thin for economic development and the area was set aside for the Endangered Spaces process.

Capital Region

A mineral resource and land-use assessment of Manitoba's Capital Region (Winnipeg and portions of the surrounding municipalities of Rockwood, St. Andrews, St. Clements, Brokenhead, Rosser, West St. Paul, East St. Paul and Springfield) is underway by the Mines and Geological Services branches. The study is being conducted in response to the Capital Region Strategy under development by the Manitoba Round Table. The purpose of this assessment is to provide mineral resource data for use in municipal development plans for the Capital Region that will legally protect high quality quarry minerals, such as crushed stone (Bamburak and Bezys, 1995, 1996).

The first phase of the Capital Region study (north of 50° latitude) was essentially complete by early 1997 (Bamburak and Bezys, 1996). In March, 1999, eight preliminary maps, depicting bedrock topography and geology, overburden thickness and mineral resource potential for NTS 621/2, /3, /6 and /7, were released (Bezys, Bamburak and Conley, 1999). Additional bedrock occurrences have since been brought to the attention

of the Department by Edward Dobrzanski, who is associated with the Manitoba Museum of Man and Nature. These outcrops will also be documented within an open file report on Phase 1 of the Capital Region study, which is currently undergoing peer-review.

Carving stone

Over the past five years, the Department has received numerous requests for locations of carveable stone. Theyer (1998) described a 5 by 50 m soapstone occurrence on the south shore of Lower Ospwagan Lake, 25 km south of Thompson. Small figurines have been carved from this stone. Individuals have been guided to other potential sites in the Province to collect small quantities of stone for testing purposes.

Dimension stone

"Marble" dimension stone was utilized in Manitoba during the 1930s. Mottled red and buff Ordovician dolomite from Mile 69.5 of the Hudson Bay Railway, northeast of The Pas, was quarried by Hudson Bay Marble and Granite Quarries, Limited. The stone was utilized in the interior of the Tier Building at the University of Manitoba (Goudge, 1944). Almost 60 years later, equivalent beds were mapped by Gunter and Yamada (1987), 30 km southeast of Snow Lake. Shortly after, Manitoba Marble Inc. leased the site and produced in excess of 40 blocks by sawing or by feather and wedge techniques. The blocks are currently undergoing market acceptance tests.

The town of Snow Lake has expressed interest in having a dimension stone cutting plant locate in the town. The plant would have to draw on stone from nearby quarries, such as that owned by Manitoba Marble. The development of a dimension stone cutting plant is dependent upon the discovery of at least 10 "colours" of stone. In October 1998, a few days were spent in the Paleozoic outcrop belt, south of Snow Lake to determine whether additional "marble stone colours" were available with appropriate fracture-spacing and uniform composition. This was followed up in July 1999, when a week was spent, north of The Pas, in the Paleozoic outcrop belt. Several sites have been selected for drill-testing next year.

"Granite" dimension stone producers and occurrences in southeast Manitoba were documented in a publication by Schmidtke (1994). Since then, a number of individuals have expressed interest in these occurrences. Discussions have been conducted and field tours arranged to previous operating sites and to prospective areas.

Garnet sand

In 1982, McCabe (1982) reported that highly garnetiferous sands are present on the west shore of Clearwater Lake, 30 km north of The Pas. During the summer of 1999, samples of the sand were collected at two localities for heavy mineral analysis. Results of the study may assist in determining the provenance of the sand.

Kaolin

Since 1982, the Department, in cooperation with the Geological Survey of Canada, has carried out geophysical work in the Sylvan area, 20 km north of Arborg. Hosain et al. (1995) briefly reviewed the results of these previous studies and described the new work carried out by the Geological Services Branch and the University of Manitoba in 1995. An intensive compilation of all data to 1996 was published by Ferguson et al. (1999). The deposit was interpreted to be 100 m wide and about 25 m deep within a palaeokarst surface consisting of sinuous, discontinuous depressions. This palaeokarst surface was encountered in three holes, totaling 51.1 m, drilled in 1997. No kaolinic sediments were encountered (Bezys and Bamburak, 1997).

