Permit Fact Sheet

General Information

Permit Number	WI-0021113-11-0
Permittee Name and Address	Sturgeon Bay Utilities PO Box 27, Sturgeon Bay, WI 54235
Permitted Facility Name and Address	Sturgeon Bay Utilities Wastewater Treatment Facility 724 Shorecrest Drive, Sturgeon Bay, Wisconsin
Permit Term	January 01, 2026 to December 31, 2030
Discharge Location	724 Shorecrest Drive, Sturgeon Bay, Wisconsin NW ¼, SW ¼, SW ¼ of Section 8, Township 27 North, Range 26 East, City of Sturgeon Bay, Door County, WI
Receiving Water	Sturgeon Bay in Lake Michigan in Upper Door County of Door Peninsula in Door County
Stream Flow ($Q_{7,10}$)	N/A – A 10:1 dilution factor for a lake discharge is used in deriving effluent limits, where applicable
Stream Classification	Coldwater aquatic life community, recreation and public water supply
Discharge Type	Existing Continuous Discharge
Annual Average Design Flow (MGD)	2.816
Industrial or Commercial Contributors	Hatco Corporation which manufactures food warming equipment, toasters, and booster water heaters for the commercial food service industry. This facility has a pretreatment notification with the department.
Plant Classification	A1 - Suspended Growth Processes; B - Solids Separation; C - Biological Solids/Sludges; P - Total Phosphorus; D - Disinfection; L - Laboratory; SS - Sanitary Sewage Collection System
Approved Pretreatment Program?	Not applicable

Facility Description

Sturgeon Bay Utilities (SBU) is a public utility that operates the sanitary sewage collection system and wastewater treatment facility for the City of Sturgeon Bay. The facility treats residential and commercial domestic wastewater, industrial wastewaters, and hauled septage waste from the septage receiving station. Class A and exceptional quality sludge is generated from the treatment facility is hauled to off-site storage and accepted by a third-party contractor for distribution and reuse. The paragraphs below describe the liquid and solids treatment train of the Sturgeon Bay Utilities Wastewater Treatment Facility.

Liquid Treatment Train: The facility provides preliminary, primary, secondary treatment, and seasonal disinfection to the influent from the City of Sturgeon and septage from the septage receiving station. Preliminary treatment consists of

influent pumping, fine screening and grit removal. Primary treatment includes primary clarification. Following the primary treatment is the secondary treatment processes. The secondary treatment processes include activated sludge treatment process with aeration basins, chemical phosphorus removal with ferric chloride, and secondary clarification. Lastly, the wastewater is treated with seasonal disinfection with an ultraviolet (UV) disinfection system. The final treated effluent then flows by gravity through a submerged outfall structure to the Sturgeon Bay of Lake Michigan via Outfall 001.

Solids Treatment Train: The solids treatment includes gravity thickeners, anaerobic digestors, belt filter presses and treats primary, and waste activated sludge (WAS) from the primary and final clarifiers and hauled municipal sludge from municipalities in Door County. All of the generated primary and WAS from the primary and final clarifiers are sent to two circular gravity thickeners. One gravity thickener is in use and other is used for additional treatment and storage. The hauled municipal sludge is conveyed to a covered storage tank (former primary clarifier). The combined thickened sludge and hauled sludge are then sent to a primary anaerobic digestor and one secondary anaerobic digestor. The primary anaerobic digestor is operated in a thermophilic range (131°F). The secondary anaerobic digestor is operated in a mesophilic range (85°F to 100°F). The digested sludge can be then processed through two parallel belt filter presses, or the generated Class A and exceptional quality (EQ) liquid sludge can be loaded on trucks to be distributed via Outfall 004 if the belt presses are not available. The liquid sludge can also be hauled by truck to be land applied on department approved sites via Outfall 004 as Class B liquid sludge in case the Class A and EQ process and the belt presses are not available. The facility adds a polymer to the belt filter presses to improve thickening of the sludge. One belt filter press currently serves as emergency backup. The generated Class A and EQ cake sludge is loaded on a truck to be taken to off-site storage via Outfall 005 and to be later distributed by a contractor. The cake sludge can also be hauled by truck to be land applied on department approved sites via Outfall 005 as Class B sludge in case the Class A/EQ process is not available.

Facility Upgrades: The facility completed installation of the UV disinfection system in 2024 switching from chlorine disinfection. The facility also completed construction of a new off-site storage building for their third-party contractor to use for storing the Class A and EQ cake sludge for later use and distribution. During the permit term, the facility proposes to rehab their sludge treatment processes.

Substantial Compliance Determination

After a desk top review of all discharge monitoring reports, compliance maintenance annual reports, land application reports, compliance schedule items, and a site visit on October 10, 2025, this facility has been found to be in substantial compliance with their current permit.

