

Responses to Questions Regarding Waukesha's Potential Application For Great Lakes Water

June 3, 2009

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 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. 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.

The questions from environmental groups (in italics), along with our responses, follow. Each section includes a brief summary of the issue by the Waukesha Water Utility.

(Continue to next page for questions and answers.)

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Questions and Issues Raised by Waukesha's Proposed Lake Michigan Diversion Plan

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.**

- 1) *In order to make reasoned decisions on what impact water supply alternatives may have on the long term sustainability of the Great Lakes, policy makers need to have fully detailed information on the alternatives.*

What water supply alternatives has Waukesha considered in addition to a Lake Michigan diversion? Please provide, for each alternative, what information was obtained, and what studies were used or commissioned in the alternatives analysis. Would you be willing to provide original source materials to the public and to our organizations?

In March 2002, the Waukesha Water Utility completed a Future Water Supply study that was prepared by CH2M Hill and Ruekert & Mielke. The participants in this study included representatives from the Waukesha Water Utility, the City of Waukesha, the Wisconsin Department of Natural Resources (DNR), the Southeast Wisconsin Regional Planning Commission (SEWRPC), the United States Geological Survey (USGS), the Wisconsin Geological Survey (WGS), and the University of Wisconsin-Madison (UW-Madison).

Thirteen different base alternatives were considered, with ten being screened out for various reasons that are described in the report. The final three alternatives, use of the current wells in combination with shallow wells, development of a well field in western Waukesha County, and development of nearby shallow wells, were then considered individually and also in combination.

The result of the study indicated that the two best options for a long term supply for the City of Waukesha were to seek groundwater from areas such as western and southern Waukesha County or to develop a Great Lakes water supply. This large report is available on the City website at:

http://www.ci.waukesha.wi.us/c/document_library/get_file?folderId=46267&name=DLE-5620.pdf and has been reviewed by several groups that helped draft the questions asked in this letter.

The conclusions of this study have also been affirmed by the SEWRPC draft Regional Water Supply Plan for Southeastern Wisconsin, which recommends a limited expansion of the use of Lake Michigan water.

A link to the SEWRPC study can be found on the City of Waukesha's web site at <http://www.ci.waukesha.wi.us/web/guest/futurewatersupplyinfo>.

- 2) *Was an alternative considered that included a combination of water supply options that blends shallow and deep aquifer water with reuse and recycling of wastewater, and aggressive conservation measures? Why or why not? If so considered, why was this alternative rejected?*

Yes. Several different alternatives were considered. The alternatives utilized combination of the water supply options, including shallow and deep aquifer water. Options such as wastewater reuse and recycling were also considered in the study. For a number of reasons, including the higher health risks, the high costs involved, statutory limitations, and public perceptions of safety, they were eliminated from consideration.

Conservation was considered with all of the options (Waukesha has, since that time, adopted aggressive conservation measures through the most comprehensive water conservation plan in the Midwest. See Section III). The final recommendation was to develop sandstone wells in western Waukesha County; develop shallow wells in the aquifers south of Waukesha or west of Waukesha; or develop a Great Lakes supply.

The Waukesha Water Utility believes that the most environmentally sustainable option is using Great Lakes water, which could be recycled back to its source after use. This is consistent with Wisconsin's Great Lakes Compact implementing statute, which says a "'(r)reasonable water supply alternative' means a water supply alternative that is similar in cost to, and as environmentally sustainable and protective of public health as, the proposed new or increased diversion and that does not have greater adverse environmental impacts than the proposed new or increased diversion." See §281.346(1)(ps), Wis. Stats. Any option that continues to use the deep aquifer will perpetuate the current adverse environmental impacts on regional surface water, the shallow aquifer and the deep aquifer. Continued use of the deep aquifer will not be as sustainable or as protective of public health, compared to a Great Lakes water supply.

In addition, water supplies with multiple sources are more expensive – a key issue under Wisconsin's new water supply plan statute.

SEWRPC also studied Waukesha's water supply and its draft report agrees that Lake Michigan water is the most affordable and environmentally sustainable option.

The Waukesha Water Utility believes that the City must end its use of the deep aquifer, in order to help that aquifer recover and to benefit the surface waters which are being adversely affected by its drawdown. Continuing that environmental harm, when an option for sustainable use of Great Lakes water is available, is an irresponsible policy choice. Indeed, according to Wisconsin's Compact implementing statutes, a community is "without adequate supplies of potable water" if it is "lacking a water supply that is economically and environmentally sustainable in the long term to meet reasonable demands for a water supply in the quantity and quality that complies with applicable drinking water standards, is protective of public health, is available at a reasonable cost, and does not have adverse environmental impacts greater than those likely to result from the proposed new or increased diversion." See § 281.346(1)(zm), Wis. Stats. Clearly, the deep aquifer does not meet the law's standards for adequate water supply, because it is not economically and environmentally sustainable in the long term.

- 3) *If the Waukesha Water Utility receives approval for a Lake Michigan diversion, does the Utility plan to shut down all deep and shallow aquifer wells and use of groundwater? If not, what wells would be maintained and why? What amount of water would continue to be pumped from the shallow and deep aquifers?*

All of the deep aquifer wells would be abandoned upon receipt of a Great Lakes water supply. Under this scenario, the pumpage from the deep aquifer would be zero.

The shallow wells – currently wells 11, 12, and 13 (which was brought on-line in early 2009) – would remain in service as a redundant/backup/peaking supply in the event of a catastrophic failure to the water supply or a high water demand period. This type of supply would have been necessary during the events of January 19, 2009, when the Milwaukee Water Works experienced a power outage that caused interruptions in service to its retail and wholesale customers. The amount of water that would continue to be pumped would depend upon the need for backup or peaking supply.

The remaining shallow backup wells would also need minimal pumping on regular intervals to ensure proper operation and maintenance.

- 4) *If Waukesha were to change over from groundwater supplies to Lake Michigan water, what impact would this have regarding recharge of the deep aquifer? (time and amount)? What additional impacts to the deep aquifer can be expected if communities east of the divide and other straddling communities currently on groundwater were to switch to Lake Michigan water?*

We do not have an estimate of the impact of the City of Waukesha alone eliminating its wells from the deep aquifer. However, the SEWRPC water supply study has estimated the effects if Lake Michigan supply were extended to: the City of Cedarburg and the Villages of Fredonia, Grafton, and Saukville in Ozaukee County; the western portion of the City of Brookfield, the western portion of the Village of Menomonee Falls, the Town of Brookfield, and the Cities of Pewaukee and Waukesha in Waukesha County; and the Village of Union Grove in Racine County. The models estimate that there would be a recovery in the deep aquifer (or a reduction in the cone of depression) of an average by county of 35 to 136 feet, with a maximum recovery of 270 feet between 2005 and 2035. There would be no further significant drawdown. Waukesha utilizes approximately 30 percent of the water from these communities drawing from the deep aquifer, so ending its use of the deep aquifer should have a very significant positive impact on the aquifer and the environment. It is also important to note that, according to the USGS, if all communities in southeastern Wisconsin end their use of the deep aquifer, it will recover 50% in 7 years and 90% in 70 years.

The fact that there will be recovery in the aquifer is supported by observations of deep wells that the Waukesha Water Utility has shut down due to high radium levels. At four deep wells where pumping of non-compliant water was discontinued, the groundwater levels have recovered between 8 and 14 feet in the last year. Where deep wells remain in operation, groundwater levels continued to decline between 5 and 9 feet.

Recovery of the aquifer is also supported by studies that show that aquifer levels in northeastern Illinois recovered significantly when communities in Lake, DuPage and Cook Counties abandoned their wells in the same aquifer that Waukesha draws from and switched to Lake Michigan water. Between 1980 and 2000, the aquifers under these areas recovered significantly. The 2002 Illinois State Water Survey report, “A Comparison of Potentiometric Surfaces for the Cambrian-Ordovician Aquifers of Northeastern Illinois, 1995 and 2000,” states: “Where pumpage from the deep bedrock has been reduced sharply at long-term pumping centers, such as in Cook, DuPage, and Lake Counties, groundwater level recoveries of more than 100 feet over large areas have

been observed.” (See p. 37). These recoveries were widespread. “A comparison of 40 water elevations in 1980 and 2000 found groundwater levels about 300 feet higher at Villa Park and Elmhurst (DuPage County) than they were in 1980. Meaningful recoveries of more than 100 feet were observed over a large area of Cook, DuPage, and Lake Counties.” (See pp. 39-40). (<http://isws.illinois.edu/pubdoc/DCS/ISWSDCS2002-02.pdf>)

- 5) *Please compare the costs of continuing to use the deep water aquifer as Waukesha’s sole water source (include energy, chemical and other costs associated with pumping and treating water) with the costs of purchasing, pumping, and returning Lake Michigan water (include energy, construction and other costs associated with pumping water to and from Lake Michigan).*

We have updated the costs of developing the different supplies in the 2002 Future Water Supply Study. These costs have been updated to reflect current projected costs and are outlined in the table below. Further, the option costs were evaluated within the draft SEWRPC regional water supply study, which recommended that the City of Waukesha develop a Great Lakes water supply to serve its residents. A link to the Future Water Supply Study report can be found at:

<http://www.ci.waukesha.wi.us/web/guest/futurewatersupplyinfo>.

Water Supply Option Costs Updated		
	Capital Costs	Operating Costs
Sandstone Near Waukesha	\$87,000,000	\$6,600,000
Sandstone West of Waukesha	\$116,000,000	\$2,500,000
Shallow Aquifer	\$96,000,000	\$3,800,000
Lake Michigan	\$56,000,000 - \$70,000,000	\$5,300,000

Note: Costs include land acquisition and other infrastructure costs

- 6) *What are the long term economic and environmental costs and benefits of returning flow to the Lake Michigan Basin via:*

A. the Root River?

We are currently estimating the costs of constructing a return flow pipeline to the Root River. SEWRPC, however, has estimated that the costs of construction would be approximately \$32 million dollars. This is in addition to the cost of a water supply pipeline.

