Appendix E

Facility Plan Amendment for Wastewater Treatment Plant Improvements for Returning Water Withdrawn from Lake Michigan

Facility Plan Amendment

Wastewater Treatment Plant Improvements for Returning Water Withdrawn from Lake Michigan

Prepared for

City of Waukesha

April 2010

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Facility Plan Amendment

Wastewater Treatment Plant Improvements for Returning Water Withdrawn from Lake Michigan

Submitted to

City of Waukesha

April 2010

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1. Background Information and Existing Conditions

1.1 Need for Proposed Project

Continued use of the deep aquifer as a water supply for the City of Waukesha and other communities in southeastern Wisconsin and northeastern Illinois is unsustainable because of decreasing quantity and increasingly poor water quality. Dramatic drawdown in the aquifer is exacerbated by the Maquoketa shale aquitard, which limits groundwater recharge in much of the region. The water quality withdrawn from the increasingly deeper parts of the aquifer has continued to degrade. For example, levels of radium (a naturally-occurring radioactive isotope known to cause cancer) and total dissolved solids become worse with aquifer depth.

To provide a permanent and sustainable source of clean water for its service area, the City of Waukesha is applying for a Lake Michigan water supply in their *Draft Application for Lake Michigan Water Supply* (Application). The Great Lakes Water Resources Compact (Compact) requires the City of Waukesha to return the water that it withdraws from Lake Michigan, less an allowance for consumption.

The City of Waukesha's wastewater treatment plant (WWTP) currently discharges to the Fox River, which is in the Mississippi River watershed. A Lake Michigan water supply would require a new outfall from the WWTP, for the return flow to the Lake Michigan watershed. This document identifies alternatives for returning flow to the Lake Michigan watershed for a Lake Michigan water supply, and is submitted as an amendment to the *Waukesha Wastewater Treatment Facility Plan* (July 1990). Additional facilities planning may be required beyond this amendment to evaluate WWTP capacity and potential improvements to meet future wastewater treatment needs.

1.2 Planning Areas

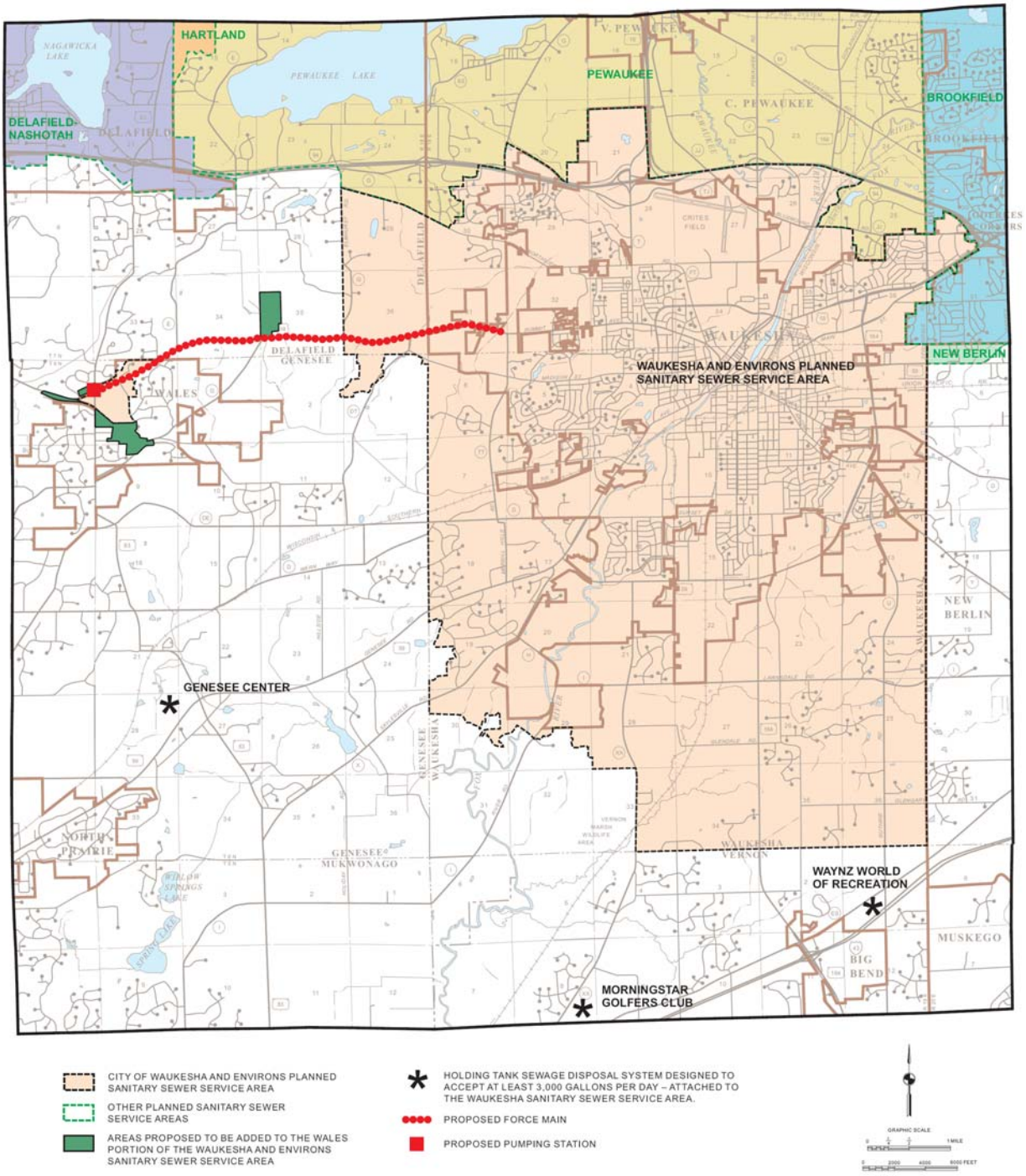
The sanitary sewer and water supply planning (service) areas are discussed below.

1.2.1 Sanitary Sewer Planning Area

The Southeastern Wisconsin Regional Planning Commission (SEWRPC) defined the planning area for the City of Waukesha sanitary sewer collection system.[1] The area consists of all the City and Town of Waukesha, and portions of the Brookfield, New Berlin, Muskego, Pewaukee, Delafield, Genesee, Mukwonago, Wales and Vernon. The area also includes some holding and septage tanks, such as the two tanks located at the Kettle Moraine High School. The sanitary sewer service area is shown in Figure 1.

[1] SEWRPC, Sanitary Sewer Service Area for the City of Waukesha and Environs. March 1999. (Amended February 2001, June 2002, September 2003, September 2004, September 2005, September 2006, and December 2007.)

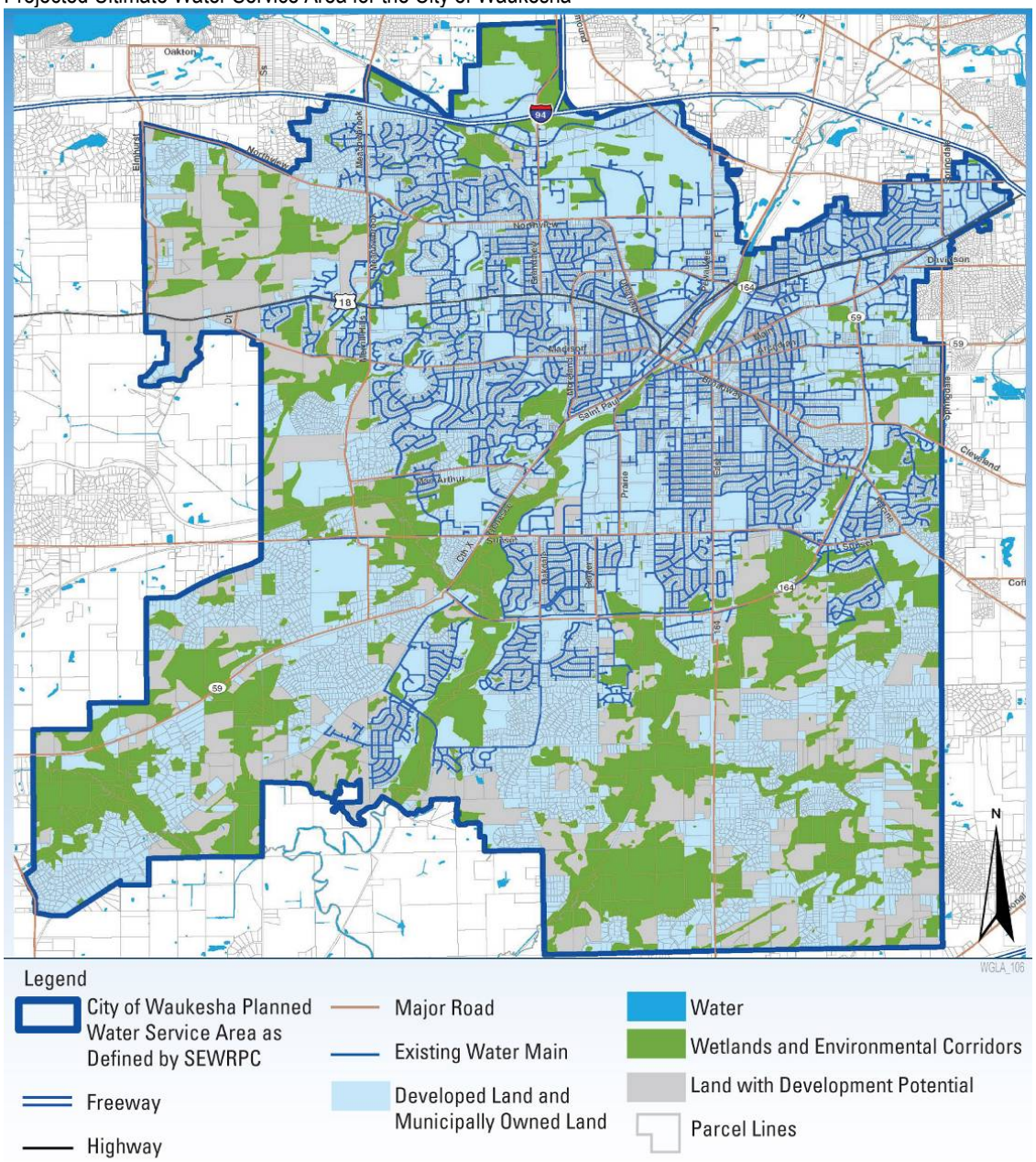
FIGURE 1
Sanitary Sewer Service Planning Area (SEWRPC, 2007)



1.2.2 Water Supply Planning Area

SEWRPC delineated a water supply service area which includes the City of Waukesha corporate limits plus a few small adjacent areas.[2] A detailed discussion of the water supply service area is included in Appendix D of the Application. The projected ultimate water supply service area is shown in Figure 2.

FIGURE 2
Projected Ultimate Water Service Area for the City of Waukesha



Source: Adapted from SEWRPC/Philip Evenson, Executive Director. 2008. Letter to Waukesha Water Utility/Daniel S. Duchniak, P.E., General Manager. December 23, attachment.

[2] SEWRPC, December 2008. *Water Supply Service Area for the City of Waukesha and Environs, Waukesha County, Wisconsin,* p. 2.

1.2.3 Comparison of Planning Areas

The planned water supply service area and the planned sanitary sewer service area are very similar, but there are three differences between them:

- A portion of the Village of Wales and three sewage holding tanks are within the planned sanitary sewer service area (Figure 1) but not within the planned water supply area. The total future population that may be served in the Village of Wales is estimated to be about 500 persons[3].
- An area south of Interstate 94 along Bluemound Road between the Fox River and State Highway 164 is within the City of Waukesha planned sanitary sewer service area but not in the planned water supply service area. The area is currently served by the City of Pewaukee's municipal water supply system but the sanitary sewer flow is treated by the City of Waukesha.
- A portion of the Town of Genesee along the State Highway 59 and County Highway X corridor, immediately west of the Town of Waukesha, is within the planned water supply service area but not in the sanitary sewer service area. This area does not currently receive drinking water from the City of Waukesha, but is planned to in the future because it is identified as a special well casing area by the WDNR due to groundwater bacterial contamination.[4] Sanitary sewer service for these water users is anticipated to be provided by onsite wastewater treatment systems. This area includes about 530 parcels.[5]

Because the differences between the planned water supply and sanitary sewer service areas are very small, SEWRPC concluded that the City of Waukesha planned water supply service area is consistent with the City of Waukesha sanitary sewer service area as incorporated in the adopted regional water quality management plan.[6]

To demonstrate the current small differences in the service areas, 2009 sanitary and water supply flow data was analyzed to compare the water balance between metered water supply data and metered sanitary sewer flow data. The total flow to the City of Waukesha WWTP from customers that only receive sanitary sewer services (i.e. customers that do not receive drinking water from the City of Waukesha but have their sanitary sewage treated by the City) averaged 0.51 million gallons per day (mgd). In comparison, the total water demand from customers that only receive drinking water from the City of Waukesha (i.e. customers that do not receive wastewater treatment from the City of Waukesha but receive drinking water from them) averaged 0.14 mgd. The difference between the two resulted in an average 0.37 mgd more sanitary sewer flow to the City of Waukesha than water supply. Compared to an average annual WWTP flow rate of about 10 mgd, the additional flow from the sanitary sewer service area is small (3.7 percent).

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[3] SEWRPC, *Sanitary Sewer Service Area for the City of Waukesha and Environs*, September 2006 and December 2007 Amendments. http://www.sewrpc.org/ publications/capr/capr-100_ssa_city_of_waukesha.pdf.

[4] SEWRPC, December 2008. *Water Supply Service Area for the City of Waukesha and Environs, Waukesha County, Wisconsin*, p. 3.

[5] City of Waukesha parcel data. March 22, 2010.

[6] SEWRPC, December 2008. *Water Supply Service Area for the City of Waukesha and Environs, Waukesha County, Wisconsin*, p. 3.

1.3 Wastewater Treatment Plant Effluent

The Wisconsin Pollutant Discharge Elimination System (WPDES) permit for the City of Waukesha WWTP is effective until December 31, 2012. The WPDES permit is included in Attachment A and is generally summarized in Table 1. The WWTP is an activated sludge treatment facility with tertiary dual media filtration (sand and anthracite) and ultraviolet light disinfection. The plant consistently produces high quality effluent that has very low BOD (biochemical oxygen demand), TSS (total suspended solids), NH_3-N (ammonia) and TP (total phosphorus).