In the spring of 1999, Susan Pullan of the Terrain Sciences Division of the Geological Survey of Canada carried out a jointly funded seismic survey in the Sylvan for the Department of Energy and Mines. Results of the survey are pending.

STRATIGRAPHIC DRILLING

Lake St. Martin

In cooperation with the Geological Survey of Canada, six stratigraphic holes (Table GS-27-1) were drilled north of Lake St. Martin (M-1-99 to M-6-99, Fig. GS-27-1). The objective of the drilling was to intersect the remobilized Precambrian granitic basement. Three of the holes ended in glacial till at the prescribed depth. Jurassic Amaranth Formation (Fig. GS-28-2, this volume) red beds, anhydrite and gypsum were found beneath glacial till in Holes M-1-99, M-2-99 and M-5-99. Hole M-1-99 ended in a cavern filled with unconsolidated sand. Hole M-6-99 was unusual because of an outflow of gas out of the drill stem when the core tube was removed. A 7 m high column of water and gas was expended for a five minute interval. Three hours later a small quantity of gas was still being expelled.

Porcupine Hills - Birch Mountain resources

In a joint-effort with Dawson Bay Resources, two stratigraphic/ industrial mineral holes (Table GS-27-1) were drilled on the north slope of the Porcupine Hills. The holes were drilled to provide stratigraphic and industrial mineral data on the Cretaceous to Devonian section in the PDR area. Hole M-7-99 (Fig. GS-27-1), drilled north of Westgate, penetrated a disturbed Cretaceous interval overlying younger Pleistocene till. The speckled calcareous shale, with minor calcarenite, of the Favel Formation (Table GS-28-1, this volume) was cored. Hole M-8-99 (Fig. GS-27-1) was drilled north of National Mills. This hole cut through the sand, silt and clay of the Cretaceous Swan River Formation and into the underlying Devonian argillaceous carbonates. The section seemed relatively undisturbed, but recovery of the Cretaceous portion was poor. The core from both holes will be split and analyzed to determine if any anomalous mineralization is present (Bamburak, GS-28, this volume).

Table GS-27-1: Summary of Stratigraphic and Industrial Minerals Corehole Data 1999

Hole No.	Location and Elevation (m)	SYSTEM/Formation/ (Member)	Interval (m)	Summary Lithology
M-01-99 Lake St. Martin	16-17-32-8W 5733640N 530880E 249 m	OVERBURDEN JURASSIC/Amaranth	0.0-14.3 14.3-20.4	Glacial till Evaporite and red beds undifferentiated
M-02-99 Lake St. Martin	2-5-32-8W 5729080N 530580E 248 m	OVERBURDEN JURASSIC/Amaranth	0.0-26.5 26.5-29.6	Glacial till Evaporite and red beds undifferentiated
M-03-99 Lake St. Martin	14-4-32-8W 5730450N 532000E 248 m	OVERBURDEN	0.0-17.5	Glacial till
M-04-99 Lake St. Martin	14-4-32-8W 5730360N 532000E 248 m	OVERBURDEN	0.0-17.5	Glacial till
M-05-99 Lake St. Martin	6-24-32-9W 5734310N 526910E 252 m	OVERBURDEN JURASSIC/Amaranth	0.0-17.0 17.0-35.8	Glacial till Evaporite and red beds undifferentiated
M-06-99 Lake St. Martin	10-15-32-8W 5733250N 534010E 249 m	OVERBURDEN	0.0-17.5	Glacial till
M-07-99 Westgate North	11-31-44-29W 5857571N 320828E 304.8 m	OVERBURDEN CRETACEOUS/Favel PLEISTOCENE	0.0-7.8 7.8-29.7 29.7-35.8	Glacial till Disturbed calcareous speckled shale with thin limestone beds, inoceramus, oil smell Boulder till
M-08-99 National Mills North	07-34-44-29-W 5856305N 326120E 310.9 m	OVERBURDEN CRETACEOUS/Swan River DEVONIAN/Souris River?	0.0-20.5 20.5-78.5 78.5-105.9	Glacial till Sand, silt and clay Argillaceous limestone

