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Summary of issues

Regarding Waukesha's potential application for Great Lakes water

June 3, 2009

Note: This document contains summary of many of the issues addressed in the Waukesha Water Utility's responses to questions raised by several conservation group about its potential use of Lake Michigan water. This summary contains introductory remarks and summaries from each of the eight sections of questions.

The 50-plus page document containing all the questions and answers can be found at the Waukesha Water Utility web site, http://www.ci.waukesha.wi.us/web/guest/futurewatersupplyinfo.

The Waukesha Water Utility is pleased to provide these initial responses to a comprehensive and thoughtful list of questions submitted by various environmental organizations about the potential use and recycling of Lake Michigan water as a new long term source of water for Waukesha. Waukesha is committed to taking a comprehensive approach to water resource management in developing a water supply application and having a positive environmental impact on the region as it obtains a new source of safe and sustainable drinking water for our residents.

We hope our responses provide helpful information. Our answers represent our thorough ongoing analysis of the issues related to a new water supply and the contents of our potential application for Great Lakes water. This is an evolving, ongoing process. We will continue to address all relevant issues prior to submitting this matter to the appropriate City officials for their review and final determination. The Waukesha Water Utility and the City of Waukesha have committed to having a series of public meetings to keep the public informed and to address concerns expressed by members of the public and environmental groups regarding the possible application for Great Lakes water.

Introduction

The Great Lakes-St. Lawrence River Basin Water Resources Compact passed the Wisconsin Legislature in 2008. By the end of the year, all eight Great Lakes states had passed the Compact and it was ratified by Congress and signed by the President.

This historic agreement, negotiated by Governor Jim Doyle and the other Great Lakes Governors, protects the resources of the Great Lakes, which contain 20% of the world's fresh surface water. The Compact generally prohibits diversions of water beyond the surface divide that defines the Great Lakes basin but makes exceptions for communities, such as Waukesha, in counties that straddle the divide. To qualify for an exception, a community must meet certain strict conditions,

including water conservation, return of the water it uses to the lake, and obtaining the permission of the eight Great Lakes governors, with input from by the Canadian Provinces.

Waukesha will likely be the first community outside the surface divide to apply to the Great Lakes governors for lake water. Mayor Nelson and the Waukesha Water Utility are committed to setting a high standard by preparing a role model application that will set a positive precedent for any communities that may apply in the future. Their goal is to prove that the new Compact works, protecting the Great Lakes while meeting the legitimate water needs of communities like Waukesha.

The need for a new water supply

Continued use of Waukesha's current deep aquifer water supply is unsustainable and inadequate due to problems with water quantity and quality. The deep aquifer that we depend upon is overburdened by pumping from multiple communities over the decades in southeastern Wisconsin (including nearby Milwaukee until the 1950's), leading to significant decreases in water quality and aquifer levels. The drawdown in the aquifer is also due to a geological feature that limits the recharge of the aquifer from rain and snow in much of the region, including Milwaukee and eastern Waukesha counties.

As water is withdrawn from the deeper parts of the aquifer, the water quality diminishes. For instance, radium (a substance known to cause cancer) is on the increase. Waukesha is legally obligated to comply with a stipulation entered into with the Wisconsin Department of Justice and approved by the Waukesha County Circuit Court, to bring its water supply into compliance with Federal Drinking Water standards for radium. However, radium is just one of the growing quality and quantity problems associated with the deep aquifer that Waukesha uses. Some wells are drawing water that is essentially salt water due to increasing levels of contaminants. The Utility has also pumped water with temperatures as high as 98 degrees. In addition, pumping water from these depths consumes large amounts of energy and increases costs.

Regional benefits from stopping use of the deep aquifer

The drawdown in the deep aquifer harms southeastern Wisconsin surface water by reducing needed groundwater flow and discharge to area streams and lakes. Approximately 33 million gallons per day are pumped from the deep aquifer in the seven-county region of southeastern Wisconsin is. This drawdown in the deep aquifer has created a 600 foot cone of depression. Water that would otherwise stay on the surface or move to other groundwater sources instead flows into the deep aquifer to try to fill this cone of depression. Analyses performed by the United States Geologic Survey (USGS) and the Wisconsin Geologic Natural History Survey (WGNHS) indicated that this water is drawn into the cone of depression from several sources:

- Reduced flow to inland surface water due to downward leakage to deep rocks (59%);
- Reduced groundwater flow toward Lake Michigan (8%);
- Reduced groundwater storage (11%);
- Groundwater flow from outside the SEWRPC region (18%); and
- Groundwater flow out of Lake Michigan (4%).

