Permit Fact Sheet

1 General Information

Permit Number:	WI-0023370-09-0	
Permittee Name:	BELOIT CITY	
Address:	555 Willowbrook Road	
City/State/Zip:	BELOIT WI 53511	
Discharge Location:	East bank of Rock River immediately south of Shirland Ave bridge, approximately 2 miles southwest of the treatment plant located at 555 Willowbrook Road, Beloit, WI. (SW ¼ of SE ¼ of Section 35, T1N_R12E - Lat:42.4964 – Lon: -89.0415)	
Receiving Water:	Rock River (Turtle Creek Watershed, LR01, Lower Rock River Basin) in Rock County. Rock River at Beloit is 303(d) listed as impaired for total phosphorus.	
StreamFlow ($Q_{7,10}$):	219 cfs	
Stream Classification:	Warm Water Sport Fish (WWSF), Non-public Water Supply	
Design Flow(s)	Daily Maximum	18.3 MGD
	Weekly Maximum	14.6 MGD
	Monthly Maximum	13.2 MGD
	Annual Average	11.0 MGD
Significant Industrial Loading?	<25% of Influent Flow – American Aluminum, Beloit Box Board, Fairbanks-Morse, Frito Lay, Hormel, IPM Foods, Kerry Foods, Kettel Foods, Beloit Memorial Hospital and Genecor	
Operator at Proper Grade?	Yes – Class 4 Facility with required Subclasses: A–Primary Settling, C–Activated Sludge, E–Disinfection, F–Anaerobic Digestion, G–Mechanical Sludge, I–Phosphorus Removal and J-Laboratory. Four operators certified at various grades/subclasses.	
Pretreatment Program Approval Date:	October 14, 1983	

2 Facility Description

The City of Beloit operates a wastewater treatment facility (WWTF) providing secondary treatment to a combination of domestic, commercial and industrial wastewater. The WWTF serves a total population of approximately 36,100 in the City of Beloit and portions of several small surrounding communities. Treatment units include preliminary influent screening press, grit removal, primary settling, anoxic selector, advanced activated sludge with ammonia and biological phosphorus removal, final clarification, and seasonal effluent chlorine (sodium hypochlorite) contact disinfection and dechlorination (sodium bisulfite). Biosolids are thickened and/or dewatered using a gravity belt thickener and belt filter press, anaerobically digested and stored prior to land application or landfilling.

Beloit administers a local industrial pretreatment program approved by the Department on October 14, 1983. The collection system for the City of Beloit is a 100% separate sewer system with no constructed overflow points. The City is also covered under a “no exposure certification” for storm water. The Department has found the City to be in substantial compliance with its current permit.

The attached water quality based limits recommendations memo by the Water Quality Bureau for this permit reissuance dated October 6, 2014 contains additional information regarding this discharge to the Rock River. The WQBEL memo also includes a map depicting the location of the Beloit WWTF outfall.

3 Proposed Permit Reissuance

The Department anticipates an effective date of July 1, 2015 for the proposed permit. Therefore, to allow a full permit term of five years, the proposed permit's expiration date is June 30, 2020. If the permit reissuance process takes more or less time than anticipated, the permit's dates of effectiveness and expiration may be changed accordingly.

Sample Point Designation		
Sample Point Number	**Discharge Flow, Units, and Averaging Period**	**Sample Point Location, WasteType/sample Contents and Treatment Description (as applicable)**
701	3.8 MGD (11/1/2013 – 10/31/2014)	Representative influent samples shall be collected after preliminary screening, but before grit removal.
001	3.7 MGD (11/1/2013 – 10/31/2014)	Representative final effluent samples shall be collected after the chlorinate/dechlorinate disinfection in the chlorine contact tank, prior to discharge to the Rock River.
002	2,400 Dry U.S. Tons (Application)	Anaerobically digested, thickened, Liquid, Class B. Representative sludge samples shall be collected from the on-site storage tank recirculation line.
005	New Outfall	Anaerobically digested, thickened, Cake, Class B. Representative sludge samples shall be collected from the cake pump after the belt press.
107	N/A	Mercury field blanks shall be collected using Clean Hands/Dirty Hands sample handling procedures.

4 Influent - Proposed Monitoring

4.1 Sample Point Number: 701- INFLUENT TO PLANT

Monitoring Requirements					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Continuous	Continuous	
CBOD5		mg/L	5/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total		mg/L	Daily	24-Hr Flow Prop Comp	
Cadmium, Total Recoverable		ug/L	Quarterly	24-Hr Flow Prop Comp	
Chromium, Total Recoverable		ug/L	Quarterly	24-Hr Flow Prop Comp	

Monitoring Requirements					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Copper, Total Recoverable		ug/L	Quarterly	24-Hr Flow Prop Comp	
Lead, Total Recoverable		ug/L	Quarterly	24-Hr Flow Prop Comp	
Nickel, Total Recoverable		ug/L	Quarterly	24-Hr Flow Prop Comp	
Zinc, Total Recoverable		ug/L	Quarterly	24-Hr Flow Prop Comp	
Mercury, Total Recoverable		ng/L	Quarterly	24-Hr Flow Prop Comp	See "Mercury Monitoring" subsection in permit.

4.1.1 Changes from Previous Permit:

Influent sample frequency for mercury reduced from monthly to quarterly.