We have received initial indications that additional flow in the Root River could potentially allow for additional fish passage time downstream at the hatchery in Racine. Potentially extending the hatchery season would benefit the Lake Michigan fishery at a time when there are other stressors on it. Further, it appears that there are other locations on the stream where additional flow could be beneficial. We are currently reviewing our management plan for return flow during rain events. We will

be working more closely with MMSD regarding the water quality impacts and benefits of the potential discharge.

B. the Menomonee River via Underwood Creek?

SEWRPC estimated the costs of constructing a return flow pipeline to the Menomonee River via Underwood Creek. An initial estimate of the cost of constructing a pipe to Underwood Creek is approximately \$20 million. This is in addition to the cost of a water supply pipeline. Compared to the other return flow options, it is the most cost effective option.

Waukesha's goal for returning water to Lake Michigan through Underwood Creek is to protect the integrity and quantity of the Great Lakes. Waukesha's proposed use of return flow water as a resource in a Great Lakes tributary (instead of as a discharge to simply be released via a pipe) is an important innovation.

As you know, MMSD is currently restoring a one mile stretch of Underwood Creek by removing much of the existing concrete streambed lining and rehabilitating the watercourse to re-establish aquatic and wetland habitat. One of MMSD's goals is to improve fish passage, as shown in publicly available documents, such as the document titled "Underwood Creek Rehabilitation and Flood Management Project; Preliminary Engineering Design Project." Waukesha's return flow could provide additional flow to support these restoration efforts and we are currently in the process of evaluating the potential effects of the return flow on these restoration efforts.

Waukesha does understand that there are plans to remove additional concrete lining in the channel at a future date. We are committed to working with the designers to ensure that return flow will be accomplished such that the existing improvements, as well as any future improvements, are not negatively impacted by the return of Waukesha's treated water. We have had, and will continue to have, discussions with MMSD to ensure that the designers of the new channel are aware of the additional flow from Waukesha and account for it in the design of the channel.

Underwood Creek has been adversely affected by urbanization. There is significant engineered stormwater infrastructure that routes runoff directly to the creek, rather than infiltrating into the ground and then to the stream as subsurface flow as likely occurred in its pre-developed condition. Stream baseflow has been reduced as a result, particularly at lower flows. The return flow from Waukesha can be utilized to help offset the impacts of urbanization and provide additional baseflow to support restoration efforts. We recognize that these restoration efforts will be ongoing and that Waukesha would need to be a party to ensuring that the efforts are maximized.

We are currently reviewing the return flow options. Under any implemented scenario, the goal would be to minimize any additional risk of flooding. The City of Waukesha is currently developing a management strategy that maximizes the environmental benefits associated with return flow of treated water and meets the requirements of the Great Lakes Compact and state law. Further, we intend to consult with the Milwaukee Metropolitan Sewerage District (MMSD) and the Southeastern

Wisconsin Watersheds Trust (SWWT) regarding the water quality costs and potential benefits of the discharge.

C. piped directly to Lake Michigan?

This will be the more expensive option available for return flow. SEWRPC estimated that the initial capital costs of Waukesha alone returning treated wastewater directly back to Lake Michigan would be approximately \$48 million and cause disruptions due to construction in urban areas.

Furthermore, piping the return flow water directly to Lake Michigan would eliminate the benefits of increased flows in the tributary streams that are in need of additional flow and the positive precedent of using treated wastewater as a resource. It would also needlessly and substantially increase costs to the public.

D. returned through the MMSD system?

The SEWRPC draft report concludes that this option is not cost effective. This was based on analyses conducted under the 2007 regional water quality management plan update, where the potential of connecting the South Milwaukee wastewater treatment plant to MMSD was investigated.

We are currently gathering additional information on this option. We expect that this would be more expensive than the Underwood Creek return flow option because it likely would entail a longer distance and consume valuable capacity of the MMSD conveyance system. Concern has been expressed about the capacity of the MMSD system to accept Waukesha's flows under peaking conditions where there may be a greater risk of a combined sewer overflow. This could potentially require expensive upgrades to the conveyance and treatment system and increase the risks of combined sewer overflows.

According to the SEWRPC draft Water Supply Plan for Southeastern Wisconsin, this "option would entail abandonment of, or substantially reduced use of, the City of Waukesha wastewater treatment plant and the concomitant conveyance of wastewater to the MMSD sewerage system. Wastewater from the Waukesha service area would then be conveyed and treated in the MMSD sewerage system."

The SEWRPC report goes on to conclude that "the basic reason for this return flow option not being considered further is that the MMSD sewerage system is not sized to convey or treat the City of Waukesha wastewater. Thus, a pipeline from Waukesha to a MMSD sewage treatment plant would be required and treatment plant capacity duplicating the City of Waukesha capacity would be needed."

Finally, the City of Waukesha is contracted to treat the wastewater from the Village of Wales and other areas outside of the water service area. This would prevent the City from abandoning the current wastewater treatment facility. Since it would be impossible to retire the wastewater treatment plant in Waukesha, the City would be sending treated wastewater into the MMSD collection system, adding to the clear

water issues, such as stormwater entering the wastewater collection system through leaking pipes or illegal connections to the sanitary sewer system that currently exist.

7. *How many short-term construction jobs would be created by building a pipeline to return water to Lake Michigan under any of the above scenarios including Underwood Creek? How many long-term, family-sustaining jobs would be created to operate and maintain the system?*

We have discussed the job potential for a contract of this type with the Wisconsin Underground Contractors Association and estimate that the contract to install a supply pipeline from the City of Milwaukee with a return flow pipe to Underwood Creek would create 100 construction jobs over a two year period. It would also create jobs for subcontractors and material suppliers. It is estimated that 15% of the \$70 million cost for a Lake Michigan water supply connection would be direct labor over two years for a \$60,000 per year worker. We estimate that approximately 300 jobs would be created, including subcontractors and suppliers. It is also estimated that the project would create the equivalent of approximately 5 to 10 long term, full time jobs to manage and support the system. This includes subcontracted work and outside support and supply for the Utility.

8. *How many shallow aquifer wells have been constructed to date? Where are they located, how much does each produce, and what were the capital costs of each to construct? How many more are under construction now and how many more are planned? Again, where are these wells planned for, how much is each projected to produce, and what are the anticipated construction costs of each?*

There have been two shallow wells constructed to date (Wells #11 and #12) with an additional well (Well #13) which was recently completed and connected to the water distribution system in April, 2009. These wells are all located on the south side of the City of Waukesha. Well #11 has a capacity between 300-400 gallons per minute (gpm) or between 0.4 and 0.55 million gallons per day (MGD); Well #12 has a capacity of 600-700 gpm or between 0.85 and 1.0 MGD; and Well #13 has a capacity of 750 gpm or 1.05 MGD. The cost was \$4.2 million for Wells 11 & 12 with the blending facility, and \$2.2 million for Well #13. There are additional shallow wells planned for the south side of the City to meet short term radium compliant water needs. In addition to providing short term supply needs, these wells are anticipated to provide redundant and peaking capacity in the event of a catastrophic event to the water supply line or a long term drought where demands would be extremely high. The City is currently negotiating to acquire property for these additional shallow wells. It is expected these wells could produce between 2,100 and 3,500 gpm (3.0 and 4.0 MGD). The early cost estimates are approximately \$8 million. There is also additional infrastructure that is required to convey and distribute the water.

(Continue to next page for next section.)

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 even fewer communities to actually switch to Great Lakes water.**
1. *Have the City of Waukesha and the Waukesha Water Utility had discussions, either formal or informal, with other local jurisdictions about joining in the diversion request now or in the future? If so, please identify them.*

No.

2. *What is the current capacity of Waukesha's wastewater treatment processing plant—how many MGD of wastewater can be treated? What is the volume of water treated by the Waukesha Water Treatment Plant in each of the last three years? Are there plans to expand the current capacity? If so, by how much and over what timeframe?*

The current capacity of the wastewater treatment plant is 14 MGD (million gallons per day) during dry weather conditions and 18.5 MGD during wet weather conditions. The volume of wastewater treated in 2008 was 4,190,000,000 gallons per year (11.45 MGD). In 2007, the total volume treated was 3,902,000,000 gallons per year (10.7 MGD) in 2006, 3,614,000,000 gallons per year (9.9 MGD); and, in 2005, 3,194,000,000 gallons per year (8.8 MGD). There are no plans to expand the current treatment capacity.

3. *What is the land area and population currently being served by the Waukesha Water Utility? What is the average water volume in MGD provided to this current customer base per year: 2000 - 2008? What is the maximum MGD water supply capacity?*

The current land area serviced by the City of Waukesha consists of 25.1 square miles and is shown in Attachment A. The current population of Waukesha is approximately 68,030 people as of January 2008.

The Average Day and Maximum Days between 2000 and 2008 are as follows:

Year	Average Day (MGD)	Maximum Day (MGD)
2000	7.75	10.15
2001	7.73	12.53
2002	8.09	12.78
2003	7.66	11.67
2004	7.37	10.48
2005	7.78	12.87
2006	7.18	10.23
2007	7.17	9.79
2008	6.91	9.93

The maximum water supply capacity is 18.1 MGD.

4. *What is the projected land area and population that is proposed to be served by a Lake Michigan diversion and what is the average MGD volume of water that is projected to be supplied to this customer base? What are the assumptions for these projections?*

The projected land area to be served by Lake Michigan water is shown in Attachment A. The ultimate service area was defined by SEWRPC. Waukesha also asked SEWRPC to determine the ultimate population for this service area. The population projection for the entire service area is 97,400 people. Based on an engineering evaluation of Waukesha water use, this would require an average water supply of 10.99 MGD and a maximum day supply of 18.46 MGD at build-out. These water projections incorporate water savings based on the level of success we have realized and project to realize with our aggressive water conservation effort.

