

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

DATE: June 7, 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
Julie A. Anderson	Director, Racine County Division of Planning and Development
Kenneth R. Bradbury	Hydrogeologist/Professor, Wisconsin Geological and Natural History Survey
Douglas S. Cherkauer	Professor of Geology, 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
Daniel S. Duchniak	General Manager, Waukesha Water Utility, City of Waukesha
Thomas M. Grisa	Director of Public Works, City of Brookfield
Andrew A. Holschbach	Director, Ozaukee County Planning, Resources, and Land Management Department
Terrence H. Kiekhaefer	Director of Public Works, City of West Bend
Patrick T. Marchese	Member, Water Policy Advisory Panel, Public Policy Forum
J. Scott Mathie (for Matthew Moroney)	Metropolitan Builders Association of Greater Milwaukee
George E. Melcher	Director, Kenosha County Department of Planning and Development
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
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

Thomas J. Bunker	General Manager, Water and Wastewater Utility, City of Racine
Charles A. Czarkowski	Regional Water Program Expert, Wisconsin Department of Natural Resources, Southeast Region
Charles P. Dunning	Hydrologist, U.S. Geological Survey

Franklyn A. Ericson	Manager, Environmental Operations & Central Services, S.C. Johnson & Son, Inc.
David Ewig	Water Superintendent, City of Port Washington
Jeffrey A. Helmuth	Hydrogeologist Program Coordinator, Wisconsin Department of Natural Resources, Madison
Roger C. Johnson	Manager, North Shore Water Commission
Thomas J. Krueger	Water and Wastewater Utility Director, Village of Grafton
Carrie M. Lewis	Superintendent, Milwaukee Water Works, City of Milwaukee
Mark Lurvey	Agricultural Business Operator
George A. Torres	Director, Transportation & Public Works, Milwaukee County Department of Parks and Public Infrastructure

GUESTS

Daniel T. Feinstein	Hydrologist, U.S. Geological Survey
Nancy Frank	UWM Urban Planning
Paul G. Hayes	Mid-Kettle Moraine Partners Group
John Jansen	Senior Geoscientist, Aquifer Science & Technology
Randall R. Kerkman	Administrator, Town of Bristol
Laurie Longtine	Wisconsin League of Conservation Voters
Peter V. McAvoy	Director, 16th Street Community Health Center
James Rowen	Concerned Citizen
Steven H. Schultz	Department Head, Water Supply and Wastewater Treatment, Ruekert & Mielke, 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.

CONSIDERATION OF MINUTES OF THE MEETING OF MAY 17, 2006

Chairman Bauer noted that copies of the minutes of the May 17, 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 III, "Surface Water Treatment Technologies," and Chapter IV, "Groundwater Withdrawal and Treatment Technologies" of SEWRPC Technical Report No. 43, *State-of-the-Art of Water Supply Practices*. He noted that the approval would, of course, be subject to any comments received today on the minutes and the attachments thereto.

Mr. Rau referred to paragraph on Lake Michigan included in the first Secretary's Note on page 5 of the minutes and recommended the word "on" be deleted as it appeared after the word "rainfall." The change was duly noted and made.

Mr. Rau referred to the second paragraph on page 8, and noted that Ms. Lewis's comment had been that chloramination was not effective as a primary means of disinfection, and that the word "not" should be added ahead of the word "effective" in the first sentence of the second paragraph concerned. The spelling of chloramination was also corrected. The changes were duly noted.

Mr. Rau referred to the fourth paragraph on page 8 and noted that the word "less" at the end of the first line should be deleted. The change was duly noted.

Mr. Grisa referred to the paragraph on fluoridation on the top of page 9 and indicated that his comments at the May 17th meeting were intended to highlight the potential problems related to the over-abundant availability of fluoride in products, such as toothpaste and food products, which make it difficult to regulate the amount of fluoride ingested and potential can result in higher dosages of fluoride than are desirable, particularly in children. Mr. Rau noted that he had been involved in a recent Wisconsin Water Association meeting where the issue of fluoride in water was highlighted as a social issue. He cited an example of a community which began to add fluoride to the water supply because some residents of the community may not have access to fluoride from other sources due to economic status. Mr. Rau indicated that the Wisconsin Water Association was proposing to make more information on this subject available later this year.

Chairman Bauer recommended, and it was generally agreed, to revise the paragraph on fluoridation to reflect the concerns raised.

[Secretary's Note: The paragraph on fluoridation which is intended to be added after the first sentence of the fifth paragraph on page 17 of Chapter III of SEWRPC Technical Report No. 43 has been revised to read as follows:

"Fluoridation of drinking water is an option which can be undertaken to reduce the incidence of dental cavities. The use of fluoridation for this purpose is controversial, with valid questions being raised regarding the cost-effectiveness of the provision of fluoridation through the water supply, as opposed to the provision of fluoridation through individual dental care. In addition, the availability of fluoride in products, such as toothpaste and certain food products, make it difficult to limit the amounts of fluoride ingested to amounts considered healthy, particularly in children. Another consideration in evaluating the option of the provision of fluoridation through the water supply is social in nature, and relates to the concern that some residents may not have access to individual dental care and other sources of fluoride due to economic status."]

