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GEOLOGICAL AND NATURAL HISTORY SURVEY
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AVAILABILITY OF GROUND WATER FOR MUNICIPAL SUPPLY AT NEW RICHMOND, ST. CROIX COUNTY, WISCONSIN

by

P.G. Olcott

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May 3, 1968

Mr. Michael Desparte
Division of Local Affairs
and Development
Department of Resource Development
1 West Wilson Street
Madison, Wisconsin

Dear Mr. Desparte:

Enclosed are the reports on water availability in the Prescott and New Richmond areas that you requested.

If we can be of further service please contact our office.

Very truly yours,

WISCONSIN GEOLOGICAL SURVEY

Perry G. Olcott
Geologist

PGO:jw
Enc.

WOFR 68-1

University Extension
Wisconsin Geological & Natural History Survey

AVAILABILITY OF GROUND WATER FOR MUNICIPAL SUPPLY AT NEW RICHMOND, ST CROIX COUNTY, WISCONSIN

by Perry G. Olcott

This report was prepared at the request of the State of Wisconsin Department of Local Affairs and Services, Division of State Economic Development for inclusion in a comprehensive planning report for the Village of New Richmond, St. Croix County, Wisconsin. Information was taken from the files of the Wisconsin Geological and Natural History Survey.

Topography and Drainage

New Richmond is located on an undulating upland plain developed on the Prairie du Chien Dolomite (a magnesium-rich limestone). Surface elevations range from about 950 to 1100 feet above mean sea level. The immediate area of New Richmond has a thin covering of clayey glacial drift, generally from 25 to 50 feet thick. The area is drained by the Willow River which flows southwesterly to the Mississippi River. Many small lakes formed by Kettle holes in the glacial material surround New Richmond.

Geology and Water-Bearing Characteristics of Aquifers

Ground-water availability depends chiefly on the character and thickness of water-bearing rocks. Although the geology of New Richmond has not been mapped in detail, some generalizations can be made from well log, outcrop, and topographic information.

The bedrock-surface consists predominantly of Prairie du Chien Dolomite. The St. Peter Sandstone, which overlies the dolomite, also is present in irregular patches at the bedrock surface in the area. The thickness of the two formations totals 200 to 225 feet but the thickness of each formation varies inversely with the other and one unit may be present to the exclusion of the other. Limited well data indicate both the Prairie du Chien Dolomite and the St. Peter Sandstone are present at the bedrock surface in New Richmond.

Underlying the Prairie du Chien Dolomite in descending order are the Trempealeau Formation, Franconia Sandstone, and Dresbach Group. The Trempealeau

Formation, consisting of sandstone and calcareous siltstone, is about 130 to 150 feet thick. The Franconia Sandstone is about 90 to 110 feet thick and consists of sandstone with some shale. The Dresbach Group is estimated to be 600 to 700 feet thick and is comprised of two sandstone units separated by a calcareous shaly sandstone unit. The Dresbach Group rests on crystalline rocks that do not yield water. Bedrock formations dip southwestward at about 35-40 feet per mile.

The Dresbach Group in much of Wisconsin is considered the major water-producing rock unit and it yields large quantities of good quality water in New Richmond. Wells penetrating the Dresbach Group range up to 800 feet in depth and yield up to 1000 gpm (gallons per minute).

The Franconia Sandstone generally yields only moderate to small amounts of water to wells but the formation generally is exposed in, and contributes water to deep wells penetrating the Dresbach Group.

The upper part of the Trempealeau Formation and the Prairie du Chien Group are tapped by several wells in New Richmond and yield large quantities of water. Yields range from 500-900 gpm in wells 300-350 feet deep.

Quality of Ground Water

Ground water in the New Richmond area is hard and may contain iron but otherwise is of good chemical quality. Analysis of water from an 802 foot municipal well (#3) at New Richmond is listed below.

Iron (Fe)	3.5	Alkalinity, total ($CaCo_3$)	192
Manganese (Mn)	.06	Sulfate	6.5
Calcium (Ca)	47	Chloride	0
Magnesium (Mg)	19.9	Fluoride	.9
Hardness (total)	200	Nitrite	.008
Dissolved solids	218	Nitrate	.24
		pH	7.3

(Analysis by Wisconsin State Laboratory of Hygiene, Nov., 1962; all values except pH in parts per million)

Ground water contamination may be a problem in the New Richmond area where thin glacial drift overlies the Prairie du Chien Dolomite bedrock. Contamination from the surface may enter wells by moving long distances through fractures and solution channels in the rocks. Adequate well construction, including a deep casing and careful grouting of the casing may help prevent the problem.

Conclusions

Abundant ground water is available in the New Richmond area from the Prairie du Chien Dolomite and Trempealeau Formation and/or deeper sandstone formations. Wells penetrating the Prairie du Chien and Trempealeau will be about 300-350 feet deep and yields of 500 gpm or more can be expected. Wells drilled to the Dresbach Group will be about 800 feet deep and may yield up to 1000 gpm.

Chemical quality of the ground water generally is good with the exception of hardness and in places, iron.

There is some potential for contamination of ground water in the New Richmond area because thin glacial cover overlies dolomite bedrock. Proper well construction may help such a problem.