5. *Is there a difference between the land area and population to be served by a Lake Michigan diversion and the current land area and population served by the Waukesha Wastewater treatment facility? If so, what is it, and please explain?*

Yes, there are minor differences. The current wastewater service area includes the Village of Wales and the water service area does not. Other than that, they are essentially the same, although a few minor boundary lines depend on water supply systems of adjacent communities. These differences are detailed in the letter from SEWRPC to the Waukesha Water Utility approving the water service area at http://www.ci.waukesha.wi.us/c/document_library/get_file?folderId=42481&name=DLE-5166.pdf.

6. *Would the City of Waukesha consider limiting the geographical area that is proposed to be served by a Lake Michigan diversion to the current geographical area served by the Waukesha Water Utility in 2008? Why or why not?*

The preference of the Waukesha Water Utility is to provide urban services to nearby areas that will be developed, including the use and recycling of Great Lakes water, instead of encouraging development on well and septic systems. We believe that is the best option for environmental sustainability. We are also required under state law to plan for future service area and demands as part of our master planning. That is why we requested and received a defined service area from SEWRPC, along with ultimate population projections for build-out conditions of the planned service area.

The City of Waukesha and Waukesha County are also working towards compliance with the Comprehensive Planning/Smart Growth legislation. The City of Waukesha Planning Department is in the process of updating the Development Plan for Waukesha County to Meet Specific Needs of the City of Waukesha. This plan update will address the following elements:

- Issues and Opportunities
- Agricultural, Natural, and Cultural Resources
- Community Facilities and Utilities
- Housing
- Economic Development
- Land Use
- Transportation
- Intergovernmental Cooperation
- Plan Implementation

The City of Waukesha plans to adopt the Comprehensive Plan this year, which will then be incorporated into the Waukesha County Comprehensive Plan that will be adopted later in 2009.

7. *What is the planned route for water if Great Lakes water is supplied via the City of Milwaukee's Water Works? How large would the pipe(s) be and how many miles of pipe need to be laid? What would be the economic and environmental impacts and costs for that infrastructure? If water were diverted from Lake Michigan through Milwaukee Water Works' existing infrastructure and any new construction, how long before the new water supply system could be fully operational?*

The SEWRPC report provides the background information for the routing of water supply and discharge lines to and from the Milwaukee area. The sizing of the infrastructure has not been finalized at this point and will not be finalized until such time as an application receives approval. It is estimated that the pipelines for water supply and return flow would cost approximately \$60 to \$70 Million. It is our intent to work within the spirit of the compact and provide return flow that would improve the environment within the Great Lakes basin.

Once an application is approved, we anticipate it would take approximately five years before easement acquisition and construction are complete.

8. *Will Waukesha attempt to sell water obtained from a Lake Michigan diversion to other communities outside the Lake Michigan basin?*

No. The City of Waukesha does not plan to sell water to other communities. It is not expected that we would have sufficient water under our request to sell water.

Even if Waukesha or another community were to sell water to such communities, it is important to recognize that those communities would be subject to the same permitting procedural requirements, including any requirements of the Great Lakes Compact, as were applied to the City of Waukesha. This would include providing return flow of the treated wastewater, adopting an aggressive conservation plan and applying to the Great Lakes states and receiving approval from their governors for the use of Great Lakes water.

9. *If “reliable capacity”, defined as system capacity when the largest single component is not available for service, is the standard applied that justifies a diversion request amount of 20 – 24 MGD (three times as much as the average MGD currently used), how is it justified to shift from a multiple source (multiple shallow and deep aquifer wells) to a single source (Lake Michigan) that presumably is funneled through a single pumping station between MWW and the City of Waukesha? Or are multiple redundant pumping stations and pipelines being planned and at what cost?*

The question inappropriately compares potential future **maximum** demands to current **average** demand. Regardless, our estimate of future peak demand has been lowered.

The City of Waukesha is consulting with the DNR as it develops its application for Great Lakes water and will work with the agency to determine how the Great Lakes Compact will work and what volume of water it will request under its Great Lakes application. Our projections for the service area defined by SEWRPC call for an average day projection of 10.99 MGD and a maximum day of 18.46 MGD at build-out. The request must meet future demands, not just today’s, in order to ensure prudent planning and investment, as well as the availability of financing.

It is important to note that if the City requests these amounts, we will be consistent with the Compact implementing statute, which requires us to forecast demand for water, taking into account the expected population, based on growth projections and planned population densities (§ 281.348(c)3m, Wis. Stats.). To be approved, a water supply plan must meet a municipality’s projected needs.

The intent is to only build a single pipeline from our water supplier with redundancy from the shallow wells that would remain in service. When the DNR considers reliable capacity of a pumping station, they consider the largest single unit of that pumping station out of service. In our case, the pumping station would have multiple pumps and backup generation for those pumps. We would have to construct the pumping station so

that we could provide water on a maximum day, even if the largest pump were out of service.

The Utility's maximum day on record was 15.2 MGD, which occurred when the City's population was approximately 55,000 people. With a projected population estimated at 97,400 people at build-out, the maximum day projection based on historical records would equate to 26.9 MGD. However, given the success of our conservation plan, we will be requesting a lower amount than the 26.9 MGD figure our historical records indicate the demand may be. Our estimated request of 18.5 MGD for maximum day demand at build-out is more than 30% less than historic demand per capita.

However, it is also important to realize that most days would involve much lower volumes, with an average of 10.99 MGD predicted at build-out. We have historically seen the maximum days limited to a small number of days per year.

Waukesha must design and build its infrastructure to meet the foreseeable build-out demand. Bond underwriters will also insist on knowing that sufficient water capacity will be available to make the project feasible for the long term. When a construction project such as this is built, the cost of adding the capacity within the infrastructure to accommodate the ultimate build-out projection is less than 15% of the total construction cost if it is added to the original contract. Therefore, it is the most efficient use of ratepayer money if the project is constructed to accommodate the ultimate service area.

(Continue to next page for next section.)

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.
1. *What water conservation measures have been implemented to date and what have the savings directly tied to these measures been? What are the next steps being taken to conserve water? When will these be implemented?*

The following pages detail the conservation measures that have been implemented so far and that are planned for the future.

Water use by customers of the Waukesha Water Utility dropped 25% from 1988 to 2004, despite a 17% increase in population. However, the Utility adopted a comprehensive water conservation plan in 2006 to achieve further reductions, with a goal of 20% less per capita by 2020. The City of Waukesha's new plan has made it the Midwest's leader in

water conservation efforts and has already reduced water use by 11%. Residential water use declined 3% in 2008 compared to 2007.

Waukesha is using 2005 as the baseline for the comparisons because it represents the actual water usage the year before the Water Conservation and Protection Plan was implemented by the City of Waukesha. The Utility does recognize that rainfall in 2005 was lower than in 2008. However, there will be issues no matter what year is selected as a baseline, since future years may always differ, either being wetter or drier.

If we compare 2008 to 2004 – years that had rainfall totals within one inch of one another – the City would still achieve a significant and successful 6.3% reduction in water use. As this section details, conservation efforts will be continued and increased, as well as monitored.

Daytime sprinkling bans, conservation rates structures, toilet rebates, water conservation demonstration projects, education programs in schools, creation of a regional conservation planning group, a water conservation contest, enactment of stormwater regulations, implementing the Smart Growth in programs, and many other initiatives are also part of Waukesha's efforts to conserve and protect water. These initiatives are outlined in our Water Conservation and Protection Plan that can be found on our web site at: <http://www.ci.waukesha.wi.us/web/guest/waterhome>.

Our future plans include investigation and action on recharge, building ordinances, water reuse, smart growth comprehensive planning, and other initiatives as outlined in the plan. Each year a new component of the plan is worked on. We also intend to continue to work with the Waukesha County Water Conservation Coalition to try to implement plans on a regional basis.

The Waukesha Water Utility is proud to have received the first Water Efficiency Award from the Wisconsin Water Association. The award was created in 2008 to acknowledge accomplishments that demonstrate leadership, innovation and progress in promoting the wise use of water and energy resources through water efficiency and conservation.

Sprinkling ban

Waukesha's conservation plan includes a ban on daytime sprinkling (Municipal Ordinance 13.11). This is the first ordinance of its kind adopted in the State of Wisconsin. Non-daytime sprinkling is limited to twice per week, which is more restrictive than any other community in Wisconsin and most others in the nation.

The ordinance also sets forfeitures for violations. Additional monetary consequences for violations were adopted by Waukesha's municipal court in 2008.

Public education efforts regarding the ordinance have included inserts and notes in water bills, as well as refrigerator magnets. A number of newspaper and TV stories have provided publicity and information. Street signs with sprinkler ordinance information were installed on major arterials into the City of Waukesha in 2007. Refrigerator magnets on the ordinance were distributed in 2008 and promoted by newspaper articles.

Time Warner also produced a 30 second public service announcement regarding the ordinance that was aired on the local cable television channel.

The result has been a great success. The water conservation ordinance was enacted in 2006. Comparisons from May 1 to Oct. 1 (when the sprinkling ban is in effect) have shown a 15.4% reduction in water use from 2005 to 2008 (2005 was the year preceding the enactment of the ordinance). This reflects a 205,054,000 gallon reduction during the ordinance period between 2008 and 2005. In 2005, our peak day was 12.9 million gallons. In 2008, our peak day was 9.9 million gallons. The effectiveness of the ordinance is seen not only in the total water use reduction, but in the reduction in the number of peak water use days. In 2005, there were 56 days exceeding 9.0 million gallons of pumped water. In 2008, there were only two days exceeding 9.0 million gallons of pumped water.

Conservation rate structure

Waukesha also has adopted a conservation (inclining) rate structure for residential customers in 2007, becoming the first utility in the state to charge customers more per gallon as water use increases. The Public Service Commission has called the idea a model for other utilities.

The Utility is currently before the PSC with a request to strengthen and expand the program in 2009, including adjustments in the tiers and rates for residential customers. You will note from the table below, that the new proposed rate structure strengthens the conservation rate structure by reducing the amount of water allowed before reaching the next tier and increasing the cost increases per tier.

