

**MINUTES OF THE SEVENTH MEETING  
SEWRPC REGIONAL WATER SUPPLY PLANNING ADVISORY COMMITTEE**

DATE: July 13, 2006  
TIME: 9:00 a.m.  
PLACE: Lower Level Conference Room  
Regional Planning Commission Offices  
W239 N1812 Rockwood Drive  
Waukesha, Wisconsin

**MEMBERS PRESENT**

Kurt W. Bauer, Chairman	Executive Director Emeritus, SEWRPC
Robert P. Biebel, Secretary	Special Projects Environmental Engineer, SEWRPC
Kenneth R. Bradbury	Hydrogeologist/Professor, Wisconsin Geological and Natural History Survey
Douglas S. Cherkauer	Professor of Hydrogeology, University of Wisconsin-Milwaukee
Lisa Conley	Representative, Town and Country Resource Conservation and Development, Inc.
Michael P. Cotter	Director, Walworth County Land Use and Resource Management Department
Charles A. Czarkowski	Regional Water Program Expert, Wisconsin Department of Natural Resources, Southeast Region
Daniel S. Duchniak	General Manager, Waukesha Water Utility, City of Waukesha
Charles P. Dunning	Hydrologist, U.S. Geological Survey
Thomas M. Grisa	Director of Public Works, City of Brookfield
Roger C. Johnson	Manager, North Shore Water Commission
Terrence H. Kiekhaefer	Director of Public Works, City of West Bend
Mark Lurvey	Agricultural Business Operator
George E. Melcher	Director, Kenosha County Department of Planning and Development
Matthew Moroney	Executive Director, Metropolitan Builders Association of Greater Milwaukee
Paul E. Mueller	Administrator, Washington County Planning and Parks Department
Jeffrey Musche	Administrator/Clerk, Town of Lisbon
Michael P. Rau	General Manager, We Energies-Water Services
Edward St. Peter	General Manager, Water Utility, City of Kenosha
Dale R. Shaver	Director, Waukesha County Department of Parks and Land Use
James Surfus	Senior Environmental Engineer, Miller Brewing Company
Jack H. Takerian (for George A. Torres)	Director of Facilities Management, Milwaukee County Department of Public Works
Tracy Tolzman (for Franklyn A. Ericson)	S.C. Johnson & Son, Inc.
Daniel S. Winkler	Director of Public Works and Utilities, City of Lake Geneva
Steven N. Yttri	General Manager, Water and Sewer Utility, City of Oak Creek

## **MEMBERS EXCUSED OR OTHERWISE ABSENT**

Julie A. Anderson	Director, Racine County Division of Planning and Development
Thomas J. Bunker	General Manager, Water and Wastewater Utility, City of Racine
David Ewig	Water Superintendent, City of Port Washington
Jeffrey A. Helmuth	Hydrogeologist Program Coordinator, Wisconsin Department of Natural Resources, Madison
Andrew A. Holschbach	Director, Ozaukee County Planning, Resources, and Land Management Department
Thomas J. Krueger	Water and Wastewater Utility Director, Village of Grafton
Carrie M. Lewis	Superintendent, Milwaukee Water Works, City of Milwaukee
Patrick T. Marchese	Member, Water Policy Advisory Panel, Public Policy Forum

## **GUESTS**

Ryan T. Amtmann	Strand Associates, Inc.
Ann Beier	Director of Mayor Barrett's Office of Environmental Sustainability
Darryl Enriquez	Reporter, Milwaukee Journal-Sentinel
Daniel T. Feinstein	Hydrologist, U.S. Geological Survey
Paul G. Hayes	Mid-Kettle Moraine Partners Group
John Jansen	Senior Geoscientist, Aquifer Science & Technology
Perry M. Lindquist	Manager, Land Resources Division, Waukesha County Department of Parks and Land Use
James Rowen	Concerned Citizen
Steven H. Schultz	Department Head, Water Supply and Wastewater Treatment, Ruekert & Mielke, Inc.
Kristina Surfus	Student
Yash P. Wadhwa	Strand Associates, Inc.

## **STAFF**

Catherine D. West	Planner, Southeastern Wisconsin Regional Planning Commission
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## **CALL TO ORDER AND ROLL CALL**

Chairman Bauer called the meeting to order at 9:00 a.m. Roll call was taken by circulating an attendance signature sheet, and a quorum was declared present.

## **PRESENTATION BY USGS AND WGNHS STAFFS ON GROUNDWATER MODELING FINDINGS**

Chairman Bauer then referred the Committee to Agenda Item 2, and reminded the Committee that it was agreed at the June 7, 2006, Committee meeting to ask representatives of the U.S. Geological Survey and the Wisconsin Geological and Natural History Survey to present a summary of groundwater modeling findings related to the sources and fate of water pumped from the deep sandstone aquifer underlying the Region. He noted that Mr. Daniel Feinstein of the U.S. Geological Survey and Dr. Ken Bradbury of the Wisconsin Geological and Natural History Survey would be making the presentation. He noted that both

of these individuals had been directly involved in the development and operation of the Commission groundwater model for the Southeastern Wisconsin Region and that they were both well regarded in the fields of hydrogeology and groundwater system modeling. He noted further that Messrs. Bradbury and Feinstein were currently working with the Commission staff on the groundwater analyses needed as an integral part of the regional water supply plan, together with Drs. Cherkauer and Dunning. Chairman Bauer then asked Messrs. Bradbury and Feinstein to proceed with the presentation on the groundwater modeling findings.