A summary of the average monthly WWTP effluent concentrations is summarized in Table 2 (and discussed in more detail in Appendix H of the Application) and a summary of the average daily WWTP effluent flow over the last several years is shown in Figure 3. The average daily WWTP effluent flow ranges from about 9 to 12 mgd.

TABLE 1
General Summary of Current City of Waukesha WWTP WPDES Effluent Permit Limits

Parameter	Permit Limit
BOD_5, total	≤8.2 to 10 mg/L weekly (varies by season)
TSS, total	≤10 mg/L weekly
NH_3-N (ammonia), total	≤2 to 6 mg/L monthly (varies by season)
Dissolved oxygen	≥7 mg/L daily, (≥6.7 mg/L in September)
Total phosphorus (TP)	≤1 mg/L monthly
Fecal coliform	≤400#/100 mL monthly geometric mean (May–September)

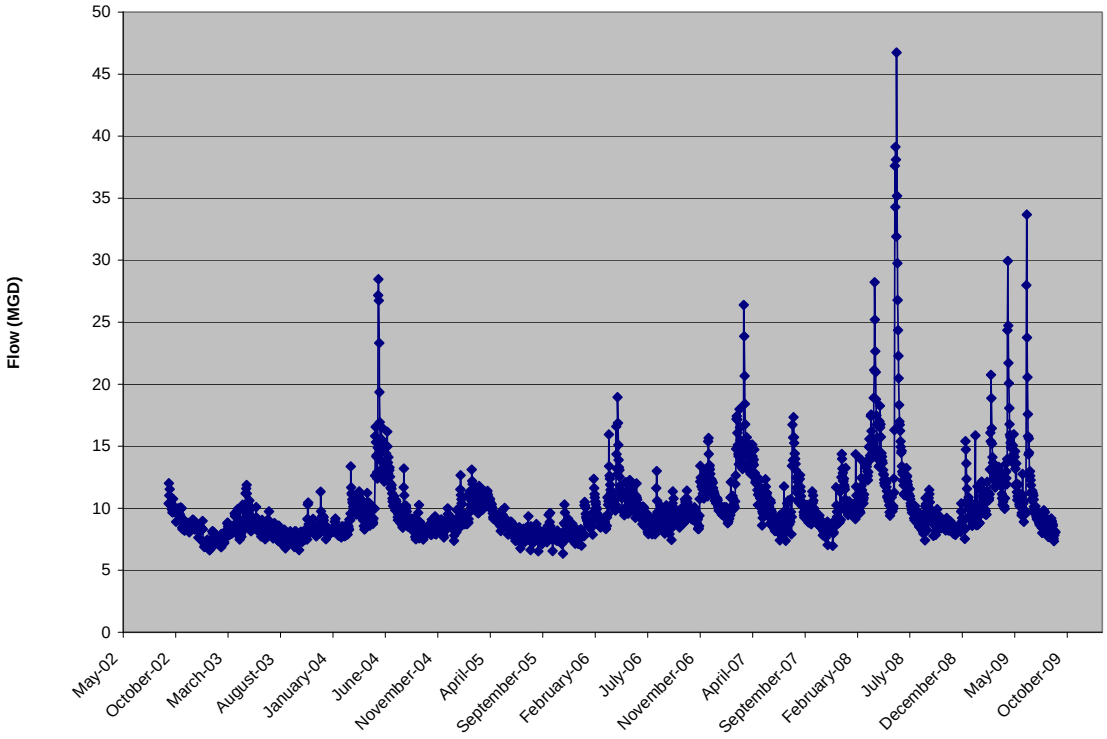
TABLE 2
Waukesha WWTP Average Monthly Effluent Concentrations (October 2002–August 2009)

Month	Flow (mgd)	BOD_5 (mg/L)	Ammonia (as N) (mg/L)	TP (mg/L)	Dissolved Oxygen (mg/L)	Temp (°C)	TSS (mg/L)	Fecal Coliform (cfu/100 mL)[a]	Copper (µg/L)[b]	Zinc (µg/L)[b]
Jan.	9.4	1.7	0.10	0.11	10.3	12.0	0.9	ND	6.6	42.0
Feb.	9.3	1.7	0.06	0.10	10.5	11.5	0.9	ND	12.4	48.6
March	11.3	1.7	0.14	0.12	10.4	12.3	1.1	ND	6.1	49.6
April	12.3	1.7	0.09	0.10	9.7	14.1	1.4	ND	8.6	22.0
May	11.5	2.0	0.20	0.12	9.0	16.4	1.2	2	7.1	45.7
June	12.1	2.6	0.14	0.21	8.2	18.8	1.8	49	6.1	30.5
July	9.2	1.8	0.05	0.16	8.0	20.6	1.0	2	6.1	29.3
Aug.	9.0	1.8	0.07	0.19	7.9	21.3	1.1	2	6.3	37.2
Sept.	8.8	2.1	0.10	0.21	8.0	20.8	1.0	2	8.7	39.0
Oct.	8.8	1.6	0.04	0.24	8.7	18.6	1.1	ND	5.7	36.6
Nov.	8.6	1.6	0.07	0.21	9.5	16.0	1.1	ND	6.7	33.8
Dec.	9.2	1.6	0.07	0.15	10.3	13.3	1.1	ND	9.3	47.4

[a]Geometric means were used for fecal coliform data. The numbers shown in the table represent the average geometric mean for each month.
[b]Data for copper and zinc between 2005 and 2009.

cfu – colony forming units; ND – no disinfection.

FIGURE 3
City of Waukesha WWTP Effluent Average Daily Flow



1.4 Infiltration and Inflow

The City of Waukesha has been implementing an aggressive infiltration and inflow (I&I) reduction program to reduce the amount of clear-water entering the sanitary sewer collection system. Like all communities with sanitary sewer collection systems, some I&I is observed in the City of Waukesha during wet periods and storm events. I&I contributes to the collection system flows during these times and subsequently receive the same treatment at the WWTP as do sanitary flows. The City of Waukesha's collection system and WWTP have adequate conveyance and treatment capacity to provide treatment of the I&I, but the City has continued the I&I reduction program to minimize the treatment costs associated with the I&I, and to minimize the I&I that could be part of the return flow.

Over the past several years many projects have been completed that contribute to reducing I&I, including sewer televising, smoke testing and dye tracing pipes and structures; replacing sewer laterals, cracked pipes and manholes; lining and sealing manholes and sewers; and identifying and correcting sump pump and foundation drain connections to the sanitary sewer. The City is continuing to investigate I&I throughout the collection system to prioritize projects that provide the most efficient I&I reduction. These efforts include sewer system modeling, in-pipe flow monitoring, sewer televising and smoke testing, and completing a sewer system evaluation survey (SSES).

2. Alternatives Identification

Five alternatives were considered for providing return flow to the Lake Michigan. Each alternative requires a pump station at the WWTP site to convey the return flow over the Lake Michigan watershed divide. The alternatives include:

- Alternative 1: Return Flow to Underwood Creek—Return treated wastewater effluent to Underwood Creek in Waukesha County, a tributary to Lake Michigan through the Menomonee River in Milwaukee.
- Alternative 2: Return Flow to Root River—Return treated wastewater effluent to the Root River in Milwaukee County, a tributary to Lake Michigan in Racine.
- Alternative 3: Return Flow Direct to Lake Michigan—Return treated wastewater effluent directly to Lake Michigan.
- Alternative 4: Return untreated wastewater to the Milwaukee Metropolitan Sewerage District for treatment and return to Lake Michigan.
- Alternative 5: Return treated wastewater to the Milwaukee Metropolitan Sewerage District for treatment and return to Lake Michigan.

The alternatives only considered a pump station at the WWTP site because there is available land owned by the City and it provides the least challenges for operation, maintenance, and implementation (compared to an off-site pump station location). Alternatives for a gravity return flow were not considered because it would require a very deep pipe that would require a tunnel for several miles, and would be much more expensive than the other alternatives that were evaluated in detail. The five alternatives are discussed below.

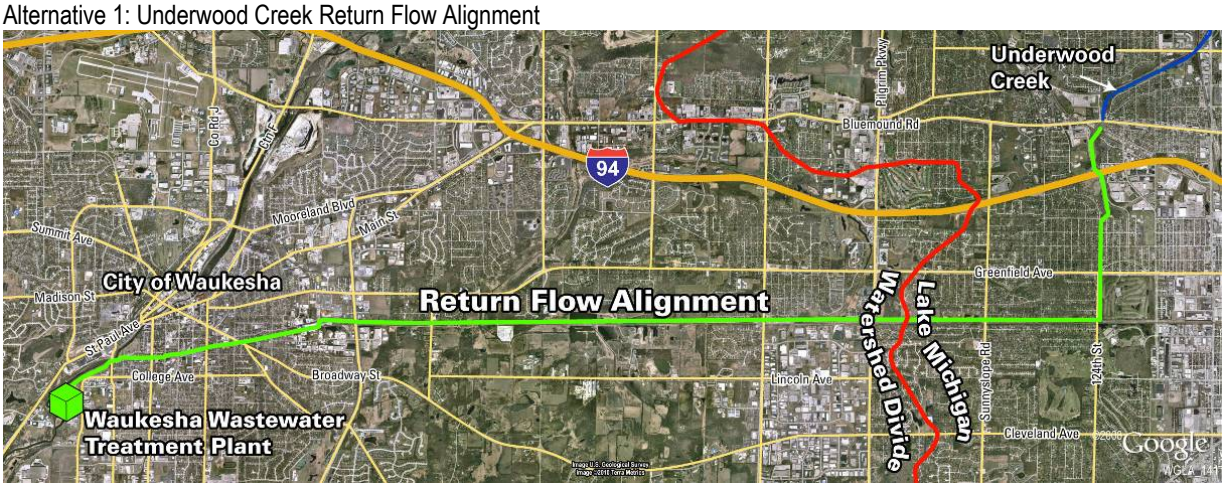
2.1 Alternative 1: Underwood Creek

Return flow to Underwood Creek is expected to occur in Waukesha County, near the crossing of Underwood Creek and Bluemound Road. From that location, Underwood Creek flows about 2.6 river miles to its confluence with the Menomonee River in Wauwatosa before flowing another 10 river miles to Lake Michigan in the City of Milwaukee.

A screening level layout was developed for the return flow pipeline (Figure 4). It begins at the City of Waukesha WWTP, and proceeds north and east through a City park and along an alley and minor streets for about 1.3 miles. The pipeline continues east for another 1.3 miles following an abandoned railroad corridor planned for a future recreational trail, where it joins with an utility corridor and bike trail and runs for another 7 miles. The pipeline continues north 1.9 miles along a street, bike path and Underwood Creek Parkway until it ends near the confluence of the north and south branch of Underwood Creek. In total, the pipeline consists of about 11.5 miles of 36-inch diameter pipe.

The return flow rate is based on the amount of drinking water supplied to the City of Waukesha. The return flow rate is anticipated to range from about 7.5 mgd to 13 mgd. Wastewater flow exceeding 13 mgd is anticipated to be discharged to the existing Fox River outfall.

FIGURE 4
Alternative 1: Underwood Creek Return Flow Alignment



The effect of the return flow on water quality, habitat and fisheries, and geomorphic stability in Underwood Creek were analyzed for the City's Lake Michigan Application. The return flow will have some impact on water quality, but will improve the water quality of Underwood Creek for some parameters (Appendix H in Application). The return flow will have a beneficial effect on habitat and fisheries (Appendix L in Application), and it will not negatively affect the geomorphic stability of the creek (Appendix G in Application). As discussed in the Application, the City will continue to meet current and future WDNR effluent limits for an Underwood Creek discharge.

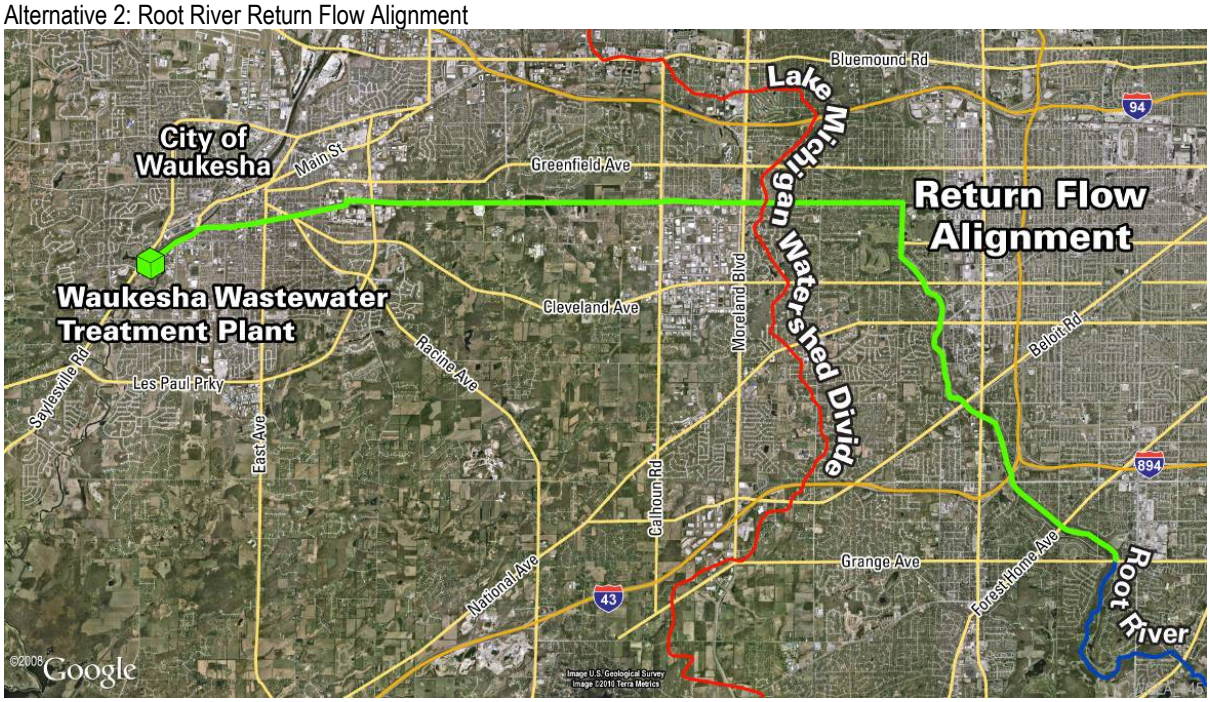
2.2 Alternative 2: Root River

The Root River flows through parts of Milwaukee and Racine counties, and into Lake Michigan at Racine, Wisconsin. The river has more natural channel (e.g., natural bottom substrate and vegetated river banks) than does Underwood Creek, and it has a mixture of land uses between its headwaters and Lake Michigan. The headwaters of the Root River are heavily urbanized, the middle reaches are primarily agriculture and lower density development, and the lower parts of the watershed near Lake Michigan are heavily urbanized.