(Continue to next page.)

		Single Family Residential		Two Family Residential		Three Family Residential	
		Percentage of Qtrly Bills Affected	Percentage of Qtrly Gallons Billed Affected	Percentage of Qtrly Bills Affected	Percentage of Qtrly Gallons Billed Affected	Percentage of Qtrly Bills Affected	Percentage of Qtrly Gallons Billed Affected
First Tier (Old 0 to 30,000; New 0 to 10,000)	Old \$1.95/1,000	95.6%	87.0%	71.8%	51.4%	59.6%	38.1%
	New \$2.05/1,000	36.7%	17.2%	43.1%	23.0%	36.0%	16.8%
Second Tier (Old 30,001 to 40,000; New 10,001 to 30,000)	Old \$2.20/1,000	3.4%	8.2%	19.6%	27.8%	28.0%	36.2%
	New \$2.65/1,000	58.9%	69.8%	38.5%	41.0%	61.2%	74.8%
Third Tier (Old 40,001 and above; New 30,001 and above)	Old \$2.70/1,000	1.0%	4.8%	8.6%	20.8%	12.4%	25.7%
	New \$3.40/1,000	4.4%	13.0%	18.4%	36.0%	2.8%	8.4%

The Utility has focused on residential users because they have the largest fluctuations in water use and use the greatest percentage of water by class in the Waukesha Water Utility water service area. In addition, businesses see more significant monetary impacts through conservation and have been successful in reducing their water use. Finally, business water rates have increased by larger percentages than residential rates. We continue to optimize and evaluate the effects of rate structures on the water used in Waukesha.

Toilet rebate program

Waukesha was the first municipality to have a toilet rebate program approved by the PSC. Toilets are the largest user of water inside the home. They account for 27% of the water used in an average home. Outdated and leaky toilets are major potential sources of wasted water.

The pilot program offered \$25 rebates for replacement of a high volume (3.5 gallon or more) toilet with a high efficiency toilet that uses 1.28 gallons per flush and is approved by EPA's WaterSense Program.

The Utility also publicized the benefits of updating and repairing toilets with a Don't Flush \$ Down the Drain program to teach customers about the fact that a family of four can save \$75 to \$200 per year by replacing pre-1994 toilets. The Utility has also encouraged the purchase of low flow faucets and shower heads.

City Hall plumbing retrofit

In 2006, Kohler donated water saving toilets, urinals and aerators for a water conservation demonstration program at City Hall. 3.5 gallon per flush toilets were replaced with 1.6 gallon per flush toilets. Urinals were retrofitted so that they flushed as needed by use of sensors instead of periodically flushing. City Hall saw water use reductions of between 15 and 25 percent over previous years. However, with a changeover from a water-cooled to an air-cooled air conditioning system at City Hall in 2007, water use is now down 90% from 2005 to 2008 at the building.

Public education

Public education on the importance of water conservation is critical for the success of all of the initiatives the City and Utility have embarked upon.

Our website was updated in 2005 to include numerous tips for water conservation (<http://www.ci.waukesha.wi.us/web/guest/conservation>), but additional improvements in the website are planned in 2009.

Waukesha is also a sponsor and participant with the Metropolitan Builders' Wisconsin Trend Home: 2008 which featured gray water reuse, permeable pavement, high-efficiency fixtures and appliances, EPA Water Sense plumbing and a rainwater catchment system. The Utility also has encouraged industrial water conservation and energy efficiency with the assistance of Wisconsin Focus on Energy. The home also highlighted other features such as Solar Heating for water use throughout the home and was built with an emphasis on recycling and reusing materials.

Waukesha Mayor Larry Nelson and Waukesha County Executive Dan Vrakas created the Waukesha County Coalition for Conservation in 2006 to prepare and implement a water conservation public education strategy for southeastern Wisconsin. The coalition, which included representatives of business, government, education and local interest groups, has the goal of developing unified and consistent messages to be used in public education materials throughout the region. The members, including the Waukesha Water Utility, contribute to conservation facts that can be found on their website: www.wisconsinwaterwise.org.

The coalition held a contest, from November 2007 through February 2009, challenging Waukesha residential customers to see who could reduce their water use over a 12 month billing cycle by the highest percentage. The 257 single family households who participated in the contest achieved an average 8% reduction in water use, a saving of 1,085,200 gallons. The entire single family residential class of 16,890 households over that same time period saved 29,892,000 gallons with an average of 2.8% reduction. Five households were recently named in the contest as winners and earned a prize of having

their water bills paid for 2008. The money for the water bills was raised from donations by generous local sponsors. There were also 10 households awarded prizes for the most innovative water conservation ideas. Gift certificates to local businesses were presented to the winners of the innovative ideas. The grand prize winner of \$500 from the Waukesha State Bank donated the prize back to the coalition for use in an upcoming water conservation challenge with the Waukesha School District elementary schools. See a news story at <http://www.jsonline.com/news/waukesha/40882392.html>.

We have also been active with the Waukesha County Water Conservation Coalition on the rain barrel group, the regional utility subgroup, and the business group. The rain barrel committee has had several meetings – including a meeting at the Utility, on Jan, 23, 2009, where we invited MMSD to talk about the successes of their existing rain barrel program. This committee made the attempt to reach out regionally by inviting other municipalities to this meeting. The municipalities that attended were the following: Town of Brookfield, Village of Dousman, Town of Eagle, Village of Hartland, Village of Menomonee Falls, Oconomowoc Water Utility and City of Pewaukee. The regional utility subgroup has also met at the Utility. We have discussed conservation efforts that utilities can embark on to reduce water usage. These efforts would include sprinkling ordinances, past water usage printing on water bills, public service announcements for the area for water conservation, rain barrels, stormwater recharge, smart growth planning, etc. The business group has met several times. It has sponsored restaurant table tents for restaurants that say “Water served upon request. By reducing water waste and washing chemical use, our restaurant is protecting the environment. Thank you for your cooperation and helping us do the right thing.” Please see the website at www.Wisconsinwaterwise.org to download a copy. The coalition has also done displays at the Wisconsin Restaurant Association with information available on the table tents with additional water and energy saving information. They have also done presentations at Waterwise and are initiating a water conservation award for businesses who implement conservation in their business.

The Conservation Coalition and the Waukesha Water Utility continue to develop and implement additional conservation programs. The need for conservation is a regional issue and the more collaboration and cooperation we can have among the area’s water users, the more effective our efforts will be. We challenge and encourage other communities, both inside and outside the basin, to join us in implementing water conservation initiatives.

Working with schools

The Waukesha Water Utility has partnered with the Waukesha School District to teach water education classes to fifth graders. The Utility and the school district share the costs. Approximately 1,000 students per year take these classes as part of their science curriculum. The students do an outdoor field investigation of the Fox River Sanctuary and visit one of our pumping stations. At the pumping station, they learn about the water cycle, where our water comes from, how it is treated and distributed, and future concerns dealing with quantity and quality. By the end of the lesson, students understand that water is a limited resource, human activities have a direct impact on the water quantity

and quality, and using water wisely is everyone's responsibility. These are lessons we believe are often shared with their families, as well.

Alliance for Water Efficiency

The Waukesha Water Utility became a member of the Alliance for Water Efficiency in 2008. We recognized the value of this national organization as a resource to keep us abreast of the ever growing water conservation information and trends. The Alliance for Water Efficiency is a stakeholder based non-profit organization dedicated to the efficient and sustainable use of water. Located in Chicago, the Alliance serves as a North American advocate for water efficient products and programs, and provides information and assistance on water conservation efforts. See <http://www.allianceforwaterefficiency.org/default.aspx>.

Stormwater protection

Waukesha has passed all of the Phase II Stormwater ordinances required by federal regulations, including Public Education and Outreach, Public Participation/Involvement, Illicit Discharge Detection and Elimination, Construction Site Runoff Control, Post-Construction Runoff Control and Pollution Prevention/Good Housekeeping.

Next steps

The City has several possible next steps to continue its leadership in water conservation and protection planning. The following potential steps are being reviewed and evaluated by the appropriate City departments to determine how they could be implemented and the value gained by implementation:

- **Revise the Development Ordinance to follow Low Impact Development (LID) Principles.** One of the major recommendations of the conservation plan concerned the revision of the City's development ordinance to require new developments to follow low impact development principles, in order to protect local water resources. The City will consider establishing a timeline for revising its development ordinance along these lines. This would place Waukesha at the forefront of water conservation and protection planning.
- **Seek Urban Runoff Funding from the State (319 program).** As a step toward encouraging low impact development, the City could seek funding to implement Low Impact Development Demonstration projects within the City limits. These may be partially funded by money available from the Wisconsin Department of Natural Resources. Applications may be made to the State of Wisconsin for 319 urban runoff grants. These can include, but are not limited to:
 - Installation of rain gardens on City property; and
 - Construction of permeable pavement parking lots at City facilities.

- **Water Audits.** The Waukesha Water Utility will continue to work with the biggest water users, reviewing their water saving programs as a precursor to a water audit.
 - **Focus on Energy.** Waukesha will continue to work with Focus on Energy to identify opportunities to reduce water use. Potential programs include assisting hotels in installing low flow showerheads and working with restaurants to install high pressure hand sprayers.
 - **Phase out sewer credit meters for outdoor water use.** Currently, the City gives a credit to water users who meter water that does not get treated by the wastewater treatment plant through the use of meters that measure water use that does not go through pipes to the wastewater system. The City intends to revise its wastewater ordinance to phase out the use of sewer credit meters over a three year period. New sewer credit meters would no longer be available to be installed and the credit system would be phased out over a three to five year period. Meters would then be removed as part of the water meter change out program.
2. *What were the average daily and annual water volume amounts supplied to the Waukesha Water Utility's customers in the years 1995, 2000 and 2005? What were the top 20 major water users for those years (other than residential users)?*

The data in the following table is the data we had available on our current computer system. Additional data would need to be retrieved from our archives off site.

