

Permit Modification Fact Sheet

Changes from the previous permit fact sheet are highlighted in grey.

General Information

Permit Number:	WI-0020141-10-1	
Permittee Name:	City of Kiel	
Mailing Address:	City of Kiel, PO Box 98, Kiel, WI 53042	
Facility Address:	Kiel Wastewater Treatment Facility, 100 East Park Avenue, Kiel, WI 53042	
Discharge Location:	Kiel Wastewater Treatment Facility, 100 East Park Avenue, Kiel, WI 53042 NE ¼, NE ¼, NW ¼ of Section 29, Township 17 North, Range 21 East, City of Kiel, Manitowoc County, WI	
Receiving Water:	Sheboygan River (Water Body Identification Code number 50700) at Rockville Flowage in the Sheboygan River Watershed (SH03) of the Sheboygan River Drainage Basin in Manitowoc County and groundwater via land application in Calumet and Manitowoc Counties.	
StreamFlow (Q _{7,10}):	0.93 cfs	
Stream Classification:	Warm water sport fish (WWSF) community and non-public water supply	
Discharge Type:	Existing continuous discharge	
Design Flow(s)	Daily Maximum	3.86 MGD
	Weekly Maximum	Not determined
	Monthly Maximum	2.29 MGD
	Annual Average	1.43 MGD
Significant Industrial Loading?	Yes, and includes the following: Ameriquip (metal fabrication and finishing), Household Utilities, Inc. (metal fabrication and finishing), Vollrath Company LLC (metal fabrication), Land O'Lakes Cheese Plant (cheese making), and Sargento Cheese (cheese processing).	
Operator at Proper Grade?	Facility Subclasses & Classification: Facility is classified at the advanced level for the following subclasses: A1 (Suspended Growth Processes), B (Solids Separation), C (Biological Solids/Sludges), D (Disinfection), and P (Total Phosphorus); and at the basic level for L (Laboratory) and SS (Sanitary Sewage Collection System). OIC Subclasses & Grade: Kris August is certified at the advanced level for the following subclasses: A1 (Suspended Growth Processes), B (Solids Separation), C (Biological Solids/Sludges), D (Disinfection), L (Laboratory), and P (Total Phosphorus); and at the basic level for SS (Sanitary Sewage Collection System).	
Approved Pretreatment Program?	N/A	

Facility Description

The City of Kiel owns and operates the Kiel Wastewater Treatment Facility that treats residential and commercial domestic wastewater, industrial wastewaters, and hauled waste from the hauled waste receiving stations. Class A sludge is

generated from the treatment facility and either land applied or distributed as exceptional quality sludge to the public. The paragraphs below describe the liquid and solids treatment train of the Kiel Wastewater Treatment Facility.

Liquid Treatment Train: The facility provides preliminary, primary, secondary, and tertiary treatment to the influent. Preliminary treatment consists of influent pumping, fine screening and grit removal. Primary clarification is followed by the activated sludge process with aeration basins. Ferric sulfate is added prior to the secondary clarifiers for phosphorus removal. Secondary clarification then follows and removes the settled solids and then disk filters for tertiary filtration prior to disinfection. Disinfection consists of a chlorine contact tank using gaseous chlorine and liquid sulfur dioxide for dechlorination. The effluent then enters a post-aeration basin then flows by gravity through a submerged outfall structure to the Sheboygan River via Outfall 001.

Solids Treatment Train: The solids treatment includes anaerobic digestors, aerated sludge holding tank, screw presses, belt filter press, dryer and sludge storage structure. Primary settled sludge and scum from the primary clarifiers is sent to a two-stage anaerobic digester system. The process includes one primary anaerobic digester and one secondary anaerobic digester. The digester supernatant is returned to the tank prior to the primary clarifiers. The digested sludge then flows to an aerated sludge holding tank where it mixed with waste activated sludge from the secondary clarifiers. The aerated sludge is then pumped to a new screw press. A polymer is added to improve thickening. The pressate from the screw presses is returned to the tank prior to the primary clarifiers. The pressed sludge then is treated through a new dryer to meet Class A and exceptional quality (EQ) sludge requirements. The dried Class A EQ sludge is then placed a new conveyor system to the sludge storage building. The Class A EQ sludge is either immediately land applied or distributed to the public via Outfall 005 or if stored for a certain length of time retested for Class A pathogen requirements either land applied or distributed to the public via Outfall 006. The permittee has the ability to use an existing belt press to thicken the sludge prior to the dryer in case the screw press is not available. Additionally, the permittee has the ability to collect cake sludge from the belt filter press and serves as emergency backup in case Class A sludge cannot be produced. The pressed cake sludge can be land applied as Class B sludge on department approved sites via Outfall 007.

Recent facility Upgrades: The facility recently went through a large facility upgrade during the previous permit term. These facility upgrades included: new aeration basins, new blowers and aerators for existing aeration basins, two new secondary clarifiers, new mechanisms for existing clarifiers, replacing the existing sand filters with disk filters for phosphorus removal, new sludge pumps, new sludge screw presses, and sludge Class A dryer replacing the Class A sludge pasteurization process.

Substantial Compliance Determination

After a desk top review of all discharge monitoring reports, compliance annual maintenance reports, land application reports, compliance schedule items, and a site visit on May 2, 2023, this facility has been found to be in substantial compliance with their current permit.

Compliance determination entered by Trevor Moen, Wastewater Engineer, on May 7, 2024.

Fact Sheet Organization

This fact sheet explains the rationale and assumptions used in deriving the conditions and requirements set forth in this permit. Additionally, this fact sheet highlights changes in permit conditions that the department proposes to make when reissuing the WPDES permit. This fact sheet compares conditions in the previous permit to those in the reissued permit. The tables that follow were taken from the permit and are numbered in this fact sheet as they are numbered in the permit. Bolded and highlighted text and cells within tables indicate permit conditions that are new or different from those found in the previous permit.

Sample Point Designation		
Sample Point Number	Discharge Flow, Units, and Averaging Period	Sample Point Location, Waste Type/Sample Contents and Treatment Description (as applicable)
701	Daily Average: 1.28 MGD (April 2018 to February 2024)	INFLUENT - Total combined influent from the sanitary sewage collection system and hauled waste receiving station. At Sampling Point 701, the permittee shall collect representative samples of influent from the influent automatic sampler drawing 24-hour flow proportional composite samples from the open channel after screening and prior to the grit tank and primary clarifiers. The permittee shall measure the influent flow rate using a continuous flow recording device after the main lift station.
105	New sampling point only use if the facility will divert flow around the tertiary filters prior to disinfection.	At Sampling Point 105, the permittee shall report the diverted flow which bypasses the tertiary filtration system prior to disinfection.
001	Daily Average: 1.23 MGD (April 2018 to February 2024)	EFFLUENT - At Sampling Point 001, the permittee shall collect representative samples of effluent from the effluent automatic composite sampler drawing 24-hour flow proportional composite samples from the post aeration basin following disinfection, except that the permittee shall continuously measure for pH, DO, and temperature from the post aeration basin and collect grab samples of the effluent at the final weir of the post aeration basin for total residual chlorine, E. coli, PFOA, and PFOS prior to being discharged to the Sheboygan River via Outfall 001. The permittee shall measure the effluent flow rate using a continuous flow recording device prior to the tertiary filters.
005	Average Annual Sludge Generated: 3,428 cubic yards (2019 to 2023) Average Annual Sludge Land Applied or Distributed: 1,286 metric tons (2019 to 2023)	DRIED CLASS A EQ SLUDGE - Class A, exceptional quality cake sludge from treatment of primary sludge with anaerobic digestion mixed with waste activated sludge from final clarification in an aerated holding tank, then treated with a screw press (or belt press as emergency back-up) and a dryer. At Sampling Point 005, the permittee shall collect representative grab and/or composite samples of cake sludge immediately following the sludge dryer and be monitored quarterly for metals (List 1), nutrients (List 2), Class A pathogen density requirements (List 3), and vector attraction reduction (List 4) prior to immediately being bagged, distributed or land applied as exceptional quality sludge or being stored on-site in dried cake sludge piles in the storage building. All pathogen control samples shall be discrete samples. Each pathogen control sample shall meet the pathogen limit to prove effective pathogen treatment. Monitoring results for each sampling event shall be reported on a quarterly basis.