Mr. Grisa referred to the seventh paragraph on page 5 of the revised Chapter IV, "Groundwater Withdrawal and Treatment Technologies," of SEWRPC Technical Report No. 43. He recommended, and it was generally agreed, to reword the last sentence in that paragraph to read: "In addition, private property owners using groundwater as a source of supply have water softening costs which are not typically incurred when using surface water as a source of supply."

Mr. Grisa referred to the addition of a sentence on page 10 of revised Chapter IV of SEWRPC Technical Report No. 43 regarding hydrous manganese oxide filtration. He noted that the chapter had not been

expanded to include adsorption processes as had been agreed to at the meeting held on May 17, 2006. A discussion ensued, upon which it was agreed to add a section of the report on radionuclide treatment options which have been pilot tested, and could be expected to receive Wisconsin Department of Natural Resources approval. These would include, but not be limited to, the WRT and Layne Christensen selective resin processes which would be discussed generically.

[Secretary's Note: The following sentences have been added to the third paragraph under the section entitled "Hydrous Manganese Oxide (HMO) Filtration" on page 10:

"There are some proprietary processes which utilize the general concepts of HMO treatment processes."

In addition, the following section has been added to the text following the section entitled "Hydrous Manganese Oxide (HMO) Filtration" on page 10:

"Ion Selective Adsorbent Technologies

One proprietary technology which uses adsorption for the removal of Radium has been successfully pilot tested in Wisconsin. This process is typically utilize an up-flow contactor containing a proprietary granular media which is selective in adsorbing radium compounds in the water. The radium is adsorbed to the media and radium levels in the drinking water are, thereby, reduced. Radium levels are typically reduced to well below the maximum contaminant level (MCL) of 5.0 Pico curies per liter allowed by U.S. Environmental Protection Agency and Wisconsin State Standards. Other companies have proposed the use of similar adsorption technologies for use in drinking water treatment within the State.

In the pilot tested process, the water to be treated flows sequentially through two vessels containing the adsorption media. The media adsorption capacity is initially exhausted where the raw water enters the upstream vessel. As more water is treated, media exhaustion extends progressively through this vessel. When all of the media in the upstream vessel is exhausted, as determined by calculation or by testing for the adsorbed radium, the media in the upstream vessel is removed. The media in the downstream vessel is moved to the upstream vessel and the exhausted media in the upstream vessel is replaced with new media.

Removal and disposal of the media is typically handled by the proprietary company that provides the media. Disposal is typically done at a licensed disposal facility. In most cases, the media disposal is accomplished as part of a service contract with the proprietary company. One advantage of this procedure is that facility operating personnel do not need to handle waste material high in radionuclides. The costs for these technologies are typically the cost associated with the vessels and backwash equipment. Costs of the media and exchange of the media are typically incurred under a service contract with the company providing the media."]

Mr. Duchniak referred to the second full paragraph on page 9 of revised Chapter IV of SEWRPC Technical Report No. 43 and recommended that the first sentence be revised by adding the word "labor" ahead of the word "intensive." Upon brief discussion, it was agreed to revise the subject sentence to read as follows:

“Some of the processes used to remove radionuclides can be relatively labor-intensive from an operational perspective. Others have limited labor requirements, but require contractual arrangements for media replacement and disposal.”

Mr. Duchniak and Dr. Cherkauer referred to the first paragraph on page 15 of revised Chapter IV of SEWRPC Technical Report No. 43. They recommended a number of revisions to that paragraph which clarified the text. Upon brief discussion, it was agreed that the staff would revise the paragraph concerned.

[Secretary’s Note: The first paragraph on page 15 of revised Chapter IV of SEWRPC Technical Report No. 43 has been revised to read as follows:

“New Source Development

Ultimately, any treatment alternative must be evaluated on the basis of a number of factors, including economic factors. Typically, alternative scenarios include options which involve utilizing the source under new operational parameters, or abandoning the existing source in favor of a source which does not contain the contaminant of concern. Blending water from the source concerned with water from new sources can sometimes be used to reduce the concentration of contaminants below the maximum contaminant level (MCL). Treatment of a portion of the noncompliant flow stream, and subsequent remixing with untreated water can also be used to reduce the concentration below the MCL. Public perceptions may play a role in decisions to treat water from the source, or develop a new source. Education of the public can help to assure that decisions are based on sound science, engineering, and public health practices.”]

Mr. Duchniak referred to the third paragraph on page 15 of revised Chapter IV of SEWRPC Technical Report No. 43. He recommended that the last two sentences be reviewed, as they used unnecessarily overly technical language. He also noted that well reconstruction to reduce contaminant levels may reduce the well capacity.

[Secretary’s Note: Review of the last two sentences of the third paragraph on page 15 indicates that the paragraph deals with a technical topic, and no simpler language was able to be developed that accurately conveyed the necessary information. The following sentence was added to the end of the subject paragraph:

“The process of reconstructing wells to reduce contamination may result in reduced well capacity.”]

Ms. Anderson asked about the ending time of the May 17, 2006, meeting as set forth on page 13 of the minutes be revised from 4:30 p.m. to 11:30 a.m.