The conceptual pipeline alignment for return flow to the Root River is the same as the pipeline for Underwood Creek for about the first 9.6 miles. Where the Underwood Creek pipeline heads north toward Underwood Creek, the Root River pipeline would head southeast for 6 miles toward the Root River (Figure 5) following streets, a parkway, and a bike trail. In total, the pipeline consists of about 15.5 miles of 36-inch diameter pipe.

The return flow rate is the same as the Underwood Creek alternative, and is anticipated to range from about 7.5 mgd to 13 mgd. Wastewater flow exceeding 13 mgd is anticipated to be discharged to the existing Fox River outfall.

FIGURE 5
Alternative 2: Root River Return Flow Alignment



The effects of return flow on the Root River are expected to be similar with Underwood Creek. The effects on water quality, habitat and fisheries, and geomorphic stability are discussed in Section 5 of the Application.

2.3 Alternative 3: Direct to Lake Michigan

A screening-level alignment for return flow directly to Lake Michigan was developed to evaluate the environmental effects and costs (Figure 6). The conceptual pipeline alignment is the same as that for Underwood Creek and Root River for the first 9.6 miles. Where the two pipelines diverge, the Lake Michigan alignment continues east about 11.2 miles parallel to a railroad corridor. As the alignment nears Lake Michigan, it continues east about 1.2 miles along a city street where it intersects with the Lake. The alignment extends into Lake Michigan about 0.5 miles to provide an offshore outfall. In total, the pipeline consists of about 23.5 miles of 36-inch diameter pipe.

The return flow rate is the same as the Underwood Creek alternative, and is anticipated to range from about 7.5 mgd to 13 mgd. Wastewater flow exceeding 13 mgd is anticipated to be discharged to the existing Fox River outfall.

FIGURE 6
Alternative 3: Direct to Lake Michigan Return Flow Alignment

The return flow will not negatively affect the habitat and fisheries, or the geomorphic stability of the lake. Water quality impacts to Lake Michigan are expected to be similar as the Underwood Creek and Root River alternatives because for all three alternatives, the return flow ultimately ends in Lake Michigan. This is discussed further in Section 5 of the Application.

2.4 Alternative 4: Return Untreated Wastewater to MMSD

This alternative includes constructing about 10 miles of 36-inch force main from the City of Waukesha WWTP to the MMSD collection system. The City of Waukesha's wastewater would combine with flow in the MMSD collection system and be conveyed to either of MMSD's two treatment plants.

The return flow rate is the same as the Underwood Creek alternative, and is anticipated to range from about 7.5 mgd to 13 mgd. Wastewater flow exceeding 13 mgd is anticipated to be discharged to the existing Fox River outfall.

The City of Waukesha would continue to operate a WWTP, to allow discharge to the Fox River during periods when sanitary sewer flow exceeds the maximum planned return flow rate of 13 mgd. To minimize out-of-basin water in the return flow (as required by the Compact), discharge of treated sanitary sewer flow would continue to the Fox River for the flow in excess of the maximum return flow. This intermittent operation of the WWTP would not be possible without significant modification of the existing WWTP processes.

Improvements to the MMSD collection system and treatment plants are likely required. The MMSD system is capacity limited during wet weather, so any flow returned to MMSD would likely require additional conveyance and treatment capacity equivalent to the return flow rate.

The Southeastern Wisconsin Regional Planning Commission included an alternative similar to this in its evaluation of return flow alternatives, but it was not recommended because the

cost exceeded that of return flow directly to Lake Michigan or to a Lake Michigan tributary.[7] Consequently, this alternative was not evaluated further for these reasons, and for those discussed above.

2.5 Alternative 5: Return Treated Wastewater to MMSD

This alternative includes the continued use the City of Waukesha WWTP for all discharges to the Fox River and return flow to MMSD. After the wastewater is treated at the City of Waukesha WWTP, the return flow would combine with flow in the MMSD collection system and be conveyed to either of MMSD's two treatment plants. The combined flow would receive treatment at the MMSD facilities for discharge directly to Lake Michigan. The same as the previous alternative, a 10-mile, 36-inch force main would convey the return flow from the WWTP to the MMSD collection system.

The return flow rate is the same as the Underwood Creek alternative, and is anticipated to range from about 7.5 mgd to 13 mgd. Wastewater flow exceeding 13 mgd is anticipated to be discharged to the existing Fox River outfall.

This alternative would be less challenging to implement than the previous alternative for providing untreated return flow to MMSD because the City of Waukesha's WWTP would operate continuously like its current operation (compared to the intermittent operation for only Fox River discharges as discussed in the previous alternative). However, it would still require the same capacity improvements to the MMSD system, which contribute to making this alternative much more costly than the other alternatives for return flow.[8]

Providing double-treatment of the return flow (first at the City of Waukesha WWTP and then at MMSD) is also an inefficient use of resources for no significant improvement in return flow water quality. As was with the previous alternative, this alternative was not evaluated further for the reasons discussed above.

3. Effluent Limits

The Wisconsin Department of Natural Resources (WDNR) has provided effluent limits (Attachment B) for a return flow using existing stream conditions for Underwood Creek and the Root River. The proposed limits are summarized below, and are very similar to those in the current WPDES permit (Table 1):

- Maximum effluent BOD and TSS concentrations between 5 to 10 mg/L
- Minimum effluent dissolved oxygen concentration of 7 mg/L.
- Maximum effluent TP concentration of 1 mg/L, but may decrease in the future with rules being developed.
- Limitations for NH_3-N ammonia nitrogen will be driven by effluent quality and would likely be more stringent than the maximum 2 to 6 mg/l in the current permit.

[7] SEWRPC. 2008. Planning Report No. 52: A Regional Water Supply Plan for Southeastern Wisconsin. Chapter 9, Page 37.
[8] Ibid.

- Limitations for mercury will remain as in the current permit (alternative limitations under NR 106.145). Limitations for other bioaccumulating chemicals of concern will not apply because they have not been detected.
- Limitations for chloride (alternative limitations under NR 106, Subchapter VII) and associated reduction requirements will continue.
- Disinfection, as currently applied, must continue.
- Specific provisions of NR 207.04(2)(a), that effluent limitations for an existing discharge, will remain unchanged if the treatment facility can meet those existing limitations. Existing effluent quality and permit limitations must be maintained.

4. Alternatives Analysis

The return flow alternatives considered economic and nonmonetary criteria for identifying the preferred alternative. These analyses are summarized below.

4.1 Economic Analysis

Cost estimates for the alternatives are summarized in Table 3 (details of the cost estimates are included in Appendix M of the Application). Cost estimates were developed for return flow to Underwood Creek, Root River, and direct to Lake Michigan. The cost estimates include a pump station at the City of Waukesha WWTP, a pipeline, and an outfall. The cost estimates were prepared for comparing alternatives based on information available at the time of the estimate. Detailed engineering design has not been completed. The final cost estimate of any project will depend on market conditions, site conditions, final project scope, schedule, and other variable factors. As a result, final project costs may vary from the estimates presented here. Cost estimates were not developed for the alternatives for return flow to MMSD because the alternatives were not further evaluated after initial screening, as discussed above.

TABLE 3
Cost Comparison for Return Flow Alternatives

Return Flow Alternative	Capital Cost[a]	Annual Operations and Maintenance	20-Year Present Worth	50-Year Present Worth
1: Underwood Creek	$56,174,000	$119,000	$57,539,000	$58,050,000
2: Root River	$75,963,000	$145,000	$77,627,000	$78,249,000
3: Direct to Lake Michigan	$109,848,000	$159,000	$111,672,000	$112,355,000

[a]Includes direct construction cost, contractor administrative costs (insurance, bonds, supervision etc), 25% contingency, and costs for permitting, legal, engineering, administrative.
Includes a 6% discount rate for present worth analysis.

Return flow to Underwood Creek is the least cost alternative primarily because it has the shortest pipeline and least amount of infrastructure. The Root River return flow alignment is more costly primarily because it requires about 4 more miles of force main and a more powerful pump station. The direct Lake Michigan return flow is the most expensive of the three alternatives primarily because it requires about 12 more miles of force main compared

to Underwood Creek, a more powerful pump station, and an offshore outfall into Lake Michigan. As discussed above, the return flow alternatives to MMSD were eliminated after initial screening and therefore detailed cost estimates were not completed.

4.2 Nonmonetary Analysis

4.2.1 Alternative 1: Underwood Creek

Underwood Creek has been adversely affected by urbanization but a return flow could provide improvements to the creek. Engineered stormwater infrastructure routes runoff into the creek, rather than allowing infiltration into the ground and then to the stream as subsurface flow, as in the past. As a result, stream baseflow has been reduced, particularly at low flows and drought periods. The MMSD is rehabilitating a 1-mile stretch of Underwood Creek by removing much of the concrete streambed lining and rehabilitating the watercourse to reestablish aquatic and wetland habitat. One goal is to improve fish passage, as described in *Underwood Creek Rehabilitation and Flood Management Project; Preliminary Engineering Design Project.* As described in Section 5 and Appendix L of the Application, the return flow could support the rehabilitation efforts and provide additional environmental improvements.

This alternative also has the shortest pipeline and therefore would result in the least amount of construction, traffic disruptions and noise.

4.2.2 Alternative 2: Root River

Similar to return flow to Underwood Creek, a Root River return flow could also provide benefits to the river. These are discussed in Section 5 of the Application.

This alternative is expected to have more impacts during construction because the pipeline is longer, it requires more infrastructure, and its construction will likely have a longer duration than a return flow to Underwood Creek.

4.2.3 Alternative 3: Direct to Lake Michigan

This alternative has the greatest construction impacts because it requires the most infrastructure. Besides the need for construction in Lake Michigan with this alternative, the impacts to Lake Michigan are expected to be the same as the previous alternatives because all the alternatives ultimately flow to Lake Michigan. However, return flow directly to Lake Michigan would have no environmental benefit beyond returning the water to the Lake Michigan, because the return flow would be conveyed in a pipe, instead of through surface water.

This alternative requires the most infrastructure and therefore is expected to have the most construction impact. The proposed alignment also follows a railroad corridor through highly urbanized areas, where construction is expected to be more difficult compared to the previous alternatives. The impacts of this alternative are discussed in more detail in Section 5 of the Application.

4.2.4 Alternative 4: Return MMSD Untreated Wastewater to MMSD

As discussed above, this alternative was not considered after initial screening. It is not considered a sustainable or viable option.

4.2.5 Alternative 5: Return MMSD Treated Wastewater to MMSD

As discussed above, this alternative was not considered after initial screening. It is not considered a sustainable or viable option.

5. Environmental Assessment

As part of the Application, an *Environmental Report* (Appendix N) has been completed that evaluates the environmental affects of the return flow alternatives. In summary, a return flow to Underwood Creek has the least environmental impacts, and it provides an environmental improvement to the habitat and fisheries within Underwood Creek. A detailed evaluation is included in the Application.

6. Recommended Plan

Return flow to Underwood Creek is the preferred alternative because it is least cost, it has the least infrastructure and construction impacts, it can provide an improvement to the habitat and fisheries in Underwood Creek, and it requires the smallest pump station at the City of Waukesha WWTP, which will have the least energy demand.

The City of Waukesha WWTP site is about elevation 800 feet. The highest point along the length of the return flow alignment is about 900 feet, and the discharge to Underwood Creek is about 720 feet. The pump station will be designed to overcome the static head of about 100 feet, plus the friction losses in the pipeline. A plan view of the WWTP site with a potential location of a new effluent pump station is shown in Figure 7 and the pipeline alignment to Underwood Creek is shown in Figure 8.

FIGURE 7
City of Waukesha WWTP Site Plan Showing Potential Location of a Return Flow Pump Station

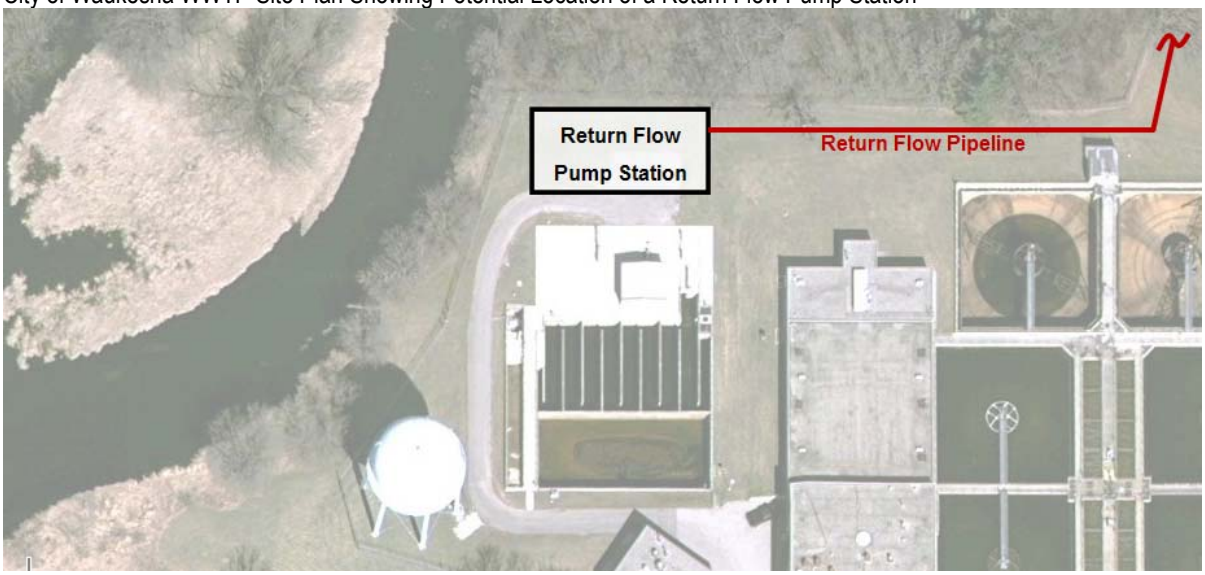


FIGURE 8
Underwood Creek Return Flow Pipeline Alignment

Attachment A

Current WPDES Permit

WISCONSIN
DEPT. OF NATURAL RESOURCES

WPDES PERMIT

STATE OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES

PERMIT TO DISCHARGE UNDER THE WISCONSIN POLLUTANT DISCHARGE ELIMINATION SYSTEM

Waukesha City

is permitted, under the authority of Chapter 283, Wisconsin Statutes, to discharge from a facility located at
600 Sentry Drive
to

The Southeastern Fox River in Waukesha County

in accordance with the effluent limitations, monitoring requirements and other conditions set forth in this permit.