There has been a decline in water intensive industry in the City of Waukesha, especially prior to 2003. Some of the additional declines in industrial water use can be attributed to efforts to conserve water and electricity in the industries within the City. For instance, water saving fixtures have been upgraded; internal processes using water and electricity have been evaluated and optimized for maximum efficiency; and policy changes such as instituting no irrigation on premises have contributed a large effect on water use in some instances. There has also been employee involvement through suggestion boxes and conservation "fairs" at lunchtime for continued awareness and education. The Mayor of Waukesha and the Utility General Manager have meet with representatives from the 10 largest water customers to provide an awareness of the importance of the water conservation initiative and to get "buy in" for this effort.

(Continue to next page.)

	1995	1995 Usage	2000	2000 Usage	2005	2005 Usage
Total Annual Pumpage (GAL)	3,011,475,000		2,836,140,994		2,838,403,020	
Average Day Demand (Million Gals/day)	8.25		7.73		7.78	
#1 User	Navistar International	175,700,000	Navistar International	223,175,000	International Truck & Engine	75,014,600
#2 User	Cooper Power	97,000,000	Golden Guernsey	59,875,500	Golden Guernsey	66,624,000
#3 User	Ventura/Holsum Foods	71,400,000	Cooper Power (North St)	56,980,500	Waukesha Memorial Hospital	54,200,000
#4 User	Waukesha Foundry	69,500,000	Waukesha Memorial Hospital	49,033,600	Ventura Foods	35,818,500
#5 User	Wisconsin Centrifugal	61,100,000	Ventura Foods	36,056,000	AGA Gas, Inc	29,268,400
#6 User	Golden Guernsey	53,300,000	Waukesha Foundry	36,050,500	Cooper Power (North St)	25,740,200
#7 User	Amron Corporation	47,000,000	Wisconsin Centrifugal	28,965,000	Metaltek Int'l	22,095,000
#8 User	Waukesha Engine	38,200,000	AGA Gas, Inc	24,349,800	Waukesha Cty Courthouse	19,224,500
#9 User			Waukesha Engine	23,247,900	Waukesha Engine	17,982,700
#10 User					Waukesha Kramer	17,308,000
#11 User					Cooper Power (Badger Dr)	16,100,000
#12 User					Cooper Power Systems (Lincoln Ave)	13,825,100
#13 User					GE Medical Systems	7,341,000

3. *The Water Utility estimates that with water conservation measures, it will not use more water in future years than what it is currently using. What actions will the WWU take if water use estimates are exceeded? Will additional diversion requests be made? Would a current request be expanded?*

Our expectation is that, due to water conservation, the City of Waukesha's *per capita* use would not increase. We do not expect that the City of Waukesha's overall water use will not increase. In order to provide service to the defined service area, we anticipate that our average day demands would ultimately be 10.99 MGD and the maximum day demand would be 18.46 MGD.

Waukesha, as required by the Compact implementing statute and by prudent planning, will request sufficient water to meet its project needs. The City of Waukesha does not expect to make any additional requests for water other than the amounts necessary to provide water service to its ultimate service area as defined by SEWRPC. (See Attachment A for service area).

Waukesha will maintain and increase its conservation programs and their effectiveness.

4. *If Waukesha obtains Lake Michigan water, will it continue its water conservation programs? How will the water conservation program be monitored?*

Yes, Waukesha will continue its water conservation measures. They will continue to be monitored for effectiveness, as they are today. Water usage is easily measured. Water supply volumes will be reported to Wisconsin DNR, as required.

5. *How much of the decline in usage cited in the article is due to the loss of water-intensive industry that has left Waukesha? Does your utility have stats on this?*

Approximately 20% of the latest reduction is attributed to declines in industrial usage. Approximately 60% is due to reduced residential usage. The following narrative and table summarizes the history of water use.

Since 1997, the total water use for the industrial, commercial and residential classes has decreased approximately 427,383,000 Gallons. Approximately 400,978,000 gallons (94%) of this reduction is attributed to annual industrial usage. However, the 1997 industrial class averaged 16,384 gallons per day, and in 2008 it averaged of 7,108 gallons per day for a 56% reduction.

32,843,000 gallons (7.5%) of the annual reduction is from residential usage. However, in the residential class in 1997, we had an average of 48.6 gallons per capita per day and, in 2008, we had an average of 42.4 gallons per capita per day, or a 12.8% reduction.

Annual commercial usage actually increased over that same 1997-2008 time period by 6,438,000 gallons (+1.5%) overall. However, water use per customer declined in the commercial class. In 1997, we had an average of 458,718 gallons per customer per day. In 2008, we had 363,436 gallons per customer per day, or a 20.8% reduction.

In 2006, the Waukesha Water Utility implemented its comprehensive water conservation program. Our first initiative in 2006, once our conservation plan was adopted, was to enact a sprinkling ordinance that would affect all customer classes. This ordinance was targeted at reducing our peak demands and overall reducing our average day demands. We were successful in both areas, as illustrated in these statistics:

- In 2005, our average day demand was 7.8 MGD and our peak day demand was 12.9 MGD.
- In 2008, the average day demand was 6.9 MGD and our peak day demand was 9.9 MGD.

Looking at the water usage from 2005 (the year before the conservation program was introduced) until 2008, the total water use for the industrial, commercial and residential classes is down approximately 230,182,000 gallons.

In other words, in a three year period under the new conservation program, the reduction in water use was almost half the amount seen in the previous twelve years. The majority of this reduction came from the residential class.

Only approximately 46,106,000 gallons (20%) of the latest reduction is attributed to declines in industrial usage while 137,201,000 (60%) is due to reduced residential usage. Commercial usage increased over that same time period by 46,875,000 gallons (20%). But please note that average *per customer* use did decline in each of the classes, as described in the previous sections.

Based on these numbers and the reduction in peak demands since 2005, the Waukesha Water Utility conservation plan has proven to be extremely successful in achieving the goal of reducing residential class water use.

	Number of Industrial Customers	Industrial Usage (1000 Gallons)	Number of Commercial Customers	Commercial Usage (1000 Gallons)	Number of Residential Customers	Residential Usage (1000 Gallons)	Total Population	Res. Use (gcd)*
2008	147	382,412	2,277	827,543	16,890	1,056,650	68,030	42.4
2007	141	404,079	2,264	846,566	16,677	1,086,542	67,880	43.9
2006	144	424,603	2,235	858,062	16,501	1,077,127	67,750	43.6
2005	144	428,518	2,189	874,418	16,295	1,193,851	67,850	48.2
2004	144	435,004	2,141	854,624	15,983	1,117,325	66,816	45.7
2003	144	461,885	2,112	895,850	15,686	1,176,115	66,807	48.2
2002	143	612,856	2,101	914,138	15,508	1,185,745	66,237	49.0
2001	142	586,552	2,038	874,030	15,209	1,128,475	65,324	47.3
2000	138	660,364	1,952	848,664	14,754	1,067,184	64,825	45.0
1999	137	722,097	1,925	847,914	14,593	1,112,499	63,027	48.8
1998	135	796,217	1,891	837,823	14,327	1,109,478	62,197	48.9
1997	131	783,390	1,790	821,105	13,946	1,089,493	61,358	48.6

* gcd indicates Gallons per Capita per Day

6. *How much has the actual reduction in per capita residential usage been? Does you utility have stats on this?*

Please refer to the data in the table above. The number of residential customers continues to increase, but the total water usage by residential customers has declined since our conservation programs began. In 2005, the year before the conservation program began; the City of Waukesha had a per capita water use of 48.2 gcd (gallons per capita per day). In 2008, that usage was reduced to 42.4 gcd, a reduction of 12%.

We have also seen industrial use decline as industry has left the City and as remaining industries have conserved. In 1997, we had 131 industrial customers. In 2008, we had 147 industrial customers, or a 12.2% increase.

The commercial customer class, which in this table also includes multi-family units, has the highest rate of growth in numbers of customers. In 1997, there were 1790 commercial accounts. In 2008, that number increased to 2277 commercial accounts, or a 27.2% increase. Note that usage has also declined in this class since the beginning of our formal conservation programs in 2006: from 874,418,000 in 2005 to 827,543,000 in 2008. This is a 5.8% decrease, as the data above shows.

The residential customer class had 13,946 accounts in 1997 and 16,890 accounts in 2008, or a 21.1% increase. However, as discussed previously, the residential class had a 12% drop in water usage.

7. *What was the contribution of precipitation to that change in residential usage cited in the article? As an example, the precipitation for all of 2005 was 32.8 in, while that for 2008 was 45.1 (a 38% increase). [Note these rainfall figures are over the entire calendar year--not just growing seasons--and are for southern Washington County]. To me, that rainfall pattern seems that it could easily account for the 12% drop in water usage from 2005 to 2008 as in wetter years people don't water their lawns as much, clean their cars, etc. I'm not entirely negating all of your conservation efforts, but just wanted to get a better understanding of the situation. Do you have more data on residential and industrial water usage declines that can be correlated with yearly or seasonal rainfall events?*

	2004		2005		2006		2007		2008	
	Precip (Inches)	No of Precip Events	Precip (Inches)	No of Precip Events	Precip (Inches)	No of Precip Events	Precip (Inches)	No of Precip Events	Precip (Inches)	No of Precip Events
May	9.44	17	2.86	9	4.63	10	2.05	10	2.23	9
June	5.11	11	2.19	6	2.18	7	4.01	6	10.27	12
July	2.02	11	2.69	7	3.74	9	2.95	8	4.08	5
August	4.35	8	1.18	2	4.49	10	7.45	15	1.04	8
September	0.13	1	3.64	5	2.98	10	1.51	4	4.07	6
Total	21.05	48	12.56	29	18.02	46	17.97	43	21.69	40

See the table above. We will assume the precipitation is in the form of rain for the months in the table.