Compliance determination made by Trevor Moen, Wastewater Engineer, on October 20, 2025.

Sample Point Descriptions

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: 1.83 MGD (January 2021 to August 2025)	INFLUENT - COMBINED: Combined influent from the sanitary sewer collection system and septage receiving station. At Sampling Point 701, the permittee shall collect representative samples of the influent from the influent automatic sampler drawing 24-hour flow proportional composite samples from the Parshall Flume after influent screening and grit removal but prior to the primary clarifiers. The permittee shall measure the influent flow rate using a continuous flow recording device on the Parshall Flume after influent screening and grit removal but prior to the primary clarifiers.
702	Daily Average: 82,215 GPD (January 2021 to August 2025)	INFLUENT - SEPTAGE: Influent from the septage receiving station. At Sampling Point 702, the permittee shall calculate the total daily volume of septage received by number truck tank volumes received at the septage receiving station.
703	Monthly Average: 69,885 Gallons per Month (January 2021 to August 2025)	INFLUENT - SLUDGE: Municipal sludge received from other wastewater treatment facilities. At Sampling Point 703, the permittee shall calculate the total daily volume of municipal sludge received by the number truck tank volumes received from other wastewater treatment facilities prior to being discharged to either the spare primary clarifier or gravity thickener used for biosolids storage.
001	Daily Average: 1.61 MGD (January 2021 to August 2025)	EFFLUENT: At Sampling Point 001, the permittee shall collect representative samples of effluent from the effluent automatic sampler drawing 24-hour flow proportional samples from the pipe prior to UV disinfection except that the permittee shall collect grab samples of the effluent from the Parshall Flume after UV disinfection for pH, E. coli, mercury, PFOA, and PFOS prior to being discharged to Sturgeon Bay of Lake Michigan via Outfall 001. The permittee shall measure the effluent flow rate using a continuous flow recording device on the Parshall Flume after the UV disinfection system.

Sample Point Designation		
Sample Point Number	**Discharge Flow, Units, and Averaging Period**	**Sample Point Location, Waste Type/Sample Contents and Treatment Description (as applicable)**
004	Not applicable – Outfall not used during the permit term	CLASS A/EQ LIQUID SLUDGE: Temperature phased anaerobically digested liquid (thermophilic/mesophilic digestion). At Sampling Point 004, the permittee shall collect representative grab and/or composite samples of the liquid sludge immediately after the two-stage digestion treatment process and be monitored quarterly for metals (List 1), nutrients (List 2), Class A pathogen density requirements (List 3), and vector attraction reduction (List 4), and PFAS prior to being distributed or land applied as exceptional quality sludge or being stored off-site. 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. This outfall has been included for emergency use in case dewatering with the belt press is not available and shall remain inactive unless the permittee needs to use this outfall. The permittee shall contact the department to activate this outfall if it will be used.
005	Average Annual Sludge Generated and Distributed: 352 metric tons (2021 to 2024)	CLASS A CAKE SLUDGE: Temperature phased anaerobically digested liquid (thermophilic/mesophilic digestion) that has been thickened and then dewatered (belt filter press) producing cake sludge. At Sampling Point 005, the permittee shall collect representative grab and/or composite samples of the cake sludge from the conveyor after belt filter press to be monitored quarterly for metals (List 1), nutrients (List 2), Class A pathogen density requirements (List 3), and vector attraction reduction (List 4), and PFAS prior to immediately being bagged, distributed or land applied as exceptional quality sludge or being stored off-site. 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.
006	Not applicable – New Outfall	PFRP EQ LIQUID SLUDGE: Thermophilic anaerobically digested liquid sludge. At Sampling Point 006, the permittee shall collect representative grab and/or composite samples of the liquid sludge immediately after the thermophilic digester treatment process and be monitored quarterly for Class A pathogen density requirements (List 3) prior to being convey to the mesophilic digester. 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)**
007	Not applicable – New Outfall	FRP EQ CAKE SLUDGE STORAGE: Thermophilic/Mesophilic digested, belt pressed cake sludge from storage. At Sampling Point 007, the permittee shall collect representative grab and/or composite samples of the cake sludge from off-site storage and be monitored quarterly for Class A pathogen density requirements (List 3) and PFAS 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. This outfall is a placeholder and shall remain inactive unless the permittee retains ownership of the sewage sludge within the off-site storage facility. The permittee shall contact the department to activate this outfall if it will be used.
111	Not applicable – Field blank sampling point for mercury and does not require flow monitoring	FIELD BLANK: At Sampling Point 111, the permittee shall collect a field blank for each day a mercury sample is collected. The permittee shall report the field blank concentrations when reporting mercury sample results.