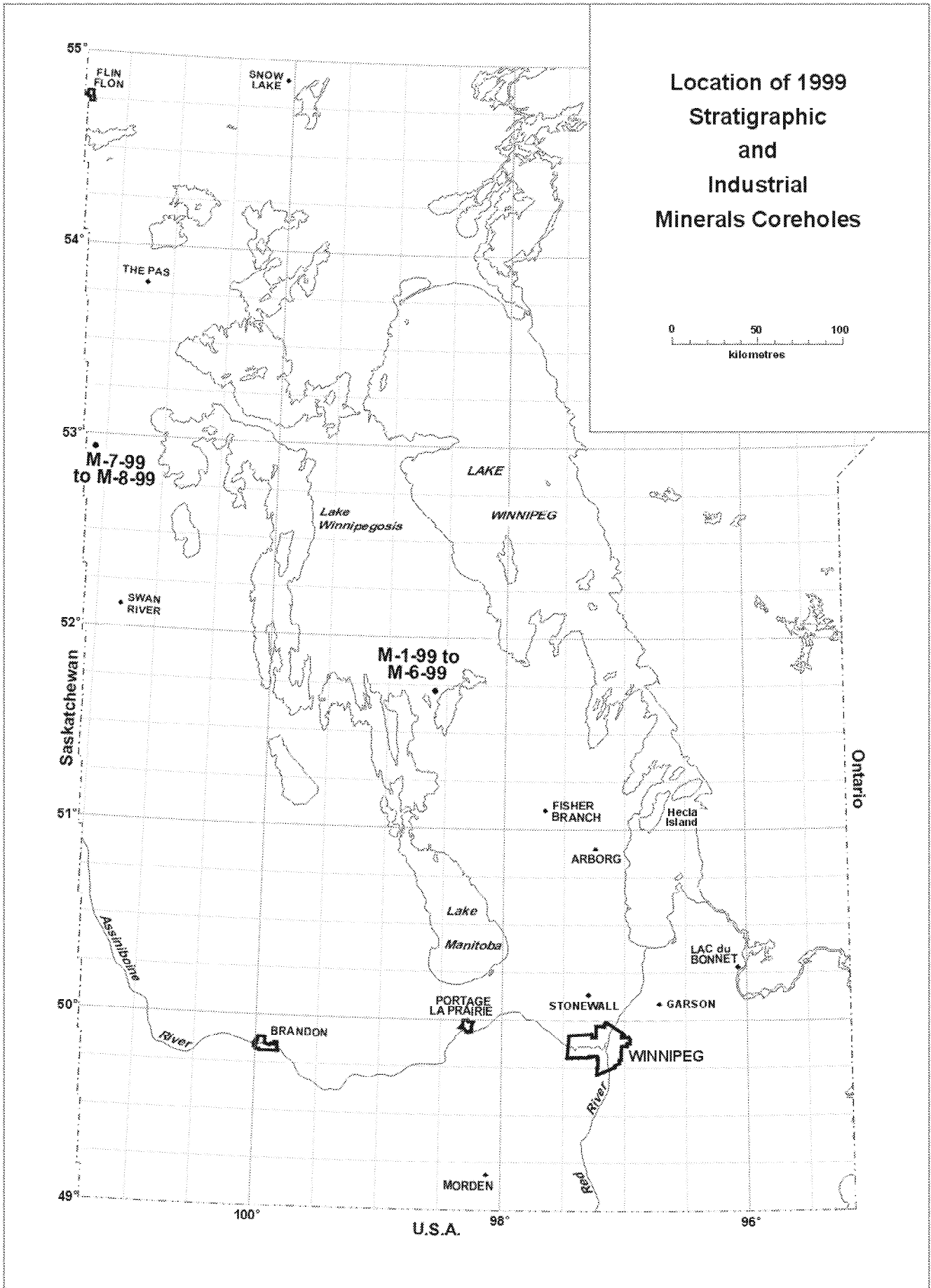


Figure GS-27-1: Location of 1999 stratigraphic and industrial mineral coreholes.

ACKNOWLEDGEMENTS

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