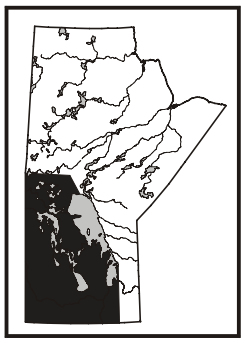

by R.K. Bezys

Bezys, R.K. 2000: Stratigraphic investigations and corehole drilling program, 2000; *in* Report of Activities 2000, Manitoba Industry, Trade and Mines, Manitoba Geological Survey, p. 196-201.

SUMMARY

Stratigraphic investigations and drilling programs were carried out for various projects. The Capital Region Study has been completed and the report is in the editing stage. H.R. McCabe's historical corehole data have been added to the Manitoba Stratigraphic Database. All brine springs are being tabulated for the Prairie-Type Project. Two coreholes were drilled in the Dancing Point (Lake Winnipeg) area for stratigraphic purposes; one corehole was drilled proximal to the High Rock Lake structure; one corehole was drilled in the Wekusko area to test metallic veining in the Red River Formation; and one corehole was drilled in the Winnipegosis area for regional stratigraphy. A total of 457.8 m of drilling was conducted this year.

STRATIGRAPHIC INVESTIGATIONS

Capital Region Project

A mineral-resource and land-use assessment of Manitoba's Capital Region (Winnipeg and portions of the surrounding municipalities) was undertaken by the Manitoba Mines Branch and the Manitoba Geological Survey. 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).

In 1999, eight preliminary maps were released that depict overburden thickness, bedrock topography and mineral resource potential in NTS map sheets 62I/2, /3, /6 and /7 (Bezys, Bamburak and Conley, 1999a–h). Final versions of these maps, as well as eight maps covering NTS map sheets 62H/10, /11, /14 and /15, are in the final stages of preparation; the accompanying economic report will be released for March 2001 (*see* Conley, GS-30, this report).

Manitoba Stratigraphic Database

The Manitoba Stratigraphic Database continues to be updated. At this time, 437 stratigraphic and/or oil and gas wells have been updated with historical tops picked by H.R. McCabe (*see* Conley (GS-30, this volume) and Bezys and Conley (1999) for further information).

Prairie-Type Microdisseminated Mineralization

This project is the investigation of Prairie-type microdisseminated mineralization in Devonian-age carbonate rocks in the Mafeking quarries (west-central Manitoba; Fedikow et al., 1996). Surface mapping is augmented by geochemical and geophysical surveys: brine spring, b-horizon soil and stream sampling. Rock outcrops in the Mafeking quarries display unusual 'chimney' features that appear to represent hydrothermal vents. Palynological (conodont) analyses of sand and clay infill from the centre of these chimneys indicate a Devonian Souris River Formation age, the same as that of the carbonate host rock of the chimneys. There is no evidence of Cretaceous-age infill to suggest a karst origin. Sideritic rinds adjacent to the chimneys are slightly enriched in some elements, such as Co, Ni, Zn and Fe, when compared with surrounding host rock strata (Table GS-31-1). This enrichment suggests that mineralizing fluids were coming from underlying strata as brines or formation waters.

An open file report is in preparation and is expected to be released in March 2001. A B.Sc. thesis on the Mafeking quarry has been completed in conjunction with the University of Manitoba (Ramnath, 1999). Nuno Machado (University of Montreal) is carrying out age-dating work on the zircon and monazite. Steve Grasby (Geological Survey of Canada (GSC–Calgary) continues to conduct sample analyses

Table GS-31-1: Select INAA geochemistry of solution chimneys from the North Mafeking quarry, west-central Manitoba.