Sample Point Designation		
Sample Point Number	Discharge Flow, Units, and Averaging Period	Sample Point Location, Waste Type/Sample Contents and Treatment Description (as applicable)
006	New land application outfall used to track compliance with Class A pathogen control requirements if cake sludge will be land applied or distributed at a later time.	DRIED CLASS A EQ SLUDGE STORAGE - Class A, exceptional quality cake sludge from treatment of primary sludge with anaerobic digestion mixed with waste activated sludge from final clarification in an aerated holding tank, then treated with a screw press (or belt press as emergency back-up) and a dryer, then transported by a conveyor to an on-site storage building, and stored in piles. At Sampling Point 006, the permittee shall collect representative grab samples of cake sludge from the dried cake sludge piles in the on-site storage building and be monitored for pathogen control (List 3) prior to being distributed or land applied as exceptional quality sludge if the distribution or land application will occur at a later time as specified in the department approved sludge management plan. All pathogen control samples shall be discrete samples. Each pathogen control sample shall meet the pathogen limit to prove effective pathogen treatment. Monitoring results for each sampling event shall be reported on a quarterly basis.
007	New land application outfall used in case of emergency.	CLASS B CAKE SLUDGE - Class B cake sludge from treatment of primary sludge with anaerobic digestion mixed with waste activated sludge from final clarification in an aerated holding tank, then treated with a belt press and loaded onto trucks or stored in an on-site storage building. This outfall has been included for emergency use in case Class A sludge treatment is not available. At Sampling Point 007, the permittee shall collect representative composite samples of cake sludge from truck loadout or cake storage piles in the on-site storage building prior to being land applied on department approved sites via Outfall 007.

1 Influent – Monitoring Requirements

Sample Point Number: 701- INFLUENT

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow Rate		MGD	Continuous	Continuous	
BOD5, Total		mg/L	2/Week	24-Hr Flow Prop Comp	

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Suspended Solids, Total		mg/L	2/Week	24-Hr Flow Prop Comp	
Phosphorus, Total		mg/L	2/Week	24-Hr Flow Prop Comp	

Changes from Previous Permit:

No changes from the previous permit.

Explanation of Limits and Monitoring Requirements

Flow Rate, BOD₅, and TSS Monitoring: Influent wastewater strengths and volumes shall be characterized at treatment facilities by monitoring for flow, BOD₅ and TSS pursuant to s. NR 210.04(2), Wis. Adm. Code. Influent monitoring for flow, BOD₅, and TSS remains unchanged from the previous permit.

Total Phosphorus Monitoring: Monitoring requirements may be adjusted on a case-by-case basis depending on wastewater characteristics and their potential to degrade water quality pursuant to s. NR 210.04(3), Wis. Adm. Code. The department has included influent total phosphorus monitoring to characterize the strength of the total phosphorus loadings to the treatment facility and to support operational changes for phosphorus removal process. Influent monitoring for total phosphorus remains unchanged from the previous permit.

Sample Frequency: The department shall determine on a case-by-case basis the monitoring frequency to be required for each parameter in a permit pursuant to s. NR 205.066, Wis. Adm. Code. The Monitoring Frequencies for Individual Wastewater Permits guidance (April 12, 2021) recommends that standard monitoring frequencies be included in individual WPDES permits based on the size and type of the facility, in order to characterize effluent quality and variability, to detect events of noncompliance, and to ensure fairness and consistency in permits issued across the state. Guidance and requirements in administrative code were considered when determining the appropriate monitoring frequencies for pollutants that have final effluent limits in effect during this permit term.

Permitted monitoring frequencies for influent BOD₅ and TSS fall below the standard monitoring frequencies outlined in the guidance document. The permittee demonstrates a history of consistent compliance with existing BOD₅, TSS, and total phosphorus effluent limits. Data submitted during the previous permit term continues to show consistent compliance with BOD₅ and TSS effluent limitations, and the set monitoring frequencies are consistent with requirements of state code. The current monitoring frequency for BOD₅ and TSS shall continue this permit term. If performance levels begin to vary during the permitted term, the department may re-evaluate current sampling frequency for BOD₅ and TSS and implement more frequent monitoring via permit modification or at permit reissuance. The sampling frequencies for influent flow, BOD₅, TSS, and total phosphorus remain unchanged from the previous permit.

Sample Type: The department shall require the use of 24-hour flow proportional samplers for monitoring influent wastewater quality except where the department determines through the permit issuance process that other sample types may adequately characterize the influent quality pursuant to s. NR 210.04(4), Wis. Adm. Code. The 24-hour flow proportional sampling is the most representative method of collecting wastewater samples for wastewater coming into and being discharged from a wastewater treatment plant on a continuous basis. The sample type of BOD₅, TSS, and total phosphorus remains unchanged from the previous permit. For municipal waste at a treatment facility, methods of flow measurement shall include a continuous recording device pursuant to s. NR 218.05(1), Wis. Adm. Code. The sample frequency and sample type of influent flow rate remains unchanged from the previous permit.

2 Inplant - Monitoring and Limitations

Sample Point Number: 105- OTHER BYPASS

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow Rate		MGD	Per Occurrence	Continuous	Start flow measurement at the commencement of bypass operations. Measure flow in daily increments until operation ends and report daily bypass flow on the eDMR. See the Other Bypass Requirements section below.
Time		hours	Per Occurrence	Calculated	Report the total duration of 'Other Bypass' within a given day (12:00 am -11:59 pm) in which the other bypass occurs. See the Other Bypass Requirements section below.

Changes from Previous Permit:

- This is a new sample point and was not included in the previous permit.

Explanation of Limits and Monitoring Requirements

Other Bypass Monitoring: The department has determined that an “other bypass” as defined in s. NR 205.07(1)(u)3., Wis. Adm. Code, may occur at the wastewater treatment facility. Furthermore, the department has previously approved plans in accordance with s. 281.41, Wis. Stats., for the partial bypassing around the tertiary treatment process prior to disinfection. Section NR 205.07(1)(u), Wis. Adm. Code, requires that the department approve all other bypasses. The department included to this sampling point to constitute permitting and approval of the other bypass provided the other bypass monitoring requirements and conditions are followed. The other bypass may only divert flow around the tertiary filtration system prior to disinfection. A bypass that is defined as a controlled diversion in s. NR 205.07(1)(v), Wis. Adm. Code, is not covered under this sample point. In no case shall this include flow diversion which would constitute blending, as defined in s. NR 210.03(2e), Wis. Adm. Code, unless otherwise approved in this permit.

3 Surface Water - Monitoring and Limitations

Sample Point Number: 001- EFFLUENT

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow Rate		MGD	Daily	Continuous	
BOD ₅ , Total	Weekly Avg	9.4 mg/L	2/Week	24-Hr Flow Prop Comp	Limit applies August each year.
BOD ₅ , Total	Monthly Avg	9.4 mg/L	2/Week	24-Hr Flow Prop Comp	Limit applies August each year.
BOD ₅ , Total	Weekly Avg	9.5 mg/L	2/Week	24-Hr Flow Prop Comp	Limit applies September each year.
BOD ₅ , Total	Monthly Avg	9.5 mg/L	2/Week	24-Hr Flow Prop Comp	Limit applies September each year.
BOD ₅ , Total	Weekly Avg	10 mg/L	2/Week	24-Hr Flow Prop Comp	Limit applies May through July and October each year.
BOD ₅ , Total	Monthly Avg	10 mg/L	2/Week	24-Hr Flow Prop Comp	Limit applies May through July and October each year.
BOD ₅ , Total	Weekly Avg	15 mg/L	2/Week	24-Hr Flow Prop Comp	Limit applies November through April each year.
BOD ₅ , Total	Monthly Avg	15 mg/L	2/Week	24-Hr Flow Prop Comp	Limit applies November through April each year.
BOD ₅ , Total	Weekly Avg	108 lbs/day	2/Week	Calculated	Limit applies May through October each year.
BOD ₅ , Total	Weekly Avg	161 lbs/day	2/Week	Calculated	Limit applies November through April each year.
Suspended Solids, Total	Weekly Avg	10 mg/L	2/Week	24-Hr Flow Prop Comp	Limit applies May through October each year.
Suspended Solids, Total	Monthly Avg	10 mg/L	2/Week	24-Hr Flow Prop Comp	Limit applies May through October each year.
Suspended Solids, Total	Weekly Avg	15 mg/L	2/Week	24-Hr Flow Prop Comp	Limit applies November through April each year.
Suspended Solids, Total	Monthly Avg	15 mg/L	2/Week	24-Hr Flow Prop Comp	Limit applies November through April each year.
Suspended Solids, Total	Weekly Avg	340 lbs/day	2/Week	Calculated	See the TMDL Limitations in the permit.
Suspended Solids, Total	Monthly Avg	228 lbs/day	2/Week	Calculated	See the TMDL Limitations in the permit.