4.1.2 Explanation of Monitoring Requirements

Mercury monitoring frequency reduced from monthly to once every 3 months because adequate representative results meeting the data quality requirements in ss. NR 106.145(9) and (10), Wis. Adm. Code, were generated during the previous permit term. This reduced monitoring frequency is consistent with the mercury field blank and effluent sample frequencies contained in this permit. Influent sampling frequency is based upon size of facility. Influent metals monitoring in combination with effluent metals monitoring used to calculate local industrial pretreatment limits.

5 Inplant - Proposed Monitoring

5.1 Sample Point Number: 107- Mercury Field Blank

Monitoring Requirements					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Mercury, Total Recoverable		ng/L	Quarterly	Blank	See "Mercury Monitoring" subsection in permit.

5.1.1 Changes from Previous Permit:

Sample frequency for mercury field blanks reduced from monthly to quarterly.

5.1.2 Explanation of Monitoring Requirements

Frequency of mercury field blank analysis reduced from monthly to once every 3 months because adequate representative results meeting the data quality requirements in ss. NR 106.145(9) and (10), Wis. Adm. Code, were generated during the previous permit term. This reduced monitoring frequency is consistent with the mercury influent and effluent sample frequencies contained in this permit.

6 Surface Water - Proposed Monitoring and Limitations

Unless otherwise noted below, limitations are effective year-round beginning on the effective date of this permit.

6.1 Sample Point Number: 001- EFFLUENT

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Continuous	Continuous	
CBOD5	Monthly Avg	25 mg/L	5/Week	24-Hr Flow Prop Comp	See subsection 6.4.7 in permit for percent removal requirements for CBOD and Suspended Solids.
CBOD5	Weekly Avg	40 mg/L	5/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total	Monthly Avg	30 mg/L	Daily	24-Hr Flow Prop Comp	
Suspended Solids, Total	Weekly Avg	45 mg/L	Daily	24-Hr Flow Prop Comp	
Suspended Solids, Total	Monthly Avg	1,778 lbs/day	Daily	24-Hr Flow Prop Comp	Limit effective January annually.
Suspended Solids, Total	Monthly Avg	2,196 lbs/day	Daily	Calculated	Limit effective February annually.
Suspended Solids, Total	Monthly Avg	2,465 lbs/day	Daily	Calculated	Limit effective March annually.
Suspended Solids, Total	Monthly Avg	2,323 lbs/day	Daily	Calculated	Limit effective April annually.
Suspended Solids, Total	Monthly Avg	2,141 lbs/day	Daily	Calculated	Limit effective May annually.
Suspended Solids, Total	Monthly Avg	2,015 lbs/day	Daily	Calculated	Limit effective June annually.
Suspended Solids, Total	Monthly Avg	1,596 lbs/day	Daily	Calculated	Limit effective July annually.
Suspended Solids, Total	Monthly Avg	1,248 lbs/day	Daily	Calculated	Limit effective August annually.
Suspended Solids, Total	Monthly Avg	845 lbs/day	Daily	Calculated	Limit effective September annually.
Suspended Solids, Total	Monthly Avg	1,367 lbs/day	Daily	Calculated	Limit effective October annually.
Suspended Solids, Total	Monthly Avg	2,094 lbs/day	Daily	Calculated	Limit effective November annually.

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Suspended Solids, Total	Monthly Avg	1,746 lbs/day	Daily	Calculated	Limit effective December annually.
Suspended Solids, Total	Weekly Avg	2,276 lbs/day	Daily	Calculated	Limit effective January annually.
Suspended Solids, Total	Weekly Avg	2,811 lbs/day	Daily	Calculated	Limit effective February annually.
Suspended Solids, Total	Weekly Avg	3,155 lbs/day	Daily	Calculated	Limit effective March annually.
Suspended Solids, Total	Weekly Avg	2,973 lbs/day	Daily	Calculated	Limit effective April annually.
Suspended Solids, Total	Weekly Avg	2,740 lbs/day	Daily	Calculated	Limit effective May annually.
Suspended Solids, Total	Weekly Avg	2,579 lbs/day	Daily	Calculated	Limit effective June annually.
Suspended Solids, Total	Weekly Avg	2,043 lbs/day	Daily	Calculated	Limit effective July annually.
Suspended Solids, Total	Weekly Avg	1,597 lbs/day	Daily	Calculated	Limit effective August annually.
Suspended Solids, Total	Weekly Avg	1,082 lbs/day	Daily	Calculated	Limit effective September annually.
Suspended Solids, Total	Weekly Avg	1,750 lbs/day	Daily	Calculated	Limit effective October annually.
Suspended Solids, Total	Weekly Avg	2,680 lbs/day	Daily	Calculated	Limit effective November annually.
Suspended Solids, Total	Weekly Avg	2,235 lbs/day	Daily	Calculated	Limit effective December annually.
Nitrogen, Ammonia (NH3-N) Total	Daily Max	17 mg/L	3/Week	24-Hr Flow Prop Comp	
Chlorine, Total Residual	Daily Max	38 ug/L	Daily	Grab	Limit effective May 1 through September 30 annually.
Chlorine, Total Residual	Weekly Avg	31 ug/L	Daily	Grab	Limit effective May 1 through September 30 annually.
Fecal Coliform	Geometric Mean	400 #/100 ml	2/Week	Grab	Limit effective May 1 through September 30 annually. See standard requirement 6.4.7 in the