There being no further corrections or additions, the minutes of the meeting of May 17, 2006, were approved as amended on a motion by Mr. Mueller, seconded by Mr. St. Peter, and carried unanimously.

CONSIDERATION OF CHAPTER VI, “GROUNDWATER RECHARGE AND MANAGEMENT,” OF SEWRPC TECHNICAL REPORT NO. 43

Chairman Bauer asked the Committee to consider Agenda Item 3. He noted that all Committee members had received a revised copy of Chapter VI of SEWRPC Technical Report No. 43 for review prior to the

meeting. He then asked Dr. Jansen, the primary author of the chapter, to review the chapter with the Committee on a page-by-page basis.

Dr. Bradbury recommended, and it was generally agreed, to change the title of the chapter to “Artificial Groundwater Recharge and Management” in order to distinguish the enhancement of recharge through technological means from naturally occurring recharge.

Dr. Cherkauer indicated that in his opinion, the chapter was well written. However, he indicated that in some areas, there was excessive bias toward conditions and practices in Colorado. He cited Figure VI-1 on page 3 as an example, noting the indicated recharge in mountainous areas, and the affect of underground mines. Upon brief discussion, it was agreed to modify Figure VI-1 to reflect conditions in Wisconsin and to make attendant changes to the text as may be appropriate.

[Secretary’s Note: A revised copy of Figure VI-1 is included in the revised version of Chapter VI attached to these minutes.]

Ms. Conley noted that current development and stormwater and wastewater disposal practices resulted in losses of water from some of the watersheds in the Region. She recommended that the introduction include a discussion of that issue. Dr. Jansen indicated that this would be difficult to quantify. Chairman Bauer recommended, and it was agreed, to add a paragraph to the introduction section discussing the issue raised on a qualitative basis.

[Secretary’s Note: A paragraph has been added regarding the issue of basin water losses due to current stormwater management and wastewater disposal practices. The paragraph is included on page 1 in the revised version of Chapter VI attached to these minutes.]

Mr. Grisa referred to the second paragraph on page 2 and noted that the MMSD inline storage system, or deep tunnel system, was really not suitable for nonaquifer underground storage. Mr. Marchese agreed. Upon brief discussion, it was agreed to delete the third sentence in the second full paragraph on page 2.

Mr. Grisa referred to page 4 and noted that the list of states highlighted with recharge projects included New York, Nevada, and Kansas. However, Figure VI-2 did not indicate that these states had large numbers of projects. Dr. Jansen replied that while the states concerned may have had a large number of projects, they had a long history of large-scale projects.

Mr. Grisa referred to the listing of goals of potential artificial recharge projects in the first full paragraph on page 5. He noted that groundwater quality protection was an important consideration and that infiltration of runoff could cause quality problems. Dr. Jansen noted that this issue was covered later in the chapter. Upon brief discussion, it was agreed to add text to the subject paragraph addressing this concern.

[Secretary’s Note: The following sentences have been added at the end of the first full paragraph on page 5:

“Runoff from urban and some rural lands can contain contaminants that could be detrimental to groundwater quality. Furthermore, recharge of treated wastewater into aquifers has a potential for transmitting regulated and unregulated contaminants into the groundwater system. Thus, the potential contamination of aquifers is an important factor in the consideration of artificial recharge projects.”]

Mr. Marchese referred to the section on sources of cost data on page 6. He asked if the cost data used for artificial recharge technologies were consistent with the data developed for the surface and groundwater technologies, as set forth in Chapters III and IV. Dr. Jansen indicated that the costs of treatment for water to be recharged had been taken directly from the cost data in the other chapters and, thus, were fully consistent; and he explained the procedures for costing out the recharge facility components utilizing the Lake Geneva infiltration facility as a basis.

Mr. Mueller described the use of grassed swale roadway drainage systems, contrasting that technique with curb and gutter systems with storm sewers. He indicated that such use of grassed swales was, in effect, a type of surface water infiltration. Mr. Mueller suggested adding that practice to the surface infiltration measures included in the chapter. Mr. Biebel reported that Mr. Helmuth had submitted written comments recommending that biofiltration and surface sand filters also be added to the text as surface infiltration methods.

[Secretary's Note: Table VI-1 on page 8, now page 9, has been revised to add an item under the list of surface infiltration methods to include "other stormwater management practices, including the use of grassed swale drainage systems, including grassed roadway drainage ditches, bioretention facilities, and surface sand filters." A bulleted item on this topic has also been added to the text after the third bulleted item on page 14, now page 15. The revised table and text are included in the revised version of Chapter VI attached to these minutes.]

Mr. Rau noted the reference to riverbank filtration systems on pages 6 and 7 and suggested references be added to systems that have been installed in the United States. He cited an Iowa system as an example. Dr. Jansen responded that there were some examples of such systems, however, most of the installed systems were in Europe.

[Secretary's Note: The text on page 7 has been revised to add references to domestic examples of riverbank filtration systems. The revised text is incorporated into the revised version of Chapter VI attached to these minutes.]

