

In general, for the next level of study, the database needs updating. It requires more information from existing water wells, and additional information from new ones.

Before an attempt is made to upgrade the level of interpretation provided in this report and the accompanying maps and groundwater query, it is recommended that all water wells for which water well drilling reports are available be subjected to the following actions:

1. The horizontal location of the water well should be determined within ten metres. The coordinates must be in 10TM NAD 27 or some other system that will allow conversion to 10TM NAD 27 coordinates.
2. A four-hour aquifer test (two hours of pumping and two hours of recovery) should be performed with the water well to obtain a realistic estimate for the transmissivity of the aquifer in which the water well is completed.
3. Water samples should be collected for chemical analysis after 5 and 115 minutes of pumping, and analyzed for major and minor ions.

In addition to the data collection associated with the existing water wells, all available geophysical logs should be interpreted to establish a more accurate spatial definition of individual aquifers.

There is also a need to provide the water well drillers with feedback on the reports they are submitting to the regulatory agencies. The feedback is necessary to allow for a greater degree of uniformity in the reporting process. This is particularly true when trying to identify the bedrock surface. The water well drilling reports should be submitted to the AEP Resource Data Division in an electronic form. The money presently being spent by AEP and Prairie Farm Rehabilitation Administration (PFRA) to transpose the paper form to the electronic form should be used to allow for a technical review of the data and follow-up discussions with the drillers.

An effort should be made to form a partnership with the petroleum industry. The industry spends millions of dollars each year collecting information relative to water wells. Proper coordination of this effort could provide significantly better information from which future regional interpretations could be made. This could be accomplished by the M.D. taking an active role in the activities associated with the construction of lease sites for the drilling of hydrocarbon wells and conducting of seismic programs.

Groundwater is a renewable resource and it must be managed.

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10 GLOSSARY

Aquifer	a formation, group of formations, or part of a formation that contains saturated permeable rocks capable of transmitting groundwater to water wells or springs in economical quantities.
Aquitard	a confining bed that retards but does not prevent the flow of water to or from an adjacent aquifer.
Available Drawdown	in a confined aquifer, the distance between the non-pumping water level and the top of the aquifer. in an unconfined aquifer (water table aquifer), two thirds of the saturated thickness of the aquifer.
Facies	the aspect or character of the sediment within beds of one and the same age (Pettijohn, 1957).
Fluvial	produced by the action of a stream or river.
Friable	poorly cemented.
Hydraulic Conductivity	the rate of flow of water through a unit cross-section under a unit hydraulic gradient; units are length/time.
Kriging	a geo-statistical method for gridding irregularly-spaced data.
Lacustrine	fine-grained sedimentary deposits associated with a lake environment and not including shore-line deposits.
Surficial Deposits	includes all sediments above the bedrock.
Transmissivity	the rate at which water is transmitted through a unit width of an aquifer under a unit hydraulic gradient: a measure of the ease with which groundwater can move through the aquifer. Apparent Transmissivity: the value determined from a summary of aquifer test data, usually involving only two water-level readings. Effective Transmissivity: the value determined from late pumping and/or late recovery water-level data from an aquifer test. Aquifer Transmissivity: the value determined by multiplying the hydraulic conductivity of an aquifer by the thickness of the aquifer.
Yield	a regional analysis term referring to the rate a properly completed water well could be pumped, if fully penetrating the aquifer. Apparent Yield: based mainly on apparent transmissivity. Long-Term Yield: based on effective transmissivity.

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Appendix B

MAPS AND FIGURES ON CD-ROM

CD-ROM

- A) Database
- B) ArcView Files
- C) Query
- D) Maps and Figures

1) General

- Index Map
- Surface Casing Types used in Drilled Water Wells
- Location of Water Wells
- Depth of Existing Water Wells
- Depth to Base of Groundwater Protection
- Bedrock Topography
- Bedrock Geology
- Cross-Section A - A'
- Cross-Section B - B'
- Geologic Column
- Generalized Cross-Section (for terminology only)
- Risk of Groundwater Contamination
- Relative Permeability
- Hydrographs - AEP Observation Water Wells
- Water Levels in AEP Obs WWs

2) Surficial Aquifers

a) Surficial Deposits

- Thickness of Surficial Deposits
- Non-Pumping Water-Level Surface in Surficial Deposits
- Total Dissolved Solids in Groundwater from Surficial Deposits
- Sulfate in Groundwater from Surficial Deposits
- Chloride in Groundwater from Surficial Deposits
- Fluoride in Groundwater from Surficial Deposits
- Total Hardness of Groundwater from Surficial Deposits
- Piper Diagram - Surficial Deposits
- Amount of Sand and Gravel in Surficial Deposits
- Thickness of Sand and Gravel Aquifer(s)
- Water Wells Completed in Surficial Deposits
- Apparent Yield for Water Wells Completed in Sand and Gravel Aquifer(s)

b) First Sand and Gravel

- Thickness of First Sand and Gravel
- First Sand and Gravel - Saturation

c) Upper Sand and Gravel

- Thickness of Upper Surficial Deposits
- Thickness of Upper Sand and Gravel (not all drill holes fully penetrate surficial deposits)
- Apparent Yield for Water Wells Completed through Upper Sand and Gravel Aquifer

d) Lower Sand and Gravel

- Structure-Contour Map - Top of Lower Surficial Deposits
- Depth to Top of Lower Sand and Gravel Aquifer
- Thickness of Lower Surficial Deposits
- Thickness of Lower Sand and Gravel (not all drill holes fully penetrate surficial deposits)
- Apparent Yield for Water Wells Completed through Lower Sand and Gravel Aquifer
- Non-Pumping Water-Level Surface in Lower Sand and Gravel Aquifer

3) Bedrock Aquifers

a) General

- Apparent Yield for Water Wells Completed in Upper Bedrock Aquifer(s)
- Total Dissolved Solids in Groundwater from Upper Bedrock Aquifer(s)
- Sulfate in Groundwater from Upper Bedrock Aquifer(s)
- Chloride in Groundwater from Upper Bedrock Aquifer(s)
- Fluoride in Groundwater from Upper Bedrock Aquifer(s)
- Total Hardness of Groundwater from Upper Bedrock Aquifer(s)
- Piper Diagram - Bedrock Aquifers
- Recharge/Discharge Areas between Surficial Deposits and Upper Bedrock Aquifer(s)
- Non-Pumping Water-Level Surface in Upper Bedrock Aquifer(s)