Permit Requirements

1 Influent Requirements

Sample Point Number: 701- INFLUENT - COMBINED

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Daily	Continuous	
BOD_5, Total		mg/L	Weekly	24-Hr Flow Prop Comp	
$CBOD_5$		mg/L	5/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total		mg/L	5/Week	24-Hr Flow Prop Comp	
Phosphorus, Total		mg/L	3/Week	24-Hr Flow Prop Comp	
Nitrogen, Ammonia (NH3-N) Total		mg/L	3/Week	24-Hr Flow Prop Comp	
Mercury, Total Recoverable		ng/L	Quarterly	24-Hr Flow Prop Comp	

Changes from Previous Permit:

- Influent limitations and monitoring requirements were evaluated for this permit term and no changes were required in this permit section from the previous permit.

Explanation of Limits and Monitoring Requirements

Flow Rate, BOD_5, $CBOD_5$ and TSS: Monitoring of influent flow, BOD_5, $CBOD_5$, and total suspended solids is required by s. NR 210.04(2), Wis. Adm. Code, to assess wastewater strengths and volumes and to demonstrate the percent removal requirements in s. NR 210.05, Wis. Adm. Code, and in the Standard Requirements section of the permit. Influent monitoring for flow, BOD_5, $CBOD_5$ and TSS remains unchanged from the previous permit.

Total Phosphorus, Ammonia Nitrogen, and Mercury: Influent 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 and ammonia nitrogen monitoring to characterize the strength of the total phosphorus and ammonia nitrogen loadings to the treatment facility and to support operational changes for phosphorus and ammonia removal processes. The department requires quarterly influent monitoring for mercury to continue to characterize the mercury loading coming into the wastewater treatment facility and better assess mercury reductions. Influent monitoring for total phosphorus, ammonia nitrogen, and mercury 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 influent 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 influent flow, BOD_5, $CBOD_5$, and TSS are consistent with the standard monitoring frequency outlined in guidance. The sampling frequencies for influent flow, BOD_5, $CBOD_5$, and TSS 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 for BOD_5, $CBOD_5$, TSS, total phosphorus, ammonia nitrogen, and mercury 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 type of flow rate remains unchanged from the previous permit.

Sample Point Number: 702- INFLUENT - SEPTAGE

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Waste Received Septage		MGD	Daily	Total Daily	

Changes from Previous Permit:

- The department changed the units for Waste Received Septage from GPD to MGD.

Explanation of Limits and Monitoring Requirements

The influent monitoring has been added to the permit to track the volumes of hauled wasted accepted at the septage receiving station. The units have been changed to be consistent with the units for influent and effluent flow monitoring.

Sample Point Number: 703- INFLUENT - SLUDGE

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Waste Received Municipal Sludge		MGD	Daily	Total Daily	

Changes from Previous Permit:

- The department changed the units, sample frequency, and sample type for Waste Received Municipal Sludge.

Explanation of Limits and Monitoring Requirements

The influent monitoring has been added to the permit to track the volumes of hauled municipal sludge accepted at the wastewater treatment facility. The units, sample frequency, and sample type have been changed to be consistent with the units for other influent flow and volume monitoring.

2 Inplant - Monitoring and Limitations

Sample Point Number: 111- FIELD BLANK

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Mercury, Total Recoverable		ng/L	Quarterly	Blank	

Changes from Previous Permit:

- No changes from previous permit.

Explanation of Limits and Monitoring Requirements

Mercury Field Blank- Monitoring is included in the permit pursuant to s. NR 106.145, Wis. Adm. Code. Field blanks must meet the requirements under s. NR 106.145(9) and (10), Wis. Adm. Code. The permittee shall collect a mercury field blank for each set of mercury samples (a set of samples may include a combination of influent, effluent or other samples all collected on the same day). Field blanks are required to verify a sample has not been contaminated during collection, transportation or analysis.

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	
CBOD5	Monthly Avg	15 mg/L	5/Week	24-Hr Flow Prop Comp	
CBOD5	Weekly Avg	25 mg/L	5/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total	Monthly Avg	15 mg/L	5/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total	Weekly Avg	25 mg/L	5/Week	24-Hr Flow Prop Comp	
pH Field	Daily Max	9.0 su	5/Week	Grab	
pH Field	Daily Min	6.0 su	5/Week	Grab	
E. coli	Geometric Mean - Monthly	126 #/100 ml	2/Week	Grab	Monitoring and Limit applies April through October each year.
E. coli	% Exceedance	10 Percent	Monthly	Calculated	Monitoring and Limit applies April through October each year. See the E. coli Percent Limit section below. Enter the result in the DMR on the last day of the month.
Phosphorus, Total	Monthly Avg	0.7 mg/L	3/Week	24-Hr Flow Prop Comp	See the Phosphorus Water Quality Based-Effluent Limitation(s) section below.
Phosphorus, Total	6-Month Avg	0.6 mg/L	3/Week	24-Hr Flow Prop Comp	See the Phosphorus Water Quality Based-Effluent Limitation(s) section below.
Nitrogen, Ammonia (NH3-N) Total		mg/L	3/Week	24-Hr Flow Prop Comp	See Ammonia Limit Not Needed - Continue to Optimize Removal of Ammonia section below.
Nitrogen, Total		mg/L	Quarterly	24-Hr Flow	See Nitrogen Series