Mr. Winkler referred to Table VI-1 on page 8, now page 9, regarding the advantages and disadvantages of surface infiltration. Mr. Winkler indicated that it was important to recognize that land with suitable infiltration characteristics was needed for such systems to be viable. He also noted that one of the major limitations of such systems was land availability and land cost. In some cases, it may be that long transmission piping is needed to reach an available site. He noted that in many cases these considerations could make surface infiltration systems prohibitively costly. Mr. Winkler noted that the Lake Geneva facility lands included 60 to 70 acres of land near a major highway interchange.

Mr. Winkler also reported that chloride levels in the wastewater would likely always be an issue. He noted that, in the case of Lake Geneva, the surface infiltration of wastewater was being done as a means of disposing of wastewater, rather than as a means of maintaining the shallow aquifer for water supply purposes. After further discussion, it was agreed to modify Table VI-1 by adding the terms "land availability and cost" and "regulatory considerations" to the limitations column for surface infiltration technologies and to change the first advantage for surface infiltration to read "Initial low capital construction cost."

Drs. Bradbury and Cherkauer referred to Table VI-1 and noted the need to change the words "Playa Lakes" to "Closed Depressions, Including Kettles." The change was duly noted.

Dr. Bradbury referred to the section of Table VI-1 on direct injection and noted that, in effect, there was a regulatory prohibition of such practices. Dr. Jansen generally agreed, indicating that the issue was addressed later in the chapter.

Dr. Cherkauer referred to the reference to “Playa lakes” on the top of page 14, now page 15, and in Figure VI-3. He recommended, and it was generally agreed, to revise this term to “shallow closed depressions, including kettles.”

Mr. Biebel reported that Mr. Helmuth’s written comments referred to the third bulleted item on page 14, now page 15, and recommended the following sentences be added at the end of that item:

“Stormwater infiltration is required by Chapter NR 151 of the *Wisconsin Administrative Code* for many developments over one acre in size. In some cases, these requirements are being met by the use of rain gardens or bioretention basins.”

There ensued a discussion of the appropriateness of meeting the stormwater management requirements with rain gardens, because of the uncertainty of the permanence of such facilities on individual lots. Mr. Melcher indicated that Kenosha County has concerns about the potential for rain gardens to be altered or filled in. He indicated that large-scale systems on common property may be more likely to be maintained. After further discussion, it was agreed to add the two sentences by Mr. Helmuth, plus a caveat regarding the concern about permanence.

[Secretary’s Note: The text changes to the third bulleted item on page 14, now page 15, are shown in the revised version of Chapter VI attached to these minutes.]

Mr. Biebel reported that Mr. Helmuth’s written comments recommended that the following be added to the text of the first full paragraph on page 16 (now page 16):

“Subsurface infiltration methods may be used to increase recharge of aquifers. Such facilities may be subject to the Federal underground injection control program if the method of placing the fluid is the use of the injection well. An injection well may be a bored, drilled, or driven shaft; a dug hole, deeper than wide; an improved sinkhole; or a subsurface fluid distribution system, such as a drain field or similar system.”

The change was duly noted.

Ms. Conley noted that she had reviewed reports of significant reductions in stormwater runoff due to increases in tree canopy cover. She asked if the development of a tree canopy should be included as a means of increasing infiltration. Mr. Biebel suggested that the presence of trees may reduce runoff, but the impact of tree canopy on infiltration was not clear, since some of the rainfall would be lost as evapotranspiration. Dr. Cherkauer indicated that he would provide information related to the affect of woodlands on infiltration characteristics; and Mr. Biebel indicated that the information so provided would be reviewed and the report text revised as appropriate.

[Secretary’s Note: Information provided by Dr. Cherkauer and SEWRPC file data were reviewed. The fifth bulleted item on page 14, now page 15, has been revised to read as follows:

- “• Enhanced recharge methods use man-made changes of the land to increase recharge or decrease removal of groundwater by evapotranspiration In arid and semiarid regions enhanced recharge

methods often include removal of deep rooted plants called phreatophytes, such as cottonwoods and salt cedars. In more humid regions, such as southeastern Wisconsin, restoration of farmland to native prairie or woodland may increase recharge by reducing runoff. Studies conducted for the Southeastern Wisconsin Region indicate that the percentage of land that is in natural condition—woodlands, grasslands, wetlands—is an important factor in the enhancement of groundwater recharge.¹ Runoff may be reduced by up to about 25 percent by converting cropland to woodland or native prairie with a net increase in groundwater recharge.² The amount of tree canopy present in the City of Milwaukee area was estimated in a 2003 report to reduce stormwater runoff by from 5 to 22 percent.³ While the runoff reduction impacts of tree canopy development have been estimated, the groundwater infiltration relationships are not clear because of the interrelated affects of runoff, infiltration, and evapotranspiration. Evaluation of the impacts of the application of specific vegetative land cover changes on infiltration requires site-specific study. The conversion of land to specific types of vegetative cover with root development considered conducive to infiltration may enhance aquifer recharge.

¹Douglas S. Cherkauer and S.A. Ansari, “Estimating Groundwater Recharge from Topography, Hydrogeology, and Land Cover,” *Ground Water*, January-February 2005.