The permittee shall not discharge after the date of expiration. If the permittee wishes to continue to discharge after this expiration date an application shall be filed for reissuance of this permit, according to Chapter NR 200, Wis. Adm. Code, at least 180 days prior to the expiration date given below.

State of Wisconsin Department of Natural Resources
For the Secretary

By _____
Timothy Thompson
Basin Engineer

May 9, 2008
Date Permit Signed/Issued

PERMIT TERM: EFFECTIVE DATE - June 01, 2008 **EXPIRATION DATE - December 31, 2012**

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1 Influent Requirements

1.1 Sampling Point(s)

Sampling Point Designation	
Sampling Point Number	**Sampling Point Location, WasteType/Sample Contents and Treatment Description (as applicable)**
702	Samples shall be taken ahead of the Parshall flume, after screening and grit removal. This sample point is ahead of recycle flows.

1.2 Monitoring Requirements

The permittee shall comply with the following monitoring requirements.

1.2.1 Sampling Point 702 - INFLUENT

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Daily	Continuous	
BOD_5, Total		mg/L	Daily	24-Hr Flow Prop Comp	
Suspended Solids, Total		mg/L	Daily	24-Hr Flow Prop Comp	
Mercury, Total Recoverable		ng/L	Monthly	24-Hr Flow Prop Comp	
Cadmium, Total Recoverable		µg/L	Quarterly	24-Hr Flow Prop Comp	
Chromium, Total Recoverable		µg/L	Quarterly	24-Hr Flow Prop Comp	
Copper, Total Recoverable		µg/L	Monthly	24-Hr Flow Prop Comp	
Lead, Total Recoverable		µg/L	Quarterly	24-Hr Flow Prop Comp	
Nickel, Total Recoverable		µg/L	Quarterly	24-Hr Flow Prop Comp	
Zinc, Total Recoverable		µg/L	Monthly	24-Hr Flow Prop Comp	

1.2.1.1 Sample Analysis

Samples shall be analyzed using a method which provides adequate sensitivity so that results can be quantified, unless not possible using the most sensitive approved method.

1.2.1.2 Mercury Monitoring

The permittee shall collect and analyze all mercury samples according to the data quality requirements of ss. NR 106.145(9) and (10), Wisconsin Administrative Code. The limit of quantitation (LOQ) used for the effluent and field blank shall be less than 1.3 ng/L, unless the samples are quantified at levels above 1.3 ng/L. The permittee shall collect at least one mercury field blank for each set of mercury samples (a set of samples may include combinations of intake, influent, effluent or other samples all collected on the same day). The permittee shall report results of samples and field blanks to the Department on Discharge Monitoring Reports.

2 In-Plant Requirements

2.1 Sampling Point(s)

Sampling Point Designation	
Sampling Point Number	**Sampling Point Location, WasteType/Sample Contents and Treatment Description (as applicable)**
101	Field Blank for Effluent Mercury
102	Flows that exceed the capacity of the expanded UV system and that have received preliminary, primary, secondary and tertiary treatment but not disinfection

2.2 Monitoring Requirements and Limitations

The permittee shall comply with the following monitoring requirements and limitations.

2.2.1 Sampling Point 101 - Mercury Effluent Blank

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Mercury, Total Recoverable		ng/L	Monthly	Grab	See 3.2.1.3

2.2.2 Sampling Point 102 - In-Plant Diversion

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Per Occurrence	Continuous	See 2.2.2.1

2.2.2.1 In-Plant Diversion Requirements

This permit includes a compliance schedule to conduct tests on the UV disinfection system to evaluate the need for future additional disinfection facilities. A proposed plan of action for necessary upgrade of the disinfection system shall be submitted at the end of the study, along with an implementation schedule. If a diversion occurs between May 1 and September 30, the following conditions and monitoring shall apply:

- Fecal coliform limit shall remain in full force and effect following any diversion around the UV system. Regardless of the permit required sample frequency for fecal coliform, within 24 hours following any diversion around the UV system, the fecal coliform of disinfected effluent, tertiary effluent before disinfection and final effluent shall be sampled. The facility shall demonstrate compliance by a mass balance to estimate the final effluent fecal coliform density as follows: $[FC]_{eff} = \{Q_{uv}[FC]_{uv} + Q_{bypass}[FC]_{bypass}\}/Q_{eff}$

  where:

  Q_{eff} = flow rate of final plant effluent
  Q_{uv} = flow rate of disinfected effluent
  Q_{bypass} = flow rate of bypassed tertiary effluent

$[FC]_{eff}$ = fecal coliform density of final plant effluent (CFU/100 mL)
$[FC]_{uv}$ = fecal coliform density of disinfected effluent
$[FC]_{bypass}$ = fecal coliform density of tertiary effluent before disinfection

- The flow rate of the diverted flow shall be submitted on the monthly Discharge Monitoring Report (DMR or eDMR). Also, the plant flow trend chart(s) covering the day(s) of the diversion, and indicating the duration of the diversion event, shall be submitted electronically, with the Discharge Monitoring Report form, or with the electronic discharge monitoring form certification, no later than the 15th of the month following the month of the diversion(s).

2.2.2.2 Wet Weather SSO

The Burr Oak lift station is located at 1861 Oakdale Drive and is equipped with an overflow pipe that could discharge extreme wet weather flows into a ditch that discharges into the Fox River. The WWTP personnel have the capability to remotely monitor activities at the Burr Oak lift station through the SCADA system.
Bypasses and overflows of wastewater from the City of Waukesha sanitary sewerage system, including discharges from lift stations are prohibited and are not authorized by this permit. The Department may initiate legal action regarding such occurrences as authorized by s. 283.89, Wis. Stats., as provided in item 6.2.6 of this permit.

3 Surface Water Requirements

3.1 Sampling Point(s)

Sampling Point Designation	
Sampling Point Number	**Sampling Point Location, WasteType/Sample Contents and Treatment Description (as applicable)**
001	Flow proportional composite samples shall be taken from the effluent drop box after the UV disinfection system and the Parshall flume, before the outfall pipe. Grab samples shall also be taken from the effluent drop box .

3.2 Monitoring Requirements and Effluent Limitations

The permittee shall comply with the following monitoring requirements and limitations.

3.2.1 Sampling Point (Outfall) 001 - EFFLUENT

Monitoring Requirements and Effluent Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Daily	Continuous	See 3.2.1.4
BOD_5, Total	Weekly Avg	8.5 mg/L	Daily	24-Hr Flow Prop Comp	July and August limit
BOD_5, Total	Weekly Avg	8.2 mg/L	Daily	24-Hr Flow Prop Comp	September limit
BOD_5, Total	Weekly Avg	10 mg/L	Daily	24-Hr Flow Prop Comp	October-June limit
Suspended Solids, Total	Weekly Avg	10 mg/L	Daily	24-Hr Flow Prop Comp	
pH Field	Daily Max	9.0 su	Daily	Grab	
pH Field	Daily Min	6.0 su	Daily	Grab	
Nitrogen, Ammonia (NH_3-N) Total	Daily Max	24 mg/L	Daily	24-Hr Flow Prop Comp	Limit applicable to only January, February, March, April, November and December
Nitrogen, Ammonia (NH_3-N) Total	Weekly Avg	11 mg/L	Daily	24-Hr Flow Prop Comp	January limit
Nitrogen, Ammonia (NH_3-N) Total	Weekly Avg	12 mg/L	Daily	24-Hr Flow Prop Comp	February, November and December limit
Nitrogen, Ammonia (NH_3-N) Total	Weekly Avg	13 mg/L	Daily	24-Hr Flow Prop Comp	March limit
Nitrogen, Ammonia (NH_3-N) Total	Weekly Avg	10 mg/L	Daily	24-Hr Flow Prop Comp	April and October limit
Nitrogen, Ammonia (NH_3-N) Total	Weekly Avg	8.5 mg/L	Daily	24-Hr Flow Prop Comp	May limit

Monitoring Requirements and Effluent Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Nitrogen, Ammonia (NH_3-N) Total	Weekly Avg	5.6 mg/L	Daily	24-Hr Flow Prop Comp	June limit
Nitrogen, Ammonia (NH_3-N) Total	Weekly Avg	3.9 mg/L	Daily	24-Hr Flow Prop Comp	July limit
Nitrogen, Ammonia (NH_3-N) Total	Weekly Avg	4.2 mg/L	Daily	24-Hr Flow Prop Comp	August limit
Nitrogen, Ammonia (NH_3-N) Total	Weekly Avg	5.8 mg/L	Daily	24-Hr Flow Prop Comp	September limit
Nitrogen, Ammonia (NH_3-N) Total	Monthly Avg	5.0 mg/L	Daily	24-Hr Flow Prop Comp	January limit
Nitrogen, Ammonia (NH_3-N) Total	Monthly Avg	5.2 mg/L	Daily	24-Hr Flow Prop Comp	February limit
Nitrogen, Ammonia (NH_3-N) Total	Monthly Avg	6.0 mg/L	Daily	24-Hr Flow Prop Comp	March limit
Nitrogen, Ammonia (NH_3-N) Total	Monthly Avg	5.6 mg/L	Daily	24-Hr Flow Prop Comp	April limit
Nitrogen, Ammonia (NH_3-N) Total	Monthly Avg	4.9 mg/L	Daily	24-Hr Flow Prop Comp	May limit
Nitrogen, Ammonia (NH_3-N) Total	Monthly Avg	3.1 mg/L	Daily	24-Hr Flow Prop Comp	June limit
Nitrogen, Ammonia (NH_3-N) Total	Monthly Avg	2.0 mg/L	Daily	24-Hr Flow Prop Comp	July limit
Nitrogen, Ammonia (NH_3-N) Total	Monthly Avg	2.1 mg/L	Daily	24-Hr Flow Prop Comp	August limit
Nitrogen, Ammonia (NH_3-N) Total	Monthly Avg	2.9 mg/L	Daily	24-Hr Flow Prop Comp	September limit
Nitrogen, Ammonia (NH_3-N) Total	Monthly Avg	4.5 mg/L	Daily	24-Hr Flow Prop Comp	October limit
Nitrogen, Ammonia (NH_3-N) Total	Monthly Avg	5.4 mg/L	Daily	24-Hr Flow Prop Comp	November limit
Nitrogen, Ammonia (NH_3-N) Total	Monthly Avg	5.1 mg/L	Daily	24-Hr Flow Prop Comp	December limit
Dissolved Oxygen	Daily Min	6.7 mg/L	Daily	Grab	September limit
Dissolved Oxygen	Daily Min	7.0 mg/L	Daily	Grab	October-August limit
Chloride	Weekly Avg	756 mg/L	4/Month	24-Hr Comp	See 3.2.1.6
Phosphorus, Total	Monthly Avg	1.0 mg/L	Daily	24-Hr Flow Prop Comp	
Fecal Coliform	Geometric Mean	400 #/100 ml	3/Week	Grab	May-September limit
Cadmium, Total Recoverable		µg/L	Quarterly	24-Hr Flow Prop Comp	See 3.2.1.2
Chromium, Total Recoverable		µg/L	Quarterly	24-Hr Flow Prop Comp	See 3.2.1.2
Copper, Total Recoverable		µg/L	Monthly	24-Hr Flow Prop Comp	See 3.2.1.2

Monitoring Requirements and Effluent Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Lead, Total Recoverable		µg/L	Quarterly	24-Hr Flow Prop Comp	See 3.2.1.2
Mercury, Total Recoverable	Daily Max	5.0 ng/L	Monthly	Grab	See 3.2.1.3
Nickel, Total Recoverable		µg/L	Quarterly	24-Hr Flow Prop Comp	See 3.2.1.2
Zinc, Total Recoverable		µg/L	Monthly	24-Hr Flow Prop Comp	See 3.2.1.2
Acute WET		TU_a	Annual	24-Hr Flow Prop Comp	See 3.2.1.5
Chronic WET		rTU_c	1/ 6 Months	24-Hr Flow Prop Comp	See 3.2.1.5

3.2.1.1 Average Annual Design Flow

The average annual design flow of the permittee's wastewater treatment facility is 14 MGD.

3.2.1.2 Sample Analysis

Samples shall be analyzed using a method which provides adequate sensitivity so that results can be quantified, unless not possible using the most sensitive approved method.

3.2.1.3 Mercury Monitoring

The permittee shall collect and analyze all mercury samples according to the data quality requirements of ss. NR 106.145(9) and (10), Wisconsin Administrative Code. The limit of quantitation (LOQ) used for the effluent and field blank shall be less than 1.3 ng/L, unless the samples are quantified at levels above 1.3 ng/L. The permittee shall collect at least one mercury field blank for each set of mercury samples (a set of samples may include combinations of intake, influent, effluent or other samples all collected on the same day). The permittee shall report results of samples and field blanks to the Department on Discharge Monitoring Reports.

3.2.1.4 Peak Flow Reporting

For any calendar day during the disinfection season (May 1st through September 30th) where the peak instantaneous effluent flow is greater than 35 MGD, the permittee shall submit a plant flow trend chart. The chart(s) may be submitted electronically, with the Discharge Monitoring Report form, or with the electronic discharge monitoring form certification, no later than the 15th of the month following the month of the peak flow(s).

3.2.1.5 Whole Effluent Toxicity (WET) Testing

Primary Control Water: The SE Fox River, upstream and outside the mixing zone of the discharge (outfall 001) or any other known discharge

Instream Waste Concentration (IWC): 92%

Dilution series: At least five effluent concentrations and dual controls must be included in each test.

- **Acute:** 100, 50, 25, 12.5, 6.25% and any additional selected by the permittee.
- **Chronic:** 100, 75, 50, 25, 12.5% and any additional selected by the permittee.

WET Testing Frequency: Tests are required during the following quarters.