[Secretary's Note: A copy of the PowerPoint presentation given by Messrs. Bradbury and Feinstein is attached to these minutes as Exhibit A.]

Mr. Czarkowski referred to the estimates of flow into the cone of depression caused by pumping and to the component of that flow that was leakage through the shale aquitard from the shallow into the deep aquifer. He asked if that was due, in part, to dual aquifer wells. Mr. Feinstein responded that there likely was some impact from dual aquifer wells, but that it was likely a small impact, and in the modeling was included in the leakage component.

Mr. Grisa noted that the relationship between the groundwater system and Lake Michigan was complex and problematic, and even more so when consideration is given to the fact that some communities, such as the Cities of Brookfield and Muskego, pump water from groundwater sources which is then returned to Lake Michigan as treated wastewater. He also noted that as development takes place in the Lake Michigan basin, the amount of runoff to Lake Michigan may be expected to increase and the amount of groundwater recharge decreased.

Dr. Cherkauer indicated that the question of how much water discharged from the City of Waukesha deep wells would have flowed toward Lake Michigan if there were no wells, was academic. He noted that such flow does not represent current conditions, but rather, a situation which no longer exists. Chairman Bauer agreed, and indicated that the findings presented involved some sophistry since very long periods of time were a factor in all of the scenarios presented, flows in the deep aquifer being very slow. Therefore, he said, some of the conditions postulated in the presentation would take many decades to occur.

Dr. Jansen noted that it was important to postulate a predevelopment baseline condition for the groundwater systems. Otherwise, conditions, including groundwater divides and sources of water moving into the drawdown cone caused by pumping would have no frame of reference. Mr. Feinstein agreed.

In answer to a question by Dr. Cherkauer, Mr. Feinstein indicated that the situation in southeastern Wisconsin was somewhat unusual within the Great Lakes basin because of presence of the Maquoketa shale aquitard. He noted that if the aquifer were not confined, the groundwater and surface water divides would be in closer proximity to each other.

Mr. Duchniak noted that there has been some recovery of the water levels in areas of the deep aquifer where pumping has been reduced. He asked how long such a recovery would take if the deep aquifer pumping in southeastern Wisconsin were halted entirely. Mr. Feinstein noted that the present drawdowns were the result of pumping over a period of about 140 years. Dr. Bradbury indicated that it was estimated that about 90 percent of the drawdown would be recovered in about 70 years if pumping were halted entirely.

Mr. Duchniak noted that it had been stated that the drawdown of the deep aquifer had resulted in a reduction in surface water flows, and indicated that a recovery of the deep aquifer levels should also restore such surface water flows, and that most of the beneficial impacts on surface waters would occur west of the subcontinental divide. Mr. Feinstein agreed, but cautioned that the data on the surface water

impacts was not derived from hydrologic measurements, but was estimated on the basis of the mathematical modeling.

In answer to a question by Mr. Rau, Mr. Feinstein indicated that the times of travel of recharge water into areas of influence of well pumping was quite variable due to the fractured nature of some areas of the aquifer systems and the presence of the shale aquitard layer. He indicated that for water flowing from western Waukesha County beyond the limits of the shale, the travel time to the City of Waukesha wells was probably hundreds, or even thousands, of years. Mr. Rau responded that he had asked the question in order to put a framework on quality issues related to times for reacting to potential contamination sources. Dr. Bradbury indicated that the deep aquifer was relatively well protected from that point of view, but noted that the potential of uncased wells providing direct connections between the shallow and deep aquifer were a concern.

Mr. Mueller asked about the findings of the modeling on groundwater quality. Dr. Bradbury indicated that some general conclusions could be drawn, including that the groundwater beneath the Maquoketa shale layer is better protected from surface sources of contamination than the shallow aquifer. As wells must be constructed deeper into the deep aquifer, water quality may be expected to decrease in some wells due to naturally occurring radionuclides and dissolved solids and arsenic. He noted, however, that water quality in this regard, has been found to decrease with drawdown levels in some, but not all, wells. Mr. Feinstein noted that there were ongoing studies related to water quality in the deep aquifer. He noted specifically, studies to help better understand the flushing times for radium contamination, and the potential of oxygenation and its relationship to potentially increased arsenic levels in the water drawn by deep wells.

Mr. Lindquist asked if the water that was estimated to be flowing into the deep cone of depression caused by pumping of the deep aquifer was surface water out of Lake Michigan, or groundwater from under Lake Michigan. Mr. Feinstein indicated that the water is coming out of the Lake itself and passing through the shale aquitard. Dr. Bradbury noted that this occurs at very slow rates, but over a very large area.

Mr. Winkler asked if the rainfall that infiltrates the shallow aquifer flows eastward along the top of the shale. Mr. Feinstein responded that most infiltrated water finds its way to the surface water system and is discharged in this case to surface waters in the Fox River watershed.

There being no further questions or comments on the presentation, Chairman Bauer thanked Messrs. Bradbury and Feinstein on behalf of the Committee for their presentation.

## **CONSIDERATION OF MINUTES OF THE MEETING OF JUNE 7, 2006**

Chairman Bauer noted that copies of the minutes of the June 7, 2006, meeting of the Regional Water Supply Planning Advisory Committee had been provided, to all members of the Committee for review prior to the meeting, and asked that the Committee consider approval of those minutes.