Element	Co	Fe	Ni	Zn
Units	ppm	%	ppm	ppm
Detection Limit	**1**	**0.01**	**20**	**50**
SC1:				
Sinter	-1	0.19	-20	-50
Rind	**140**	**36.8**	**88**	**577**
Wall rock	2	0.48	-20	-50
SC2:				
Sinter	1	0.37	-20	-50
Rind	**17**	**32.2**	**-20**	**186**
Wall rock	2	1.31	-20	-50
SC3:				
Sinter	1	0.28	-20	-50
Rind	**19**	**32.9**	**-20**	**174**
Wall rock	2	0.85	-20	-50
SC4:				
Sinter	1	0.21	-20	65
Rind	**270**	**38.4**	**-20**	**296**
SC7A:				
Sinter	2	0.26	-20	-50
Rind	**43**	**27.2**	**-20**	**480**
SC7B:				
Sinter	1	0.19	-20	-50
Rind	**49**	**26.5**	**-20**	**588**
Wall rock	2	0.61	-20	-50
SC8:				
Sinter	2	0.18	-20	-50
Rind	**10**	**27.7**	**-20**	**67**
Wall rock	2	1.14	-20	-50
SC9:				
Sinter	1	0.19	-20	-50
Rind	**110**	**28.1**	**71**	**640**
SC10:				
Sinter	2	0.26	-20	-50
Rind	**87**	**25.5**	**60**	**472**
SC11:				
Sinter	12	0.68	-20	-50
Sinter	7	0.57	-20	-50
Rind	**190**	**31.1**	**89**	**193**
Wall rock	4	1.41	-20	-50
SC12:				
Sinter	1	0.18	-20	-50
Rind	**72**	**40.7**	**-21**	**158**
SC13:				
Sinter	2	0.13	-20	-50
Rind	**8**	**28.6**	**-20**	**99**
SC14:				
Sinter	1	0.14	-20	-50
Wall rock	**3**	**2.71**	**-20**	**-50**
SC15:				
Sinter	2	0.2	-20	-50
Rind	**33**	**29.6**	**75**	**184**
SC17:				
Sinter	2	0.3	-20	-50
Rind	**37**	**34.5**	**-20**	**80**
Wall rock	1	0.71	-20	-50

of brine springs for stable-isotope geochemistry (*see* Grasby, GS-34, this volume). All brine springs in west-central Manitoba are being inventoried and will be presented as a GSC bulletin.

STRATIGRAPHIC AND INDUSTRIAL MINERALS COREHOLE DRILLING

Dancing Point

Two coreholes were drilled in the Dancing Point area, east of Highway 6 and west of the Lake Winnipeg shoreline (Fig. GS-31-1; Table GS-31-2). Corehole M-1-00 went to 170.5 m and intersected the Precambrian; corehole M-2-00 went to a depth of 151.8 m and intersected the Winnipeg Formation sandstone. These coreholes were drilled in an area where silicified coral heads (5–10 cm in diameter) were found along the Silurian escarpment (W.D. McRitchie, pers. comm., 2000). Corehole M-1-00 confirmed the stratigraphic location of these coral heads, from within the middle of the Stonewall Formation. Corehole M-2-00 did not encounter any evidence of the silicified coral heads. These two coreholes will be valuable reference holes for NTS map sheet 63B, where very few coreholes have been drilled.

High Rock Lake

One corehole, M-3-00, was drilled east of the High Rock Lake structure (Fig. GS-31-2, -3; Table GS-31-2). A study conducted by H.R. McCabe indicated the presence of a highly disturbed area, possibly