- **Acute:** Oct-Dec, 2008; July-Sept, 2009; Oct-Dec, 2010; July-Sept, 2011; Jan-March, 2012;
- **Chronic:** July-Sept, 2008; Oct-Dec, 2008; Jan-March, 2009; July-Sept, 2009; Apr-June, 2010; Oct-Dec, 2010; Jan-March, 2011; July-Sept, 2011; Jan-March, 2012; July-Sept, 2012.

Reporting: The permittee shall report test results on the Discharge Monitoring Report form, and also complete the "Whole Effluent Toxicity Test Report Form" (Section 6, "*State of Wisconsin Aquatic Life Toxicity Testing Methods Manual, 2nd Edition*"), for each test. The original, complete, signed version of the Whole Effluent Toxicity Test Report Form shall be sent to the Biomonitoring Coordinator, Bureau of Watershed Management, 101 S. Webster St., P.O. Box 7921, Madison, WI 53707-7921, within 45 days of test completion. The original Discharge Monitoring Report (DMR) form and one copy shall be sent to the contact and location provided on the DMR by the required deadline.

Determination of Positive Results: An acute toxicity test shall be considered positive if the Toxic Unit - Acute (TU_a) is greater than 1.0 for either species. The TU_a shall be calculated as follows: If $LC_{50} \geq 100$, then $TU_a = 1.0$. If LC_{50} is < 100, then $TU_a = 100 \div LC_{50}$. A chronic toxicity test shall be considered positive if the Relative Toxic Unit - Chronic (rTU_c) is greater than 1.0 for either species. The rTU_c shall be calculated as follows: If $IC_{25} \geq IWC$, then $rTU_c = 1.0$. If $IC_{25} < IWC$, then $rTU_c = IWC \div IC_{25}$.

Additional Testing Requirements: Within 90 days of a test which showed positive results, the permittee shall submit the results of at least 2 retests to the Biomonitoring Coordinator on "Whole Effluent Toxicity Test Report Forms". The retests shall be completed using the same species and test methods specified for the original test (see the Standard Requirements section herein).

3.2.1.6 Chloride Variance – Implement Source Reduction Measures

The 4X/monthly monitoring for chloride shall be done on four consecutive days within a week.

This permit contains a variance to the water quality-based effluent limit (WQBEL) for chloride granted in accordance with s. NR 106.83(2), Wis. Adm. Code. As conditions of this variance the permittee shall (a) maintain effluent quality at or below the interim effluent limitation specified in the table above, (b) implement the chloride source reduction measures specified below, and (c) perform the actions listed in the compliance schedule. (See the Schedules of Compliance section herein.):

Source reduction measures shall include, but shall not be limited to the following elements. Where applicable, the frequency and suggested means of reporting are in brackets:

- Report daily minimum and maximum air temperature (for December through April) and precipitation (year round [DMRs]
- Continue education of homeowners on softener efficiency and reductions (via flyers, news releases, bill inserts, web site, or other means)[in reports as required in Section 5.3 of this permit]
- Recommend/require hard water for outside water sources [in reports as required in Section 5.3 of this permit]
- Track salt use for road de-icing [by June 30th of each year; report shall cover the entire winter season before the reporting date. Reporting may be done as a letter, e-mail, or as part of the DMR]
- Provide information on sanitary and storm sewer improvements [in reports as required by Section 5.3 of this permit]
- Provide information on any anticipated changes to chloride concentration/loading as a result of changes to municipal water supply quality/quantity [in reports as required by Section 5.3 of this permit]

4 Land Application Requirements

4.1 Sampling Point(s)

The discharge(s) shall be limited to land application of the waste type(s) designated for the listed sampling point(s) on Department approved land spreading sites or by hauling to another facility.

Sampling Point Designation	
Sampling Point Number	**Sampling Point Location, WasteType/Sample Contents and Treatment Description (as applicable)**
002	Samples shall be taken and composited from the belt presses during press runs, before discharge to the sludge storage building. Grab samples are also taken from stacks in the sludge storage building prior to land application.

4.2 Monitoring Requirements and Limitations

The permittee shall comply with the following monitoring requirements and limitations.

4.2.1 Sampling Point (Outfall) 002 - Anaerobic Belt Pressed Sludge

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Solids, Total		Percent	1/ 2 Months	Grab Comp	
Arsenic Dry Wt	Ceiling	75 mg/kg	1/ 2 Months	Grab Comp	
Arsenic Dry Wt	High Quality	41 mg/kg	1/ 2 Months	Grab Comp	
Cadmium Dry Wt	Ceiling	85 mg/kg	1/ 2 Months	Grab Comp	
Cadmium Dry Wt	High Quality	39 mg/kg	1/ 2 Months	Grab Comp	
Copper Dry Wt	Ceiling	4,300 mg/kg	1/ 2 Months	Grab Comp	
Copper Dry Wt	High Quality	1,500 mg/kg	1/ 2 Months	Grab Comp	
Lead Dry Wt	Ceiling	840 mg/kg	1/ 2 Months	Grab Comp	
Lead Dry Wt	High Quality	300 mg/kg	1/ 2 Months	Grab Comp	
Mercury Dry Wt	Ceiling	57 mg/kg	1/ 2 Months	Grab Comp	
Mercury Dry Wt	High Quality	17 mg/kg	1/ 2 Months	Grab Comp	
Molybdenum Dry Wt	Ceiling	75 mg/kg	1/ 2 Months	Grab Comp	
Nickel Dry Wt	Ceiling	420 mg/kg	1/ 2 Months	Grab Comp	
Nickel Dry Wt	High Quality	420 mg/kg	1/ 2 Months	Grab Comp	
Selenium Dry Wt	Ceiling	100 mg/kg	1/ 2 Months	Grab Comp	
Selenium Dry Wt	High Quality	100 mg/kg	1/ 2 Months	Grab Comp	
Zinc Dry Wt	Ceiling	7,500 mg/kg	1/ 2 Months	Grab Comp	
Zinc Dry Wt	High Quality	2,800 mg/kg	1/ 2 Months	Grab Comp	
Nitrogen, Total Kjeldahl		Percent	1/ 2 Months	Grab Comp	
Nitrogen, Ammonium (NH_4-N) Total		Percent	1/ 2 Months	Grab Comp	
Phosphorus, Total		Percent	1/ 2 Months	Grab Comp	

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Phosphorus, Water Extractable		Percent	1/ 2 Months	Grab Comp	
Potassium, Total Recoverable		Percent	1/ 2 Months	Grab Comp	
PCB Total Dry Wt	Ceiling	50 mg/kg	Once	Grab Comp	See 4.2.1.5
PCB Total Dry Wt	High Quality	10 mg/kg	Once	Grab Comp	See 4.2.1.5
Radium 226 Dry Wt	-	pCi/g	Quarterly	Grab Comp	

Other Sludge Requirements	
Sludge Requirements	**Sample Frequency**
List 3 Requirements – Pathogen Control: The requirements in List 3 shall be met prior to land application of sludge.	**Quarterly**
List 4 Requirements – Vector Attraction Reduction: The vector attraction reduction shall be satisfied prior to, or at the time of land application as specified in List 4.	**Quarterly**

4.2.1.1 List 2 Analysis

If the monitoring frequency for List 2 parameters is more frequent than "Annual" then the sludge may be analyzed for the List 2 parameters just prior to each land application season rather than at the more frequent interval specified.

4.2.1.2 Changes in Feed Sludge Characteristics

If a change in feed sludge characteristics, treatment process, or operational procedures occurs which may result in a significant shift in sludge characteristics, the permittee shall reanalyze the sludge for List 1, 2, 3 and 4 parameters each time such change occurs.

4.2.1.3 Multiple Sludge Sample Points (Outfalls)

If there are multiple sludge sample points (outfalls), but the sludges are not subject to different sludge treatment processes, then a separate List 2 analysis shall be conducted for each sludge type which is land applied, just prior to land application, and the application rate shall be calculated for each sludge type. In this case, List 1, 3, and 4 and PCBs need only be analyzed on a single sludge type, at the specified frequency. If there are multiple sludge sample points (outfalls), due to multiple treatment processes, List 1, 2, 3 and 4 and PCBs shall be analyzed for each sludge type at the specified frequency.

4.2.1.4 Sludge Which Exceeds the High Quality Limit

Cumulative pollutant loading records shall be kept for all bulk land application of sludge which does not meet the high quality limit for any parameter. This requirement applies for the entire calendar year in which any exceedance of Table 3 of s. NR 204.07(5)(c), is experienced. Such loading records shall be kept for all List 1 parameters for each site land applied in that calendar year. The formula to be used for calculating cumulative loading is as follows:

[(Pollutant concentration (mg/kg) x dry tons applied/ac) ÷ 500] + previous loading (lbs/acre) = cumulative lbs pollutant per acre

When a site reaches 90% of the allowable cumulative loading for any metal established in Table 2 of s. NR 204.07(5)(b), the Department shall be so notified through letter or in the comment section of the annual land application report (3400-55).

4.2.1.5 Sludge Analysis for PCBs

The permittee shall analyze the sludge for Total PCBs one time during **2009**. The results shall be reported as "PCB Total Dry Wt". Either congener-specific analysis or Aroclor analysis shall be used to determine the PCB concentration. The permittee may determine whether Aroclor or congener specific analysis is performed. Analyses shall be performed in accordance with Table EM in s. NR 219.04, Wis. Adm. Code and the conditions specified in Standard Requirements of this permit. PCB results shall be submitted by January 31, following the specified year of analysis.

4.2.1.6 Lists 1, 2, 3, and 4

List 1 **TOTAL SOLIDS AND METALS** See the Monitoring Requirements and Limitations table above for monitoring frequency and limitations for the List 1 parameters
Solids, Total (percent)
Arsenic, mg/kg (dry weight)
Cadmium, mg/kg (dry weight)
Copper, mg/kg (dry weight)
Lead, mg/kg (dry weight)
Mercury, mg/kg (dry weight)
Molybdenum, mg/kg (dry weight)
Nickel, mg/kg (dry weight)
Selenium, mg/kg (dry weight)
Zinc, mg/kg (dry weight)

List 2 **NUTRIENTS** See the Monitoring Requirements and Limitations table above for monitoring frequency for the List 2 parameters
Solids, Total (percent)
Nitrogen Total Kjeldahl (percent)
Nitrogen Ammonium (NH4-N) Total (percent)
Phosphorus Total as P (percent)
Phosphorus, Water Extractable (as percent of Total P)
Potassium Total Recoverable (percent)

List 3
PATHOGEN CONTROL FOR CLASS B SLUDGE

The permittee shall implement pathogen control as listed in List 3. The Department shall be notified of the pathogen control utilized and shall be notified when the permittee decides to utilize alternative pathogen control.

The following requirements shall be met prior to land application of sludge.

Parameter	Unit	Limit
Fecal Coliform*	MPN/gTS or CFU/gTS	2,000,000
OR, ONE OF THE FOLLOWING PROCESS OPTIONS		
Aerobic Digestion	Air Drying	
Anaerobic Digestion	Composting	
Alkaline Stabilization	PSRP Equivalent Process	

* The Fecal Coliform limit shall be reported as the geometric mean of 7 discrete samples on a dry weight basis.

List 4
VECTOR ATTRACTION REDUCTION

The permittee shall implement any one of the vector attraction reduction options specified in List 4. The Department shall be notified of the option utilized and shall be notified when the permittee decides to utilize an alternative option.

One of the following shall be satisfied prior to, or at the time of land application as specified in List 4.

Option	Limit	Where/When it Shall be Met
Volatile Solids Reduction	≥38%	Across the process
Specific Oxygen Uptake Rate	≤1.5 mg O_2/hr/g TS	On aerobic stabilized sludge
Anaerobic bench-scale test	<17 % VS reduction	On anaerobic digested sludge
Aerobic bench-scale test	<15 % VS reduction	On aerobic digested sludge
Aerobic Process	>14 days, Temp >40°C and Avg. Temp > 45°C	On composted sludge
pH adjustment	>12 S.U. (for 2 hours) and >11.5 (for an additional 22 hours)	During the process
Drying without primary solids	>75 % TS	When applied or bagged
Drying with primary solids	>90 % TS	When applied or bagged
Equivalent Process	Approved by the Department	Varies with process
Injection	-	When applied
Incorporation	-	Within 6 hours of application

4.2.1.7 Daily Land Application Log

Daily Land Application Log		
Discharge Monitoring Requirements and Limitations The permittee shall maintain a daily land application log for biosolids land applied each day when land application occurs. The following minimum records must be kept, in addition to all analytical results for the biosolids land applied. The log book records shall form the basis for the annual land application report requirements.		
Parameters	**Units**	**Sample Frequency**
DNR Site Number(s)	Number	Daily as used
Outfall number applied	Number	Daily as used
Acres applied	Acres	Daily as used
Volume applied	As appropriate * /day	Daily as used
Application rate per acre	unit */acre	Daily as used
Nitrogen applied per acre	lb/acre	Daily as used
Method of Application	Injection, Incorporation, or surface applied	Daily as used

*gallons, cubic yards, dry US Tons or dry Metric Tons

5 Schedules of Compliance

5.1 Mercury Pollutant Minimization Program

An alternative mercury effluent limitation of 5.0 ng/L is included in this permit pursuant to NR 106.145(6); therefore, the permittee shall implement a pollutant minimization program as outlined below.

Required Action	Date Due
Implement the Mercury Pollutant Minimization Program (PMP) Plan: The permittee shall continue to implement the mercury PMP plan as amended by the Department	
Submit the first annual status report: The permittee shall submit to the Department an annual status report on the progress of the PMP as required by s. NR 106.145(7), Wis. Adm. Code. Submittal of the first annual status report is required by the Date Due. The final report shall be submitted three months prior to permit expiration. Note: If the permittee wishes to apply for an alternative mercury effluent limitation, that application is due with the application for permit reissuance by 6 months prior to permit expiration. The permittee should submit or reference the PMP plan as updated by the Annual Status Report or more recent developments as part of that application.	09/30/2008
Second annual report: Submit the second annual report	09/30/2009
Third annual report: Submit the third annual report	09/30/2010
Fourth annual report: Submit the fourth annual report	09/30/2011
Final report: Submit the final progress report	06/30/2012

5.2 Ultraviolet Disinfection System Evaluation and Upgrade

Tests shall be conducted on the UV disinfection system to evaluate the need for future additional disinfection facilities. A proposed plan of action for necessary upgrade of the disinfection system shall be submitted to the Department at the end of the study, along with an implementation schedule.