Chairman Bauer reminded the Committee members that all of the revisions which were requested by the Committee to be made in the materials reviewed at that meeting were intended to be fully documented in the minutes, or in attachments thereto. He reminded the Committee members that approval of the minutes would constitute final approval of Chapter VI, "Artificial Groundwater Recharge and Management," of SEWRPC Technical Report No. 43, *State-of-the-Art of Water Supply Practices*, and of the base year scenario and the design year 2035 conditions with existing trends scenario, as set forth in SEWRPC staff memorandum entitled "Conceptual Framework for Existing and Future Condition Alternative Plans to be Initially Considered Under the Regional Water Supply Planning Program for Southeastern Wisconsin," dated June 21, 2006. He noted that the approval would, of course, be subject to any comments received today on the minutes and the attachments thereto.

Mr. Yttri referred to the revised paragraph on fluoridation on page 3 of the minutes as proposed for Chapter IV, "Groundwater Withdrawal and Treatment Technologies," of SEWRPC Technical Report No. 43, *State-of-the-Art of Water Supply Practices*, and stated that, in his opinion, it was an overly negative statement. He recommended, and it was generally agreed, to add a sentence to the revised paragraph noting that certain health organizations recommend fluoridation.

[Secretary's Note: The following sentence has been added to the revised paragraph on fluoridation as set forth on page 3 of the minutes as proposed to be added to Chapter IV of SEWRPC Technical Report No. 43:

"With regard to the option of providing fluoridation of water supplied, it should be noted that the American Dental Association, the American Medical Association, the Centers for Disease Control and Prevention, and the U.S. Public Health Service, and the World Health Organization recognize the public health benefits of drinking water fluoridation.]

Mr. Grisa referred to the new section entitled "Ion Selective Adsorbent Technologies" on page 4 of the minutes as proposed to be added to Chapter IV of SEWRPC Technical Report No. 43. He recommended, and it was generally agreed, to expand the text to reflect all of the proprietary technologies which had been pilot tested locally. He specifically noted that the Layne Christensen Selective Resin Process as one which was pilot tested in the Village of Pewaukee and City of New Berlin. He noted that that process was not referred to in the revised text. Mr. Schultz agreed to check with the Wisconsin Department of Natural Resources (WDNR) on the status of that system and other such systems and to expand the text accordingly.

[Secretary's Note: The subject section has been revised by adding the following to the section entitled "Ion Selective Adsorbent Technologies" between the third and fourth paragraphs:

"A second proprietary technology was pilot tested in Wisconsin at two sites in southeastern Wisconsin. The process uses a proprietary manufactured adsorbent media which is selective in removing Radium and Barium compounds in the water in a manner similar to the adsorptive granular media. The pilot tests were submitted to the Wisconsin Department of Natural Resources (WDNR) for review and approval. The WDNR correspondence indicates the test results were positive and that further testing would be required of the completed units. This process is apparently no longer represented by the pilot testing company of record. The process differs from the system described above, in that instead of operating in the vertical upflow mode, the water flows downward through two vessels in series. The media is loaded at a higher rate than the granular media operating in an up flow mode. When the removal capacity of the initial vessel is exhausted, the second vessel becomes the first and new media is added to the second vessel.

The initial plans were to load this media to a higher radioactivity level that would require land filling in a site licensed to take the levels of Technically Enhanced Naturally Occurring Radioactive Material (TENORM) that would be created. Initial Plans were for disposal of the media by the vendor. The media is still available, however it is not known if the process has been purchased or offered by another vendor serving the Region."]

Mr. Grisa referred to page 5 of revised Chapter VI of SEWRPC Technical Report No. 43 and recommended that a bulleted objective on the protection of groundwater quality be added to the listing of objectives of potential recharge projects. Dr. Cherkauer agreed and recommended attendant revisions to the last sentence of the new paragraph following the listing of objectives.

[Secretary's Note: The following objective has been added as the seventh bulleted item on page 5 of the minutes as proposed to be added to Chapter VI of SEWRPC Technical Report No. 43:

- “• Protect groundwater quality.”

In addition, the last sentence of the paragraph following the list of bulleted objectives on page 5 was revised to read:

“Care must be taken to avoid potential contamination of aquifers from artificial recharge projects.”]

Mr. Grisa referred to the last sentence of the first bulleted item on page 15 of the revised Chapter VI of SEWRPC Technical Report No. 43, suggested a need for adding the words “those features” following the word “of.” The change was duly noted.

Ms. Conley referred to the reference to rain gardens on pages 10 and 11 of the minutes, and noted that the use of large-scale rain gardens for multiple purposes had not been fully referenced in the revised version of Chapter VI of SEWRPC Technical Report No. 43. Mr. Biebel referred to the third bulleted item on page 15 of the revised Chapter VI, and noted that larger-scale rain gardens and bio-retention basins were presented as viable recharge options. Ms. Conley recommended that the text note the potential multiple benefits of such facilities. The recommendation was generally agreed to.

[Secretary's Note: The following sentences are added to the third bulleted item on page 15 of revised Chapter VI of SEWRPC Technical Report No. 43:

“Larger-scale rain gardens, or bio-retention facilities, can serve multiple purposes, including groundwater recharge, nonpoint source pollution control, and as an onsite aesthetic amenity. To properly serve these purposes, the site development must be specifically designed with these purposes in mind.”]