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
					permit.
Phosphorus, Total	Monthly Avg	2.0 mg/L	Daily	24-Hr Flow Prop Comp	This is an interim limit. See the "Phosphorus Limitation(s)" subsection at 3.2.1.5 in the permit for the final water quality based phosphorus limits and subsection 8.1 below for the phosphorus compliance schedule.
Phosphorus, Total		lbs/day	Daily	Calculated	See the "Phosphorus Limitation(s)" subsection at 3.2.1.5 in the permit for final phosphorus mass limits. Calculate the daily mass discharge of phosphorus on the same days phosphorus sampling occurs. Daily mass (lbs/day) = daily concentration (mg/L) x daily flow (MGD) x 8.34.
pH Field	Daily Max	9.0 su	Daily	Grab	
pH Field	Daily Min	6.0 su	Daily	Grab	
Mercury, Total Recoverable	Daily Max	3.3 ng/L	Quarterly	Grab	This is an Alternative Mercury Effluent Limit. See the "Mercury Monitoring" subsection at 3.2.1.9 in the permit for sampling and analysis requirements and subsection 8.2 below for the mercury compliance schedule.
Acute WET		TUa	See Listed Qtr(s)	24-Hr Flow Prop Comp	See "Whole Effluent Toxicity (WET) Testing" subsection at 3.2.1.10 in the permit for monitoring dates and WET requirements.
Chronic WET		rTUc	See Listed Qtr(s)	24-Hr Flow Prop Comp	See "Whole Effluent Toxicity (WET) Testing" subsection at 3.2.1.10 in the permit for monitoring dates

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
					and WET requirements.
Cadmium, Total Recoverable		ug/L	Quarterly	24-Hr Flow Prop Comp	Monitor Only
Chromium, Total Recoverable		ug/L	Quarterly	24-Hr Flow Prop Comp	Monitor Only
Copper, Total Recoverable		ug/L	Quarterly	24-Hr Flow Prop Comp	Monitor Only
Lead, Total Recoverable		ug/L	Quarterly	24-Hr Flow Prop Comp	Monitor Only
Nickel, Total Recoverable		ug/L	Quarterly	24-Hr Flow Prop Comp	Monitor Only
Zinc, Total Recoverable		ug/L	Quarterly	24-Hr Flow Prop Comp	Monitor Only
Chloride		mg/L	Monthly	24-Hr Flow Prop Comp	Monitor Only - January 1, 2019 to December 31, 2019
Temperature Maximum		deg F	3/Week	Continuous	Monitor Only - January 1, 2019 to December 31, 2019 See the "Effluent Temperature Monitoring" subsection at 3.2.1.11 in the permit for monitoring requirements.
Nitrogen, Total Kjeldahl		mg/L	Quarterly	24-Hr Flow Prop Comp	Monitor Only
Nitrogen, Nitrite + Nitrate Total		mg/L	Quarterly	24-Hr Flow Prop Comp	Monitor Only
Nitrogen, Total		mg/L	Quarterly	Calculated	Monitor Only

6.1.1 Rock River Total Maximum Daily Load

A total maximum daily load (TMDL) was developed for the Rock River Basin to determine the maximum amounts of phosphorus and sediment that can be discharged to protect and improve water quality. The Rock River Basin's TMDL was approved by the Environmental Protection Agency (EPA) in September 2011. These final effluent limits were derived from and comply with the applicable water quality criterion and are consistent with the assumptions and requirements of the EPA-approved Waste Load Allocation (WLA) for the Rock River. The entire report can be found at: http://dnr.wi.gov/topic/TMDLs/RockRiver/Final_Rock_River_TMDL_Report_with_Tables.pdf. The proposed permit includes limitations and requirements necessary to implement the recommendations of the TMDL. For specific limits see below.

6.1.2 Changes from Previous Permit

The City of Beloit WWTF is in the Rock River TMDL, which was approved September 28, 2011. Weekly average and monthly average total suspended solids (TSS) mass limits as well as monthly average phosphorus mass limits were calculated to comply with the TMDL. Beloit can easily meet the TSS mass limits that take effect on the permit effective date. The final effluent mass limitations for phosphorus do not take effect until the end of the phosphorus compliance schedule. The 2.0 mg/L phosphorus concentration limit from the previous permit has been retained in the reissued permit as an interim limit that applies on the permit effective date. Ammonia sampling frequency was reduced from daily to 3/Week. Beloit has requested a continuation of a variance from the water quality criterion for mercury of 1.3 ng/L for the protection of wildlife (the most stringent criterion for this substance). The Alternative Mercury Effluent Limit of 3.6 ng/L from the current permit was recalculated using mercury data generated during the current permit term and a new daily maximum limit of 3.3 ng/L is included in the reissued permit. Mercury monitoring has been reduced from monthly to quarterly. Annual acute and chronic Whole Effluent Toxicity Testing will continue in the reissued permit with new time frames for testing listed in the permit. Monthly chloride monitoring is required in calendar year 2019 to provide data for the next permit reissuance process. New Thermal (temperature) Rules became effective October 10, 2010. Temperature limits are not recommended for Beloit; however, three times per week effluent temperature monitoring is required in calendar year 2019 to provide data for the next permit reissuance process.

6.1.3 Explanation of Limits and Monitoring Requirements

Water Quality Based Limits and WET Requirements and Disinfection

Refer to the WQBEL memo and the WET checklist for the detailed calculations, prepared by Nasrin Mohajerani dated October 6, 2014 used for this reissuance. Sampling frequency is on a case by case basis upon size of facility. Sample frequency is considered to capture results that are representative of discharge.