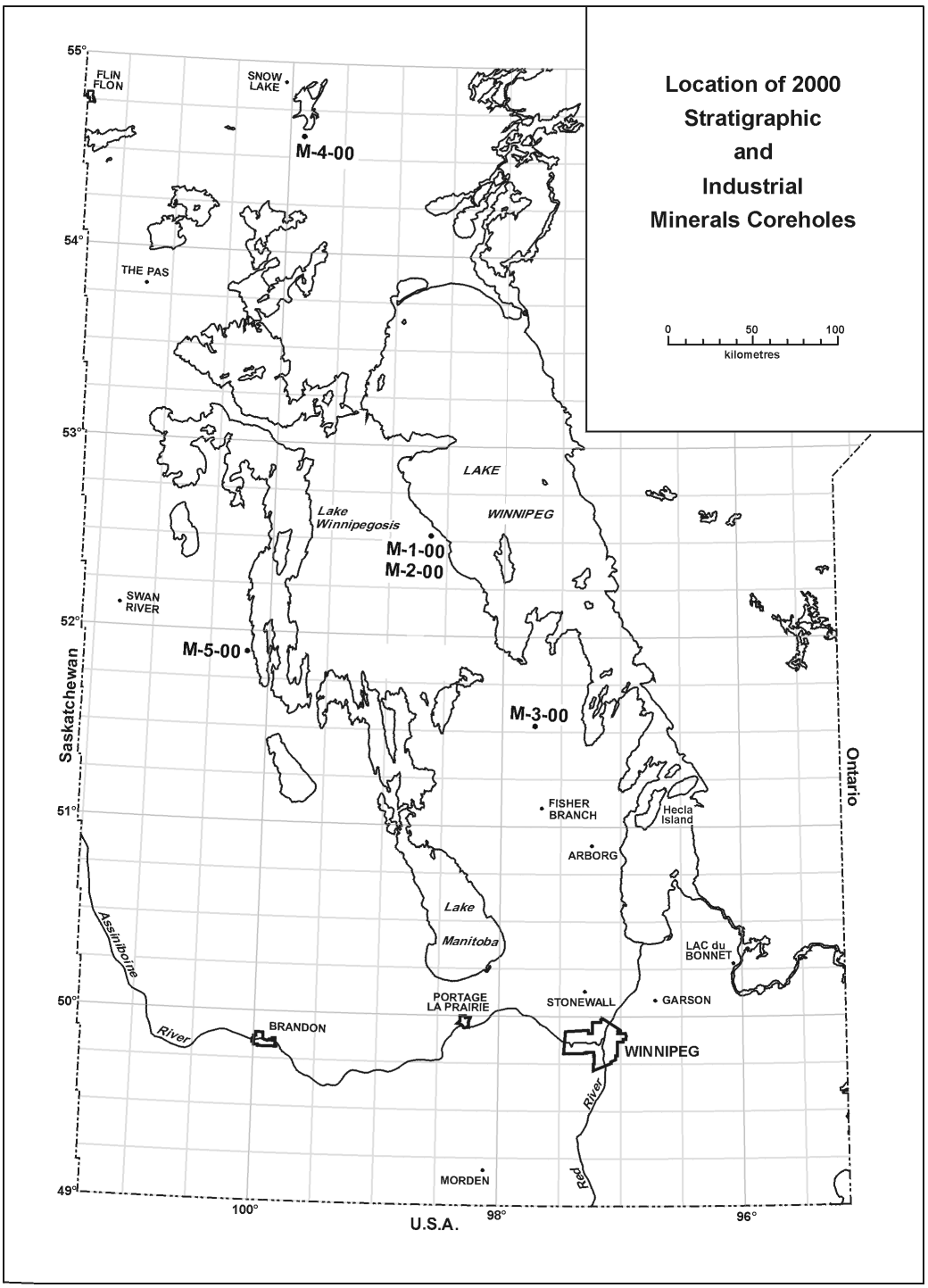

Figure GS-31-1: Location of stratigraphic and industrial-mineral coreholes, 2000.

Table GS-31-2: Summary of stratigraphic corehole data, 2000.