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Suspended Solids, Total		lbs/month	Monthly	Calculated	Calculate and report the total monthly mass of TSS discharged in lbs/month on the last day of the month on the eDMR.
Suspended Solids, Total		lbs/yr	Monthly	Calculated	Calculate and report the 12-month rolling sum of the total monthly mass of TSS on the last day of the month on the eDMR.
pH (Minimum)	Daily Min	6.0 su	Daily	Continuous	
pH (Maximum)	Daily Max	9.0 su	Daily	Continuous	
Dissolved Oxygen	Daily Min	7.0 mg/L	Daily	Continuous	
E. coli	Geometric Mean - Monthly	126 #/100 ml	Weekly	Grab	Monitoring and Limit applies May through September each year.
E. coli	% Exceedance	10 Percent	Monthly	Calculated	Monitoring and Limit applies May through September each year. See the E. coli Percent Limit section in the permit. Enter the result in the DMR on the last day of the month.
Chlorine, Total Residual	Daily Max	25 ug/L	5/Week	Grab	Monitoring and Limit applies May through September each year.
Chlorine, Total Residual	Weekly Avg	8.0 ug/L	5/Week	Grab	Monitoring and Limit applies May through September each year.
Chlorine, Total Residual	Monthly Avg	8.0 ug/L	5/Week	Grab	Monitoring and Limit applies May through September each year.
Phosphorus, Total	Monthly Avg	1.0 mg/L	2/Week	24-Hr Flow Prop Comp	
Phosphorus, Total	Monthly Avg	23 lbs/day	2/Week	Calculated	See the TMDL Limitations section in the permit.

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Phosphorus, Total		lbs/month	Monthly	Calculated	Calculate and report the total monthly mass of TP discharged in lbs/month on the last day of the month on the eDMR.
Phosphorus, Total		lbs/yr	Monthly	Calculated	Calculate and report the 12-month rolling sum of the total monthly mass of TP on the last day of the month on the eDMR.
Nitrogen, Ammonia Variable Limit		mg/L	2/Week	See Table	See the Daily Maximum Ammonia Nitrogen Limits section in the permit.
Nitrogen, Ammonia (NH3-N) Total	Daily Max - Variable	mg/L	2/Week	24-Hr Flow Prop Comp	See the Daily Maximum Ammonia Nitrogen Limits section in the permit.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	15 mg/L	2/Week	24-Hr Flow Prop Comp	Limit applies January through February each year.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	19 mg/L	2/Week	24-Hr Flow Prop Comp	Limit applies March through April each year.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	5.2 mg/L	2/Week	24-Hr Flow Prop Comp	Limit applies May each year.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	3.7 mg/L	2/Week	24-Hr Flow Prop Comp	Limit applies June through September each year.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	9.4 mg/L	2/Week	24-Hr Flow Prop Comp	Limit applies October each year.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	13 mg/L	2/Week	24-Hr Flow Prop Comp	Limit applies November each year.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	12 mg/L	2/Week	24-Hr Flow Prop Comp	Limit applies December each year.
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	5.3 mg/L	2/Week	24-Hr Flow Prop Comp	Limit applies October through March each year.
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	2.2 mg/L	2/Week	24-Hr Flow Prop Comp	Limit applies April through May each year.
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	1.7 mg/L	2/Week	24-Hr Flow Prop Comp	Limit applies June through September each year.
Chloride		mg/L	Monthly	24-Hr Flow Prop Comp	Monitoring only required from January 2027 to December 2027.

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Temperature Maximum		deg F	Daily	Continuous	See Effluent Temperature Monitoring section in the permit.
Nitrogen, Total Kjeldahl		mg/L	Quarterly	24-Hr Flow Prop Comp	See Nitrogen Series Monitoring section in the permit.
Nitrogen, Nitrite + Nitrate Total		mg/L	Quarterly	24-Hr Flow Prop Comp	See Nitrogen Series Monitoring section in the permit.
Nitrogen, Total		mg/L	Quarterly	Calculated	See Nitrogen Series Monitoring section in the permit. Total Nitrogen = Total Kjeldahl Nitrogen (mg/L) + Total (Nitrite + Nitrate)
PFOS		ng/L	Annual	Grab	Monitoring only. See PFOS/PFOA Sampling and Reporting Requirements section in the permit and PFOS/PFOA Minimization Plan Determination of Need section in the permit and compliance schedule.
PFOA		ng/L	Annual	Grab	Monitoring only. See PFOS/PFOA Sampling and Reporting Requirements section in the permit and PFOS/PFOA Minimization Plan Determination of Need section in the permit and compliance schedule.
Acute WET		TUa	See Listed Qtr(s)	24-Hr Flow Prop Comp	See the Whole Effluent Toxicity Testing section in the permit.
Chronic WET	Monthly Avg	1.1 TUC	See Listed Qtr(s)	24-Hr Flow Prop Comp	See the Whole Effluent Toxicity Testing section in the permit.

Changes from Previous Permit

- The BOD concentration limits have been changed for August and September.
- TMDL derived TSS mass effluent limitations and monitoring has been added to the permit.

- The daily minimum oxygen limit has been increased to 7.0 mg/L.
- Fecal coliform monitoring and limits have been replaced with *Escherichia coli* (*E. coli*) monitoring and limits. *E. coli* limits during the recreation season (May to September).
- Total residual chlorine daily maximum, weekly average and monthly average limits have been lowered.
- The sample frequency for total phosphorus has been changed from “Monthly” to “Weekly”.
- TMDL derived total phosphorus mass effluent limitation and monitoring has been added to the permit.
- Daily continuous temperature monitoring is now required year-round.
- Monthly chloride monitoring is only required in 2027.
- Quarterly nitrogen series monitoring has been added to the permit.
- Bimonthly PFOA and PFOS monitoring has been added to the permit. The monitoring frequency has been reduced from 1/ 2 Months to Annual.
- A chronic WET monthly average limit of 1.1 TU_c has been added to the permit.

Explanation of Limits and Monitoring Requirements

More information and explanation about the proposed water quality-based effluent limits (WQBELs) is found in the “Water Quality-Based Effluent Limitations for Kiel Wastewater Treatment Facility (WI-0020141-10)” memo dated March 8, 2024.

Flow Rate Monitoring: For municipal waste at a treatment facility, methods of flow measurement shall include a continuous recording device pursuant to s. NR 218.05(1), Wis. Adm. Code. Effluent monitoring for flow remains unchanged from the previous permit.

Secondary Treatment Limits and WQBELs for BOD₅, TSS, pH, and DO: Publicly owned treatment works with a discharge to a surface water classified as a fish and aquatic life water shall meet the secondary treatment effluent concentration limits specified for BOD₅, TSS, pH, and DO in s. NR 210.05(1), Wis. Adm. Code. The permittee discharges to the Sheboygan River which is classified as a fish and aquatic life water. Therefore, effluent limitations in s. NR 210.05(1), Wis. Adm. Code apply. However, the department determined WQBELs for BOD₅, TSS, and DO that are more restrictive.

The department calculated monthly BOD₅ limits based on the 26-pound method using the new design flow rate of 1.43 MGD, monthly river low flows, and the DO limit of 7.0 mg/L. The monthly BOD concentration limits were calculated to be higher than the current BOD concentration limits except for the months of August and September. The BOD concentration limits were lowered to 9.4 mg/L for August and 9.5 mg/L for September. The DO daily minimum limit of 7.0 mg/L must be included in the permit to ensure the DO in the receiving water does not decrease below the standard of 5 mg/L. The BOD mass limits were determined using the design flow rate of 1.29 MGD in the previous permit. The BOD mass limits were calculated based on weekly BOD limits were determined to be higher than current limits when using the new design flow rate of 1.43 MGD. The BOD mass limits of 108 lbs/day (May through October) and 161 lbs/day (November through April) remain unchanged from the previous permit for antidegradation and antibacksliding purposes per ch. NR 207, Wis. Adm. Code.

The TSS concentration limits were then set equal to the BOD concentration limits based on best professional judgement in previous permits. The department finds these limits to appropriate for the reissued permit and TSS concentration limits remain unchanged.

Limitations for pH are contained in s. NR 210.05(1)(c), Wis. Adm. Code, which are equivalent to water quality standards in s. NR 102.04(3)(c), Wis. Adm. Code. The limits for pH remain unchanged from the previous permit.

TMDL derived TSS Mass Effluent Limitations: If the department determines a limitation is necessary, effluent limitation shall be also consistent with a total maximum daily load (TMDL) if a TMDL has been approved by the U.S.