The cone of depression has significant negative impacts on surface waters depriving surface streams of flow and groundwater supplies. Continued use of the deep aquifer will continue or worsen the current harmful environmental impacts. On the other hand, ending the use of the aquifer will help the aquifer recover and improve surface waters throughout southeastern Wisconsin. According to the USGS, if communities in southeastern Wisconsin end their use of the deep aquifer, it will recover 50% in 7 years and 90% in 70 years.

Waukesha is proposing to end its use of the deep aquifer by switching to a Great Lakes water supply and recycling that water back to the source after use, which cannot be accomplished with groundwater supplies. Ending the use of the deep aquifer should be a top environmental priority for southeastern Wisconsin.

Leading the Midwest in water conservation

Water use by customers of the Waukesha Water Utility dropped 25% from 1988 to 2004, despite a 17% increase in population. Nevertheless, the City adopted a comprehensive water conservation plan in 2006 to reduce water use even further. That plan, which has a goal of a 20% reduction in water use per capita by 2020, has made Waukesha the Midwest's leader in water conservation efforts. These efforts have resulted in an additional 11% reduction in overall water use in only three years.

As part of its conservation plan, a component of the plan was the adoption by Waukesha of an ordinance which bans daytime sprinkling and limits sprinkling at other times to two days per week. The goal of the ordinance is to reduce overall and summer peak water use by customers.

Further conservation initiatives by Waukesha include being the first water utility in the state to apply for and receive permission to adopt a water conservation rate structure for residential class customers. That initiative increases rates as water use goes up -- the opposite of most utilities. The Public Service Commission has referred to this initiative as a model for other utilities. The Utility is currently refining its conservation rate structure as part of its rate increase proposal presently before the Public Service Commission.

Waukesha is also the first utility in the state to start a rebate program to replace old, inefficient toilets – a major source of wasted water. In partnership with the Kohler Co., water-saving toilets, urinals and faucet aerators were installed at Waukesha City Hall as a demonstration project for utility customers. With a subsequent changeover from a water-cooled to an air-cooled air conditioning system, water use is now down 90% at City Hall.

Education programs in schools, creation of a regional conservation planning group, a water conservation contest, enactment of stormwater regulations, redefining development practices, and many other initiatives are also part of Waukesha's comprehensive plan. The Waukesha Water Utility is committed to being a leader in its management of water and is striving to bring the latest in water conservation and effective resource management to the region. (See Section III for more details.)

Recycling water back to Lake Michigan

According to studies prepared by experts on behalf of the City, as well as a new regional water supply study, the best environmental option for a City of Waukesha water supply is Lake Michigan water. Lake Michigan water is the best environmental option because it can be returned, or recycled, back to its source. Groundwater, on the other hand, is discharged to rivers that lead to the oceans, instead of being recycled back to the source.

Waukesha has developed an innovative proposal to return water to Lake Michigan by using a tributary river, instead of a pipe. In either case, the City would create a positive new precedent of using wastewater as a resource to improve regional surface waters.

MMSD's report "Underwood Creek Rehabilitation and Flood Management Project: Preliminary Engineering Design Project," dated August 2006, states that the restoration on Underwood Creek needs "enhanced flows" for the pool and riffle system to support fish habitat, especially during the driest parts of the year. Waukesha's very high quality of wastewater treatment meets all state water quality standards and will meet the requirements set forth in MMSD's report.

In addition, Lake Michigan water is much softer than groundwater, allowing users to stop or reduce their use of water softeners. That will reduce the amount of salt that ends up in our surface waters and reduce energy use. More than 9,500,000 pounds of salt (over 4,750 tons) are used each year to soften the hard groundwater. Most of this salt is discharged in the treated wastewater into receiving waters. Energy use would also be reduced as the City turned off pumps that bring up water from up to 2,000 feet underground.