Ms. Conley referred to page 16 of the minutes relating to the SEWRPC staff memorandum on future condition alternative plans and asked for a clarification regarding the potential for considering other alternative plans. Mr. Biebel indicated that, as he recalled it, the context of the comments at the previous meeting related to the development of an alternative which provided for a very high level of water conservation measures. He indicated that the intention at this time was to develop a realistic water conservation component to include in all alternatives considered. After further discussion, Chairman Bauer indicated that it would, indeed, be possible to develop and evaluate other alternative plans than those noted in the subject SEWRPC staff memorandum if the Committee so requested. He indicated that after review of the initially developed alternative plans, the Committee may determine a need to examine additional alternatives.

Dr. Cherkauer referred to the new paragraph on the top of page 37 of revised Chapter VI of SEWRPC Technical Report No. 43 regarding the Pabst Farms development. He asked if the Maquoketa shale aquitard separating the shallow and deep aquifers was present at that location. Dr. Jansen responded that the development area was probably located near on an area where the shale was pinched out, but that the

precise locations concerned was unknown. Dr. Cherkauer recommended, and it was generally agreed, that the paragraph be reviewed in that context.

[Secretary's Note: The following sentence has been added following the fifth sentence of the paragraph describing the Pabst Farm on page 37 of revised Chapter VI of SEWRPC Technical Report No. 43:

“The Maquoketa shale formation aquitard pinches out in the vicinity of the Pabst Farm development. Therefore, there is a direct interconnection between the shallow and the deep aquifers under the development area.”]

[Secretary's Note: Following the July 13, 2006, meeting, Dr. Jansen was provided with capital cost data for the Odana Hill Golf Course artificial recharge project described on page 39 of revised Chapter VI of SEWRPC Technical Report No. 43. The following sentence has been added to the paragraph describing the Odana Golf Course project on page 39:

“The capital cost of the artificial recharge project as estimated in 2006, was reported to be \$1.9 million.”]

There being no further corrections or additions, the minutes of the meeting of June 7, 2006, were approved as amended, on a motion by Mr. Mueller, seconded by Mr. Melcher, and carried unanimously.

#### **CONSIDERATION OF CHAPTER V, “SMALL AREA AND INDIVIDUAL WATER SUPPLY SYSTEMS,” OF SEWRPC TECHNICAL REPORT NO. 43**

Chairman Bauer asked the Committee to consider Agenda Item 4. He noted that all Committee members had received a copy of Chapter V of SEWRPC Technical Report No. 43 for review prior to the meeting. He then asked Mr. Schultz, the primary author of the chapter, to review the chapter with the Committee on a page-by-page basis. The following questions were raised, comments made, and actions taken in the course of the review.

Dr. Cherkauer referred to the first paragraph on page 1, and noted that as part of the work being done by the hydrogeology team for the regional water supply plan, he had made estimates of the net water pumped by domestic wells. He noted that there was in 2000 a net withdrawal of about 18 million gallons per day (mgd), comprised of about 13.5 mgd pumped by private wells serving residences which are located within public sanitary sewer service areas and most of which was lost to the aquifer. He noted further that there was in 2006 a net withdrawal of another approximately 4.5 mgd of water pumped by private wells serving residences served by onsite sewage disposal systems. After further discussion, Dr. Cherkauer agreed to provide a report which would document the findings of his analysis, and that the information would be added to the text.

Mr. Shaver asked that the methodology used by Dr. Cherkauer in making the estimation be provided in order to permit use of the data in county planning programs. (Copy of draft report attached to these minutes as Exhibit A.)

[Secretary's Note: Text has been added regarding the water use for private wells ahead of the last sentence of the first paragraph on page 1. The text is incorporated into the revised version of Chapter V attached to these minutes.]

Ms. Conley noted that the chapter did not include a section on rainwater capture and treatment and suggested that such a section be added to the document. Mr. Schultz responded that it was intended to include rainwater capture and use in Chapter VII of the report, which is to address water conservation measures.

Mr. Melcher noted that if rainwater was being considered for household use, it would be important to address the issues of water quality and public health. Mr. Czarkowski agreed, and indicated that any such references should stress that captured rainwater is not considered suitable for potable uses.

After further discussion, it was agreed that the staff would add a section on rainwater capture for individual systems. In addition, the section would reference Chapters VI and VII for the uses of rainwater which are more appropriately covered under infiltration and water conservation technologies, respectively.

[Secretary's Note: A new section has been added to Chapter V on page 4 (now page 5) ahead of the section entitled "Point-of-Use and Point-of-Entry Water Treatment." The new section is included in the revised version of Chapter V transmitted with these minutes.]

Mr. Czarkowski referred to the third paragraph on page 2 regarding well capacities. He recommended, and it was generally agreed, to express the capacities in terms of gallons per minute rather than gallons per hour.

Mr. Melcher referred to the fourth paragraph on page 2 and noted the western Kenosha, and probably western Racine Counties, also had sand and gravel deposits that could support private wells.

[Secretary's Note: The fifth sentence in the fourth paragraph on page 2 has been revised to add western Kenosha and western Racine Counties to the areas which contain sand and gravel deposits which can support private wells.]

Mr. Czarkowski referred to the last sentence in the fourth paragraph on page 2 regarding the use of surface water as a source of domestic supply. He recommended, and it was generally agreed, to add text indicating that the use of surface water as a source of supply for private domestic uses would require a plan review under Chapter NR 812 of the *Wisconsin Administrative Code*, and that there were no currently known private domestic systems which utilize such surface water as the source of supply for potable uses within southeastern Wisconsin.