Environmental Protection Agency (USEPA) for the receiving waterbody consistent with s. NR 205.067(3)(a), Wis. Adm. Code. The discharge to Sheboygan River is within the Northeast Lakeshore Basin TMDL area. The Northeast Lakeshore Basin TMDL for total phosphorus and total suspended solids was approved by the USEPA on October 30, 2023. The department has determined that TSS effluent limitations are necessary. Therefore, the department must also calculate TMDL derived TSS limits to be consistent with the Northeast Lakeshore Basin TMDL. The approved total suspended solids waste load allocation (WLA) for the permittee is 52,306 lbs/year which results in calculated total suspended solids mass limits of 340 lbs/day as a weekly average and 228 lbs/day as a monthly average. Since the TSS WLA is expressed as an annual load (lbs/yr), the permittee must also calculate and report the rolling 12-month sums of total monthly loads for TSS. Rolling 12-month sums can be compared directly to the annual wasteload allocation. Based on the effluent TSS data submitted on eDMRs from April 2018 to February 2024, the permittee can currently meet the TSS mass limits, and a compliance schedule is not needed.

E. Coli: Fecal coliform monitoring and limits have been replaced with E. coli monitoring and limits. The final E. coli limits include 126 #/100 ml as a monthly geometric mean and 410 #/100 ml as a daily maximum may not be exceeded more than 10 percent of the time in any calendar month. Revisions to bacteria surface water quality criteria to protect recreational uses and accompanying E. coli WPDES permit implementation procedures became effective May 1, 2020. The new rule requires that WPDES permits for facilities with required disinfection include monitoring for E. coli while facilities are disinfecting during the recreation period and establish effluent limitations for E. coli established in s. NR 210.06(2), Wis. Adm Code. The administrative code rule changes included the following actions: revised the bacteria water quality criteria from fecal coliform to E. coli to protect recreation in ch. NR 102, Wis. Adm. Code.; removed fecal coliform criteria for certain individual waters from ch. NR 104, Wis. Adm. Code; revised permit requirements for publicly owned sewage treatment works in ch. NR 210, Wis. Adm. Code; and, updated approved analytical methods for bacteria in ch. NR 219, Wis. Adm. Code.

The permittee discharges to the Sheboygan River which the permittee must ensure the Sheboygan River is suitable for supporting recreational use and protect humans from illness caused by fecal contamination due to recreational contact with surface water. The Sheboygan River is not classified as a public water supply. Therefore, the permittee is required to disinfect during the recreation season pursuant to s. NR 210.06(1)(a), Wis. Adm. Code. Section NR 210.06(2)(a)1., Wis. Adm. Code, includes two limits which must be included in permits for facilities which are required to disinfect in order to protect recreation season (May to September): The geometric mean of E. coli bacteria in effluent samples collected in any calendar month cannot exceed 126 counts/100 mL. No more than 10% of E. coli bacteria samples collected in any calendar month can exceed 410 counts/100 mL. Fecal coliform limits and monitoring are no longer required for recreational protection.

The permittee had monitored effluent E. coli weekly from 05/06/2022 – 09/28/2022 with a total of 20 results. The geometric mean monthly limit of 126 #/100 mL was not exceeded during this period with a maximum monthly geometric mean of 12 #/100 mL. Effluent data did not exceed the maximum limit of 410 #/100 mL. The maximum reported value was 71 #/100 mL. Based on the effluent E. coli monitoring data, the permittee has demonstrated that the final E. coli limits can be met immediately with the existing disinfection system.

Total Residual Chlorine: The permittee currently uses chlorine gas to disinfect the final effluent prior to discharge to Sheboygan River during the recreational season (May to September). Therefore, the department must evaluate effluent limitations to assure proper operation of the dechlorination system. Section NR 210.06(2)(b), Wis. Adm. Code, states that when chlorine is used for disinfection, the daily maximum total residual chlorine concentration of the discharge may not exceed 0.10 mg/L. However, the department must also evaluate WQBELs for total residual chlorine. Chlorine effluent limits were calculated using current acute and chronic chlorine toxicity criteria for the protection of aquatic life included in Tables 1 and 5 of ch. NR 105, Wis. Adm. Code. The WQBELs were determined to be more restrictive than the technology based effluent limitations in s. NR 210.06(2)(b), Wis. Adm. Code. The determined a daily maximum limit of 25 µg/L and a weekly average effluent limitation of 8.0 µg/L should also be included in the permit. These are more restrictive than the current daily maximum and weekly average limits. Sections NR 106.07(3) and NR 205.067(7), Wis. Adm. Code require WPDES permits contain weekly average and monthly average limitations for municipal dischargers whenever practicable and necessary to protect water quality. Therefore, a monthly average limit of 8.0 µg/L is required to meet expression of limits requirements, equal to the weekly average limit.

Total Phosphorus: Phosphorus requirements are based on the Phosphorus Rules as detailed in chs. NR 102 (water quality standards) and NR 217, Wis. Adm. Code (effluent standards and limitations for phosphorus). Chapter NR 217 of the Wis. Adm. Code addresses point source dischargers of phosphorus to surface waters. Currently, there are three types of limit calculations used to determine if a phosphorus limit is needed: a technology based effluent limit (TBEL), a QBEL determined by stream criteria and an effluent limit based on a TMDL allocation.

- A TBEL of 1.0 mg/L is needed if a facility discharges more than the threshold of 150 pounds per month (s. NR 217.04(1)(a)1., Wis. Adm. Code). The data demonstrates that the annual monthly average phosphorus loading is less than 150 lbs/month. However, the current permit has a monthly average limit of 1.0 mg/L that served as an interim limit. This limit remains applicable unless a more stringent QBEL is given.
- Section NR 102.06(3)(a), Wis. Adm. Code, specifies river segments with a phosphorus criterion of 0.100 mg/L. The phosphorus criterion of 0.10 mg/L applies to the Sheboygan River. The department calculated final total phosphorus QBELs based on the phosphorus criterion consistent with s. NR 217.13, Wis. Adm. Code, and final total phosphorus QBELs were determined to be 0.30 mg/L as a monthly average, 0.10 mg/L as a six-month average, and 0.72 lbs/day as a six-month average. These limits have yet to take effect per the compliance schedule in the previous permit. The department has determined to include the total phosphorus TMDL derived limitations in lieu of the QBELs calculated under s. NR 217.13, Wis. Adm. Code pursuant to s. NR 217.16, Wis. Adm. Code.
- The discharge to Sheboygan River is within the Northeast Lakeshore Basin TMDL area. The Northeast Lakeshore Basin TMDL for total phosphorus and total suspended solids was approved by the USEPA on October 30, 2023. If the department determines a QBEL is necessary, limitations shall be consistent with a TMDL if a TMDL has been approved by the USEPA for the receiving waterbody consistent with s. NR 205.067(3)(a), Wis. Adm. Code. The department has determined that total phosphorus QBELs are necessary. Therefore, the department must also calculate TMDL derived total phosphorus limits to be consistent with the Northeast Lakeshore Basin TMDL. The approved total phosphorus WLA for the permittee is 4,359 lbs/year. Since the equivalent concentration is greater than 0.3 mg/L, the WLA should be expressed as a monthly average mass limit for total phosphorus and no six-month average limit is required. The department calculated a total phosphorus mass limit of 23 lbs/day as a monthly average.

Ammonia: Ammonia limits were calculated using current acute and chronic ammonia toxicity criteria for the protection of aquatic life are included in Tables 2C and 4B of ch. NR 105, Wis. Adm. Code. Subchapter IV of ch. NR 106 establishes the procedure for calculating QBELs for ammonia. The weekly average and monthly average limits have not changed from the previous permit. Section NR 106.33(2), Wis. Adm. Code, was updated effective on September 1, 2016. As a result, seasonal 20 and 40 mg/L thresholds for including ammonia limits in municipal discharge permits are no longer applicable under current rules. As such, the daily maximum variable limit table (see below) has been expanded from the table in the previous permit to include ammonia nitrogen limits throughout the pH range (6.0 to 9.0 s.u.).

Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L
6.0 ≤ pH ≤ 6.1	108	7.0 < pH ≤ 7.1	66	8.0 < pH ≤ 8.1	14
6.1 < pH ≤ 6.2	106	7.1 < pH ≤ 7.2	59	8.1 < pH ≤ 8.2	11
6.2 < pH ≤ 6.3	104	7.2 < pH ≤ 7.3	52	8.2 < pH ≤ 8.3	9.4
6.3 < pH ≤ 6.4	101	7.3 < pH ≤ 7.4	46	8.3 < pH ≤ 8.4	7.8
6.4 < pH ≤ 6.5	98	7.4 < pH ≤ 7.5	40	8.4 < pH ≤ 8.5	6.4
6.5 < pH ≤ 6.6	94	7.5 < pH ≤ 7.6	34	8.5 < pH ≤ 8.6	5.3
6.6 < pH ≤ 6.7	89	7.6 < pH ≤ 7.7	29	8.6 < pH ≤ 8.7	4.4
6.7 < pH ≤ 6.8	84	7.7 < pH ≤ 7.8	24	8.7 < pH ≤ 8.8	3.7
6.8 < pH ≤ 6.9	78	7.8 < pH ≤ 7.9	20	8.8 < pH ≤ 8.9	3.1
6.9 < pH ≤ 7.0	72	7.9 < pH ≤ 8.0	17	8.9 < pH ≤ 9.0	2.6

Chloride: Effluent chloride concentrations are below the calculated WQBELs; therefore, limits are not required. However, monthly monitoring is required in 2027 to ensure that 11 sample results are available at the next permit reissuance to meet the reasonable potential data requirements of s. NR 106.85, Wis. Adm. Code.

Temperature: Kiel submitted a dissipative cooling (DC) study in 2017 pursuant to s. NR 106.59(4), Wis. Adm Code which was approved because the discharge allows for a zone of free passage for fish in the river. Instream temperatures did not exceed any sublethal criteria downstream of the outfall and did not increase the temperature in the stream to above 3 degrees from ambient conditions.

The permittee may request continued consideration of DC in accordance with s. NR 106.59(8), Wis. Adm. Code. The permittee's request must: 1) be submitted with the permit reissuance application; 2) certify that there has been no substantive change in operations or loadings since the previous permit application; 3) include any new information generated during the current permit term with certification that it is consistent with the previous permit application. The permittee submitted this continuation request of DC certifying that there has been no substantive change in operations or loadings since the previous permit application and it was included with the permit application received on October 5, 2022.

The department has granted approval of the continuation request of DC for this permit term. However, there is a large amount of industrial wastewater, it is recommended that the permittee identify changes in thermal loadings. Another DC study will be needed during the winter months if the heat loading appears to increase again above the conditions during the DC study. Therefore, the department has included year-round maximum temperature monitoring to capture any changes in thermal loadings. The facility has in-line temperature probe that can continuously monitor for temperature. Therefore, the sampling frequency and sample type was changed to "daily" and "continuous", respectively.

Nitrogen Series Monitoring (NO₂+NO₃, TKN and Total N): The department has included monthly effluent monitoring for total nitrogen since the permittee is a major discharge (>1 MGD) in the permit through the authority under s. 283.55(1)(e), Wis. Stats., which allows the department to require the permittee to submit information necessary to identify the type and quantity of any pollutants discharged from the point source. More information on the justification to include total nitrogen monitoring in wastewater permits can be found in the "Guidance for Total Nitrogen Monitoring in Wastewater Permits" dated October 1, 2019.

Arsenic: The sample that was collected for the permit reissuance application had a limit of detection (LOD) of 14 µg/L which is greater than 1/5 of the most stringent calculated limit of 3.6 µg/L based on the human cancer criteria. The facility collected another effluent arsenic sample on March 12, 2024, with a result of <0.70 µg/L. Because this result is less than 1/5 of the most stringent calculated limit, there is no reasonable potential to exceed calculated arsenic effluent limits and no monitoring is required in the permit.

PFOA and PFOS: NR 106 Subchapter VIII – Permit Requirements for PFOS and PFOA Dischargers became effective on August 1, 2022. At the first reissuance of a WPDES permit after August 1, 2022, the new rule requires WPDES permits for major municipal dischargers with an average flow rate greater than 1 MGD but less than 5 MGD, at a minimum sample effluent once every two-months for PFOS and PFOA pursuant s. NR 106.98(2)(b), Wis. Adm. Code. A sample frequency of 1/2 months means one sample is taken during any two-month period. Examples of 1/2 month sample would be every other month (Jan, March, May, etc.) or back-to-back months with a break in between (February & March, May & June, Aug & Sept, etc.). DMR Short Forms will be generated for the following time periods: January-February, March-April, May-June, July-August, September-October, and November-December. At a minimum one sample result will be present on each form. The initial determination of the need for sampling shall be conducted for up to two years in order to determine if the permitted discharge has the reasonable potential to cause or contribute to an exceedance of the PFOS or PFOA standards under s. NR 102.04(8)(d)1, Wis. Adm. Code.

Pursuant to s. NR 205.066, Wis. Adm. Code, the department may specify the monitoring frequency for PFOS and PFOA on a case-by-case basis after the initial 24 months of sampling.

After a review of the data submitted with the Year 2 Report on Effluent Discharges, the department has determined that it is warranted to reduce the sampling frequency in this case. The department is requiring continued monitoring of these compounds to complete the permit term to ensure that the current effluent quality is maintained. At the next permit

reissuance, the department will make another determination as to whether further reduction or removal of monitoring is warranted, based on the continued sampling results.

Whole Effluent Toxicity Testing: Whole effluent toxicity (WET) testing requirements and limits are determined in accordance with ss. NR 106.08 and NR 106.09, Wis. Adm. Code, as revised August 2016. (See the current version of the Whole Effluent Toxicity Program Guidance Document and checklist and WET information, guidance and test methods at <http://dnr.wisconsin.gov/topic/wastewater/wet.html>) Additionally, major municipal discharger with a design flow greater than 1.0 MGD and/or with approved pretreatment program must at a minimum perform annual WET testing pursuant to 40 CFR Part 122.21(j)(5).

After consideration of the guidance provided in the Department's WET Program Guidance Document (2019) and other information described above, 1 x yearly acute and chronic WET tests were recommended in the reissued permit. Tests should be done in rotating quarters to collect seasonal information about this discharge. WET testing should continue after the permit expiration date (until the permit is reissued).

The department has determined that due to the available chronic WET testing data and requirements specified in ss. NR 106.08 and NR 106.09, Wis. Adm. Code, a chronic WET limit is required in the permit and shall be 1.1 TUc expressed as a monthly average. The chronic WET limit is calculated by taken 100 over the instream waste concentration (IWC). IWC means an estimate of the proportion of effluent to total volume of water (receiving water + effluent). The IWC was increased from 85% to 90% due to the increase in the design flow rate to 1.43 MGD so less available dilution.

Sample Type: The department shall require the use of 24-hour flow proportional samplers for monitoring effluent wastewater quality except where the department determines through the permit issuance process that other sample types may adequately characterize the effluent quality pursuant to s. NR 210.04(4), Wis. Adm. Code. The 24-hour flow-proportional sampling is the most representative method of collecting wastewater samples for wastewater coming into and being discharged from a wastewater treatment plant on a continuous basis. Grab samples for pH, TRC, and E. coli are required as compositing and holding such samples would change the test results and is noncompliant with maximum holding times specified in ch. NR 219, Wis. Adm. Code. The sample type for all parameters remains unchanged from the previous permit.

Sampling Frequency: The department shall determine on a case-by-case basis the monitoring frequency to be required for each parameter in a permit pursuant to s. NR 205.066, Wis. Adm. Code. The Monitoring Frequencies for Individual Wastewater Permits guidance (April 12, 2021) recommends that standard monitoring frequencies be included in individual WPDES permits based on the size and type of the facility, in order to characterize effluent quality and variability, to detect events of noncompliance, and to ensure fairness and consistency in permits issued across the state. Guidance and requirements in administrative code were considered when determining the appropriate monitoring frequencies for pollutants that have final effluent limits in effect during this permit term.

Previously permitted monitoring frequencies for all parameters, except for BOD₅, TSS, ammonia nitrogen, and total phosphorus, are consistent with the standard monitoring frequency outlined in the guidance. These sampling frequencies remain unchanged from the previous permit. If performance levels begin to vary during the permitted term, the department may re-evaluate current sampling frequencies and implement more frequent monitoring via permit modification or at permit reissuance.

Permitted monitoring frequencies for effluent BOD₅, TSS, and ammonia nitrogen fall below the standard monitoring frequencies outlined in the guidance document. The permittee demonstrates a history of consistent compliance with existing BOD₅, TSS, and ammonia nitrogen effluent limits. Data submitted during the previous permit term continues to show consistent compliance with BOD₅, TSS, and ammonia nitrogen effluent limitations, and the set monitoring frequencies are consistent with requirements of state code. The current monitoring frequency for BOD₅, TSS, ammonia nitrogen shall continue this permit term. If performance levels begin to vary during the permitted term, the department may re-evaluate current sampling frequency for BOD₅, TSS, and ammonia nitrogen and implement more frequent monitoring via permit modification or at permit reissuance. The sampling frequencies for BOD₅, TSS, and ammonia nitrogen remain unchanged from the previous permit.