²Environment 1999, An Assessment of the Quality of Vermont’s Environment, *The Vermont Agency of Natural Resources*, Available at: www.Anr.vt.us/Env99/waterfor.html

³*Milwaukee Metropolitan Sewerage District*, Evaluation of Stormwater Reduction Practices, March 2003.”]

Ms. Conley referred to the third bulleted item on page 14 and recommended that the concept of large-scale rain gardens be added to the text. This change was agreed to. Mr. Grisa also referred to the third bulleted item on page 14 and recommended that the word “many” be revised.

[Secretary’s Note: The text for the third bulleted item on page 14, now page 15, has been revised as recommended and is included in the revised version of Chapter VI attached to these minutes.]

Ms. Conley noted that stormwater utilities are being formed as a means of financing facilities, such as rain gardens. Mr. Biebel agreed, but indicated that a stormwater utility was only one of several means to implement plan elements and would best be described in the plan implementation chapter of the plan report, rather than the chapters on the specific technologies.

Mr. Grisa noted that preservation of open space was another method of providing for infiltration. Mr. Biebel agreed that such a preservation was beneficial. However, he noted, such preservation was to be distinguished from the artificial recharge methods addressed in this chapter. Upon brief discussion, it was agreed to insert a paragraph in the introduction to the chapter explaining this distinction.

[Secretary's Note: A paragraph has been added to the introductory section covering the distinction between artificial recharge technologies and preservation of open recharge areas. The revision is included in the revised version of Chapter VI attached to these minutes.]

Dr. Bradbury referred to the paragraph on aquifer storage and recovery on page 18 and noted that certain problems are attendant to the practice and suggested that these be noted in the text. Upon brief discussion, it was agreed to add text at the end of the aquifer storage and recovery paragraph, noting potential mixing and quality problems.

[Secretary's Note: The revised text is included in the revised version of Chapter VI attached to these minutes.]

Mr. Grisa recommended, and it was generally agreed, to change the third bulleted item on page 19 to "rainfall and stormwater runoff."

Dr. Bradbury referred to Figures VI-6 through VI-10 and recommended that captions be added. The Committee agreed.

[Secretary's Note: Figures VI-6 through VI-10 will be revised prior to publication to improve the quality and add captions and titles.]

Mr. Biebel reported that Mr. Helmuth's written comments recommended adding the following sentences to the fourth paragraph on page 25, now page 27):

"If an underground injection well is used, the injectate must meet primary drinking water maximum contaminant levels (MCL) and health advisory levels if the fluid is directly placed into a saturated aquifer. No injection is allowed to endanger the quality of an underground source of drinking water."

The addition was duly noted.

Mr. Biebel reported that Mr. Helmuth's written comments included a recommendation to delete the word "nitrates" in the last paragraph on page 25, now page 27. Dr. Jansen disagreed, noting that the literature sources report removal of nitrates in the soil layer through the process of denitrification. Accordingly, the Committee agreed that no change should be made in the text in this regard.

Mr. Biebel reported that Mr. Helmuth's written comments referred to the last paragraph on page 27 and recommended that the following sentence be added as the second last sentence in the paragraph:

"Settling basins, or wet detention basins, can be used before infiltration to remove sediments and reduce clogging."

The change was duly noted.

Ms. Conley indicated that rain gardens apparently are less susceptible to clogging than other surface infiltration systems. It was agreed to investigate that characteristic and add information to the text on clogging issues on page 27, as appropriate. Ms. Conley indicated she would provide a reference on that topic.

[Secretary's Note: The following paragraph was added following the third full paragraph, now on page 30, under the heading "Clogging Issues for Surface Infiltration Systems":

"The potential for rain gardens and bioretention facilities to clog is dependent upon the factors, such as the type of vegetation and its associated root system, the permeability of the underlying soil, and the quality of the stormwater being retained. It has been reported that the use of prairie-type plants with deep roots can be effective in minimizing clogging and, in some cases, improved infiltration over time has been experienced. Because of the importance of various factors in clogging, the issue must be considered on a site-specific basis."]

Dr. Bradbury referred to footnote 32 on page 28 and corrected the author's name.

Mr. Biebel reported that Mr. Helmuth's written comments recommended refinements to the last sentence of the fourth full paragraph on page 29. The revised sentences are proposed to read as follows:

"Chapter NR 815 prohibits recharge of stormwater directly into groundwater through a well, but allows injection of stormwater through a well into unsaturated formations above an aquifer. This injection must be permitted under Chapter NR 216 and must satisfy groundwater quality standards of Chapter NR 140. Infiltration must comply with Chapter NR 140 and may require a permit under Chapter NR 216."

The change was duly noted.

Mr. Biebel reported that Mr. Helmuth's written comments recommended a change to the third sentence of the second full paragraph on page 30, now on page 32. The change proposed would substitute the phrase "Land treatment systems, including subsurface soil absorption systems," for the first word "Systems." The change was duly noted.

Mr. Marchese referred to the section on wastewater infiltration systems on page 30 and indicated that the implication of that section was that it was unlikely that wastewater effluent recycling or reuse would be a viable technology with current treatment levels. Dr. Jansen agreed with that conclusion when placed in the context of systems which recharge the groundwater aquifers, noting that under current State regulations, a variance, or change, in the regulations would be required for such systems, including spray irrigation systems, to be permitted. After further discussion, it was agreed to add text to clarify the difference between the objectives of wastewater disposal and aquifer recharge in the context of wastewater infiltration systems.