Potential Application

Waukesha's potential application is still being developed and revised and the Utility is still in the process of estimating the amount of Lake Michigan water that Waukesha may request. Wisconsin's new water supply plan law requires the Utility to forecast future demand for water, taking into account projected population growth and densities. The Utility has received a population projection at build-out for its service area (see Attachment A) from the Southeastern Wisconsin Regional Planning Commission (SEWRPC). The population at build-out is projected to be 97,400 people. (The build-out condition exists when all of the land available for development has been developed in a manner consistent with the regional plan, which could be more than 50 years in the future.) Based on that population number, the Utility estimates the average water use would be 10.99 million gallons per day (MGD) at build-out, with a maximum day demand of 18.46 MGD. Based on these numbers, Waukesha currently estimates that its request for Lake Michigan water would amount to 18.5 MGD to meet potential need on peak days. However, actual use would be much lower under built-out conditions (approximately 11 MGD) on most days, and in the years before build-out. (See Section II for additional details.)

That peak day request is more than 30% less, per capita, than Waukesha's historic peak day. This is also much less than previous estimates that a request for a peak of 20-24 MGD would be made. The lowering of the estimate to an 18.5 MGD peak at build-out is largely due to the City's expectation that its successful water conservation programs will continue and expand. The lower estimate, however, does not indicate that Waukesha's current water supply will be adequate. Continued use of the deep aquifer is unreliable and unsustainable, as well as harmful to area surface waters.

Recognizing the critical importance of returning water to Lake Michigan, the Utility proposes to return water to Lake Michigan via a tributary, setting an innovative precedent of using treated wastewater as a resource that can potentially improve the flow and quality of a stream. Previously, the Utility had proposed cutting off the return flow when the stream reached a certain level, roughly corresponding to levels reached during a two-year storm event. The Utility's new preferred option, however, is to return the estimated daily withdrawal of Great Lakes water, minus the Compact's allowance for consumptive use, during such rain events. Water can be returned under such conditions without causing concerns of flooding. Higher volumes of water would be returned on most days under our preferred option, exceeding the return flow requirements of the Compact. (See Section IV for additional details.)

Summary

In summary, Waukesha's application for Great Lakes water would end its use of the deep aquifer, benefiting surface waters throughout the region. Our innovative proposal to use return flow water as a resource would also improve surface waters. In addition, our continuing water conservation efforts have created a new standard for utilities in the Great Lakes states.

Waukesha's commitment to recycle water back to Lake Michigan after use would protect our water resources while proving that the Great Lakes Compact accommodates reasonable Wisconsin needs for water while still protecting the Great Lakes from any harm.

Brief summaries of some of the issues discussed in our responses follow.

I. Questions related to water supply sustainability

Section Summary:

- The Waukesha Water Utility and other experts have been studying the alternatives for a new water supply since the early 1990's.
- The City of Waukesha's conclusions are consistent with the conclusions in the Draft Regional Water Supply Plan for Southeastern Wisconsin by the Southeast Wisconsin Regional Planning Commission (SEWRPC).
- Conservation alone will not resolve the water supply issues in the City of Waukesha.
- Due to drawdown in the deep aquifer, surface waters in the region are negatively impacted. The result of the drawdown is that the surface waters in southeastern Wisconsin are receiving approximately 18% less in groundwater contributions, due to migration of the water to the deep aquifer instead.
- Deep aquifer wells that continue to be utilized with radium treatment continue to decline an average of approximately five to nine feet per year.

- The best environmental solution for the region is to eliminate the City's dependence on the deep aquifer for its water supply and to develop a Great Lakes supply with return flow, resulting in a resource that is sustainable for the long term.

- The City of Waukesha is proposing a role model application for Great Lakes water that will set the bar at a very high level for any community within the Great Lakes basin wanting to obtain water.

- The Great Lakes Compact allows for diversions of water to a specific group of communities that meet specific guidelines. Supporters of the Great Lakes Compact and Wisconsin's implementing statute should recognize that the City of Waukesha, as a "straddling community" is eligible to apply for water from the Great Lakes basin. The Great Lakes Compact and state laws were written with the knowledge that the City of Waukesha would potentially apply for Great Lakes water soon.