$CBOD_5$ – The $CBOD_5$ limits in Beloit's reissued permit were carried over from the previous permit. For receiving waters classified as fish and aquatic life, s. NR 210.05(1)(d), Wis. Adm. Code, allows $CBOD_5$ limits to be substituted for BOD_5 limits at the request of the permittee, pursuant to s. NR 210.07(4), Wis. Adm. Code. Beloit's request for $CBOD_5$ limits was approved by the Department and s. NR 210.05(1)(d), Wis. Adm. Code, establishes the limits at 25 mg/L as a monthly average and 40 mg/L as a weekly average.

Total Suspended Solids (TSS) Concentration – The TSS concentration limits in Beloit's reissued permit are the categorical limits specified in s. NR 210.05(1)(b), Wis. Adm. Code, for facilities discharging to receiving waters classified as fish and aquatic life and are the same as in the previous permit. TSS mass limitations based on the Rock River TMDL are discussed below.

Total Suspended Solids - Weekly average and monthly average mass limits for total suspended solids were required to comply with the Rock River TMDL, and were derived consistent with the assumptions and requirements of the EPA-approved WLA for the Rock River. Since the treatment plant can easily meet these new mass limits (see limits below), no compliance schedule is included. There are no changes proposed to concentration limits. The TMDL limits are in addition to the concentration limits for suspended solids of 30 mg/L monthly average and 45 mg/L weekly average in the current permit. The approved total suspended solids TMDL limits for this permittee are included in the following table, expressed as weekly average and monthly average effluents limits, and are effective immediately**:**

Total Suspended Solids (TSS) Effluent Limitations

Month	Monthly Avg. TSS Effluent Limit (lbs/day)	Weekly Avg. TSS Effluent Limit (lbs/day)
Jan	1778	2276
Feb	2196	2811
March	2465	3155
April	2323	2973
May	2141	2740

Month	Monthly Avg. TSS Effluent Limit (lbs/day)	Weekly Avg. TSS Effluent Limit (lbs/day)
June	2015	2579
July	1596	2043
Aug	1248	1597
Sept	845	1082
Oct	1367	1750
Nov	2094	2680
Dec	1746	2235

Ammonia – Acute (daily maximum) ammonia limits are dependent on the classification of the receiving water and effluent pH. For this reissuance, pH data from the previous permit term was analyzed and it is believed that an effluent pH of 8.0 standard pH Units (s.u.) represents the maximum reasonably expected pH. The associated daily maximum limit is 17 mg/L. This is the same as the limit contained in the previous permit. Because the reference effluent flow rates and receiving water characteristics have not changed, limitations for monthly average and weekly average ammonia limits do not need to be re-evaluated at this time. The daily maximum ammonia limit of 17 mg/L proposed for the reissued permit is more stringent than the monthly average and weekly average limits calculated for the previous reissuance process so monthly average and weekly average limits are not needed. In response to comments submitted by Beloit during the public comment period, the Department has reduced ammonia sampling frequency from daily to 3/Week. See "Notice of Final Determination" for permittee comment and Department response.

Disinfection – Because chlorine (Sodium hypochlorite) is intentionally added to the effluent for seasonal disinfection during the months of May through September, effluent limits are recommended to assure proper operation of the dechlorination (Sodium bisulfite) system.

Dissolved Oxygen (DO) – For discharges to warm water sport fisheries, when categorical $CBOD_5$ limits of 40 mg/L weekly average and 25 mg/L monthly average are imposed, those limits are considered protective of the 5 mg/L warm water DO standard and DO limits are not required.

Fecal Coliform – When disinfection is required, as is the case here, s. NR 210.06(2)(a), Wis. Adm. Code, establishes that the geometric mean of the fecal coliform bacteria for effluent samples collected in a period of 30 consecutive days may not exceed 400 #/100 ml.

Phosphorus - Recent revisions to the administrative rules for phosphorus discharges took effect on December 1, 2010. Details may be found at: http://dnr.wi.gov/topic/surfacewater/phosphorus.html. Mass limits were calculated to comply with the Rock River TMDL, and were derived consistent with the assumptions and requirements of the EPA-approved WLA for the Rock River. Limits for the permit were determined using the code changes and the provision of the TMDL. The final effluent limits for phosphorus are expressed as monthly averages. The facility currently treats for phosphorus but cannot meet the proposed mass limits year round. Since Beloit is unable to immediately achieve the proposed WQBELs based on existing operation, a schedule of compliance is appropriate and necessary pursuant to s. NR 217.17, Wis. Adm. Code. A lengthy compliance schedule has been included because the permittee will need a significant amount of time to meet the stringent phosphorus water quality based effluent limits (WQBEL) contained in the permit. The overall compliance schedule takes place over a 9 year time period. Please see compliance schedule specifics in the Schedules section. Because a phosphorus compliance schedule is being granted, an interim phosphorus limit based on current effluent quality is needed to prevent backsliding during the term of the permit. The Alternative Phosphorus Limit of 2.0 mg/L from the previous permit will be retained as an interim limit in the permit that applies on the effective date of the reissued permit. The approved total phosphorus TMDL mass limits for this permittee are included in the following table:

Total Phosphorus Effluent Limitations

Month	Monthly Avg. Total P Effluent Limit (lbs/day)
Jan	33.0
Feb	35.1
March	30.8
April	33.0
May	31.3
June	30.4
July	23.5
Aug	20.3
Sept	18.5
Oct	20.2
Nov	24.4
Dec	29.5

pH – Existing ch. NR 210, Wis. Adm. Code, limitations will remain—9.0 s.u. (standard pH units) daily maximum and 6.0 s.u. daily minimum.