The department has determined at this time that an increase in monitoring frequency is warranted for total phosphorus in order to better characterize effluent quality and variability. The monitoring frequency of 2/week is consistent with the Guidance for Implementing Wisconsin's Phosphorus Water Quality Standards for Point Source Discharges (June 1, 2020) specified for major municipal dischargers (> 1 MGD) which states setting the total phosphorus monitoring frequency consistent with monitoring frequency listed for BOD₅ (2/week) and TSS (2/week). If the permittee believes the facility should be eligible to return to the previously permitted monitoring frequency based on performance during the permitted term, they may request a reduction with their next permit application.

4 Land Application - 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
005	A	Cake	Fecal Coliform, and Heat Drying	Drying with primary solids	Land application or distributed as exceptional quality sludge	1,286 metric tons (2019 to 2023)
006	A	Cake	Fecal Coliform, and Heat Drying	Drying with primary solids	Land application or distributed as exceptional quality sludge	New Outfall
007	B	Cake	Fecal Coliform or Anaerobic Digestion	Incorporation	Land Application	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						
Is a priority pollutant scan required? No, the design flow rate is less than 5 MGD. 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.						

Sample Point Number: 005- DRIED CLASS A EQ SLUDGE

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Solids, Total		Percent	Quarterly	Composite	
Arsenic Dry Wt	Ceiling	75 mg/kg	Quarterly	Composite	
Arsenic Dry Wt	High Quality	41 mg/kg	Quarterly	Composite	
Cadmium Dry Wt	Ceiling	85 mg/kg	Quarterly	Composite	
Cadmium Dry Wt	High Quality	39 mg/kg	Quarterly	Composite	
Copper Dry Wt	Ceiling	4,300 mg/kg	Quarterly	Composite	
Copper Dry Wt	High Quality	1,500 mg/kg	Quarterly	Composite	
Lead Dry Wt	Ceiling	840 mg/kg	Quarterly	Composite	
Lead Dry Wt	High Quality	300 mg/kg	Quarterly	Composite	
Mercury Dry Wt	Ceiling	57 mg/kg	Quarterly	Composite	
Mercury Dry Wt	High Quality	17 mg/kg	Quarterly	Composite	
Molybdenum Dry Wt	Ceiling	75 mg/kg	Quarterly	Composite	
Nickel Dry Wt	Ceiling	420 mg/kg	Quarterly	Composite	
Nickel Dry Wt	High Quality	420 mg/kg	Quarterly	Composite	
Selenium Dry Wt	Ceiling	100 mg/kg	Quarterly	Composite	
Selenium Dry Wt	High Quality	100 mg/kg	Quarterly	Composite	
Zinc Dry Wt	Ceiling	7,500 mg/kg	Quarterly	Composite	
Zinc Dry Wt	High Quality	2,800 mg/kg	Quarterly	Composite	
Nitrogen, Total Kjeldahl		Percent	Quarterly	Composite	
Nitrogen, Ammonium (NH ₄ -N) Total		Percent	Quarterly	Composite	
Phosphorus, Total		Percent	Quarterly	Composite	
Phosphorus, Water Extractable		% of Tot P	Quarterly	Composite	
Potassium, Total Recoverable		Percent	Quarterly	Composite	
PCB Total Dry Wt	Ceiling	50 mg/kg	Once	Composite	Monitoring required once in 2026.
PCB Total Dry Wt	High Quality	10 mg/kg	Once	Composite	Monitoring required once in 2026.
PFOA + PFOS		µg/kg	Annual	Calculated	Report the sum of PFOA and PFOS. See PFAS Permit Sections for more information.
PFAS Dry Wt			Annual	Grab	Perfluoroalkyl and Polyfluoroalkyl Substances based on updated DNR PFAS List. See PFAS Permit Sections for more information.

Sample Point Number: 006- CLASS A EQ CAKE SLUDGE STORAGE

Sample Point Number: 007- CLASS B CAKE SLUDGE

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Solids, Total		Percent	Quarterly	Composite	Monitoring required only when cake sludge is land applied in any quarter.
Arsenic Dry Wt	Ceiling	75 mg/kg	Quarterly	Composite	Monitoring required and limits applicable only when cake sludge is land applied in any quarter.
Arsenic Dry Wt	High Quality	41 mg/kg	Quarterly	Composite	
Cadmium Dry Wt	Ceiling	85 mg/kg	Quarterly	Composite	
Cadmium Dry Wt	High Quality	39 mg/kg	Quarterly	Composite	
Copper Dry Wt	Ceiling	4,300 mg/kg	Quarterly	Composite	
Copper Dry Wt	High Quality	1,500 mg/kg	Quarterly	Composite	
Lead Dry Wt	Ceiling	840 mg/kg	Quarterly	Composite	
Lead Dry Wt	High Quality	300 mg/kg	Quarterly	Composite	
Mercury Dry Wt	Ceiling	57 mg/kg	Quarterly	Composite	
Mercury Dry Wt	High Quality	17 mg/kg	Quarterly	Composite	
Molybdenum Dry Wt	Ceiling	75 mg/kg	Quarterly	Composite	
Nickel Dry Wt	Ceiling	420 mg/kg	Quarterly	Composite	
Nickel Dry Wt	High Quality	420 mg/kg	Quarterly	Composite	
Selenium Dry Wt	Ceiling	100 mg/kg	Quarterly	Composite	
Selenium Dry Wt	High Quality	100 mg/kg	Quarterly	Composite	
Zinc Dry Wt	Ceiling	7,500 mg/kg	Quarterly	Composite	
Zinc Dry Wt	High Quality	2,800 mg/kg	Quarterly	Composite	
Nitrogen, Total Kjeldahl		Percent	Quarterly	Composite	
Nitrogen, Ammonium (NH ₄ -N) Total		Percent	Quarterly	Composite	
Phosphorus, Total		Percent	Quarterly	Composite	
Phosphorus, Water Extractable		% of Tot P	Quarterly	Composite	
Potassium, Total Recoverable		Percent	Quarterly	Composite	
PCB Total Dry Wt	Ceiling	50 mg/kg	Once	Composite	

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	Monitoring required once only when cake sludge is land applied in any year.
PFOA + PFOS		µg/kg	Annual	Calculated	Monitoring required only when cake sludge is land applied in any year. Report the sum of PFOA and PFOS. See PFAS Permit Sections for more information.
PFAS Dry Wt			Annual	Grab	Monitoring required only when cake sludge is land applied in any year. Perfluoroalkyl and Polyfluoroalkyl Substances based on updated DNR PFAS List. See PFAS Permit Sections for more information.

Changes from Previous Permit:

- The department has removed the Outfall 004 from the previous permit as the facility longer uses the pasteurization process to produce Class A sludge.
- Outfall 005 was added to track the compliance and distribution of Class A, exceptional quality sludge produced from the new sludge dryer process.
- Outfall 006 was added to track the compliance of retesting for Class A pathogen control requirements if land application or distribution will occur at a later time.
- Outfall 007 was added as an emergency in case producing Class A sludge is not available.
- Annual PFAS monitoring has been added to the permit for each sludge outfall.

Explanation of Limits and Monitoring Requirements

Outfall 005: The department added Outfall 005 from the previous permit to track the compliance and distribution of Class A, exceptional quality sludge produced from the new sludge dryer process. If a permittee generates more than one type of sludge, each sludge type shall be sampled and analyzed in accordance with the WPDES permit pursuant to s. NR 204.06(2)(a), Wis. Adm. Code. Also, this sampling point was added to track meeting vector attraction requirements and Class A pathogen control requirements immediately following the sludge dryer. Section NR 204.07(6)(a)1., Wis. Adm. Code, requires for Class A sludge that fecal coliform density or salmonella density shall be satisfied immediately after the treatment process. Lastly, to be considered exceptional quality sludge, vector attraction reduction requirement must be met prior to or at the time of meeting the Class A pathogen control requirements.

Outfall 006: The department added Outfall 006 to track the compliance if the Class A cake sludge is distributed or land applied at a later time, the sludge shall be retested for Class A fecal coliform or salmonella requirements satisfied at that time also, to ensure that regrowth of the organisms has not occurred pursuant to s. NR 204.07(6)(a)1., Wis. Adm. Code.

Outfall 007: The department added Outfall 007 from the previous permit as an emergency in case the Class A heat drying treatment process is not available. The permittee will have the ability to land apply the cake sludge from the existing belt filter press to department approved sites under Class B sludge requirements. If a permittee generates more than one type of sludge, each sludge type shall be sampled and analyzed in accordance with the WPDES permit pursuant to s. NR 204.06(2)(a), Wis. Adm. Code.