Required Action	Date Due
Plan of Study: Submit a plan of study for the evaluation of the UV disinfection system. The study shall include an evaluation of the hydraulic capacities and effectiveness of the system under various conditions of flow, lamp intensities and different system configurations. The study shall also include an evaluation of alternatives for additional disinfection needs.	06/30/2008
Submit the First Annual Report: Submit a report of the study carried out in the previous year. The report shall include an analysis of information collected from the study and an assessment of progress on completing the work called for in the plan.	01/31/2009
Second Annual Report: Submit a report as described in item 2.	01/31/2010
Submit Final Report : Submit the final report for the plan of study carried out on the UV system, along with a proposed plan of action and implementation schedule.	01/31/2011
Complete Action: Complete the plan of action and implementation program approved by the Department.	03/31/2012

5.3 Chloride Target Value

As a condition of the variance to the water quality based effluent limitation(s) for chloride granted in accordance with s. NR 106.83(2), Wis. Adm. Code, the permittee shall perform the following actions.

Required Action	Date Due
Chloride Progress Report: Submit a progress report, that shall indicate which chloride source reduction measures have been implemented. Chloride source reduction measures are noted in Section 3.2.1.5 of this permit. Note that the interim limitation of 756 mg/l, weekly average, remains enforceable until new enforceable limits are established in the next permit issuance. The first chloride progress report is to be submitted by the Date Due.	12/31/2008
Chloride Progress Report #2: Submit a chloride progress report.	09/30/2010
Final Chloride Report: Submit a final report documenting the success in meeting the chloride target value of 440 mg/l, weekly average, as well as the anticipated future reduction in chloride sources and chloride effluent concentrations. This report shall also include proposed target values and source reduction measures for negotiations with the department if the permittee intends to seek a renewed chloride variance per s. NR 106.83, Wis. Adm. Code, for the reissued permit. Note that the target value is the benchmark for evaluating the effectiveness of the chloride source reduction measures, but is not an enforceable limitation under the terms of this permit.	03/31/2012

5.4 Electrical Power System Improvement

A compliance schedule to provide alternative power source(s) to critical areas of the treatment process and to improve the power system within the facility.

Required Action	Date Due
Complete Action: Complete the plan of action for the improvement of the electrical power system at the wastewater treatment facility including providing alternative power source(s) at critical points of the plant's treatment system, such as the preliminary treatment building, the primary effluent pump station and the blower building, when a power failure occurs.	03/31/2009

6 Standard Requirements

NR 205, Wisconsin Administrative Code: The conditions in ss. NR 205.07(1) and NR 205.07(2), Wis. Adm. Code, are included by reference in this permit. The permittee shall comply with all of these requirements. Some of these requirements are outlined in the Standard Requirements section of this permit. Requirements not specifically outlined in the Standard Requirement section of this permit can be found in ss. NR 205.07(1) and NR 205.07(2).

6.1 Reporting and Monitoring Requirements

6.1.1 Monitoring Results

Monitoring results obtained during the previous month shall be summarized and reported on a Department Wastewater Discharge Monitoring Report. The report may require reporting of any or all of the information specified below under 'Recording of Results'. This report is to be returned to the Department no later than the date indicated on the form. When submitting a paper Discharge Monitoring Report form, the original and one copy of the Wastewater Discharge Monitoring Report Form shall be submitted to the return address printed on the form. A copy of the Wastewater Discharge Monitoring Report Form or an electronic file of the report shall be retained by the permittee.

All Wastewater Discharge Monitoring Reports submitted to the Department after January 1, 2008 should be submitted using the electronic Discharge Monitoring Report system, but due to the fact that the proposed permit for Waukesha is expected to be effective no earlier than January 1st, 2008, the permittee would have difficulty incorporating new or changed monitoring information into the electronic system used by the plant to comply with electronic discharge reporting by January 1st, 2008. The Department will allow a reasonable time beyond this date to accommodate needed changes by the permittee.

If the permittee monitors any pollutant more frequently than required by this permit, the results of such monitoring shall be included on the Wastewater Discharge Monitoring Report.

The permittee shall comply with all limits for each parameter regardless of monitoring frequency. For example, monthly, weekly, and/or daily limits shall be met even with monthly monitoring. The permittee may monitor more frequently than required for any parameter.

An Electronic Discharge Monitoring Report Certification sheet shall be signed and submitted with each electronic Discharge Monitoring Report submittal. This certification sheet, which is not part of the electronic report form, shall be signed by a principal executive officer, a ranking elected official or other duly authorized representative and shall be mailed to the Department at the time of submittal of the electronic Discharge Monitoring Report. The certification sheet certifies that the electronic report form is true, accurate and complete. Paper reports shall be signed by a principal executive officer, a ranking elected official, or other duly authorized representative.

6.1.2 Sampling and Testing Procedures

Sampling and laboratory testing procedures shall be performed in accordance with Chapters NR 218 and NR 219, Wis. Adm. Code and shall be performed by a laboratory certified or registered in accordance with the requirements of ch. NR 149, Wis. Adm. Code. Groundwater sample collection and analysis shall be performed in accordance with ch. NR 140, Wis. Adm. Code. The analytical methodologies used shall enable the laboratory to quantitate all substances for which monitoring is required at levels below the effluent limitation. If the required level cannot be met by any of the methods available in NR 219, Wis. Adm. Code, then the method with the lowest limit of detection shall be selected. Additional test procedures may be specified in this permit.

6.1.3 Pretreatment Sampling Requirements

Sampling for pretreatment parameters (cadmium, chromium, copper, lead, nickel, zinc, and mercury) shall be done during a day each month when industrial discharges are occurring at normal to maximum levels. The sampling of the

influent and effluent for these parameters shall be coordinated. All 24 hour composite samples shall be flow proportional.

6.1.4 Recording of Results

The permittee shall maintain records which provide the following information for each effluent measurement or sample taken:

- the date, exact place, method and time of sampling or measurements;
- the individual who performed the sampling or measurements;
- the date the analysis was performed;
- the individual who performed the analysis;
- the analytical techniques or methods used; and
- the results of the analysis.

6.1.5 Reporting of Monitoring Results

The permittee shall use the following conventions when reporting effluent monitoring results:

- Pollutant concentrations less than the limit of detection shall be reported as < (less than) the value of the limit of detection. For example, if a substance is not detected at a detection limit of 0.1 mg/L, report the pollutant concentration as < 0.1 mg/L.

- Pollutant concentrations equal to or greater than the limit of detection, but less than the limit of quantitation, shall be reported and the limit of quantitation shall be specified.

- For the purposes of reporting a calculated result, average or a mass discharge value, the permittee may substitute a 0 (zero) for any pollutant concentration that is less than the limit of detection. However, if the effluent limitation is less than the limit of detection, the department may substitute a value other than zero for results less than the limit of detection, after considering the number of monitoring results that are greater than the limit of detection and if warranted when applying appropriate statistical techniques.

6.1.6 Compliance Maintenance Annual Reports

Compliance Maintenance Annual Reports (CMAR) shall be completed using information obtained over each calendar year regarding the wastewater conveyance and treatment system. The CMAR shall be submitted by the permittee in accordance with ch. NR 208, Wis. Adm. Code, by June 30, each year on an electronic report form provided by the Department.

In the case of a publicly owned treatment works, a resolution shall be passed by the governing body and submitted as part of the CMAR, verifying its review of the report and providing responses as required. Private owners of wastewater treatment works are not required to pass a resolution; but they must provide an Owner Statement and responses as required, as part of the CMAR submittal.

A separate CMAR certification document, that is not part of the electronic report form, shall be mailed to the Department at the time of electronic submittal of the CMAR. The CMAR certification shall be signed and submitted by an authorized representative of the permittee. The certification shall be submitted by mail. The certification shall verify the electronic report is complete, accurate and contains information from the owner's treatment works.

6.1.7 Records Retention

The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by the permit, and records of all data used to complete the application for the permit for a period of at least 3 years from the

date of the sample, measurement, report or application. All pertinent sludge information, including permit application information and other documents specified in this permit or s. NR 204.06(9), Wis. Adm. Code shall be retained for a minimum of 5 years.

6.1.8 Other Information

Where the permittee becomes aware that it failed to submit any relevant facts in a permit application or submitted incorrect information in a permit application or in any report to the Department, it shall promptly submit such facts or correct information to the Department.

6.2 System Operating Requirements

6.2.1 Noncompliance Notification

- The permittee shall report the following types of noncompliance by a telephone call to the Department's regional office within 24 hours after becoming aware of the noncompliance:
  - any noncompliance which may endanger health or the environment;
  - any violation of an effluent limitation resulting from an unanticipated bypass;
  - any violation of an effluent limitation resulting from an upset; and
  - any violation of a maximum discharge limitation for any of the pollutants listed by the Department in the permit, either for effluent or sludge.

- A written report describing the noncompliance shall also be submitted to the Department's regional office within 5 days after the permittee becomes aware of the noncompliance. On a case-by-case basis, the Department may waive the requirement for submittal of a written report within 5 days and instruct the permittee to submit the written report with the next regularly scheduled monitoring report. In either case, the written report shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times; the steps taken or planned to reduce, eliminate and prevent reoccurrence of the noncompliance; and if the noncompliance has not been corrected, the length of time it is expected to continue.

NOTE: Section 292.11(2)(a), Wisconsin Statutes, requires any person who possesses or controls a hazardous substance or who causes the discharge of a hazardous substance to notify the Department of Natural Resources **immediately** of any discharge not authorized by the permit. The discharge of a hazardous substance that is not authorized by this permit or that violates this permit may be a hazardous substance spill. To report a hazardous substance spill, call DNR's 24-hour HOTLINE at **1-800-943-0003**

6.2.2 Flow Meters

Flow meters shall be calibrated annually, as per s. NR 218.06, Wis. Adm. Code.

6.2.3 Raw Grit and Screenings

All raw grit and screenings shall be disposed of at a properly licensed solid waste facility or picked up by a licensed waste hauler. If the facility or hauler are located in Wisconsin, then they shall be licensed under chs. NR 500-536, Wis. Adm. Code.

6.2.4 Sludge Management

All sludge management activities shall be conducted in compliance with ch. NR 204 "Domestic Sewage Sludge Management", Wis. Adm. Code.

6.2.5 Prohibited Wastes

Under no circumstances may the introduction of wastes prohibited by s. NR 211.10, Wis. Adm. Code, be allowed into the waste treatment system. Prohibited wastes include those:

- which create a fire or explosion hazard in the treatment work;
- which will cause corrosive structural damage to the treatment work;
- solid or viscous substances in amounts which cause obstructions to the flow in sewers or interference with the proper operation of the treatment work;
- wastewaters at a flow rate or pollutant loading which are excessive over relatively short time periods so as to cause a loss of treatment efficiency; and
- changes in discharge volume or composition from contributing industries which overload the treatment works or cause a loss of treatment efficiency.

6.2.6 Unscheduled Bypassing

Any unscheduled bypass or overflow of wastewater at the treatment works or from the collection system is prohibited, and the Department may take enforcement action against a permittee for such occurrences under s. 283.89, Wis. Stats., unless:

- The bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;
- There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and
- The permittee notified the Department as required in this Section.

Whenever there is an unscheduled bypass or overflow occurrence at the treatment works or from the collection system, the permittee shall notify the Department <u>within 24 hours</u> of initiation of the bypass or overflow occurrence by telephoning the wastewater staff in the regional office as soon as reasonably possible (FAX, email or voice mail, if staff are unavailable).

In addition, the permittee shall <u>within 5 days</u> of conclusion of the bypass or overflow occurrence report the following information to the Department in writing:

- Reason the bypass or overflow occurred, or explanation of other contributing circumstances that resulted in the overflow event. If the overflow or bypass is associated with wet weather, provide data on the amount and duration of the rainfall or snow melt for each separate event.
- Date the bypass or overflow occurred.
- Location where the bypass or overflow occurred.
- Duration of the bypass or overflow and estimated wastewater volume discharged.
- Steps taken or the proposed corrective action planned to prevent similar future occurrences.
- Any other information the permittee believes is relevant.

6.2.7 Scheduled Bypassing

Any construction or normal maintenance which results in a bypass of wastewater from a treatment system is prohibited unless authorized by the Department in writing. If the Department determines that there is significant

public interest in the proposed action, the Department may schedule a public hearing or notice a proposal to approve the bypass. Each request shall specify the following minimum information:

- proposed date of bypass;
- estimated duration of the bypass;
- estimated volume of the bypass;
- alternatives to bypassing; and
- measures to mitigate environmental harm caused by the bypass.

6.2.8 Proper Operation and Maintenance

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control which are installed or used by the permittee to achieve compliance with the conditions of this permit. The wastewater treatment facility shall be under the direct supervision of a state certified operator as required in s. NR 108.06(2), Wis. Adm. Code. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training as required in ch. NR 114, Wis. Adm. Code, and adequate laboratory and process controls, including appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of the permit.

6.3 Surface Water Requirements

6.3.1 Permittee-Determined Limit of Quantitation Incorporated into this Permit

For pollutants with water quality-based effluent limits below the Limit of Quantitation (LOQ) in this permit, the LOQ calculated by the permittee and reported on the Discharge Monitoring Reports (DMRs) is incorporated by reference into this permit. The LOQ shall be reported on the DMRs, shall be the lowest quantifiable level practicable, and shall be no greater than the minimum level (ML) specified in or approved under 40 CFR Part 136 for the pollutant at the time this permit was issued, unless this permit specifies a higher LOQ.

6.3.2 Appropriate Formulas for Effluent Calculations

The permittee shall use the following formulas for calculating effluent results to determine compliance with average limits and mass limits:

Weekly/Monthly average concentration = the sum of all daily results for that week/month, divided by the number of results during that time period.

Weekly Average Mass Discharge (lbs/day): Daily mass = daily concentration (mg/L) x daily flow (MGD) x 8.34, then average the daily mass values for the week.

Monthly Average Mass Discharge (lbs/day): Daily mass = daily concentration (mg/L) x daily flow (MGD) x 8.34, then average the daily mass values for the month.

6.3.3 Visible Foam or Floating Solids

There shall be no discharge of floating solids or visible foam in other than trace amounts.

6.3.4 Percent Removal

During any 30 consecutive days, the average effluent concentrations of BOD_5 and of total suspended solids shall not exceed 15% of the average influent concentrations, respectively. This requirement does not apply to removal of total suspended solids if the permittee operates a lagoon system and has received a variance for suspended solids granted under NR 210.07(2), Wis. Adm. Code.