The total number of the rain events in a given year is one indicator of potential water use. However, daily totals of rainfall are our best indicators of the potential water demand. If we receive precipitation every other day, we normally will not see an increase in outdoor use. When there was a long period between rain events, then there will be an increase in outdoor use.

In 2004, we experienced heavy rain with a similar frequency and intensity to the rain events we saw in 2008. However, despite similar rain, usage in 2008 was down 7.9% overall from 2004 during the summer months and down 6.2% for the year. Our average day in 2004 was 7.37 million gallons. Our average day in 2008 was 6.91 million gallons. Our residential usage declined 5.7% from 2004 to 2008, while our population increased. Residents are conserving, which we attribute to our conservation plan.

(Continue to next page for next section.)

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 minimize 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.**
1. *Waukesha proposes to send Lake Michigan water to the Fox River and the Mississippi River basin if water flows in the receiving streams (e.g. Underwood Creek) are high. It further proposes to “make up” for this lost return flow by including infiltration and inflow (I & I) and waste water from the Mississippi River basin in calculating the return flow volume to Lake Michigan. What data is the city of Waukesha depending on to assume that inflow and infiltration will help meet return flow “volume” requirements to a Lake Michigan tributary via a proposed diversion application that would send wastewater down the Fox River during high flow events? More importantly, how does this proposed approach conform with the legal requirements of the Great Lakes Compact?*

Waukesha is continuing to review the return flow options. It is our current preference to return water to the Lake Michigan source watershed at all times. During significant rain events that raise the level of the receiving stream near two year levels, our preferred option is to limit the amount to the long term average daily water use minus consumptive use.

Waukesha has data for treated wastewater discharge and water pumping going back decades. We conducted an analysis of the data from 1988 to 2008. In every year, there has been a surplus of water (more water treated and discharged than pumped). The average of this annual surplus was approximately 20%. Generally, years with more

precipitation are years when there is a greater amount of wastewater discharge. This is in part due to infiltration of stormwater into the wastewater system (Waukesha has no combined sewers).

The Compact is very clear in recognizing that wastewater treatment plants often treat more water for discharge than is drawn for public supply. The use of this surplus is recognized in the Compact in Section 4.9, subsection 1a:

- a. All Water withdrawn shall be returned, either naturally or after use, to the Source Watershed less an allowance for Consumptive Use. No surface water or groundwater from outside the Basin may be used to satisfy any portion of this criterion except if it:
 - i. Is part of a water supply or wastewater treatment system that combines water from inside and outside of the Basin;

Further, Waukesha's management plan approach will optimize the positive environmental benefit of the return flow while ensuring that water is returned to the source watershed.

2. *What is the basis for the assertion that there is a 20% increase in treated wastewater effluent from groundwater leaking into conveyance pipes (infiltration)? Is the Waukesha Wastewater Treatment Plant currently discharging into the Fox River 20% more water than it pumps from the deep water aquifer for its water supply? Is there data to back this up?*

Yes. The Waukesha Wastewater Treatment plant treats and discharges about 20% more water than the Utility pumps for a water supply. The actual volume of wastewater treated and discharged from our wastewater treatment plant exceeded the amount of water provided to the Waukesha Water Utility customers by an annual average of 18% from 2002 to 2006, according to water and wastewater utility records.

3. *If I & I occurs between the wastewater sources and the wastewater treatment facility, then isn't it also likely that sewage is leaking out? How would this be measured? What is the incentive to repair leaky pipes if I & I is being counted on to meet return flow?*

In this area, sewer pipe leakage is typically groundwater leaking *into* the pipes (infiltration), as opposed to out of the pipes (exfiltration). The sewer lines are typically installed below the water table. The surface of the groundwater is at a higher elevation than the water in the sewer, so groundwater flows into the sewer versus sewage flowing out. Sewer pipes are more likely to leak when the pipe is installed above the water table.

Inflow and infiltration (I&I) is something that occurs in all sanitary sewer systems. Over time, there are leaks into any sanitary system at points where lateral pipes connect to sewer mains. Further, water enters the system through manhole covers. There may also be illegal connections conveying rain water to the sewer system from individual homes.

There is a strong monetary incentive for every municipality to reduce I&I. All water that enters a treatment facility must be treated, which increases chemical and energy consumption and future capital costs, as treatment units must be built large enough to treat the total flow. Treating significant amounts of water entering the system has costs that are not recovered through the billing system. Reducing I&I reduces capital and operating costs for a wastewater facility. Minimizing inflow and infiltration also increases the lifetime capacity of a treatment facility and wastewater transportation system. Thus, there is an incentive to minimize I&I.

Waukesha is currently reviewing the I&I issue and developing a new I&I reduction plan that will target areas where I&I is particularly high.

4. *How would return flow to Lake Michigan be monitored? Over what interval? Daily? Monthly? Yearly? A 5-year average? How will this be regulated to protect the resources on both side of the divide?*

The return flow will be managed through a detailed operations and management plan that includes constant monitoring of the return flow. The information would be monitored in an ongoing basis to ensure that goals are being met and allow for changes to address ecological or accounting needs. We are examining the best location for monitoring the return flow accounting. This would be accomplished by metering the water through the pressurized portion of the return flow pipeline. The return flow plan will ensure that there is adequate return flow going back to the Lake Michigan watershed to meet the requirements of the Compact in a way that optimizes the use of water resources on both sides of the divide.

Our preferred management plan option is to return at least the estimated amount of water taken from the lake on any day, minus consumptive use. When combined with the wastewater discharge surplus on lower flow days, this would ensure that the return flow requirements of the Compact are met.

5. *Drought Condition Concerns:*

- a. *If I & I is to be used to offset/compensate for the Lake Michigan water sent down the Fox and into the Mississippi River during periods of high flow, what will happen during drought years when little to no I/I is available?*

Even in years of low precipitation, there has been a surplus of wastewater discharged, although the amount of the surplus is lower. As an example, in 2003, wastewater discharged was only seven percent higher than the amount of water withdrawn. Under our preferred management plan option – returning at least the estimated amount of water taken from the lake on any day, minus consumptive use – should allow enough flexibility to meet return flow requirements. This, combined with the wastewater discharge surplus, would ensure that the Compact’s return flow requirements would be met

- b. *Might there be a scenario where downstream Fox River communities compete with one another (or with return flow communities) for water for drinking water supply or recreation during drier summer months? What steps would be taken to prevent this*

from happening? When and what factors will be considered when making decisions about where to send the return flow? Will impacts on aquatic and natural resources of the receiving streams be considered in this scenario?

The best way to prevent competition is to design an effective management plan and to use adaptive management to ensure that it is flexible enough to address environmental needs. The primary driver for the plan will be return flow of water to the Lake Michigan source watershed. The Compact requires that Great Lakes water be returned, minus consumptive use, to the Great Lakes basin.

The intent of the management plan is to maximize the positive impacts on aquatic and natural resources of the receiving streams to the extent allowed in the context of meeting the return flow requirements of the Compact. Impacts on aquatic and natural resources are also a driver for the management plan, particularly in terms of providing additional flow for the new receiving stream, whether it be the Root River or Underwood Creek, or the Menomonee River. Given that the wastewater treatment plant treats more water than the Waukesha Water Utility pumps, there is additional annual flow that can be utilized to address changing environmental needs for the Fox River within the limits of Compact return flow requirements. The management plan would be adapted to meet changing conditions, including ecological, environmental and hydrological factors within these constraints.

The amount of flow on the Fox is currently quite limited during drier periods, even with the discharge of Waukesha's treated wastewater into the river. The limited nature of this flow limits the potential use of the Fox River as a water source at or near Waukesha. The Waukesha Future Water Supply Study states: "the Fox River is not suitable as a single reliable source of water for the existing or future utility service area. Review of historic data indicates that adequate dry weather flow, including allowance for base, would have been available for only 4 of the past 20 years." (Future Water Supply Study, <http://www.ci.waukesha.wi.us/web/guest/futurewatersupplyinfo>, p. 2-13).

There are very few communities that draw water from the Fox River. The ones that we are aware of are in Illinois. However, at the point where communities in Illinois use the Fox River for water supply, the flow has a significantly larger upstream watershed area from which to draw water. Additionally, their river-based supply is just one portion of their overall water supply (i.e., include groundwater wells).

The Illinois State Water Survey has already looked at the Fox River flow with and without a Waukesha discharge. In an October 2008 presentation to the Northeastern Illinois Regional Water Supply Planning Group, "Effects of Future Water Demands and Climate Change on Fox River Water Availability," a representative from the Illinois State Water Survey indicated that the reduction of Waukesha's discharge will not have any long term impact on Illinois water resource availability from the Fox River.

To the extent that the Fox River is receiving benefits from Waukesha's discharge today, it is at the expense of a drawdown in the deep aquifer that is environmentally

unsustainable and that is having significant negative environmental impacts on surface waters throughout the region.

6. *Flooding Condition Concerns:*

- a. *Given the recent years' extreme flooding conditions in southeastern Wisconsin (closing I-94 for weeks in 2008), there will undoubtedly be pressure, at times of future flooding from the Fox, to pass water through to the Underwood Creek or another return flow stream. What will be done to prevent this from happening?*

The Fox River has greater capacity than Underwood Creek to handle stormwater and is currently handling 100% of Waukesha's treated wastewater, so we do not agree that there would be pressure to avoid discharges to the Fox River. The amount of water, if any, that the Waukesha WWTP would discharge under the management plan to the Fox River during storm events is very small relative to the water flowing in that river as a result of the storm event. For example, during a 100 year storm event, returning the average day use for Waukesha would amount to less than 1% of the entire flow. Therefore, Waukesha's discharge does not and will not significantly raise the level of the stream from its current flood stage conditions.

The management plan, as envisioned, would set requirements for how much treated wastewater would be discharged to a Lake Michigan tributary. Under our preferred option, Waukesha will return at least the estimated amount of water taken from the lake on any day, minus consumptive use to the Lake Michigan source watershed. If the flow on the stream is above a predetermined level, the portion of the discharge representing the amount of water entering from the Fox River watershed will be discharged to the Fox River under the return flow management plan.