Metals, Nutrients, Pathogen Control, Vector Attraction Reduction: The parameters to be analyzed in the sludge were determined pursuant to s. NR 204.06(2)(b), Wis. Adm. Code. The ceiling and high-quality limits for metals in sludge are specified in s. NR 204.07(5), Wis. Adm. Code. Requirements for pathogen control are specified in s. NR 204.07(6), Wis. Adm. Code and in s. NR 204.07(7), Wis. Adm. Code for vector attraction reduction requirements. Nutrients are required to be analyzed to track that nutrient recommendations for the crop are not exceeded. Specifically, the amount of available nitrogen from sludge and other nitrogen sources applied per growing season may not exceed the nitrogen requirement of the crop pursuant to s. NR 204.07(8)(a), Wis. Adm. Code.

Exceptional Quality Sludge: The permittee will continue to produce exceptional quality sludge which is being tracked under Outfalls 005 and 006. The use of the exceptional quality sludge is exempt from many requirements of ch. NR 204, Wis. Adm. Code. See Section NR 204.04(3), Wis. Adm. Code for specific exemptions from code.

PFAS: The presence and fate of PFAS in municipal and industrial sludges is an emerging public health concern. EPA is currently developing a risk assessment to determine future land application rates and expects to release this risk assessment by the end of 2024. In the interim, the department has developed the “Interim Strategy for Land Application of Biosolids and Industrial Sludges Containing PFAS”.

Collecting sludge data on PFAS concentrations from a wide range of wastewater treatment facilities will help protect public health from exposure to elevated levels of PFAS and determine the department’s implementation of EPA’s recommendations. To quantitate this risk, PFAS sampling has been included in the proposed WPDES permit pursuant to s. NR 204.06(2)(b)9., Wis. Adm. Code.

Sample Frequency: The frequency of monitoring for metals, nutrients, pathogen control, and vector attraction reduction requirements of the sludge is based on the amount of sludge land applied or distributed each year pursuant to s. NR 204.06(2)(c)3., Wis. Adm. Code. The facility distributed on annual average of 1,286 dry metric tons each year (2019 to 2023). This result is between 290 dry metric tons of sludge each year and 1500 dry metric tons of sludge each year based on Table A in s. NR 204.06(2)(c)3., Wis. Adm. Code which results in a sampling frequency of once per quarter. The sampling frequency for metals, nutrients, pathogen control, and vector attraction reduction requirements remains unchanged from the previous permit. Monitoring densities for pathogen control shall be based on discrete samples. A minimum of 7 samples shall be collected quarterly. The department suggests monitoring pathogen densities throughout the duration of the quarter to confirm that the treatment process is functioning properly.

5 Schedules

5.1 PFOS/PFOA Minimization Plan Determination of Need

Required Action	Due Date
Report on Effluent Discharge: Submit a report on effluent PFOS and PFOA concentrations and include an analysis of trends in monthly and annual average PFOS and PFOA concentrations. This analysis should also include a comparison to the applicable narrative standard in s. NR 102.04(8)(d), Wis. Adm. Code. This report shall include all additional PFOS and PFOA data that may be collected including any influent, intake, in-plant, collection system sampling, and blank sample results.	06/30/2025
Report on Effluent Discharge and Evaluation of Need: Submit a final report on effluent PFOS and PFOA concentrations and include an analysis of trends in monthly and annual average PFOS and PFOA concentrations of data collected over the last 24 months. The report shall also provide a comparison on the likelihood of the facility needing to develop a PFOS/PFOA minimization plan. This report shall include all additional PFOS and PFOA data that may be collected including any influent, intake, in-plant, collection system sampling, and blank sample results. The permittee shall also submit a request to the department to evaluate the need for a PFOS/PFOA minimization plan. If the Department determines a PFOS/PFOA minimization plan is needed based on a reasonable potential evaluation, the permittee will be required to develop a minimization plan for Department approval no later than 90 days after written notification was sent from the Department. The Department will modify or revoke and reissue the permit to include PFOS/PFOA minimization plan reporting requirements along with a schedule of compliance to meet WQBELs. Effluent monitoring of PFOS and PFOA shall continue as specified in the permit until the modified permit is issued. If, however, the Department determines there is no reasonable potential for the facility to discharge PFOS or PFOA above the narrative standard in s. NR 102.04(8)(d), Wis. Adm. Code, no further action is required and effluent monitoring of PFOS and PFOA shall continue as specified in the permit.	06/30/2026

5.2 Sludge Management Plan

A management plan is required for the sludge management program.

Required Action	Due Date
Sludge Management Plan Submittal: Submit a sludge management plan to optimize the sludge management program performance and demonstrate compliance with ch. NR 204, Wis. Adm. Code, by the Due Date. This management plan shall include sufficient detail of the sludge management program for the facility. The plan shall include separate sections for each type of sewage sludge included in this permit. The SMP shall provide standardized information for communication to operators and the department including but not limited to the following: 1) Specify information on sludge treatment processes for each sampling point and outfall; 2) Sample point and outfall monitoring locations shown on a schematic and with photos;	12/31/2024

Required Action	Due Date
3) Monitoring requirements at each sampling point(s) and outfall location(s); 4) Sampling protocols for each location and parameters at each location including treatment temperature, moisture content (total solids), fecal concentration as required; 5) Monitoring frequencies at each sample point and outfalls; 6) Analytical methods with appropriate hold times and chain of custody procedures; 7) Provide documentation relating to temperature monitoring data recording, retrieval and printing out the data when requested; 8) Storage, pickup and transportation details associated with all outfalls; 9) Collection, storage, disposal information for cake sludge detailing pick-ups; and 10) Collection, storage, and disposal processes of dried cake sludge when the cake sludge does not meet minimum requirements to meet Class A and EQ requirements. 11) Identify land application sites; 12) Describe site limitations; 13) Address vegetative cover management and removal; 14) Specify availability of storage; 15) Describe the type of transporting and spreading vehicle(s); 16) Track site loadings; 17) Address contingency plans for adverse weather and odor/nuisance abatement; and 18) Include any other pertinent information. Once approved, all sludge management activities shall be conducted in accordance with the plan. Any changes to the plan must be approved by the department prior to implementing the changes.	

5.3 Capacity, Management, Operation, and Maintenance (CMOM) Program

The permittee shall have written documentation of the CMOM program components in accordance with s. NR 210.23(4), Wis. Adm. Code.

Required Action	Due Date
Revised CMOM Program: Review and revise the Capacity, Management, Operation and Maintenance (CMOM) Program to meet the requirements of s. NR 210.23, Wis. Adm. Code. A revised copy of the program shall be submitted to the department by the due date.	09/30/2024

Explanation of Schedules

PFOS/PFOA Minimization Plan Determination of Need: As stated above, NR 106 Subchapter VIII – Permit Requirements for PFOS and PFOA Dischargers became effective on August 1, 2022. S. NR 106.98, Wis. Adm. Code, specifies steps to generate data in order to determine the need for reducing PFOS and PFOA in the discharge. Data generated per the effluent monitoring requirements will be used to determine the need for developing a PFOS/PFOA minimization plan. As part of the schedule, the permittee is required to submit two annual Reports on Effluent Discharge.

If the department determines that a minimization plan is needed, the permit will be modified or revoked/reissued to include additional requirements.

Sludge Management Plan: Per s. NR 204.11(1), Wis. Adm. Code, the department may require the permittee to develop a sludge management plan, submit the plan to the department for approval and operate in compliance with the approved plan. The plan shall include a description of the facility's sludge management program and how the permittee plans to operate the facility in compliance with the requirements of the permit and ch. NR 204, Wis. Adm. Code. The sludge management plan shall be submitted to the department for approval by the due date in the permit.

Revised CMOM Program: The permittee shall have written documentation of the CMOM program components in accordance with s. NR 210.23(4), Wis. Adm. Code. The department reviewed the CMOM program as a part of inspection performed on May 2, 2024. As part of this inspection, the department identified some deficiencies in the CMOM Program and requested the facility revise the CMOM Program. This schedule serves as a reminder to submit a revised CMOM program to the department by the due date.