[Secretary's Note: The following sentences were added to the fourth paragraph on page 2:

"Any such surface water-supplied systems would be subject to the plan review requirements of Chapter NR 812 of the *Wisconsin Administrative Code*. Currently, there are no known private domestic potable water supply systems using surface water within the Region."]

Dr. Cherkauer referred to page 3 and recommended checking the amounts given of water used for irrigation in the Region, and the percentage of the total water use for both commercial and industrial systems and agricultural systems.

[Secretary's Note: The amounts of water use and the percentage of the water used in the Region in the sixth paragraph on page 3 and the second paragraph on page 4 have been revised as appropriate. The sources of the data are cited.]

Ms. Conley referred to the section of the report on page 3 regarding agricultural systems. She noted that the state-of-the-art report should include information on systems, such as drip irrigation, which are used in other parts of the country. Mr. Schultz indicated that there would be a section in Chapter VII on conservation practices for agricultural facilities.

Mr. Grisa referred to the section of the report on page 4 regarding onsite wastewater disposal systems. He noted that the use of holding tanks was being held out as undesirable for a number of reasons, including the fact that the water used is not locally returned. He recommended that the section also include text on the potential impacts on groundwater quality associated with systems other than holding tanks. Mr. Czarkowski agreed. Mr. Melcher also reiterated the importance of considering water quality, as well as water quantity, considerations.

[Secretary's Note: The text of the section on page 4 entitled "Onsite Wastewater Disposal Systems Consideration" has been revised to reflect water quality considerations related to onsite wastewater disposal. The revisions are included in the revised version of Chapter V provided with these minutes.]

Mr. Shaver cited examples of how the current code-specified 50-foot separation distance between wells and onsite sewage disposal system leach field could be violated, and noted that the specified distances may give the general public a false sense of security. Mr. Czarkowski indicated that the regulation was enforced through well driller licensing. He noted that inspections are done by Wisconsin Department of Natural Resources staff on a percentage of each well driller's projects. He also noted that the well inspection function could be delegated to counties, and that this, which had been proven to be effective, in some cases. However, no county inspection programs were not currently in place within the Region. He also noted that separation distance problems are often corrected after inspections are made at the time of a residence sale.

Mr. Czarkowski recommended, and it was generally agreed, to add information on costs for well drilling to the last paragraph on page 2. Mr. Schultz agreed to add costs, indicating that they generally ranged from \$18 to \$25 per foot of well depth.

[Secretary's Note: The following sentence has been added to the last paragraph on page 2 (now page 3):

"Costs for drilling and constructing a private domestic well in the Region are estimated to range from \$18 to \$25 per foot of well depth."]

Mr. Czarkowski recommended, and it was generally agreed, to add a section covering current regulations and policies under the heading "point-of-use and point-of-entry water" on page 4. Mr. Czarkowski offered to provide information of be included in that describing the regulatory considerations section.

[Secretary's Note: Mr. Czarkowski provided an excellent memo describing the regulatory considerations. Using that memorandum as a resource, a section on regulations and policies was drafted and is included immediately following the introductory section on page 4 (now page 6) of the revised version of Chapter V provided with these minutes.]

Dr. Bradbury asked about the source for the estimates of the water used for dairy operations shown on page 4. Mr. Biebel replied that the number of dairy operations and milk cows came from the U.S. Department of Agriculture, National Agricultural Statistics Service County Data, and the water use data were taken from a recent Wisconsin Department of Natural Resources report which contained a statewide

estimate of water use per milk cow. The regional estimate was made by applying the statewide water use per milk cow to the number of milk cows in the Region.

Mr. Czarkowski suggested, and it was generally agreed, to add a column on metals to Table V-1. Mr. Schultz agreed, noting that that would reduce the number of notes in the last column.

[Secretary's Note: Table V-1 was revised to add a column on metals and the notes adjusted accordingly.]

Dr. Cherkauer referred to the second sentence in the last paragraph on page 5 (now page 7) and recommended the words "excessive amounts of" be added ahead of the word "dissolved." The change was duly noted.

Mr. Grisa referred to Tables V-4, V-5, and V-6, and recommended, and it was generally agreed, to combine the capital and operation and maintenance costs into two tables similar to Table V-2.

Mr. Grisa referred to the text on page 10 regarding maintenance of point-of-use technology devices. He recommended that the text be expanded to address potential health concerns if the devices were not properly maintained. It was agreed to expand the text on page 10 to address this issue.

[Secretary's Note: The text on page 10 (now page 12) has been expanded regarding operation and maintenance needs and is included in the revised version of Chapter V provided with these minutes.]

Mr. Winkler noted that testing of individual private water supply systems was an important management measure. He recommended that some guidance be provided on this. Mr. Shaver and Mr. Melcher both agreed, and cited experience of the relatively low participation in water testing opportunities offered at the county level. Mr. Czarkowski reported that the Wisconsin Department of Natural Resources recommended annual bacteriological testing. It was generally agreed to add a paragraph on water supply testing on page 10 of the chapter.

[Secretary's Note: A section on water testing has been added to the text on page 11 (now page 13) and is included in the revised version of Chapter V transmitted with these minutes.]

Mr. Grisa commented that the chapter should include text regarding the use of bottled water. He indicated that there is a public perception that such water is safer than municipally supplied water.