II. Questions relating to the scope of Waukesha's request for a diversion of Lake Michigan water

Summary of Section:

- A Great Lakes water supply is the most environmentally responsible solution to the water supply issue in the City of Waukesha. While other options may be available to the City of Waukesha, those options do not allow for the recycling of the water back to its source in a manner that would provide an environmental benefit to the receiving waters and are not as cost-effective.

- The Compact implementation statute requires the City to submit a water supply plan that accommodates projected growth.

- The City of Waukesha has worked with SEWRPC to define the water service area for the Utility. We recently received a population estimate for the approved service area at build-out.

- The build-out population estimate determines our ultimate resource needs. Using this estimate, the City of Waukesha has revised the projected volume of water that will eventually be necessary to provide water service to this area. The City of Waukesha now projects the ultimate average day demand will be 10.99 MGD (million gallons per day) with a maximum day demand of 18.46 MGD. Therefore, the request for a diversion will be for 18.5 MGD to meet the potential need on peak days at build-out.

    - This estimate of peak demand is more than 30% less than the projected 26.9 MGD that would be necessary if the request were based on the historic peak days, demonstrating the City's confidence in its water conservation programs.

- This revised estimate of a request for 18.5 MGD is a significant reduction in the estimate of 20-24 MGD, and reflects the fact that the City expects its successful water conservation programs to continue and expand.

- Actual usage would be substantially less on most days, with an average of 10.99 MGD at build-out.

- Although the date that build-out would be reached is not known, Waukesha must design its infrastructure to meet that demand. Bond underwriters will also insist on knowing that sufficient water capacity will be available to make the project feasible for the long-term.
- Any other communities that would want to obtain Great Lakes water would be required to apply for it through the Great Lakes states and implement return flow to the Great Lakes basin, along with approving conservation measures similar to the City of Waukesha's.

- A significant portion of Waukesha County does not have a need or desire for Great Lakes water. The scenario with the most extensive use of Great Lakes water in Waukesha County that was considered in the SEWRPC Regional Water Supply Plan was limited to the following communities: City of Brookfield Water Utility; Menomonee Falls Water Utility; Town of Brookfield Sanitary District; City of Waukesha Water Utility; City of Pewaukee Water Utility; Village of Pewaukee Water Utility; Village of Sussex Water Utility; and Village of Lannon. However, SEWRPC's draft recommendation is for <u>even fewer</u> communities to actually switch to Great Lakes water.

III. Questions related to Waukesha's conservation measures

Section Summary:

- Water use by customers of the Waukesha Water Utility dropped 25% from 1988 to 2004, despite a 17% increase in population.

- The City adopted a comprehensive water conservation plan in 2006 to reduce water use even further. That plan, which has a goal of a 20% reduction in water use per capita by 2020, has made the City the Midwest's leader in water conservation efforts.

- The new conservation plan has led to an additional 11% reduction in overall water use in only three years.

- As part of the plan, the City adopted a new ordinance that bans daytime sprinkling and limits sprinkling at other times to two days per week.

- Waukesha became the first water utility in the state to apply for and receive permission to adopt a water conservation rate structure for residential class customers that increases rates as water use goes up, the opposite of most utilities. That plan is currently being refined and strengthened.

- Waukesha is also the first utility in the state to start a rebate program to replace old, inefficient toilets – a major source of wasted water.

- Education programs in schools, creation of a regional conservation planning group, a water conservation contest, enactment of stormwater regulations, redefining development practices, and many other initiatives are also part of Waukesha's comprehensive plan.

- Additional water conservation and protection efforts will include adoption of low-impact development, seeking funding for runoff projects, water audits and consideration of the phase-out of sewer credit meters.

IV. Questions relating to return flow

Section Summary:

- Waukesha is currently investigating all options to maximize environmental benefits while meeting the return flow requirements in the Compact. These options include, but are not limited to, the following:

  - A management plan that would return all of the treated wastewater all of the time;

  - A management plan that would return water to the Lake Michigan source watershed during significant rain events that is equal to the average amount drawn per day that month (based on past records), minus consumptive use; and

  - A management plan that would reduce return flow during storm events when the accepting stream exceeds a determined level.