Mercury – Actual flow is greater than 1.0 MGD so the mercury influent, effluent and field blank monitoring requirements for Major WWTFs in Subchapter III, NR 106.145, Wis. Adm. Code, apply. Mercury effluent and field blank data generated during the previous permit term were evaluated for sampling and analysis requirements in accordance with ss. NR 106.145 (9) and (10), Wis. Adm. Code. The 30-day Upper 99th percentile (30-day P99) of effluent results calculated using the procedures in s. NR 106.05(5), Wis. Adm. Code, was 1.52 ng/L, which is greater than the water quality criterion for the protection of wildlife of 1.3 ng/L (the most stringent criterion for this substance), so a limit is necessary (WQBEL). However, s. NR 106.145, Wis. Adm. Code, provides for a variance from water quality standards for this substance in light of its presence in the environment and the City of Beloit is requesting this variance. An Alternative Mercury Effluent Limit (AMEL) was established at the calculated 1-day P99 of 3.3 ng/L. The permit requires Beloit to continue quarterly influent, field blank and effluent monitoring, maintain mercury discharge concentrations at or below 3.3 ng/L as a daily maximum and implement a Pollutant Minimization Program designed to minimize mercury influent to the plant. Requirements for mercury are included in s. NR 106.145 Wis. Adm. Code. NR 106.145(4), Wis. Adm. Code, establishes eligibility for alternative mercury effluent limits.

WET – Yearly acute and chronic WET tests will be continued in the reissued permit. The WET Guidance Document was used to determine appropriate test frequencies. (A completed checklist for Outfall 001 is provided in the Department's WQBEL memo dated October 6, 2014 and the website http://dnr.wi.gov/topic/wastewater/WETChecklist.html provides the WET checklist and instructions for its use.). Acute and Chronic WET tests are scheduled in the following rotating quarters: October 1 – December 31, 2015; July 1 – September 30, 2016; April 1 – June 30, 2017; January 1 – March 31, 2018; July 1 – September 30, 2019; and January 1 – March 31, 2020.

Metals – Effluent monitoring for the metals listed in NR 215.03(6), Wis. Adm. Code, conducted during the previous permit term and for the permit application were evaluated and a comparison of effluent quality to potential limits determined that no permit limitations for any of the metals are necessary (WQBEL). The permittee administers a local industrial pretreatment program. Effluent metals monitoring in combination with influent metals monitoring is used to evaluate percent removal and to calculate local industrial pretreatment limits. Quarterly metals monitoring will continue in the reissued permit.

Toxics – A Priority Pollutant scan (PPS) for the toxic parameters listed in NR 215.03(1)-(4), Wis. Adm. Code, was conducted as part of the application process. These data were reviewed in the WQBEL memo dated October 6, 2014. Many substances were below levels of detection. No additional limitations are proposed in the reissued permit.

Chloride – Effluent concentrations (1-day and 4-day Upper 99th percentiles or P99s) calculated using the procedures in NR 106.05(5), Wis. Adm. Code, were below the associated acute and chronic limitations, so a limit is not needed (WQBEL). The permit requires monitoring in the fourth year that will be used for the next reissuance process.

Temperature – On October 1, 2010, revisions to chs. NR 102 and 106, Wis. Adm. Code, took effect. Details can be found at: http://dnr.wi.gov/topic/SurfaceWater/thermal.html. These revisions establish the criteria needed to calculate thermal limits. The calculated daily maximum temperature limits for Beloit were equal to or greater than 115° F for all months of the year and there is no reasonable potential that effluent temperatures at a municipal treatment facility without significant thermal loading from industries will exceed or even approach the calculated daily maximum limits. The only weekly average temperature limits that apply to Beloit's discharge are 81° F for May, 91º F for June and 106º F for July. Beloit supplied the Department with temperature data from June 2014 through September 2014 (temperature data prior to June 2014 are not believed to be representative of the discharge). Based on a comparison of the weekly average limitations and effluent quality, temperature limits are unnecessary for June or July. And while there was no representative effluent temperature data for May to compare with the calculated weekly average temperature limit of 81º F for May, based on best professional judgment the weekly average effluent temperature for May is assumed to be less than the weekly average temperatures for June (73° F) and July (74° F) and therefore there is no reasonable potential for effluent temperatures for May to exceed the calculated limit of 81° F. No temperatue limits will be included in the reissued permit; however, three times per week monitoring of maximum effluent temperatures is required in the fourth year of the permit term to use in the next permit reissuance process.

Total Nitrogen Monitoring (NO2+NO3, TKN and Total N) – Based on the "Guidance for Total Nitrogen Monitoring in WPDES Permits" dated October 2012, quarterly effluent monitoring for Total Nitrogen is required for municipal majors that discharge to the Mississippi River Basin.