Hole no.	Location and elevation (m)	SYSTEM/Formation/ (Member)	Interval (m)	Lithology summary
M-01-00	02-03-41-09W	OVERBURDEN	0.0–3.0	Glacial till
Dancing Pt.	5815850N	SILURIAN/Interlake Group/	3.0–7.8	Buff wackestone; very broken core; no *Virgiana*
	522125E	Fisher Branch		
	243.8	ORDOVICIAN-SILURIAN/	7.8–33.5	Brown mudstone to wackestone, some chert
		Stonewall		7.8–8.0: Stonewall Marker; light brown mudst.
				10.9–13.0: T-Zone; dark grey to some yellow, grainstone to mudstone
		ORDOVICIAN/Stonewall		13.0–27.6: light brown, mottled, fractured with silicified corals
		(Williams)		27.6–33.5: dark grey mudstone, laminated
		Stony Mountain	33.5–67.5	Light brown wackestone, mottled
		Red River (Fort Garry)	67.5–88.0	Grey and brown mudstones, laminated,some chert
		(lower Red River)	88.0–150.2	Brown wackestone, mottled, cherty
		Winnipeg	150.2–168.4	150.2–156.6: dark grey to grey sandstone, some shale, burrowed
				156.6–159.2: Light grey, fine-grained sandstone
				159.2–162.3: 10 cm of fine-grained brown sandstone (?infill)
				162.3–165.3: light grey, fine-grained sandstone (10 cm of core)
				165.4–168.4: no core
		PRECAMBRIAN	168.4–170.5	168.4–169.4: Regolith: white to grey, fine- to coarse-grained, severely kaolinized, unconsolidated rock
				169.4–170.5: Hornblende granodiorite: light grey to green, coarse- to very coarse grained, poorly foliated to massive rock; composition: hornblende 10–30% (1–10 mm in size), quartz and feldspar
M-02-00	15-06-41-09W	SILURIAN/Interlake Group/	0.0–4.2	Buff wackestone and packstone, abundant
Dancing Pt.	5816175N	Fisher Branch		*Virgiana*
	517125E	ORDOVICIAN-SILURIAN/	4.2–30.2	4.2–5.4: Stonewall Marker: brown mudstone, broken core
	237.7 m	Stonewall		5.4–6.8: buff mudstone
				6.8–10.4: T-Zone: blue-grey mudstone, burrowed
				10.4–21.0: buff wackestone, porous
				21.0–21.5: blue-grey marker bed, mudstone
				21.5–24.5: buff wackestone and mudstone
		(Williams)		24.5–30.2: brown to grey, laminated mudstone
		Stony Mountain	30.2–63.9	Buff mottled wackestone
		Red River/(Fort Garry)	63.9–82.5	Interbedded laminated mudstone, brown to grey
		(lower Red River)	82.5–146.5	Mottled wackestone, burrowed
		Winnipeg	146.5–151.8	146.5–149.5: Green-grey to black-grey shale with some siltstone, burrowed
				149.5–151.8: White quartzose sandstone, friable at base, becoming consolidated at top
M-03-00	16-20-28-01W	ORDOVICIAN/	0.0–11.9	Blue-grey laminated mudstone
High Rock Lake	5697600N	Red River (lower)		
	606250E	(Fort Garry)	11.9–98.7	Buff mottled wackestone (Tyndall Stone), cherty, very porous
	225 m			
		Winnipeg	98.7–127.2	98.7–103.8: green mudstone, some sand, sharp contact
				103.8–114.0: brown to grey mudstone (shale) and siltstone, burrowed
				114.0–127.2: white quartzose sandstone
M-04-00	05-20-65-16W	ORDOVICIAN/	0.0–0.85	Beige mottled dolomite
Wekusko Lake S	6054470N	Red River (Hecla Beds)		

Table GS-31-2: Summary of stratigraphic corehole data, 2000. ***(continued)***

Hole no.	Location and elevation (m)	SYSTEM/Formation/ (Member)	Interval (m)	Lithology summary
	445016E	Winnipeg	0.85–0.92	Sandstone, pyritic with dolomite clasts
	266.7 m	PRECAMBRIAN	0.92–14.35	0.92–5.25: light green-grey sericite schist, vertically sheared (missing 2 m of core)
				5.25–7.35: Granite schist, steeply dipping
				7.35–8.45: Soft sericite schist (only 0.27 m of core)
				8.45–14.35: Steeply dipping granite schist
M-05-00	01-05-33-19W	DEVONIAN/Souris River	0.0–20.2	Fine-grained dolomite
Pine River	5739324N	(Sagamace)	20.2–27.1	Dolomitic shale, limestone and breccia
	423445E	(Point Wilkins)	27.1–45.9	Dolomite, brecciated
	262 m	(First Red Beds)	45.9–56.6	Shale breccia with disturbed bedding
		Dawson Bay		
			56.6–69.8	Limestone, some dolomite
			69.8–82.8	Calcareous shale, green-grey to purple
			82.8–94.8	Limestone, brachiopod rich
		(Second Red Beds)	94.8–106.7	Polymict collapse breccia
		Winnipegosis	106.7–112.7	Dolomite breccia, fossiliferous
		(Transition Beds)		
		(Upper)	112.7–117.1	Dolomite, bituminous, black mineralization (sphalerite)
		(Lower)	117.1–121.1	Platform Facies, dolomite, vuggy and nodular