6.3.5 Chloride Notification

The permittee shall notify the Department in writing of any proposed changes which may affect the characteristics of the wastewater, which results in an increase in the concentration of chloride, under the authority of sections 283.31(4)(b) and 283.59(1), Stats. This notification shall include a description of the proposed source of chlorides and the anticipated increase in concentration. Following receipt of the notification, the Department may propose a modification to the permit.

6.3.6 Fecal Coliforms

The limit for fecal coliforms shall be expressed as a monthly geometric mean.

6.3.7 Seasonal Disinfection

Disinfection shall be provided from May 1 through September 30 of each year. Monitoring requirements and the limitation for fecal coliforms apply only during the period in which disinfection is required. Whenever chlorine is used for disinfection or other uses, the limitations and monitoring requirements for residual chlorine shall apply. A dechlorination process shall be in operation whenever chlorine is used.

6.3.8 Whole Effluent Toxicity (WET) Monitoring Requirements

In order to determine the potential impact of the discharge on aquatic organisms, static-renewal toxicity tests shall be performed on the effluent in accordance with the procedures specified in the *"State of Wisconsin Aquatic Life Toxicity Testing Methods Manual, 2nd Edition" (PUB-WT-797*, November 2004) as required by NR 219.04, Table A, Wis. Adm. Code). All of the WET tests required in this permit, including any required retests, shall be conducted on the *Ceriodaphnia dubia* and fathead minnow species. Receiving water samples shall not be collected from any point in contact with the permittee's mixing zone and every attempt shall be made to avoid contact with any other discharge's mixing zone.

6.3.9 Whole Effluent Toxicity (WET) Identification and Reduction

Within 60 days of a retest which showed positive results, the permittee shall submit a written report to the Biomonitoring Coordinator, Bureau of Watershed Management, 101 S. Webster St., PO Box 7921, Madison, WI 53707-7921, which details the following:

- A description of actions the permittee has taken or will take to remove toxicity and to prevent the recurrence of toxicity;
- A description of toxicity reduction evaluation (TRE) investigations that have been or will be done to identify potential sources of toxicity, including some or all of the following actions:

(a) Evaluate the performance of the treatment system to identify deficiencies contributing to effluent toxicity (e.g., operational problems, chemical additives, incomplete treatment)

(b) Identify the compound(s) causing toxicity

(c) Trace the compound(s) causing toxicity to their sources (e.g., industrial, commercial, domestic)

(d) Evaluate, select, and implement methods or technologies to control effluent toxicity (e.g., in-plant or pretreatment controls, source reduction or removal)

- Where corrective actions including a TRE have not been completed, an expeditious schedule under which corrective actions will be implemented;
- If no actions have been taken, the reason for not taking action.

The permittee may also request approval from the Department to postpone additional retests in order to investigate the source(s) of toxicity. Postponed retests must be completed after toxicity is believed to have been removed.

6.3.10 Whole Effluent Toxicity (WET) and Chloride Source Reduction Measures

Acute whole effluent toxicity testing requirements and acute whole effluent toxicity limitations may be held in abeyance by the department until chloride source reduction actions are completed, according to s. NR 106.89, Wis. Adm. Code, if either:

- the permittee can demonstrate to the satisfaction of the department that the effluent concentration of chloride exceeds 2,500 mg/L, or
- the permittee can demonstrate to the satisfaction of the department that the effluent concentration of chloride is less than 2,500 mg/L, but in excess of the calculated acute water quality-based effluent limitation, and additional data are submitted which demonstrate that chloride is the sole source of acute toxicity.

Chronic whole effluent toxicity testing requirements and chronic whole effluent toxicity limitations may be held in abeyance by the department until chloride source reduction actions are completed, according to s. NR 106.89, Wis. Adm. Code, if either:

- the permittee can demonstrate to the satisfaction of the department that the effluent concentration of chloride exceeds 2 times the calculated chronic water quality-based effluent limitation, or
- the permittee can demonstrate to the satisfaction of the department that the effluent concentration of chloride is less than 2 times the calculated chronic water quality-based effluent limitation, but in excess of the calculated chronic water quality-based effluent limitation, and additional data are submitted which demonstrate that chloride is the sole source of chronic toxicity.

Following the completion of chloride source reduction activities, the department shall evaluate the need for whole effluent toxicity monitoring and limitations.

6.4 Pretreatment Program Requirements

The permittee is required to operate an industrial pretreatment program as described in the program initially approved by the Department of Natural Resources including any subsequent program modifications approved by the Department, and including commitments to program implementation activities provided in the permittee's annual pretreatment program report, and that complies with the requirements set forth in 40 CFR Part 403 and ch. NR 211, Wis. Adm. Code. To ensure that the program is operated in accordance with these requirements, the following general conditions and requirements are hereby established:

6.4.1 Inventories

The permittee shall implement methods to maintain a current inventory of the general character and volume of wastewater that industrial users discharge to the treatment works and shall provide an updated industrial user listing annually and report any changes in the listing to the Department by March 31 of each year as part of the annual pretreatment program report required herein.

6.4.2 Regulation of Industrial Users

6.4.2.1 Limitations for Industrial Users:

The permittee shall develop, maintain, enforce and revise as necessary local limits to implement the general and specific prohibitions of the state and federal General Pretreatment Regulations.

6.4.2.2 Control Documents for Industrial Users (IUs)

The permittee shall control the discharge from each significant industrial user through individual discharge permits as required by s. NR 211.235, Wis. Adm. Code and in accordance with the approved pretreatment program procedures and the permittee's sewer use ordinance. The discharge permits shall be modified in a timely manner during the stated term of the discharge permits according to the sewer use ordinance as conditions warrant. The discharge permits shall include at a minimum the elements found in s. NR 211.235(1), Wis. Adm. Code and references to the approved pretreatment program procedures and the sewer use ordinance.

The permittee shall provide a copy of all newly issued, reissued, or modified discharge permits to the Department.

6.4.2.3 Review of Industrial User Reports, Inspections and Compliance Monitoring

The permittee shall require the submission of, receive, and review self-monitoring reports and other notices from industrial users in accordance with the approved pretreatment program procedures. The permittee shall randomly sample and analyze industrial user discharges and conduct surveillance activities to determine independent of information supplied by the industrial users, whether the industrial users are in compliance with pretreatment standards and requirements. The inspections and monitoring shall also be conducted to maintain accurate knowledge of local industrial processes, including changes in the discharge, pretreatment equipment operation, spill prevention control plans, slug control plans, and implementation of solvent management plans.

At least one time per year the permittee shall inspect and sample the discharge from each significant industrial user, or more frequently if so specified in the permittee's approved pretreatment program. At least once every 2 years the permittee shall evaluate whether each significant industrial user needs a slug control plan. If a slug control plan is needed, the plan shall contain at a minimum the elements specified in s. NR 211.235(4)(b), Wis. Adm. Code.

6.4.2.4 Enforcement and Industrial User Compliance Evaluation & Violation Reports

The permittee shall enforce the industrial pretreatment requirements including the industrial user discharge limitations of the permittee's sewer use ordinance. The permittee shall investigate instances of noncompliance by collecting and analyzing samples and collecting other information with sufficient care to produce evidence admissible in enforcement proceedings or in judicial actions. Investigation and response to instances of noncompliance shall be in accordance with the permittee's sewer use ordinance and approved Enforcement Response Plan.

The permittee shall make a semiannual report on forms provided or approved by the Department. The semiannual report shall include an analysis of industrial user significant noncompliance (i.e. the Industrial User Compliance Evaluation, also known as the SNC Analysis) as outlined in s.NR 211.23(1)(j), Wis. Adm. Code, and a summary of the permittee's response to all industrial noncompliance (i.e. the Industrial User Violation Report). The Industrial User Compliance Evaluation Report shall include monitoring results received from industrial users pursuant to s. NR 211.15(1)-(5), Wis. Adm. Code. The Industrial User Violation Report shall include copies of all notices of noncompliance, notices of violation and other enforcement correspondence sent by the permittee to industrial users, together with the industrial user's response. The Industrial User Compliance Evaluation and Violation Reports for the period January through June shall be provided to the Department by September 30 of each year and for the period July through December shall be provided to the Department by March 31 of the succeeding year, unless alternate submittal dates are approved.

6.4.2.5 Publication of Violations

The permittee shall publish a list of industrial users that have significantly violated the municipal sewer use ordinance during the calendar year, in the largest daily newspaper in the area by March 31 of the following year pursuant to s. NR 211.23(1)(j), Wis. Adm. Code. A copy of the newspaper publication shall be provided as part of the annual pretreatment report specified herein.

6.4.2.6 Multijurisdictional Agreements

The permittee shall establish agreements with all contributing jurisdictions as necessary to ensure compliance with pretreatment standards and requirements by all industrial users discharging to the permittee's wastewater treatment system. Any such agreement shall identify who will be responsible for maintaining the industrial user inventory, issuance of industrial user control mechanisms, inspections and sampling, pretreatment program implementation, and enforcement.

6.4.3 Annual Pretreatment Program Report

The permittee shall evaluate the pretreatment program, and submit the Pretreatment Program Report to the Department on forms provided or approved by the Department by March 31 annually, unless an alternate submittal date is approved. The report shall include a brief summary of the work performed during the preceding calendar year, including the numbers of discharge permits issued and in effect, pollution prevention activities, number of inspections and monitoring surveys conducted, budget and personnel assigned to the program, a general discussion of program progress in meeting the objectives of the permittee's pretreatment program together with summary comments and recommendations.

6.4.4 Pretreatment Program Modifications

- Future Modifications: The permittee shall within one year of any revisions to federal or state General Pretreatment Regulations submit an application to the Department in duplicate to modify and update its approved pretreatment program to incorporate such regulatory changes as applicable to the permittee. Additionally, the Department or the permittee may request an application for program modification at any time where necessary to improve program effectiveness based on program experience to date.

- Modifications Subject to Department Approval: The permittee shall submit all proposed pretreatment program modifications to the Department for determination of significance and opportunity for comment in accordance with the requirements and conditions of s. NR 211.27, Wis. Adm. Code. Any substantial proposed program modification shall be subject to Department public noticing and formal approval prior to implementation. A substantial program modification includes, but is not limited to, changes in enabling legal authority to administer and enforce pretreatment conditions and requirements; significant changes in program administrative or operational procedures; significant reductions in monitoring frequencies; significant reductions in program resources including personnel commitments, equipment, and funding levels; changes (including any relaxation) in the local limitations for substances enforced and applied to users of the sewerage treatment works; changes in treatment works sludge disposal or management practices which impact the pretreatment program; or program modifications which increase pollutant loadings to the treatment works. The Department shall use the procedures outlined in s. NR 211.30, Wis. Adm. Code for review and approval/denial of proposed pretreatment program modifications. The permittee shall comply with local public participation requirements when implementing the pretreatment program.

6.4.5 Program Resources

The permittee shall have sufficient resources and qualified personnel to carry out the pretreatment program responsibilities as listed in ss. NR 211.22 and NR 211.23, Wis. Adm. Code.

6.5 Land Application Requirements

6.5.1 Sludge Management Program Standards And Requirements Based Upon Federally Promulgated Regulations

In the event that new federal sludge standards or regulations are promulgated, the permittee shall comply with the new sludge requirements by the dates established in the regulations, if required by federal law, even if the permit has not yet been modified to incorporate the new federal regulations.

6.5.2 General Sludge Management Information

The General Sludge Management Form 3400-48 shall be completed and submitted prior to any significant sludge management changes.

6.5.3 Sludge Samples

All sludge samples shall be collected at a point and in a manner which will yield sample results which are representative of the sludge being tested, and collected at the time which is appropriate for the specific test.

6.5.4 Land Application Characteristic Report

Each report shall consist of a Characteristic Form 3400-49 and Lab Report, unless approval for not submitting the lab reports has been given. Both reports shall be submitted by January 31 following each year of analysis.

The permittee shall use the following convention when reporting sludge monitoring results: Pollutant concentrations less than the limit of detection shall be reported as < (less than) the value of the limit of detection. For example, if a substance is not detected at a detection limit of 1.0 mg/kg, report the pollutant concentration as < 1.0 mg/kg .

All results shall be reported on a dry weight basis.

6.5.5 Monitoring and Calculating PCB Concentrations in Sludge

When sludge analysis for "PCB, Total Dry Wt" is required by this permit, the PCB concentration in the sludge shall be determined as follows.

Either congener-specific analysis or Aroclor analysis shall be used to determine the PCB concentration. The permittee may determine whether Aroclor or congener specific analysis is performed. Analyses shall be performed in accordance with the following provisions and Table EM in s. NR 219.04, Wis. Adm. Code.

- EPA Method 1668 may be used to test for all PCB congeners. If this method is employed, all PCB congeners shall be delineated. Non-detects shall be treated as zero. The values that are between the limit of detection and the limit of quantitation shall be used when calculating the total value of all congeners. All results shall be added together and the total PCB concentration by dry weight reported. **Note**: It is recognized that a number of the congeners will co-elute with others, so there will not be 209 results to sum.
- EPA Method 8082A shall be used for PCB-Aroclor analysis and may be used for congener specific analysis as well. If congener specific analysis is performed using Method 8082A, the list of congeners tested shall include at least congener numbers 5, 18, 31, 44, 52, 66, 87, 101, 110, 138, 141, 151, 153, 170, 180, 183, 187, and 206 plus any other additional congeners which might be reasonably expected to occur in the particular sample. For either type of analysis, the sample shall be extracted using the Soxhlet extraction (EPA Method 3540C) (or the Soxhlet Dean-Stark modification) or the pressurized fluid extraction (EPA Method 3545A). If Aroclor analysis is performed using Method 8082A, clean up steps of the extract shall be performed as necessary to remove interference and to achieve as close to a limit of detection of 0.11 mg/kg as possible. Reporting protocol, consistent with s. NR 106.07(6)(e), should be as

follows: If all Aroclors are less than the LOD, then the Total PCB Dry Wt result should be reported as less than the highest LOD. If a single Aroclor is detected then that is what should be reported for the Total PCB result. If multiple Aroclors are detected, they should be summed and reported as Total PCBs. If congener specific analysis is done using Method 8082A, clean up steps of the extract shall be performed as necessary to remove interference and to achieve as close to a limit of detection of 0.003 mg/kg as possible for each congener. If the aforementioned limits of detection cannot be achieved after using the appropriate clean up techniques, a reporting limit that is achievable for the Aroclors or each congener for the sample shall be determined. This reporting limit shall be reported and qualified indicating the presence of an interference. The lab conducting the analysis shall perform as many of the following methods as necessary to remove interference:

3620C – Florisil	3611B - Alumina
3640A - Gel Permeation	3660B - Sulfur Clean Up (using copper shot instead of powder)
3630C - Silica Gel	3665A - Sulfuric Acid Clean Up

6.5.6 Land Application Report

Land Application Report Form 3400-55 shall be submitted by January 31, following each year non-exceptional quality sludge is land applied. Non-exceptional quality sludge is defined in s. NR 204.07(4), Wis. Adm. Code.