7 Land Application - Proposed Monitoring and Limitations

Municipal Sludge Description						
Sample Point	Sludge Class (A or B)	Sludge Type (Liquid or Cake)	Pathogen Reduction Method	Vector Attraction Method	Reuse Option	Amount Reused/Disposed (Dry Tons/Year)
002	B	Liquid	Anaerobic Digestion & Fecal Coliform	Injection & Incorporation	Land Application & Landfill	2,400 dry U.S. tons
005	B	Cake	Anaerobic Digestion & Fecal Coliform	Injection & Incorporation	Land Application & Landfill	New Outfall
Does sludge management demonstrate compliance? Yes						
Is additional sludge storage required? No						
Is Radium-226 present in the water supply at a level greater than 2 pCi/liter? No If yes, special monitoring and recycling conditions will be included in the permit to track any potential problems in landapplying sludge from this facility						
Is a priority pollutant scan required? Yes – In 2018 Priority pollutant scans are required once every 10 years at facilities with design flows between 5 MGD and 40 MGD, and once every 5 years if design flow is greater than 40 MGD.						

7.1 Sample Point Number: 002 - Anaerobic Liquid Sludge and 005 - Anaerobic Cake Sludge

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Solids, Total		Percent	1/ 2 Months	Composite	
Arsenic Dry Wt	Ceiling	75 mg/kg	1/ 2 Months	Composite	
Arsenic Dry Wt	High Quality	41 mg/kg	1/ 2 Months	Composite	
Cadmium Dry Wt	Ceiling	85 mg/kg	1/ 2 Months	Composite	
Cadmium Dry Wt	High Quality	39 mg/kg	1/ 2 Months	Composite	
Copper Dry Wt	Ceiling	4,300 mg/kg	1/ 2 Months	Composite	
Copper Dry Wt	High Quality	1,500 mg/kg	1/ 2 Months	Composite	
Lead Dry Wt	Ceiling	840 mg/kg	1/ 2 Months	Composite	
Lead Dry Wt	High Quality	300 mg/kg	1/ 2 Months	Composite	
Mercury Dry Wt	Ceiling	57 mg/kg	1/ 2 Months	Composite	
Mercury Dry Wt	High Quality	17 mg/kg	1/ 2 Months	Composite	
Molybdenum Dry Wt	Ceiling	75 mg/kg	1/ 2 Months	Composite	
Nickel Dry Wt	Ceiling	420 mg/kg	1/ 2 Months	Composite	
Nickel Dry Wt	High Quality	420 mg/kg	1/ 2 Months	Composite	
Selenium Dry Wt	Ceiling	100 mg/kg	1/ 2 Months	Composite	
Selenium Dry Wt	High Quality	100 mg/kg	1/ 2 Months	Composite	
Zinc Dry Wt	Ceiling	7,500 mg/kg	1/ 2 Months	Composite	
Zinc Dry Wt	High Quality	2,800 mg/kg	1/ 2 Months	Composite	
Nitrogen, Total Kjeldahl		Percent	1/ 2 Months	Composite	
Nitrogen, Ammonium (NH4-N) Total		Percent	1/ 2 Months	Composite	
Phosphorus, Total		Percent	1/ 2 Months	Composite	
Phosphorus, Water Extractable		% of Tot P	1/ 2 Months	Composite	
Potassium, Total Recoverable		Percent	1/ 2 Months	Composite	
PCB Total Dry Wt	Ceiling	50 mg/kg	Once	Composite	Report the sum of all PCB congener or aroclor results from the Priority Pollutant scan to be done in 2018.

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
PCB Total Dry Wt	High Quality	10 mg/kg	Once	Composite	Report the sum of all PCB congener or aroclor results from the Priority Pollutant scan to be done in 2018.
Municipal Sludge Priority Pollutant Scan			Once	Composite	As specified in ch. NR 215.03 (1-4) Wis. Adm. Code. Priority Pollutant Scan required in 2018.

7.1.1 Changes from Previous Permit:

Sample frequency for List 1 parameters (metals) and List 2 parameters (nutrients) shall be once every two months for this permit term, whereas the sample frequency for these parameters was quarterly in the previous permit. Municipal Sludge Priority Pollutant Scan required in 2018.

7.1.2 Explanation of Limits and Monitoring Requirements

Per s. NR 204.06(2)(c)3, Table A, Wis. Adm. Code, municipal treatment facilities land applying and/or landfilling between 1,654 and16,540 Dry U.S. Tons of sludge per 365 day period shall monitor sludge once per 60 days.

8 Schedules

8.1 Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus

The permittee shall comply with the WQBELs for Phosphorus as specified. No later than 30 days following each compliance date, the permittee shall notify the Department in writing of its compliance or noncompliance. If a submittal is required, a timely submittal fulfills the notification requirement.

Required Action	Due Date
Operational Evaluation Report: The permittee shall prepare and submit to the Department for approval an operational evaluation report. The report shall include an evaluation of collected effluent data, possible source reduction measures, operational improvements or other minor facility modifications that will optimize reductions in phosphorus discharges from the treatment plant during the period prior to complying with final phosphorus WQBELs and, where possible, enable compliance with final phosphorus WQBELs by June 30, 2018. The report shall provide a plan and schedule for implementation of the measures, improvements, and modifications as soon as possible, but not later than June 30, 2018 and state whether the measures, improvements, and modifications will enable compliance with final phosphorus WQBELs. Regardless of whether they are expected to result in compliance, the permittee shall implement the measures, improvements, and modifications in accordance with the plan and schedule specified in the operational evaluation report. If the operational evaluation report concludes that the facility can achieve final phosphorus WQBELs using the existing treatment system with only source reduction measures, operational improvements, and minor facility modifications, the permittee shall comply with the final phosphorus WQBEL by June 30, 2018 and is not required to comply with the milestones identified below for years 3 through 9 of this compliance schedule ('Preliminary Compliance Alternatives Plan', 'Final Compliance Alternatives Plan', 'Final Plans and Specifications', 'Treatment Plant Upgrade to Meet WQBELs', 'Complete Construction', 'Achieve Compliance').	06/30/2016