- Our current preferred option is to return water to the Lake Michigan source watershed during rain events that is equal to the average amount drawn per day that month, minus consumptive use. However, since we are still in the process of drafting a possible application, we are continuing to research the other options.

- Whichever return flow option is selected, we will work to ensure that it is implemented in an environmentally responsible manner.

V. Issue of radium in the drinking water and Waukesha's continuing use of the deep sandstone aquifer

Section Summary:

- In 2003, the City of Waukesha entered into a consent order to bring it into compliance with Wisconsin radium standards by December 2006, with a provision for an extension of the consent order if certain conditions were met. Since that time, the City has been working diligently to bring the system into compliance, incurring significant costs despite the fact

that the deep aquifer is not a sustainable long-term supply of water for Waukesha and a new water supply must be developed.

- The City has studied a new supply since the early 1990's, and a new supply is also part of SEWRPC's regional water supply study. These studies both conclude the best option for an adequate and sustainable water supply, both fiscally and environmentally, is the Great Lakes.

- The City of Waukesha negotiated a fair and just settlement with the Wisconsin Department of Justice that was approved by the Waukesha County Circuit Court. The settlement gives the City until 2018 to come into final compliance with the radium standard. In the interim, the settlement uses a first-of–its-kind flow-weighted averaging concept. This includes blending, treatment and monitoring utilizing surrogate parameters (or readily available water quality tests results that compare with radium results) within the City water system to manage multiple sources of water supply that have varying levels of radium. This will provide compliant water to the City for the interim period (allowed until 2018) until a new water supply is developed.

- It should be noted that 2018 is a short deadline, given the time needed to complete an application, seek public input, obtain approval by the Waukesha Common Council and the DNR, and submit the application for approval by the Great Lakes Governors, especially given the five years needed for easement acquisition and construction after approval. In addition, the City must consider the time that could be spent on legal appeals by various stakeholders and the time needed to pursue and implement a different option for radium compliance if its Great Lakes application is denied.

VI. Underwood Creek and the Menomonee River impacts

Issue Summary:

- The answers to the following questions are based on research completed to date. We are currently gathering additional information and research.

- Waukesha is developing the return flow strategy so that it takes into account the environmental needs of receiving streams. Waukesha's proposal would create an innovative precedent of using treated wastewater as an important resource for supporting flow restoration and other watershed goals.

- The City of Waukesha plans to work in consultation with Wisconsin DNR, MMSD, and the Southeastern Wisconsin Watersheds Trust (SWWT), to develop a discharge management plan that supports the goals of current and future watershed plans. This partnership will continue once a return flow project is implemented to monitor and evaluate ongoing water quality issues.

- The use of a management plan for the return flow is intended to ensure that additional water is available to support important ecological, hydrological and environmental goals of restoration activities in the Underwood Creek watershed.

- The Wisconsin DNR provided effluent discharge limits for potential return flow tributaries to the City of Waukesha that are substantially similar to its current limits for the Fox River and that are within the capabilities of Waukesha's wastewater treatment plant.

- Waukesha is pursuing an aggressive mercury reduction program, including a mercury minimization ordinance. The wastewater treatment plant has seen a reduction in mercury in its treated wastewater over the last several years.

- Switching from groundwater to lake water will lead to the elimination of the need for water softeners. This will help reduce chlorides in Waukesha's treated wastewater.

VII. Impact on the Fox River

Section Summary:

- Waukesha will meet the return flow requirements of the Compact by sending the required amounts of treated wastewater back to the Lake Michigan source watershed.

- There will be minimal impacts on the flow of the Fox River during most times from switching from the Fox River to a Lake Michigan tributary. There may be short-term impacts during low flows, but projections to 2050 indicate that the loss of Waukesha's flows would not adversely impact Fox River flows downstream.

- Wastewater is currently discharged down the Fox River during heavy rain events. The effect of any potential discharge of water down the Fox during future rain events would be no different, and could be less, than what is experienced currently.

VIII. Public and local government involvement

Section Summary:

- Waukesha Mayor Larry Nelson has committed to an application that is open to public participation and input. These questions and answers are a part of that process.

- The City will have forums to allow the public to comment and to ask questions on the City's application. The DNR will also have its own process to obtain public input.