- b. *What happens when both the Fox and Underwood Creek are at or exceeding flood stage, as happened in 2008 as well as 1997-1998?*

Under the management plan, when the flow of Underwood Creek is above a predetermined level, Waukesha's preferred option is to discharge the estimated amount of water used that day, minus consumptive use, to Underwood Creek. The remainder would be discharged to the Fox River, which is the current location of Waukesha's discharge (Similar levels would be set for the Root River, if that is chosen as the return flow route instead of Underwood Creek). In other words, Waukesha is proposing to return at least the estimated amount of water taken from the lake on any day, minus consumptive use. Since the Fox River is the current location of discharge, including during rain events, there will be no increase in what occurs presently when water is discharged to the Fox River.

- c. *MMSD has spent over one hundred million dollars on flood management in the Milwaukee County Grounds and western Milwaukee areas. Wauwatosa has spent tens of millions of dollars to prevent flooding of their downtown area along the Menomonee River and acquired and demolished dozens of flood-prone homes. There are still flood-prone structures in the downtown that future MMSD projects may address or the city will have to address. How will this proposed increase in return flow to Underwood Creek protect or affect those past and future investments?*

In consultation with MMSD and DNR, we are working to develop a return flow management plan that ensures that return flow will not impact those investments. As an example, it is our understanding that the County Grounds project is designed to address events above the approximately 25% probability storm event. We are proposing to return the estimated average amount of water used per day, minus an allowance for consumptive use to Underwood Creek but when the stream reaches a predetermined level we will discharge the remainder to the Fox River.

- d. *The City of Wauwatosa must meet certain FEMA rules with respect to managing peak flow stages. Isn't increasing the flow in Underwood Creek by approximately 39% going to increase this flood stage?*

Given that a portion of Waukesha's discharge may go to the Fox River during peak flood stages, the Underwood Creek flow should be unaffected.

- e. *Who will assume liability from adverse impacts from return flow, including problems associated with safety from increased flows, flooding issues, potential basement back-ups, etc?*

There is no current liability, as described in this question, for wastewater treatment plants with regard to increased flows on a stream. Waukesha would face the same liability that any Wisconsin wastewater treatment plant currently faces. Waukesha's discharge would be in accordance with the approved permit and would meet the requirements set forth in state law and the Great Lakes Compact.

- f. *What is the planned route for piping the return flow to Lake Michigan? How long would the pipes be? What are the projected economic and environmental impacts and costs for construction? Maintenance and operation? How long until the project is expected to be fully operational? Who would maintain it?*

Specific routes for the return flow are currently under review. We are examining return flow to Underwood Creek, the Menomonee River, the Root River, directly to Lake Michigan and through MMSD. In all cases, it will be necessary to construct a pipeline, which would cost between about \$20 million and \$48 million, as described in Section I, Question 6. The routes will minimize environmental disruption and likely follow existing rights of way. Environmental impacts will be similar to those found in similar pipe and utility construction routes. The project would not be fully operational until 2015 at the earliest and the Waukesha Water Utility would be responsible for maintaining the pipeline.

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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.
1. *The Water Utility frequently states that it has spent approximately \$13 million for "radium compliance". Please itemize what has been done (and when) with the \$13 million that has been spent to date.*

Please see Attachment B for a complete list of the projects that were completed, the cost/anticipated cost of those projects and the additional annual operations and maintenance associated with those projects. The projects associated with new wells and well treatment include:

1. Well #3	\$1.47 Million
2. Wells #8, 11 and 12	\$4.17 Million
3. Well #10	\$3.31 Million
4. Well #13	\$2.17 Million

2. *As of March 7, 2007, the city and utility had received “in excess of \$2 million” in federal funds for radium compliance. Have additional federal funds been received or promised? When and how much? Please itemize when and for what those funds were used?*

The following is the list of federal funding the City of Waukesha has received to date with the assistance of Senator Kohl and Representative Sensenbrenner:

- In FY 2005, Congress provided \$1,250,000 in direct appropriations.
- In FY 2006, Congress provided \$800,000 in direct appropriations.
- In FY 2008, Congress provided \$600,000 in direct appropriations.
- In FY 2009, Congress provided \$300,000 in direct appropriations.

This money was used as follows:

- FY 2005 - \$750,000 for studies related to radium treatment and design and specifications related to construction of a radium removal plant.
- FY 2005 - \$500,000 for Well #3 radium removal facilities.
- FY 2006 - \$800,000 for Wells #8, #11 and #12 iron removal and blending facility.
- FY 2008 - \$600,000 for Well #10 radium removal facilities.
- FY 2009 – \$300,000 for the Crestwood Booster Station Upgrades or a water transmission main to move radium compliant water throughout the distribution system.

We have requested additional funds; however, we have not heard if we have been awarded funds at this time.

3. *If Waukesha continues to use the radium-contaminated wells for part of its water supply, how will it ensure that radium is not returned to the Lake Michigan basin?*

The Waukesha Water Utility will discontinue the use of the deep aquifer wells in order to aid in the recovery of the deep aquifer, once a new water supply is developed. Therefore, there would be no radium in its wastewater.

4. *In Waukesha’s PowerPoint presentation Figure E2 only contains data through 1990. More recent data on aquifer levels is apparently available. Will you provide us with that information?*

We do not have any additional data for this map as it was developed by the USGS.

5. *Would Waukesha consider financially supporting communities east of the Divide to go off the deep aquifer?*

Waukesha is committing significant financial resources to ensure that its new water supply is the most sustainable option and is reluctant to offer financial support to other communities. The SEWRPC report recommends that other communities also end their use of the deep aquifer.

6. *Waukesha appears to be able to reduce radium levels in its water supply through most of the year (11 months). What would Waukesha need to do to comply with radium levels for the one month that it is out of compliance? What are the costs of complying with radium standards for that one additional month? Why is this option not being pursued?*

This question incorrectly assumes that radium is the only water quality problem associated with the use of the deep aquifer. In fact, radium is only one of a growing number of water quality and quantity problems with this water supply. The Utility has also pumped water with temperatures as high as 98 degrees. Some wells are drawing water that is essentially salt water due to increasing levels of contaminants. Continued use of the deep aquifer will increase the levels of the contaminants. Contaminants that we have encountered so far include: radium, dissolved solids, and inorganic compounds.

The question also ignores the negative impacts on surface waters from the drawdown in the deep aquifer. That drawdown continues to worsen, at a rate of five to nine feet per year.

In addition, pumping water from these depths wastes large amounts of energy and increases costs.

In regard to radium, Waukesha is able to provide compliant water to its customers for 8 months out of the year. In order to come into compliance with the federal standards, the Waukesha Water Utility would need to be able to provide an additional 3 MGD in capacity as well as be able to provide enough water if our largest well, well #10, were to be out of service. This is an additional 3.5 MGD. This would require us to install treatment at deep aquifer wells #6 and #7, as well as develop a well field south of the City with a minimum capacity of 3.5 MGD (Some of the drafters of these questions have said the well field to the south should not be relied on as a long term daily source and the City of Waukesha agrees). The preliminary cost estimates for these projects are close to \$20 million, including the necessary infrastructure.

Regardless of costs, however, continued use of the deep aquifer would only perpetuate the increasing environmental harm to surface waters in the area.

The drawdown in the deep aquifer reduces needed groundwater flow and discharge to surface waters throughout southeastern Wisconsin. Pumping from the deep aquifer in the seven county region of southeastern Wisconsin is approximately 33 million gallons per day. This drawdown in the deep aquifer has created a cone of depression of about 600 feet. 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) indicate that this water comes from several sources (http://wi.water.usgs.gov/glpf/cs_pmp_src.html).

These include:

- 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%).

This has significant negative impacts on surface waters. Surface streams are deprived of flow and groundwater supplies because of the cone of depression. On the other hand, ending the use of the aquifer will help it 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. Continued use of the deep aquifer, on the other hand, will continue or worsen the current harmful environmental impacts.

Ending the use of the deep aquifer should be a top environmental priority for southeastern Wisconsin. That is why 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.

(Continue to next page for next section.)

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.

1. *Mercury and chloride concerns:*

- a. Will the Waukesha POTW act to eliminate or reduce mercury from its waste water discharge or is the current level of mercury to be passed through Underwood Creek and into Lake Michigan?*

The City of Waukesha is pursuing an aggressive mercury reduction program. It is one of 14 communities to participate in Wisconsin's Mercury Reduction Initiative. The City enacted a mercury minimization ordinance under which dentists have installed amalgam separators that separate the mercury from older dental fillings. The ordinance requires other organizations that handle mercury to develop mercury minimization plans. Waukesha County operates 4 hazardous waste collection sites in Waukesha county, one of which is in the City of Waukesha with set times for collection.

The wastewater utility has seen reductions of mercury in the wastewater over the last two years and anticipates further reductions in the future as the plans are further implemented.

- b. *MMSD and the DNR are attempting to eliminate mercury and chloride from waters in the region and Wauwatosa has adopted programs to reduce chloride use in its communities. The Waukesha POTW currently has been given a variance for mercury and chloride emissions in its wastewater treatment permit. Will the Waukesha WWTP voluntarily forego its variances and meet the more stringent standards for mercury and chloride discharge, to match those of the “new” receiving waters in Underwood Creek, the Menomonee River and Lake Michigan? Why or why not?*

We anticipate that the switch to a Lake Michigan water supply will result in City residents removing water softeners from their homes over time. This will reduce chloride levels in the wastewater discharged to from the wastewater treatment plant, and it will reduce the electricity use associated with softeners.

More than 9,500,000 pounds of salt (over 4,750 tons) are used each year to soften the hard groundwater.

Mercury is addressed in the prior answer.

2. *Are total loading of nutrients and other pollutants to Underwood Creek and Lake Michigan being considered in the permitting process?*

The City of Waukesha’s application will include an application for a WPDES permit, so loadings of nutrients and other pollutants will be considered. We are working with MMSD and the DNR in evaluating the water quality impacts of the treated wastewater discharge.