STUDY OF FEASIBLE ALTERNATIVES - If the Operational Evaluation Report concludes that the permittee cannot achieve final phosphorus WQBELs with source reduction measures, operational improvements and other minor facility modifications, the permittee shall initiate a study of feasible alternatives for meeting final phosphorus WQBELs and comply with the remaining required actions of this schedule of compliance. If the Department disagrees with the conclusion of the report, and determines that the permittee can achieve final phosphorus WQBELs using the existing treatment system with only source reduction measures, operational improvements, and minor facility modifications, the Department may reopen and modify the permit to include an implementation schedule for achieving the final phosphorus WQBELs sooner than July 1, 2024.	
Compliance Alternatives, Source Reduction, Improvements and Modifications Status: The permittee shall submit a 'Compliance Alternatives, Source Reduction, Operational Improvements and Minor Facility Modification' status report to the Department. The report shall provide an update on the permittee's: (1) progress implementing source reduction measures, operational improvements, and minor facility modifications to optimize reductions in phosphorus discharges and, to the extent that such measures, improvements, and modifications will not enable compliance with the WQBELs, (2) status evaluating feasible alternatives for meeting phosphorus WQBELs.	06/30/2017
Preliminary Compliance Alternatives Plan: The permittee shall submit a preliminary compliance alternatives plan to the Department. If the plan concludes upgrading of the permittee's wastewater treatment facility is necessary to achieve final phosphorus WQBELs, the submittal shall include a preliminary engineering design report. If the plan concludes Adaptive Management will be used, the submittal shall include a completed Watershed Adaptive Management Request Form 3200-139 without the Adaptive Management Plan. If water quality trading will be undertaken, the plan must state that trading will be pursued.	06/30/2018
Final Compliance Alternatives Plan: The permittee shall submit a final compliance alternatives plan to the Department. If the plan concludes upgrading of the permittee's wastewater treatment is necessary to meet final phosphorus WQBELs, the submittal shall include a final engineering design report addressing the treatment plant upgrades, and a facility plan if required pursuant to ch. NR 110, Wis. Adm. Code. If the plan concludes Adaptive Management will be implemented, the submittal shall include a completed Watershed Adaptive Management Request Form 3200-139 and an engineering report addressing any treatment system upgrades necessary to meet interim limits pursuant to s. NR 217.18, Wis. Adm. Code. If the plan concludes water quality trading will be used, the submittal shall identify potential trading partners. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	06/30/2019
Progress Report on Plans & Specifications: Submit progress report regarding the progress of preparing final plans and specifications. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	06/30/2020
Final Plans and Specifications: Unless the permit has been modified, revoked and reissued, or reissued to include Adaptive Management or Water Quality Trading measures or to include a revised schedule based on factors in s. NR 217.17, Wis. Adm. Code, the permittee shall submit final	06/30/2021

construction plans to the Department for approval pursuant to s. 281.41, Stats., specifying treatment plant upgrades that must be constructed to achieve compliance with final phosphorus WQBELs, and a schedule for completing construction of the upgrades by the complete construction date specified below. (Note: Permit modification, revocation and reissuance, and reissuance are subject to s. 283.53(2), Stats.) Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	
Treatment Plant Upgrade to Meet WQBELs: The permittee shall initiate construction of the upgrades. The permittee shall obtain approval of the final construction plans and schedule from the Department pursuant to s. 281.41. Stats. Upon approval of the final construction plans and schedule by the Department pursuant to s. 281.41, Stats., the permittee shall construct the treatment plant upgrades in accordance with the approved plans and specifications. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	09/30/2021
Construction Upgrade Progress Report #1: The permittee shall submit a progress report on construction upgrades. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	09/30/2022
Construction Upgrade Progress Report #2: The permittee shall submit a progress report on construction upgrades. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	09/30/2023
Complete Construction: The permittee shall complete construction of wastewater treatment system upgrades. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	05/31/2024
Achieve Compliance: The permittee shall achieve compliance with final phosphorus WQBELs. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	07/01/2024

8.2 Mercury Pollutant Minimization Program

The permittee shall implement or continue to implement a pollutant minimization program as defined in s. NR 106.145(7), Wis. Adm. Code.