6 Standard Requirements

Changes from Previous Permit

The Standard Requirements section contains conditions and requirements that are, for the most part, applicable to all municipal permittees consistent with ss. NR 205.07(1) and NR 205.07(2), Wis. Adm. Code. Other standard requirements may be added as reminders. Changes to the standard requirements section include:

- Section 6.1.4: The limit of quantitation was updated for TSS for purposes of calculating NR 101 fees. A reminder was added about the reporting requirements when there is no discharge through a permitted outfall for flow related parameters.
- Section 6.4.7: The department has added a reminder about the expression of the E. coli limits and to enter a value of 1 for a result of 0 when calculating the geometric mean.
- Section 6.4.9: The department add the total residual chloride reporting requirements consistent with s. NR 106.07(6), Wis. Adm. Code.
- Section 6.4.12: The department has added the laboratory certification requirements for PFOA and PFOS testing.
- Section 6.5.6: The department has revised the monitoring and calculation requirements for PCB Concentrations in Sludge.
- Sections 6.5.12 to 6.5.22: The department has revised or added all applicable sludge treatment process and vector control requirements that may be applicable to the permittee. The department removed all sludge pasteurization process and pH adjustment requirements as these sludge treatment processes are no longer used by the permittee.

7 Summary of Reports Due

A summary of reports due has been added for informational purposes for the permittee to keep track of the due dates of reports and schedule items.

Other Comments/Changes from Previous Permit:

None.

Justification of Any Waivers from Permit Application Requirements

No waivers were requested from permit application requirements.

Attachments:

PFOS and PFOA Water Quality-Based Effluent Limitations for the Kiel Wastewater Treatment Facility -WPDES Permit No. (WI-0020141) in Manitowoc County, by Amy Garbe, PE, Wastewater Engineer, dated July 27, 2026

Expiration Date:

June 30, 2029

Prepared By:

Trevor Moen
Wastewater Engineer

Date: 04/26/2024

Post Fact Check Revision Date: 05/13/2024

Post Public Notice Revision Date: 06/24/2024

Revised By: Sarah Donoughe, Wastewater Specialist-Adv

Date: July 30, 2026

DATE: July 27, 2026

TO: Sarah Donoughe – NER

FROM: Kari Fleming – WY/3

SUBJECT: PFOS and PFOA Water Quality-Based Effluent Limitations for the Kiel Wastewater Treatment Facility -WPDES Permit No. (WI-0020141) in Manitowoc County

This is in response to your request for an evaluation of the need for PFOS and PFOA limitations for the Kiel Wastewater Treatment Facility. This municipal wastewater treatment facility (WWTF) discharges to the Sheboygan River, located in the Sheboygan River Watershed in the Sheboygan River Drainage Basin.

The current permit, effective since July 2024, has monitoring only for PFOS and PFOA. The following review is based on new regulations which are now in effect throughout the state of Wisconsin and recommendations are made in accordance with chapters NR 102, 104, 105, 106, 207, and 217 of the Wisconsin Administrative Code, where applicable.

Receiving Water Information

- Name: Sheboygan River
- Classification: Warm Water Sport Fish (WWSF) community, non-public water supply. Cold Water and Public Water Supply criteria are used for bioaccumulating compounds of concern, because the discharge is within the Great Lakes basin.
- Flow: The following 7-Q₁₀ and 7-Q₂ values are from USGS where Outfall 001 is located:
7-Q₁₀ = 0.93 cfs (cubic feet per second)
7-Q₂ = 2.1 cfs
Harmonic Mean Flow = 11.976 cfs

The Harmonic Mean has been estimated based on average flow and the 7-Q₁₀ using an equation from U.S. EPA's *Technical Support Document for Water Quality-Based Toxics Control* (March 1991, EPA/505/2-90-001, pgs. 88-89).

- % of Flow used to calculate limits: 25%

Effluent Information

- Flow: Average Design Flow = 1.43 MGD (million gallons per day)
For reference, the actual average flow from January 2024 to May 2026 was 1.24 MGD.
- Effluent characterization: This facility is categorized as a major municipality.

The following table lists the statistics for effluent PFOS and PFOA levels from July 2024 through May 2026.

	PFOS ng/L	PFOA ng/L
1-day P ₉₉	N/A	7.60
4-day P ₉₉	N/A	5.24
30-day P ₉₉	N/A	4.02
Mean*	1.33	3.42
Std	0.81	1.32

Sample Size	12	12
Range	<1.4-3.5	1.4-6.2

*Results below the level of detection (LOD) were included as zeroes in calculation of average.

Water Quality Based Limit – PFOS and PFOA

Administrative rules for PFOS and PFOA took effect on August 1, 2022. These rule revisions include additions to ch. NR 102 (s. NR 102.05), Wis. Adm. Code, which establish PFOS and PFOA standards for surface waters. Revisions to ch. NR 106 (s. NR 106, Subchapter VIII), Wis. Adm. Code, establish procedures for determining water quality based effluent limits for PFOS and PFOA, based on the applicable standards in ch. NR 102, Wis. Adm. Code.

PFOS

Due to PFOS being a bioaccumulating compound of concern (BCC), no mixing zone is allowed pursuant to s. NR 106.98(4), Wis. Adm. Code. Therefore, the effluent limit for PFOS is set equal to criterion (8 ng/L).

PFOA

The conservation of mass equation is described in s. NR 106.06(4)(b)1., Wis. Adm. Code, and includes variables of water quality criterion (WQC), receiving water flow rate (Qs), effluent flow rate (Qe), and upstream PFOA concentrations (Cs) provided below.

$$\text{Limitation} = [(WQC)(Qs + (1-f) Qe) - (Qs - f Qe) (Cs)] / Qe$$

Where:

WQC = 95 ng/L for Sheboygan River

Qs = 25% of the harmonic mean pursuant s. NR 106.06(4)(c)10., Wis. Adm. Code = 2.994 cfs

Cs = background concentration of PFOA in the receiving water pursuant to s. NR 106.06(4)(e), Wis. Adm. Code

Qe = effluent flow rate = 1.43 MGD = 2.21 cfs

f = the fraction of effluent withdrawn from the receiving water = 0

After substituting the appropriate variables, the calculated PFOA limit is 223 ng/L.

Reasonable Potential Determination

In accordance with s. NR 106.98(4)(b), Wis. Adm. Code, **the discharge does not have reasonable potential to cause or contribute to an exceedance of the water quality criterion for PFOS** because the arithmetic average of reported effluent PFOS data is less than 1/5th the calculated WQBEL (8 ng/L). Therefore, **a WQBEL is not required.**

In accordance with s. NR 106.98(4)(a), Wis. Adm. Code, **the discharge does not have reasonable potential to cause or contribute to an exceedance of the water quality criterion for PFOA** because the 30-day P₉₉ of reported effluent PFOA data is less than the calculated WQBEL (223 ng/L). Therefore, **a WQBEL is not required.**

Conclusions

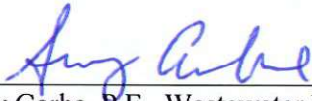
The discharge has no reasonable potential to cause or contribute to an exceedance of the water quality criterion for PFOS nor PFOA. Therefore, no WQBELs are required.

Pursuant to s. NR 205.066, Wis. Adm. Code, the department may specify the monitoring frequency for PFOS and PFOA on a case-by-case basis after the initial 24 months of sampling. **After a review of the available data, the department has determined that it is warranted to reduce the sampling frequency in this case to annually.**

If there are any questions or comments on these recommendations, please contact Amy Garbe by telephone at (608) 716-9968 or by email at Amy.Garbe@wisconsin.gov.

Attachments (2) – PFOS Data and PFOA P99 Calculation

PREPARED BY:



Amy Garbe, P.E., Wastewater Engineer

date:

7/27/26

cc: Trevor Moen, Basin Engineer – NER/Oshkosh
Nate Willis, P.E., PFAS Implementation Coordinator – CO

Attachment 1 – PFOS Data

Sample Date	PFOS Effluent Result [ng/L]
Jul-24	2
Oct-24	0.9
Nov-24	1.4
Jan-25	1
Mar-25	1.8
May-25	3.5
Aug-25	<1.5
Oct-25	1.4
Dec-25	2.5
Feb-26	<1.4
Apr-26	1.5
May-26	<1.4

Attachment 2 – PFOA P99 Calculation

EFFLUENT VARIABILITY ANALYSIS -				
=	=	=	=	
SUBSTANCE:				
NUMBER OF				
VALUES:				
TOTAL	12			
DETECTED	12			
NON-DETECTED	0			
d	0			
m	3.416667			
mean of all data	3.416667			
s	1.32173			
n	1	4	30	
d^n	0	0	0	
p	0.99	0.99	0.99	
Z_p	2.326785	2.326785	2.326785	
1+(s/m)^2	1.149651	1.149651	1.149651	
(sigma_d)^2	0.139459	0.139459	0.139459	
mu_d	1.158936	1.158936	1.158936	
(sigma_dn)^2	0.139459	0.03673	0.004976	
mu_dn	1.158936	1.2103	1.226177	
P_99 exponent	2.027854	1.65623	1.39031	
P_99	7.60	5.24	4.02	