[Secretary's Note: The following paragraph as been added after the fourth full paragraph on page 30, now on page 33:

"It should be noted that the report is focused on groundwater recharge technologies and the requirements noted herein are intended to reflect that purpose. Wastewater infiltration can also be considered as a means of wastewater disposal as opposed to aquifer recharge. In such cases, the infiltrated wastewater typically is infiltrated in the vicinity of a river or stream to which the groundwater, including the infiltrated wastewater, discharges. Wastewater could also be reused for irrigation purposes, with the intention being focused on the wastewater being a source of water for

vegetation and being applied in a manner which is consistent with vegetation needs and uptakes, rather than for aquifer recharge. The intended use and means of such wastewater infiltration or irrigation system would be a factor in determining requirements for such systems.”]

Dr. Cherkauer noted that the text was not clear on the level of treatment involved. He indicated that the level of treatment provided would be a factor in viability and ability to be permitted. In answer to a question by Mr. Biebel, Dr. Jansen stated that a tertiary level of treatment would be needed to meet the existing regulatory requirements for State permitting of a wastewater treatment plant effluent infiltration system. Upon further discussion, it was agreed to add text to the third full paragraph on page 30 to relate regulatory approvals and level of treatment for wastewater treatment plant effluent infiltration.

[Secretary’s Note: The first sentence of the third fully paragraph on page 30, now on page 32, has been revised as follows:

“The Wisconsin Department of Natural Resources has determined that it is not technically and economically feasible for wastewater absorption pond systems to meet Chapter NR 140 prevention action limits for nitrate, total dissolved solids and chloride with secondary wastewater treatment. Thus, a tertiary treatment level designed to remove these contaminants would have to be provided, or variances to the regulations obtained. For a system that has exceeded an enforcement standard at a point of standards application, the Department may require a modification in the design or operation of the system or may require closure of the system. The Department may grant a variance to the groundwater quality standards if it is demonstrated that it is not technically or economically feasible for the absorption pond system to comply, and that the concentration of the substance has been minimized to the extent technically and economically feasible.]

Mr. Marchese asked if the plan could recommend changes in the rules governing infiltration. Mr. Biebel responded that the plan could do so if the alternative and recommended plan evaluations indicate such changes would be needed to implement the recommended plan.

Mr. Grisa referred to the third paragraph on page 32 and recommended rounding the recharged water amounts. The recommendation was duly noted.

Ms. Conley referred to the Pabst Farms Development case history on page 34. She noted that the development at the Pabst Farms resulted in a water loss from the area, given the amount of water now pumped for domestic uses which is returned to the Oconomowoc River via the City of Oconomowoc sewage treatment plant. Dr. Jansen replied that this loss was not necessarily more than under predevelopment conditions, given the use of spray irrigation on the site. Upon further discussion, it was agreed to add text to highlight the conceptual issue raised by Ms. Conley.

[Secretary’s Note: The following paragraph has been added as the fourth full paragraph on page 34, now on page 37:

“The development of the Pabst Farms illustrates the complexity of the impacts of urban development on groundwater hydrology. Prior to development, the principal use of the groundwater on the site was for spray irrigation, the water being drawn from the underlying shallow aquifer by several high-capacity wells. Much of the water would have been lost through

evapotranspiration, but some would have been returned to the shallow aquifer. Upon development for urban use with public sanitary sewer and water supply services, the principal use of groundwater on the site would be for residential commercial, and industrial supply. The water would, however, be withdrawn from the deep, not the shallow, aquifer, with the spent water being conveyed to the City sewage treatment plant and discharged to the Oconomowoc River. Only a small amount of the shallow groundwater underlying the site may be lost through leakage into the sanitary sewerage system. The design of the stormwater management system for the development is such, however, that at least as much, or more, water is returned to the shallow aquifer than under the previous agricultural use. The preparation of comparable water budgets for the area in order to quantify the hydrologic flows from and to the shallow aquifer underlying the site under pre- and post-development conditions would be a complex and costly task.”]

Mr. Duchniak referred to the last paragraph on page 34 and questioned the term “not dramatic” as it was used relative to the chloride levels in the groundwater. Mr. Winkler replied that while the chloride levels do exceed the enforcement standard for groundwater, the primary purpose of the City of Lake Geneva infiltration system is to dispose of wastewater. The infiltrated effluent enters the groundwater system and flows east toward a wetland complex drained by a tributary of the White River. The impacted groundwater is not intended to be reused as potable water. Upon brief discussion, it was agreed to revise the last sentence on page 34, now on page 37, to read as follows:

“While the increase is not striking, given that the impacted groundwater system is not used for potable water supply, chloride levels consistently exceed the enforcement standard of 250 parts per million (ppm), and total dissolved solids exceed the preventive action limit of 633 ppm.”]

Mr. Duchniak referred to the Lake Geneva case study on page 34. He recommended, and it was agreed, to provide the acreage required for the infiltration basins.

[Secretary’s Note: The following phrase was added to the third sentence of the fourth paragraph on page 34, now on page 37,: “located on an area of about 45 acres,”.]