[Secretary's Note: A section on bottled water has been added ahead of the summary section on page 11 (now page 14) and is included in the revised version of Chapter V transmitted with these minutes.]

Mr. Shaver recommended that the chapter introduction should clarify the intention of the chapter to report on the state-of-the-art and to distinguish the topics covered in the chapter from the conservation measures to be included in Chapter VII covering water conservation measures.

[Secretary's Note: Text has been added to the chapter introductory section and in a new section on rainwater collection and treatment to clarify the distinction between the current state of the practices, versus conservation measures which could be viable for individual systems. The text is included in the revised version of Chapter V transmitted with these minutes.]

There being no further questions or comments, on a motion by Mr. Moroney, seconded by Mr. Melcher, and carried unanimously, Chapter V, "Small Area and Individual Water Supply Systems," of SEWRPC Technical Report No. 43, *State-of-the-Art of Water Supply Practices*, was approved as amended.

### **REVIEW OF SEWRPC STAFF MEMORANDUM ENTITLED "DEMONSTRATION AREAS FOR GROUNDWATER SUSTAINABILITY ANALYSIS"**

Chairman Bauer asked the Committee to consider Agenda Item 5. He noted that all Committee members had received a copy of the SEWRPC staff memorandum entitled "Demonstration Areas for Groundwater Sustainability Analysis," for review prior to the meeting.

Chairman Bauer indicated that the development of data on sustainability of the groundwater system was an important element of the regional water supply plan. He indicated that the staff of the Wisconsin Geological and Natural History Survey would be performing the necessary evaluations of the potential impact on the shallow aquifer system of different development densities and on onsite water supply and sewage disposal practices.

Chairman Bauer then asked Mr. Biebel to review with the Committee the subject staff memorandum. Mr. Biebel indicated that the memorandum as written addressed the groundwater quantity analyses which were to be carried out by the Wisconsin Geological and Natural History Survey. He indicated further that the study design for the regional water supply planning effort had included provisions for such analyses. However, he indicated that there was also a directly related groundwater quality issue which should be addressed. To do that, the Commission staff will conduct and report upon a literature search. Ideally, he indicated, that some risk-based conclusions could be drawn from the findings of the search. He stated that the Commission staff would investigate further the potential for quantitative evaluation of the issue, even though such an evaluation was not now included in the project budget, and report back to the Committee.

Mr. Czarkowski referred to the Town of Lisbon demonstration site and noted that there could be an issue with the well construction requirements which are in place in portions of the Town. He noted that due to bacterial contamination concerns, wells drilled in the areas with high bedrock were required to be specially cased. Mr. Biebel indicated that that issue should not be a problem in that the intent of the demonstration work was to look at a variety of geologic settings.

Dr. Cherkauer noted that none of the demonstration areas were located west of the end of the Maquoketa shale layer. Mr. Shaver indicated that the Town of Ottawa would be a potential demonstration area located west of that end.

[Secretary's Note: Consideration was given to revising the demonstration areas to include an area beyond the limits of the Maquoketa shale. Subsequent review of the demonstration area hydrogeologic characteristics support Dr. Cherkauer's recommendation. There were no areas with relatively deep sand and gravel deposits. The substitution of an area to the west of the limits of the Maquoketa shale also would provide for a better cross-section of hydrogeologic conditions. Given these considerations, the Town of LaGrange in Walworth County has been substituted for the Town of Bloomfield in Waukesha County. A revised draft of SEWRPC Staff Memorandum entitled "Groundwater Sustainability Analysis Demonstration Areas" is attached hereto.]

Mr. Moroney noted that the sustainability analysis was designed to focus on residential land uses. He questioned the need for consideration of commercial and industrial uses. Mr. Biebel responded that residential use was the primary use supported by individual, onsite, water supply systems that could be expected to occur over a large area. He also noted that there were limitations on the number of scenarios which could be considered. He noted that the results of the analyses for residential use could, perhaps, be extrapolated to other types of land uses.

Mr. Moroney recommended, and it was generally agreed, to add a summary table of hydrogeologic conditions for the six demonstration areas to confirm that a desirable range of conditions were covered.

[Secretary's Note: A table has been added to the memorandum summarizing the geological conditions for the six demonstration areas. A copy of the revised version of the staff memorandum is transmitted with these minutes.]

There being no further questions or comments, on a motion by Mr. Moroney, seconded by Mr. Melcher, and carried unanimously. The SEWRPC staff memorandum entitled "Demonstration Areas for Groundwater Sustainability Analysis," was approved as amended. A revised copy of the staff memorandum is attached to these minutes.

## **OTHER BUSINESS**

## **DATE AND TIME OF NEXT MEETING**

After a brief discussion, the next meeting of the Advisory Committee was tentatively scheduled to be held in the Commission offices on August 30, 2006, beginning at 9:00 a.m.

## **ADJOURNMENT**

There being no further business to come before the Committee, on a motion by Mr. Duchniak, seconded by Mr. Yttri, and carried unanimously, the meeting was adjourned at 11:40 a.m.

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## Exhibit A

### Estimation of domestic pumping for inclusion in the regional ground water flow model

D. S. Cherkauer  
University of Wisconsin-Milwaukee  
July, 2006

#### Objective:

The objective of this exercise is to estimate the quantity and spatial distribution of domestic pumping within southeastern Wisconsin. Domestic pumping is intended to represent all ground water supplies not provided by high capacity wells (including such non-transient sources as municipal, industrial and agricultural wells), which are already included directly in the model.