Required Action	Due Date
Implement the Mercury Pollutant Minimization Program: The permittee shall continue to implement the Mercury PMP initially submitted to and approved by the Department in March 2007 and as subsequently updated by the Annual Status Reports with the agreement of the permitee and the Department.	07/01/2015
Submit Annual Status Reports: The permittee shall submit to the Department annual status reports on the progress of the PMP as required by s. NR 106.145(7), Wis. Adm. Code. Submittal of the first annual status report covering the period from January 1, 2015 to December 31, 2015 is required by the Date Due. The report shall include a summary of any sector outreach accomplished or planned.	03/31/2016
Submit Annual Status Report #2: Submit second annual status report covering PMP activities conducted between January 1, 2016 to December 31, 2016. The report shall include a summary of any sector outreach accomplished or planned.	03/31/2017
Submit Annual Status Report #3: Submit third annual status report covering PMP activities conducted between January 1, 2017 to December 31, 2017. The report shall include a summary of any sector outreach accomplished or planned.	03/31/2018

Submit Annual Status Report #4: Submit fourth annual status report covering PMP activities conducted between January 1, 2018 to December 31, 2018. The report shall include a summary of any sector outreach accomplished or planned.	03/31/2019
Submit Annual Status Report #5: Submit fifth annual status report covering PMP activities conducted between January 1, 2019 to December 31, 2019. The report shall include a summary of any sector outreach accomplished or planned. 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.	03/31/2020
Submittal of Annual PMP Status Reports After Permit Expiration: In the event that this permit is not reissued on time for an July 1, 2020 effective date, the permittee shall continue to submit annual PMP status reports by March 31 each year summarizing sector outreach accomplished or planned during the previous calendar year. For example, a PMP status report covering the period from January 1, 2020 through December 31, 2020 would be due March 31, 2021.	

8.3 CMOM (Capacity, Management, Operation and Maintenance) Program Development

Required Action	Due Date
Complete Program Development: The permittee shall complete development of a CMOM Program. See CMOM requirements in Standard Requirement section 6.3.2 of this permit.	08/01/2016

8.4 Explanation of Compliance Schedules

Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus Compliance Schedule

Subsection NR 217.17, Wis. Adm. Code, allows the department to provide a schedule of compliance for water quality based phosphorus limits where the permittee cannot immediately achieve compliance. This compliance schedule requires the permittee to comply with the final water quality based phosphorus limits within 9 years. As part of the compliance schedule the permittee is required to submit:

- An Operational Evaluation Report to optimize reductions in phosphorus and proceed with implementation of the plans for reduction;
- A Facility Plan (Compliance Alternatives Plan) to select a preferred compliance option for meeting final phosphorus WQBELs;
- Assuming that facility upgrades will be made to comply with the final phosphorus WQBELs, the last steps of the phosphorus compliance schedule are to: submit final plans and specifications for construction, submit progress reports, and comply with final phosphorus WQBELs. If an alternative compliance option is selected such as water quality trading or adaptive management, the compliance schedule will be amended to reflect these compliance options through either permit reissuance or permit modification.

The permittee may be required to meet the final phosphorus WQBEL sooner than July 1, 2024 (less than 9 years) if the required "Operational Evaluation Report" concludes that the phosphorus WQBEL can be met using the existing treatment system with only source reduction measures, operational improvements and minor facility modifications. Also, the permittee will conduct a "Study of Feasible Alternatives" to determine whether Water Quality Trading or Adaptive Management, either alone or in combination with plant upgrades will allow the plant to meet the phosphorus WQBEL.

It is probable that, in order to consistently comply with the mass limits, the City of Beloit will need to evaluate and implement any number of the following approaches:

--Plant optimization;
--Phosphorus source reduction;
--Pilot testing of new or additional treatment processes;
--Additional treatment processes;
--Multiple treatment processes;
--Obtaining financing for construction;
--Potential for adaptive management and/or pollutant trading with upstream contributors, and implementation of such trades.

The Department believes that the compliance schedule suggested in the draft permit (9 years) provides the appropriate length of time for the permittee to evaluate these options, implement the chosen option and meet the final phosphorus limits (WQBELs).

Mercury Pollutant Minimization Program Compliance Schedule

The City of Beloit has applied for a variance from the mercury water quality criterion for the protection of wildlife (1.3 ng/L). As a condition of receiving a mercury variance, s.NR 106.145(7), Wis. Adm. Code, requires the City to develop and implement a Mercury Pollutant Minimization Program (PMP) that has been approved by the Department. The City submitted a Mercury PMP to the Department in March 2007. The compliance schedule requires the City to implement the Mercury PMP and submit annual status reports on PMP activities. Annual status reports are required to be submitted by March 31st of the following year, regardless of whether or not the permit expires without being reissued.

CMOM (Capacity, Management, Operation and Maintenance) Program Development Compliance Schedule

Because of recent changes to NR 210.23, Wis. Adm. Code, the permittee is required to submit to the Department verification that a CMOM program for the sewage collection system has been developed which is consistent with the requirements of NR 210.23, Wis. Adm. Code. All information will be kept on site, but shall be available for inspection upon request. See EPA guidance document "Guide to Evaluating Capacity Management, Operation and Maintenance (CMOM) Programs at Sanitary Sewer Collection Systems" [EPA 305 - B - 05 - 002: January 2005].

9 Attachments:

Substantial Compliance Determination – September 22, 2014

Water Quality Based Effluent Limits – October 6, 2014

Map(s) – See October 6, 2014 WQBEL Memo, Attachment #1 on page 15

WET Checklist Summary – See October 6, 2014 WQBEL Memo, page 13

Public Notice – February 18, 2015

10 Proposed Expiration Date:

June 30, 2020

Prepared By:

Phillip Spranger, Wastewater Specialist

Date: January 30, 2015

Updated: March 27, 2015 to incorporated public notice comments submitted by Harry Mathos, Beloit Director of Water Resources and March 27, 2015 to incorporate EPA review comments from Michael E. Davis, Chemical, Mechanical and Energy Engineer, NPDES Programs Branch, Water Division, USEPA, Region 5, Chicago.

cc: Amy Garbe – SCR/Fitchburg