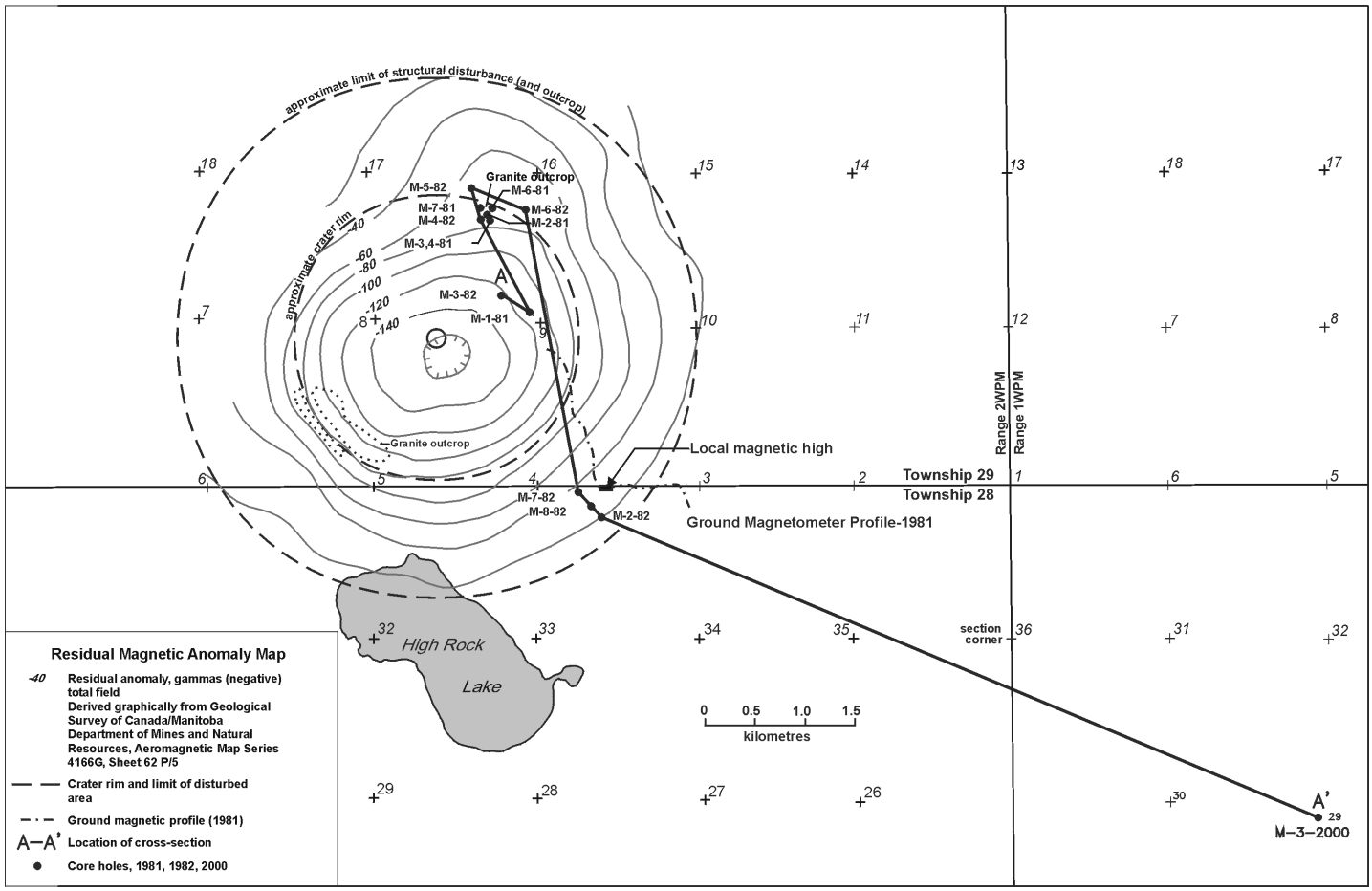

*Figure GS-31-2: Location of coreholes in the High Rock Lake structure magnetic map and of cross-section A-A' (*after *McCabe, 1982).*