#### Method:

The estimation process consists of the following steps:

I. Year 2000 census populations by quarter section were compared to maps of the extent of municipal water and sewer systems. All the data and maps were provided by SEWRPC. Each quarter section in the region was then categorized into one of three sets:

Type 1. Area lies outside municipal water and sewer service,

Type 2. Area lies outside municipal water, but inside municipal sewer service, or

Type 3. Area is served by both municipal water and sewer.

Each quarter section was assigned to the single category which represented the majority of its area.

II. Net pumping rates (gross pumping minus any water returned to the aquifer) were assigned to Types 1 and 2 above as 20 gallons per day per capita (gpdc) and 100 gpdc, respectively. The model already included ground water pumping for Type 3 above, so no estimate was necessary. The 100 gpdc value is based on representative rates for the total delivery by municipal utilities supplying ground water to customers, while the 20 gpdc value incorporates an estimate of 80% of the gross pumping being returned (Solley, et al, 1993) to the shallow aquifer through onsite wastewater treatment systems. Areas known to be served by domestic wells where wastewater is discharged to holding tanks have been included in Type 2, because their wastewater is not returned to the local aquifer.

III. The composite domestic pumping for each section within the region was then entered in the model as a single well at the model node closest to the center of the section. East of the subcrop of the Maquoketa Shale, these domestic pumping wells were entered in Model Layer 5 (the Silurian dolomite). West of the subcrop, they were entered in Model Layer 1 (glacial deposits).

**Results:**

The distribution of the estimated domestic pumping are presented at the county level in the tables which follow.

**Table 1 - Populations in each county served by domestic and municipal water sources.**

County	Domestic well; no sewer (Type 1)		Domestic well with sewer (Type 2)		Municipal water (Type 3) *	
	Residents	County %	Residents	County %	Residents	County %
Kenosha	16,982	11.4	22,937	15.3	109,658	73.3
Milwaukee	3,684	0.4	11,444	1.2	925,036	98.4
Ozaukee	17,653	21.4	22,077	28.8	42,770	51.8
Racine	23,793	12.6	23,533	12.5	141,505	74.9
Walworth	30,377	33.0	5,957	6.5	55,679	60.5
Washington	46,531	39.6	4,729	4.0	66,236	56.4
Waukesha	90,839	25.2	44,137	12.2	225,791	62.6
<b>TOTAL</b>	<b>229,859</b>	<b>11.9</b>	<b>134,814</b>	<b>7.0</b>	<b>1,566,675</b>	<b>81.1</b>

\* Includes both surface and ground water.

**Table 2 - Estimated net ground water pumping by domestic wells in each county**

County	Net Domestic Pumping				High capacity well pumping in model (mgd)	Total ground water pumping in model (mgd)
	Domestic well; no sewer		Domestic well with sewer			
	Net pumping (mgd)	% of ground water use	Pumping (mgd)	% of ground water use		
Kenosha	0.34	11.4	2.29	76.6	0.36	2.99
Milwaukee	0.07	1.4	1.14	22.9	3.77	4.98
Ozaukee	0.35	4.0	2.21	25.1	6.25	8.81
Racine	0.48	6.3	2.35	30.6	4.85	7.68
Walworth	0.61	6.4	0.60	6.3	8.30	9.51
Washington	0.93	9.6	0.47	4.9	8.27	9.67
Waukesha	1.82	4.8	4.41	11.6	31.79	38.02
<b>TOTAL</b>	<b>4.60</b>	<b>5.6</b>	<b>13.48</b>	<b>16.5</b>	<b>63.58</b>	<b>81.66</b>

**Table 3 - Distribution of total ground water pumping by aquifer**

County	Total Ground Water Pumping (mgd)	Shallow Aquifer		Deep Aquifer	
		Net Pumping (mgd)	Percent of Total	Net Pumping (mgd)	Percent of Total
Kenosha	2.99	2.91	97.3	0.08	2.7
Milwaukee	4.98	4.24	85.1	0.74	14.9
Ozaukee	8.81	7.96	90.4	0.85	9.6
Racine	7.68	3.81	49.6	3.86	50.4
Walworth	9.51	6.42	67.5	4.09	32.5
Washington	9.67	8.11	83.9	1.56	16.1
Waukesha	38.02	15.36	40.4	22.66	59.6
<b>TOTAL</b>	<b>81.66</b>	<b>47.81</b>	<b>58.5</b>	<b>33.86</b>	<b>41.5</b>

**Constraints on the Estimates:**

The resolution of the population data is good to the quarter section. However, the model nodes, which are 2500 feet on a side, do not coincide directly with quarter section boundaries (2640 feet on a side), and neither coincides with either water or sewer utility boundaries. This results in many model nodes containing portions of four quarter sections, which are areas beneath the method's resolution. To overcome this problem, the representative domestic pumping has been summed throughout each section in the model's nearfield. These values have then been added to the model as a single well for each section. This resulted in over 1000 wells representing domestic pumping being added to the model.

No attempt has been made to distribute domestic pumping among stratigraphic units within the model. There are on the order of 100,000 domestic wells within the region. Construction and location records of many of those wells simply don't exist, but the vast majority of them will have been completed in the shallowest aquifer which could supply sufficient water for a small user. Because individual wells and their depths could not be obtained, a representative composite estimate of net pumping was used, and virtually all of it has been placed in the shallow aquifer system. In cases where both the Silurian dolomite and glacial deposits are absent (4 nodes), the pumping was put in the St. Peter sandstone.