Dr. Bradbury indicted a project in Madison on the Odana Golf Course might provide another example to include in the case studies. He noted that the project was not yet operable, but was scheduled to be online in the fall. Dr. Jansen indicated that he would include that project as a case history if information were available.

[Secretary’s Note: A description of the Odana Hills Golf Course project was added to the text at the bottom of page 36, now on page 39. The revised text is included in the revised version of Chapter VI attached to these minutes.]

Mr. Biebel referred to the second full paragraph on page 41, now on page 45, and asked if the first case noted would result in exceedence of the groundwater standards for chloride, dissolved solids, and nitrates. Dr. Jansen indicated that it likely would. He noted that in order to be permitted under the present State regulations, at least tertiary treatment of the recharge wastewater would be required. It was agreed to add text explaining the regulatory and standards considerations.

[Secretary’s Note: The revised text is included in the revised version of Chapter VI attached to these minutes.]

Mr. Holschbach indicated that there was a concern with regard to the use of holding tanks which are allowed by some communities. That practice results in the transport and loss of water from an area. Mr. Biebel indicated that Chapter V in the state-of-the-art report would deal with individual household systems and that would be the place to address Mr. Holschbach's concern.

There being no further questions or comments, on a motion by Mr. Melcher, seconded by Mr. Duchniak, and carried unanimously, Chapter VI "Groundwater Recharge and Management" of SEWRPC Planning Report No. 43, *State-of-the-Art of Water Supply Practices*, was approved as amended.

REVIEW OF 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"

Chairman Bauer asked the Committee to consider Agenda Item 4. He noted that all Committee members had received a copy of the 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," for review prior to the meeting.

Chairman Bauer indicated that the presentation of alternative plans to be considered under the planning effort might be considered premature at this stage of the planning effort—that is, before problem identification has been completed. The presentation of the alternatives at this time, he said, was driven by a specific request from the staffs of the U.S. Geological Survey and Wisconsin Geological and Natural History Survey and University of Wisconsin-Milwaukee, which staffs are to perform the necessary groundwater analyses, including simulation model analyses, required to evaluate alternative plans and to form a preliminary recommended plan, these staffs being anxious to schedule and begin the extensive work entailed.

Accordingly, Chairman Bauer said, the Commission staff had prepared the memorandum under consideration. He indicated that the alternative plans set forth in the memorandum were highly generalized concepts, and were being presented to solicit Committee discussion and provide guidance to the staff in refining and detailing conceptual alternatives.

Importantly, Chairman Bauer said that—because of the highly generalized nature of the alternative plan descriptions—Committee approval was being sought only for the base year 2000 conditions, and for the design year 2035 conditions under existing trends and committed actions so that the modeling for these two conditions could proceed. Review of the four conceptual alternative plans was being sought solely to provide guidance to the staff in further describing and presenting refined alternatives for Committee review and approval.

Chairman Bauer then asked Mr. Biebel to review with the Committee on a page-by-page basis.

Mr. Biebel noted that the first page of the memorandum described the framework for the alternative plans as it was set forth in the approved study design for the regional water supply planning effort. That framework indicated that the plan preparation process would include the preparation and evaluation of a number of alternative plans; the latter requiring modeling analyses to estimate the impacts of the alternative plans on groundwater aquifers and related surface water impacts. He indicated that there would be a substantial work effort involved in providing the details of each of the alternative plans to be evaluated. He indicated that it should be recognized that, as the alternative plan details are developed,

there will be a number of decisions concerning the definitive description of the plans that will need to be made. These decisions will be subject to the review and approval of the Committee.

Ms. Conley referred to the third paragraph on page 1 and recommended that “security” be added to the list of factors considered in alternative plan evaluation. The change was agreed to.

Mr. Biebel then referred to the second page of the memorandum and noted that the base year 2000 conditions and 2035 conditions with committed actions were intended to define the current system capacities and conditions and compare these to the current and probable future 2035 needs. This would identify problems and issues to be resolved with the preparation of the alternative plans.

Mr. Biebel referred to the second bulleted item on page 2 and reported that the word “additional” in the second sentence should be replaced with the word “committed” and the portion of the second sentence following the word “sources” should be deleted along with the entire third sentence.

Mr. Mathie referred to the second bulleted item on page 2 and asked if the implementation of local regulations regarding infiltration would be factored into the assumptions related to that scenario. He noted that these local regulations are sometimes more stringent than the State regulation specifically noted. Mr. Biebel responded that it was the intent to specifically consider implementation of the regulatory requirements in Chapter NR 151 of the *Wisconsin Administrative Code* only. He noted that those regulations are relatively stringent regarding infiltration and should represent, at a system-planning level, a reasonable estimate of the level of infiltration to be achieved for new development.

Mr. Biebel then reviewed each of the four conceptual alternative plans. For each alternative he noted examples of the type of details which would need to be developed as the alternatives were refined and detailed.