6.5.7 Other Methods of Disposal or Distribution Report

The permittee shall submit Report Form 3400-52 by January 31, following each year sludge is hauled, landfilled, incinerated, or when exceptional quality sludge is distributed or land applied.

6.5.8 Approval to Land Apply

Bulk non-exceptional quality sludge as defined in s. NR 204.07(4), Wis. Adm. Code, may not be applied to land without a written approval letter or Form 3400-122 from the Department unless the Permittee has obtained permission from the Department to self approve sites in accordance with s. NR 204.06 (6), Wis. Adm. Code. Analysis of sludge characteristics is required prior to land application. Application on frozen or snow covered ground is restricted to the extent specified in s. NR 204.07(3) (l), Wis. Adm. Code.

6.5.9 Soil Analysis Requirements

Each site requested for approval for land application must have the soil tested prior to use. Each approved site used for land application must subsequently be soil tested such that there is at least one valid soil test in the four years prior to land application. All soil sampling and submittal of information to the testing laboratory shall be done in accordance with UW Extension Bulletin A-2100. The testing shall be done by the UW Soils Lab in Madison or Marshfield, WI or at a lab approved by UW. The test results including the crop recommendations shall be submitted to the DNR contact listed for this permit, as they are available. Application rates shall be determined based on the crop nitrogen recommendations and with consideration for other sources of nitrogen applied to the site.

6.5.10 Land Application Site Evaluation

For non-exceptional quality sludge, as defined in s. NR 204.07(4), Wis. Adm. Code, a Land Application Site Request Form 3400-053 shall be submitted to the Department for the proposed land application site. The Department will evaluate the proposed site for acceptability and will either approve or deny use of the proposed site. The permittee may obtain permission to approve their own sites in accordance with s. NR 204.06(6), Wis. Adm. Code.

6.5.11 Class B Sludge: Fecal Coliform Limitation

Compliance with the fecal coliform limitation for Class B sludge shall be demonstrated by calculating the geometric mean of at least 7 separate samples. (Note that a Total Solids analysis must be done on each sample). The geometric mean shall be less than 2,000,000 MPN or CFU/g TS. Calculation of the geometric mean can be done using one of the following 2 methods.

Method 1:

Geometric Mean = $(X_1 \times X_2 \times X_3 \ldots \times X_n)^{1/n}$

Where X = Coliform Density value of the sludge sample, and where n = number of samples (at least 7)

Method 2:

Geometric Mean = antilog$[(X_1 + X_2 + X_3 \ldots + X_n) \div n]$

Where X = $\log_{10}$ of Coliform Density value of the sludge sample, and where n = number of samples (at least 7)

Example for Method 2

Sample Number	Coliform Density of Sludge Sample	$\log_{10}$
1	6.0×10^5	5.78
2	4.2×10^6	6.62
3	1.6×10^6	6.20
4	9.0×10^5	5.95
5	4.0×10^5	5.60
6	1.0×10^6	6.00
7	5.1×10^5	5.71

The geometric mean for the seven samples is determined by averaging the $\log_{10}$ values of the coliform density and taking the antilog of that value.

$(5.78 + 6.62 + 6.20 + 5.95 + 5.60 + 6.00 + 5.71) \div 7 = 5.98$

The antilog of $5.98 = 9.5 \times 10^5$

6.5.12 Vector Control: Volatile Solids Reduction

The mass of volatile solids in the sludge shall be reduced by a minimum of 38% between the time the sludge enters the digestion process and the time it either exits the digester or a storage facility. For calculation of volatile solids reduction, the permittee shall use the Van Kleeck equation or one of the other methods described in "Determination of Volatile Solids Reduction in Digestion" by J.B. Farrell, which is Appendix C of EPA's *Control of Pathogens in Municipal Wastewater Sludge* (EPA/625/R-92/013). The Van Kleeck equation is:

$$VSR\% = \frac{VS_{IN} - VS_{OUT}}{VS_{IN} - (VS_{OUT} \times VS_{IN})} \times 100$$

Where: VS_{IN} = Volatile Solids in Feed Sludge (g VS/g TS)

VS_{OUT} = Volatile Solids in Final Sludge (g VS/g TS)

VSR% = Volatile Solids Reduction, (Percent)

7 Summary of Reports Due

FOR INFORMATIONAL PURPOSES ONLY

Description	Date	Page
Mercury Pollutant Minimization Program -Implement the Mercury Pollutant Minimization Program (PMP) Plan	See Permit	14
Mercury Pollutant Minimization Program -Submit the first annual status report	September 30, 2008	14
Mercury Pollutant Minimization Program -Second annual report	September 30, 2009	14
Mercury Pollutant Minimization Program -Third annual report	September 30, 2010	14
Mercury Pollutant Minimization Program -Fourth annual report	September 30, 2011	14
Mercury Pollutant Minimization Program -Final report	June 30, 2012	14
Ultraviolet Disinfection System Evaluation and Upgrade -Plan of Study	June 30, 2008	14
Ultraviolet Disinfection System Evaluation and Upgrade -Submit the First Annual Report	January 31, 2009	14
Ultraviolet Disinfection System Evaluation and Upgrade -Second Annual Report	January 31, 2010	14
Ultraviolet Disinfection System Evaluation and Upgrade -Submit Final Report	January 31, 2011	14
Ultraviolet Disinfection System Evaluation and Upgrade -Complete Action	March 31, 2012	14
Chloride Target Value -Chloride Progress Report	December 31, 2008	15
Chloride Target Value -Chloride Progress Report #2	September 30, 2010	15
Chloride Target Value -Final Chloride Report	March 31, 2012	15
Electrical Power System Improvement -Complete Action	March 31, 2009	15
Compliance Maintenance Annual Reports (CMAR)	by June 30, each year	17
Industrial User Compliance Evaluation and Violation Reports	Semiannual	23
Pretreatment Program Report	Annually	24
General Sludge Management Form 3400-48	prior to any significant sludge management changes	25
Characteristic Form 3400-49 and Lab Report	by January 31 following each year of analysis	25
Land Application Report Form 3400-55	by January 31, following each year non-exceptional quality sludge is land applied	26

Report Form 3400-52	by January 31, following each year sludge is hauled, landfilled, incinerated, or when exceptional quality sludge is distributed or land applied	26

Report forms shall be submitted to the address printed on the report form. Any facility plans or plans and specifications for municipal, industrial pretreatment and non industrial wastewater systems shall be submitted to the Bureau of Watershed Management, P.O. Box 7921, Madison, WI 53707-7921. All other submittals required by this permit shall be submitted to:
Southeast Region - Waukesha, 141 NW Barstow St., Room 180, Waukesha, WI 53188

Attachment B

Letter from the Wisconsin Department of Natural Resources: WWTP WPDES Effluent Limits

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

WISCONSIN
DEPT. OF NATURAL RESOURCES

Jim Doyle, Governor
Matthew J. Frank, Secretary

101 S. Webster St.
Box 7921
Madison, Wisconsin 53707-7921
Telephone 608-266-2621
FAX 608-267-3579
TTY Access via relay - 711

October 16, 2008

Mr. Daniel Duchniak, General Manager
Waukesha Water Utility
115 Delafield St.
Waukesha, WI 53188-3615

Subject: WPDES Effluent Limitations

Dear Mr. Duchniak:

The purpose of this letter is to provide a written response to your letter of April 7, 2008. You requested effluent limitations for a potential discharge from the City of Waukesha wastewater treatment plant (WWTP) to three Lake Michigan tributaries – Underwood Creek, Menomonee River and Root River. A meeting held on July 28, 2008 provided us all an opportunity to discuss your request and clarify any associated issues. My response at this time will be somewhat brief, reflect the phone messages I left on September 23 and, I hope, provide additional direction to the City for preparing a wastewater facility plan under the provisions of NR 110, Wis. Adm. Code.

Simultaneously, you are receiving a letter from Eric Ebersberger describing the content of a potential application for diversion of Great Lakes water. That letter contains an outline of our current expectations for the content of an application for diversion, including elements relating to return flow from a system that withdraws water from the Great Lakes basin. So as not to be redundant, my letter is limited to information relating to the quality of the discharge of the return flow and Eric's letter contains directions for the manner in which other potential effects of the discharge must be evaluated. It is our expectation that the wastewater facility plan for the project (prepared under NR 110) and the portion of the application relating to return flows will be submitted as one and contain an analysis of impacts of the wastewater flows in the tributaries on river stage, flood flows and storage and associated impacts. Similarly, an assessment of the effects associated with the diversion of the wastewater discharge out of the Fox River must be included. Finally, it must also, as identified in Eric's accompanying letter, demonstrate that the amount of return flow is equal to that withdrawn as described in the "Great Lakes Compact" legislation.

A significant factor in our evaluation is the current level of treatment provided for conventional pollutants by the Waukesha WWTP. Typically, effluent BOD and suspended solids are measured and reported at 2 mg/L or less. Ammonia nitrogen is less than 1 mg/L nearly all the time, phosphorus is usually less than 20% of the 1 mg/L permit limit and effluent DO exceeds the 7 mg/L minimum permit limit. Regardless of discharge location, it is expected that this level of treatment will continue to be provided and a permit to discharge to Lake Michigan tributaries will be at least as stringent as existing effluent quality.

Water Quality Standards – Each of the proposed discharge sites is located on a stream classified as a fish and aquatic life water. Although Underwood Creek currently contains a dissolved oxygen variance (see NR 104.06(2), Wis. Adm. Code), the Department believes the 5 mg/L dissolved oxygen standard for fish and aquatic life should be the criterion used to establish effluent limitations for that discharge location.

Of the three waterbodies, portions of the Menomonee River and Root River are listed by the Department as "impaired" under section 303(d) of the Clean Water Act. Listed pollutants include bacteria, phosphorus, sediments and PCBs. Underwood Creek is not listed specifically, although it has characteristics similar to other waters in the area that are listed as "impaired". If and when a Total Maximum Daily Load (TMDL) is established for any impaired waterbody, the limits provided below may change.

Antidegradation – Wisconsin's antidegradation policy states that "no waters of the state shall be lowered in quality unless it has been affirmatively demonstrated to the department that such a change is justified as a result of necessary economic and social development…" (NR 102.05(1), Wis. Adm. Code). This policy is implemented through NR 207 for WPDES permitted discharges. The unique character of this proposed discharge does not, in many respects, conform to the provisions and decision parameters contained in the NR 207 rule. For example, a discharge to the Lake Michigan tributaries is not a "new discharge" or an "increased discharge" under the definitions of the rule. Therefore, a reasonable analysis of this proposal using the specific provisions of the rule simply does not fit the circumstance.

However, we believe it is important and significant that any discharge such as that proposed here, abide by the basic principles of the antidegradation policy. That is, there should be no lowering of water quality unless allowed and appropriately justified and then only if the uses in the receiving water are maintained.

Within your application for a discharge of return flow to Lake Michigan tributaries, the Department will seek to assure that the specific provisions of NR 207.04(2)(a) are maintained. This rule paragraph states that effluent limitations for an existing discharge will remain unchanged if the treatment facility can meet those existing limitations. Therefore, irrespective of any other calculations of limits we could produce, you must maintain existing effluent quality and permit limitations to meet these requirements will be proposed for any WPDES permit application to discharge to the Lake Michigan tributaries.

At this time, we have undertaken a specific evaluation only for a proposed discharge to Underwood Creek. As you have proposed, this stream has the lowest flow condition and, therefore, produces the most stringent effluent limitations. Effluent limitations for a discharge to the Root River would be nearly identical to those for an Underwood Creek discharge because low flow values are similar. Limitations for a discharge directly to the Menomonee River may be less stringent, but only minimally so. As you will see, the aforementioned maintenance of existing effluent quality to meet the antidegradation policy will essentially drive the proposed effluent limitations for any discharge.

In summary, proposed effluent limitations are similar to those in the existing WPDES permit, including the following:

- Limitations for BOD and suspended solids will be in the range of 5 to 10 mg/L, with a minimum effluent DO value of 7 mg/L;
- Limitations for phosphorus are 1 mg/L, except at they may change with new rules currently under development;
- Limitations for ammonia nitrogen will be driven by existing effluent quality and would likely be more stringent than those in the current permit;
- Limitations for mercury will remain as in the current permit (alternative limitations under NR 106.145);
- Limitations for other bioaccumulating chemicals of concern will not apply because they have not been detected;
- Limitations for chloride (alternative limitations under NR 106, Subch. VII) and associated source reduction requirements will continue;
- Disinfection, as currently applied, must continue.

Given this information, we believe the appropriate scope of the wastewater facilities plan should be limited to that associated with the infrastructure necessary to return flow to the Lake Michigan basin. As noted in prior communications, the facilities planning rule requires you to evaluate the alternative of connecting wastewater discharges to other nearby systems, including the Milwaukee Metropolitan Sewerage District. Such evaluation must include an assessment of the cost-effectiveness of a connection as described in NR 110, Wis. Adm. Code. Lastly, the facilities plan must conform to any Water Quality Management Plan adopted by the Southeastern Wisconsin Regional Planning Commission.

I am hopeful that this reply and our earlier communication provide sufficient information to allow you to proceed with facilities planning for this project. If you wish to meet with us to discuss this matter further or have questions, please contact me. Feel free, also, to maintain other contacts with Department staff to discuss various technical aspects of this project.

Sincerely,

Duane H. Schuettpelz
Bureau of Watershed Management

Cc: Todd Ambs – AD/8
Pat Henderson – AD/8
Russ Rasmussen – WT/3
Bruce Baker – AD/8
Jill Jonas – DG/5
James McNelly – SER, Milwaukee
Eric Ebersberger – DG/5
Michael Hahn – SEWRPC