The analysis has only been done for 2000. Although earlier population data exist, there are usually not high-resolution maps of the utility boundaries for the same time periods.

Finally, the pumping rate of 100 gpcd used for areas with sewers is taken from water utilities serving a mix of industrial, commercial, institutional, recreational and residential users. The distribution of these uses is probably different in the less densely populated areas served by private wells, but all those types, plus agricultural use, are represented. In the absence of actual measured pumping rates in the areas served by domestic wells, it has been assumed that the per capita pumping rate is the same as in those areas served by water utilities.

Reference:

Solley, W. B., R. B. Pierce and H. A. Perlman, 1993. Estimated use of water in the United States in 1990. US Geological Survey Circular 1081, 76 p.

## Exhibit B

**Robert P. Biebel**

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**From:** Czarkowski, Charles [<mailto:Charles.Czarkowski@dnr.state.wi.us>]

**Sent:** Monday, August 14, 2006 11:30 AM

**To:** Robert P. Biebel

**Cc:** sschultz@ruekert-mielke.com; Volz, Rhonda R; Helmuth, Jeffrey A.

**Subject:** Regulation Paragraph for Chapter V, Small Area and Individual Water Supply Systems

Bob, thanks for considering my comments, hope this isn't too late, busy this season:

**The gist:** Wisconsin DCOM and DNR regulate treatment options for small individual water systems. The chapter gives the impression that, regardless of water quality problems, individuals may simply install treatment and everything A-OK. From a regulatory stance this is incorrect. Two state agencies and their agents (local plumbing inspectors and county staff) prohibit treatment in many cases. The significance of this, from a Regional planning perspective, is that POU or POE treatment is not a substitute for public water in many cases. OR the economics of obtaining a naturally safe water source precludes development in some areas. A prime example is the Village of Sussex which was compelled by state legal action to form a utility due to widespread unsafe wells. Other examples include extension of water mains to areas with landfill VOC contamination; or formation of subdivision community systems to economize the need for expensive individual wells or treatment.

I am giving you the info here, you can craft it into something succinct:

WDNR **requires** the abandonment of wells contaminated with **biological agents** to protect the groundwater resource, aquifers, from cross contamination caused by unsafe wells...in addition to public health concerns. So treatment is almost never an approved option for coliform or other biologically unsafe wells.

NR 812.26(2)(a)



(a) The owner shall permanently abandon a well or a drillhole under any of the following conditions unless the department approves the continued use of the well or drillhole:

NR 812.26(2)(a)1.



1. The well water is contaminated with biological agents, bacteriological, viral or parasitic, and 3 attempts at batch chlorination fail to eliminate the problem,

For contamination by chemical or radiological (everything other than biological) health-related parameters, DNR *has the option* of allowing continued use of unsafe wells because some contaminants are naturally-occurring (aquifers not threatened) or have limited public health significance (nitrates over 10 ppm but less than 20 ppm).

NR 812.26(2)(b)



(b) The department **may** require the owner to abandon a well or drillhole under the following conditions:

NR 812.26(2)(b)1.



1. The well water is contaminated with a substance in exceedence of the drinking water standards specified in <http://folio.legis.state.wi.us/cgi->

[bin/om\\_isapi.dll?clientID=29531347&infobase=code.nfo&jump=NR%20812.06&softpage=Document - JUMPDEST\\_NR 812.06 s. NR 812.06](http://bin/om_isapi.dll?clientID=29531347&infobase=code.nfo&jump=NR%20812.06&softpage=Document - JUMPDEST_NR 812.06 s. NR 812.06)

{note: these are the primary, health related parameters of NR809 which apply to public systems; or the groundwater enforcement standards of NR140; or on case-by-case advice from Div. of Health for unregulated contaminants-Chad}

*As a matter of policy, DNR considers treatment to be the solution of last resort for health-related contaminants. It is typically approved for individual small water systems only when obtaining a natural safe source of water is impractical.* In most cases a replacement well can be drilled into a different aquifer, shallower or deeper, to avoid the contaminant. Examples of this are gasoline contaminated wells that are replaced with deeper wells; or arsenic contaminated wells replaced with shallower wells. If a first attempt to obtain safe water is unsuccessful, DNR will then approve treatment, e.g.. Door County restaurants and resorts where bacteria-free water is not available due to crevices bedrock. \$5000 UV units were approved.

**Further, Dept of Commerce regulates & must approve all plumbing products** (fixtures, valves etc) including treatment units of all kinds, softeners, RO, iron, etc. Manufacturers submit specs and test data and request approval. Otherwise treatment unit may not be legally installed on any water supply in Wisconsin. DCOM has a website "Plumbing Product Review" with approved products (There are thousands):

<http://www.commerce.state.wi.us/SB/SB-PubsPlumbProdReg.html>

Attached is PDF of most recent list. Paper copies no longer published.

So, IF DNR approves installation of treatment, it must further be a unit approved by DCOM.

Thanks to you and/or Steve for trying to summarize this for Chapter V. I think the most appropriate place to insert this discussion would be on Page 4 under "POINT OF USE AND POINT OF ENTRY WATER TREATMENT". Right between "Introduction" and "Available Technologies". A separate heading entitled something like "Regulatory Framework" or "Regulatory Considerations" or "Regulation of Treatment".