Mr. Grisa referred to the third bulleted item on page 2 describing Alternative Plan 1. He noted that the areas where wastewater is currently or historically planned to be served by plants with a Lake Michigan discharge were noted as being included in the Lake Michigan water supply service area. He asked if that was the intent, noting specifically, portions of the City of Muskego. Mr. Biebel responded that it was not the intent in the case of the City of Muskego, but was the case for the areas planned to be tributary to the City of Kenosha wastewater treatment plant. Mr. Grisa recommended, and it was generally agreed to revised the fourth sentence under Alternative Plan 1 to read as follows:

“This alternative plan would also assume that areas located east of the subcontinental divide that logically could be provided with Lake Michigan water, and areas where such water supply is currently planned to be provided, would be provided with Lake Michigan water.”

Mr. Biebel noted that in initially developing Alternative Plans 1 through 4, the Commission staff would rely heavily on locally prepared plans.

Mr. Marchese questioned the extent of the areas to be served by Lake Michigan east of the subcontinental divide under Alternative Plan 1. He pointed out that a community like the City of West Bend would obviously not be included. However, he questioned the inclusion of the City of Cedarburg and Villages of Grafton and Saukville. Mr. Biebel responded that the details of the alternatives were yet to be developed. He noted that some of the areas in question may be included in the Lake Michigan supply area under Alternative Plan 1 and others under Alternative Plan 3. Mr. Marchese noted that criteria will have to be developed to make judgment on the extent of the Lake Michigan service area east of the subcontinental divide. Mr. Biebel agreed.

Mr. Marchese referred to Alternative Plan 2 and suggested that the artificial recharge of the deep aquifer with Lake Michigan source water could be interpreted as a diversion. Dr. Jansen noted that the recharge could be viewed as raising the piezometric surface in parts of the aquifer lying west of the divide, rather than the recharge of water actually moving into that area. Mr. Biebel indicated that the questions raised would have to be carefully evaluated as part of the alternative plan design process and that in no case would recommendations be made which would be in conflict with regulations and policies related to diversion.

Mr. Duchniak reported that Mr. Grisa had to leave and that he had asked Mr. Duchniak to make a recommendation on his behalf related to Alternative Plan 3 on page 3, and that Mr. Grisa had recommended that the words "with return flow" be deleted from the second sentence because the text stated that the use of Lake Michigan supply would be considered in a manner consistent with the Great Lakes Charter Annex 2001. It was noted that there are many requirements to be met to provide Lake Michigan water and that there was no reason to single out one requirement. Upon brief discussion, it was agreed the staff would review the Great Lakes Charter Annex 2001, and revise the text concerned, as may be warranted.

[Secretary's Note: Upon review of the Annex 2001 agreement, it was determined that there are a number of requirements proposed to be attached to the use of Lake Michigan supplies; including, among others, implementation of conservation measures, as well as return flow. Thus, reference to consistency with the Annex 2001 agreement was believed covers those requirements and there is no need to specifically identify those requirements in the text. Accordingly, the recommended change has been made.]

Ms. Conley asked if other alternatives could be considered. She suggested an alternative with a very aggressive water conservation program included. Mr. Biebel indicated that the number of alternatives which could be evaluated in detail, including groundwater and surface water impact modeling, was limited by budgeting constraints. However, he noted that there would be the possibility of considering subalternatives as each alternative is developed. The subalternatives could be used to refine the details of the alternative plans. He stated that it was intended that the state-of-the-art report would provide a basis for agreement on a realistic, yet desirable, level of water conservation.

Mr. Winkler referred to Alternative Plan 2 and asked if the shallow aquifer recharge component would be regionwide or be developed community-by-community. Mr. Biebel responded that the recommendation would have to be brought down to the community level, even though the initial concepts and components could be developed at the subregional or subwatershed level.

Mr. Holschbach indicated that water conservation should be a major component of all alternatives. Mr. Biebel indicated that that was the intention and that all alternatives would include an agreed-upon practical level of water conservation.

Mr. Shaver recommended that data on the age of the housing stock, along with assumptions on the level of plumbing fixture replacement, be considered in developing the practical level of water conservation.

Mr. Duchniak reported that the Public Service Commission and the Wisconsin Department of Natural Resources, as part of a joint agency water conservation initiative, were scheduled to complete a report in May dealing with demand side options for reducing water use.

There being no further questions or comments, on a motion by Mr. St. Peter, seconded by Dr. Cherkauer, and carried unanimously. The first two conditions, the base year 2000 conditions and the design year

2035 conditions with existing trends and committed actions, 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," were approved as amended. A revised copy of the staff memorandum is attached to these minutes.

OTHER BUSINESS

Chairman Bauer reported that the U.S. Geological Survey and Wisconsin Geological and Natural History Survey had recently developed a presentation on the findings of some groundwater simulation modeling of the performance of the deep sandstone aquifer, the impacts of pumping on that aquifer, and the source of the aquifer recharge. He indicated that the presentation was relevant to the Committee's work, and recommended that the agencies concerned be requested to make the presentation to the Committee. The consensus of the Committee was that the agencies be requested to make that presentation to the Committee at the next meeting.

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 July 13, 2006, beginning at 9:00 a.m.

ADJOURNMENT

There being no further business to come before the Committee, on a motion by Mr. Melcher, seconded by Ms. Anderson, and carried unanimously, the meeting was adjourned at 11:45 a.m.

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