3. *What effluent limits would Waukesha need to meet to discharge to a restored Underwood Creek that fully meets the fishable and swimmable goals of the Clean Water Act? Who will be monitoring the effects of this treated wastewater on downstream waterways?*

The Wisconsin DNR has provided effluent limits for the discharge using current stream conditions (See Attachment C). Waukesha’s current effluent discharge limitations are similar to the existing WPDES permit. The current treated wastewater meets those discharge limits. With regard to monitoring, MMSD has a monitoring program in place and we intend to work closely with MMSD and DNR to evaluate impacts on the stream.

4. *What impacts might increased flows of Waukesha wastewater in Underwood Creek have on creek restoration efforts underway now or being planned by MMSD, the city of Wauwatosa, Milwaukee County Parks, and others?*

The use of a management plan will ensure that additional water is available to support these important ecological, hydrological, and environmental goals. The creek has been significantly impacted by the effects of urbanization, channelization, and concrete lining. The increased flows on Underwood Creek will likely have a positive impact on the current restoration efforts, as they would provide a beneficial environment for fish passage. We anticipate that future projects would take the increased flow into account during design phases, because its highs are higher and lows are lower than would otherwise be expected. 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. Additional flow from Waukesha will help meet that goal while stopping discharge during higher flow conditions in order to prevent any concerns about adding to potential flooding.

5. *How would returning flow to Underwood Creek affect the ability of parties to remove concrete channelization in the future?*

It is our understanding that the removal of additional concrete lining is a long term goal for MMSD. We do not anticipate return flow to impact concrete removal, given that it should not significantly affect water levels due to the management plan. The addition of Waukesha’s return flow would not significantly alter any current or future restoration efforts.

6. *Do the assumptions used about Underwood Creek’s capacity to absorb more flow take into consideration extreme runoff events of the kind seen in recent years?*

The assumptions do take into consideration extreme runoff events of the kind seen in recent years. Under the return flow plan, as currently envisioned, treated wastewater would be returned every day. However, during larger rain events, where the stream is at or near two year water levels, the volume of return flow would be limited to the estimated amount of water used that day by Waukesha, minus consumptive use. Models indicate that the increase in Underwood Creek from the return flow would be minimal, particularly relative to the large amount of stormwater that is the primary driver for the increase in the level of the stream

7. *What are the impacts of the treated wastewater on water quality of Underwood Creek, which is currently a variance water? Will monitoring be conducted to ensure that this effluent is not having a negative effect on downstream receiving waters?*

MMSD currently has an aggressive monitoring program for many of its waterways, including Underwood Creek. The City of Waukesha will work closely with the DNR and MMSD to evaluate these data. In addition, Waukesha is having discussions with MMSD to determine the best approach to model the water quality effects on Underwood Creek. The modeling results will be shared as they become available over the next several months.

8. *Does Underwood Creek, as a receiving water, contain the same base flow available in the Fox River to dilute pollutants to acceptable levels that ensure compliance with water quality standards?*

The Fox River typically has a greater volume of discharge than found in Underwood Creek. However, concentrations are typically higher in Underwood Creek, as compared to Waukesha’s wastewater, for the pollutants monitored under Waukesha’s WPDES permit. Wisconsin DNR provided effluent limits that indicates that the requirements for a discharge into Underwood Creek are within the wastewater treatment plant’s current capabilities.

9. *What data does Waukesha have showing the concentration or loading of each regulated pollutant in the receiving stream prior to addition of Waukesha’s effluent?*

We utilized the Underwood Creek Water Quality Baseline Report, 2003-2005. In addition, MMSD provides water quality monitoring data at its WaterBase site (www.waterbase.uwm.edu/mmsd/).

10. *How would the proposed discharge of wastewater impact existing efforts to create a Watershed Restoration Plan, including existing efforts to model pollutant source loading, for the Menomonee River?*

Waukesha is developing the return flow strategy so that it takes into account the watershed context 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 intends to work closely with MMSD and the Southeastern Wisconsin Watersheds Trust (SWWT) to develop a discharge management plan that supports the goals of the watershed plan. The enhanced flows are an important resource to support the restoration goals on Underwood Creek. Waukesha will work with MMSD and others to ensure that they have the necessary data to model loading.

11. *Underwood Creek is one of the flashiest streams in Wisconsin, and as such, poses a tremendous safety risk for local residents and fishermen. What are the impacts of the return flow on safety, especially during high flow events?*

Under low flow conditions, the impact of the return flow should not create safety concerns. The water level would be enough to provide enhanced flows for supporting the restoration, but not enough to create a new safety risk. Even if Waukesha were to discharge all of its treated water during significant rain events, the effect of the discharge flow would be less than a quarter of an inch – insignificant relative to the stormwater flows. However, Waukesha's preferred option is to limit the discharge during high flow events, not to discharge all of its treated wastewater.

At the average flow levels, the stream would increase about 3.3 inches as a result of Waukesha's discharge.

- a. *What steps will Waukesha take to prevent erosion?*

Waukesha intends to discharge the treated wastewater in a currently concrete lined section of the channel to minimize erosion risk. It is also proposing a management plan under which treated wastewater discharged to the tributary will be limited to an estimated amount of water used that day, minus consumptive use, during rain events at or about a two year stream level.

We recognize that the location of the outfall may, at some point in the future, be restored. We intend to work with MMSD to ensure that the outfall would be constructed and placed in a manner that would be easily integrated into a restored segment of the stream.

- b. *Who will pay for inevitable erosion damage/repair work?*

Waukesha does not believe that erosion damage would occur. The majority of erosion in rivers and streams occurs during storm events where the flow of the water is above what the river or stream would normally see. The management plan for return flow will be developed to minimize erosion risk. If there is the potential for erosion from a discharge, it will be the same as

that for all other outfalls in the state. The greater risk of erosion comes from runoff during extreme stormwater events. With the use of a management plan, Waukesha is proposing to limit discharge of treated wastewater under these conditions.

- c. *Riparian landowners are currently responsible to pay for maintenance costs/repair of banks? Will Waukesha be obligated to pay for these costs as well if erosion can be tied to increased flows?*

The increased flows are intended to support the ecological, hydrological and environmental goals of the restoration of Underwood Creek or the Root River. The proposed management plan will mean that there should be no increased risk of erosion because treated wastewater would be limited during storm events.

- d. *Who will be obligated for possible increased costs of removing concrete channel in the future due to increased flows?*

Waukesha's additional flows would be within the normal limits of the stream and, as such, removal costs should not be affected by increased flows from Waukesha's treated wastewater. To ensure this, Waukesha would work with MMSD to ensure that the management plan is consistent with concrete removal needs of the future.

As stated previously, MMSD's report states a need for enhanced flows to support the goals of the restoration. The treated wastewater would provide enhanced flows as a means to support this important watershed goal. This would be an overall positive for the Underwood Creek watershed.

(Continue to next page for next section.)

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.**
1. *What are the economic and environmental impacts on the Fox River of shifting all of Waukesha's wastewater from that river to a Lake Michigan tributary and/or for sporadically sending flow down the Fox River during times of heavy rain when Underwood Creek is at high flow?*

There will be minimal impacts on the flow of the Fox River during most times. There may be short term impacts during low flows, but, as discussed earlier, the Illinois State Water Survey projections to 2050 indicate that the loss of Waukesha's flows would not adversely impact flows downstream. Treated wastewater is currently discharged to the Fox during heavy rain events. The effect on the levels of the Fox will be no different in the future from what is occurring presently during similarly sized rain events.

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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.**

1. *How will the general public and local governments be involved in reviewing and commenting on the various water supply alternatives being considered by Waukesha?*

In his April 21, 2009 State of the City address, Waukesha Mayor Larry Nelson said, "I have publicly committed that Waukesha's application will not only be a role model for all the Great Lakes states, but we will also have a role model process. We began in January with a presentation by the DNR and author Peter Annin. . . . [W]e will continue the process with a series of open meetings that will allow ample opportunity for the council and public to ask questions."

The City intends to have several public forums where citizens will be allowed to comment and ask questions on our application. Once the application is submitted, we anticipate the DNR will have its own public meeting to allow for further public input. In addition, the application will be reviewed by the eight Great Lakes governors.

2. *As of January 5th, 2009, what communities have the City of Waukesha or its Water Utility had discussions with? What others do you intend to have discussions with? If one or more of these communities object to the full or a part of the plan, how will their concerns be factored into a decision?*

The City of Waukesha has met with officials from the City of Milwaukee, the City of Racine, the City of West Allis, the Village of Elm Grove and the City of Wauwatosa. We intend to meet with representatives from all of the communities that would be affected by the construction project to allow them an opportunity for input into the process. At this point we are planning to also meet with the City of Brookfield. If a community has an issue, we will work to address the issue in a reasonable manner.

3. *Have local governments (including local governments in Illinois) formally been advised of Waukesha's diversion plan?*

No, local governments have not been formally advised of Waukesha's diversion plan. That would happen as part of the public notice process as defined in state statutes for applications.

4. *What local government approval will Waukesha need to build and operate both the water supply and return flow systems?*

We would need an agreement with a water supplier.

5. *Has Waukesha met with Milwaukee Water Works about obtaining drinking water from the City of Milwaukee? Who will pay the costs of the construction, operation and maintenance of this infrastructure?*

No, we have not met with Milwaukee Water Works. We have met with officials from the City of Milwaukee. It would be the responsibility of the City of Waukesha to fund the improvements necessary to supply the water to its customers.

6. *Has Waukesha requested the Southeastern Wisconsin Watersheds Trust provide an independent review of the impact the proposed return flow discharge would have on local waterways?*

We have met with the SWWT and are currently working on a scope of services to provide additional modeling work for Waukesha. The Waukesha Water Utility also plans to become a member of the group to facilitate communication.

(Continue to next page for attachments.)