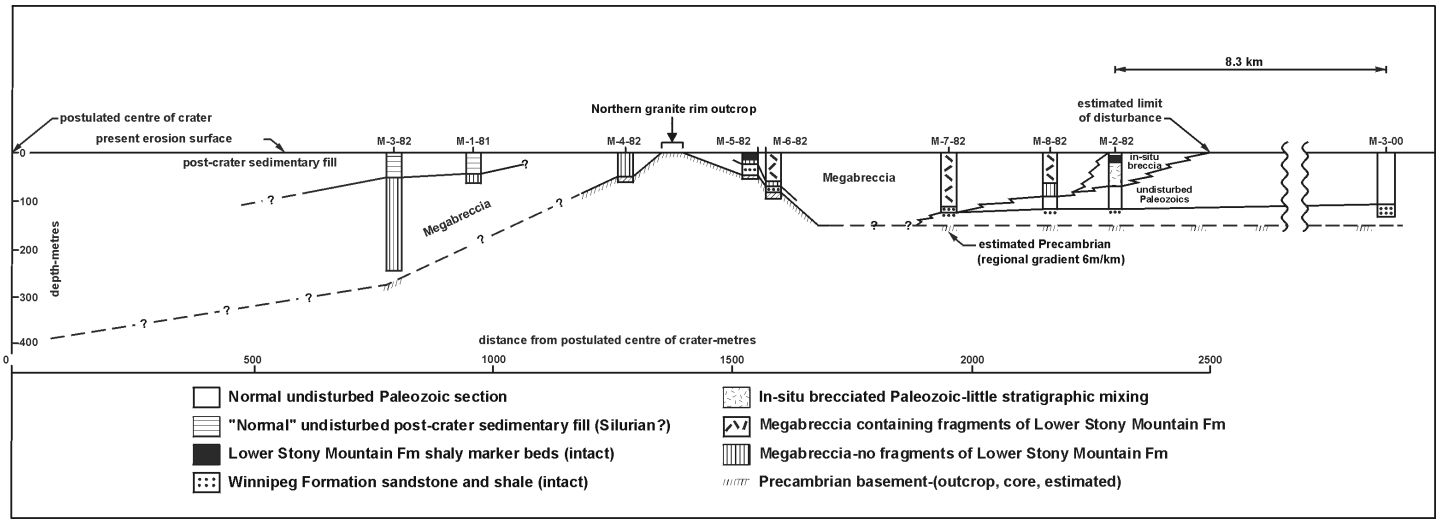

*Figure GS-31-3: Cross-section A-A' (*after *McCabe, 1982).*

representing a crypto-explosion meteorite-impact structure (McCabe, 1981). Two Precambrian granite inliers are approximately 180 m above their expected position in the regional structure. As well, disturbed Paleozoic outcrops exist north and west of the granite outcrops. The structurally disturbed area is shown to be coincident with a well defined aeromagnetic low (McCabe, 1981).

Corehole M-3-00 was drilled to provide an undisturbed reference hole in the High Rock Lake area. It was hoped that the hole would reach the Precambrian, but it encountered unconsolidated sand in the Winnipeg Formation and drilling had to be terminated prematurely. The hole is undisturbed and does not appear to be affected by the High Rock Lake structure (Fig. GS-31-3).

Wekusko Lake South

In July 1999, mineralized fractures were noted within Ordovician Red River Formation dolomite in a Manitoba Highways quarry (UTM 14, E445016, N6054470), located south of Wekusko Lake and Provincial Trunk Highway 39. Located near the east wall of the quarry, two parallel fractures, trending 085°, are spaced 3 m apart and are intersected by another fracture trending 170°. Mineralization occurs in the dolomite along the trend of the fractures over a width of 10 cm on either side of the fractures. The mineralization appears as vuggy, mauve to reddish brown or dark grey clots and sinuous stringers, with minor bright blue-green– (bornite and azurite) and brass-coloured (pyrite) crystals that appear along subfractures and within healed dendritic tendrils. A sample was sent to Activation Laboratories Ltd. for analysis by neutron activation and ICP in 1999. The values indicate a relative enrichment in Pb, Hg, Cu, Sr, As and Co. An additional sample was sent to the same laboratory early in 2000, and the results confirmed the enrichment.

Corehole M-4-00 was drilled to a depth of 14.4 m to intersect the mineralization, but only thin clots and veinlets were found near the top of the hole. A total of 13.4 m of Precambrian was intersected, a highly foliated sericite schist.

Camperville Gravity Low

The Pine River Junction corehole M-5-00 was drilled through 121.0 m of Devonian stratigraphy to verify the presence of sphalerite originally encountered in corehole M-6-80. The honey-coloured sphalerite was found in the Upper Member of the Winnipegosis Formation (McCabe, 1980; Gale and Conley, 2000). In hole M-5-00, black mineralization was encountered at the same stratigraphic level as in hole M-6-80, and appears to be the 'blackjack' form of sphalerite. No honey-coloured sphalerite was found in hole M-5-00. For further information, see Bamburak et al. (GS-32, this volume).

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