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Kjeldahl				Prop Comp	Monitoring section below.
Nitrogen, Nitrite + Nitrate Total		mg/L	Quarterly	24-Hr Flow Prop Comp	See Nitrogen Series Monitoring section below.
Nitrogen, Total		mg/L	Quarterly	Calculated	See Nitrogen Series Monitoring section below. Total Nitrogen = Total Kjeldahl Nitrogen (mg/L) + Total (Nitrite + Nitrate) Nitrogen (mg/L).
Mercury, Total Recoverable		ng/L	Quarterly	Grab	See Mercury Monitoring and Mercury Continued Implementation of Pollutant Minimization Program sections below.
PFOS		ng/L	1/ 2 Months	Grab	Monitoring only. See PFOS/PFOA Sampling and Reporting Requirements section below and PFOS/PFOA Minimization Plan Determination of Need section below and compliance schedule.
PFOA		ng/L	1/ 2 Months	Grab	Monitoring only. See PFOS/PFOA Sampling and Reporting Requirements section below and PFOS/PFOA Minimization Plan Determination of Need section below and compliance schedule.
Chloride		mg/L	Monthly	24-Hr Flow Prop Comp	Monitoring only from January 1, 2028 to December 31, 2028.
Arsenic, Total Recoverable		ug/L	Monthly	24-Hr Flow Prop Comp	Monitoring only from January 1, 2028 to December 31, 2028. See Total Recoverable Arsenic Monitoring section below.
Acute WET		TUa	See Listed Qtr(s)	24-Hr Flow Prop Comp	See the Whole Effluent Toxicity Testing section below.

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Chronic WET	Monthly Avg	11 TUc	See Listed Qtr(s)	24-Hr Flow Prop Comp	See the Whole Effluent Toxicity Testing section below.

Changes from Previous Permit

- Bimonthly PFOA and PFOS monitoring has been added to the permit.
- Monthly chloride monitoring is required in 2028.
- Monthly total recoverable arsenic monitoring is required in 2028.
- A chronic WET monthly average limit of 11 TUc 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 Sturgeon Bay Utilities Wastewater Treatment Facility (WI-0021113-11)" memo dated October 30, 2025.

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 for CBOD5, TSS, and pH: 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 limits specified for CBOD5, TSS, and pH in s. NR 210.05(1), Wis. Adm. Code. The permittee discharges to Sturgeon Bay of Lake Michigan which is classified as a fish and aquatic life water. Therefore, effluent limitations in s. NR 210.05(1), Wis. Adm. Code apply. The permittee requested that the department substitute the parameter CBOD5 for the parameter BOD5 pursuant to s. NR 210.05(1)(d), Wis. Adm. Code. The facility has previously met the requirements per NR 210.07(4)(a) Wis. Adm. Code, which requires facilities to concurrently sample their effluent for BOD_5 and $CBOD_5$ to ensure the $CBOD_5$ limits are protective and can replace the BOD_5 limits. The facility had $CBOD_5$ limits of 15 mg/L as a monthly average and 25 mg/L as a weekly average in their permit since at least 2000. These limits are more restrictive than the categorical $CBOD_5$ limits of 25 mg/L as a monthly average and 40 mg/L as a weekly average which are listed in NR 210.05(1)(d) Wis. Adm. Code, for a full fish and aquatic life receiving water. The more restrictive limits of 15 mg/L and 25 mg/L were negotiated between the department and the facility as an alternative to extending their outfall which would provide more mixing pursuant to s. NR 210.05(1)(e), Wis. Adm. Code. There are not numerical water quality standards for TSS; however, TSS concentration limits are set equal to $CBOD_5$ limits if made more stringent. The limits for cBOD5, TSS, and pH remain unchanged from the previous permit.

E. coli: 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 Sturgeon Bay of Lake Michigan which the permittee must ensure the receiving water is

suitable for supporting recreational use and protect humans from illness caused by fecal contamination due to recreational contact with surface water. The Sturgeon Bay of Lake Michigan is classified as a public water supply with regard to disinfection. However, there are no drinking water intakes are within 5 miles of the discharge. 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. However, the recreation season has been extended from April to October each year due the location of the outfall near marinas presenting a greater potential exposure to humans and animals. The department may adjust the period during which disinfection is required in a WPDES permit where necessary to protect human and animal health pursuant to s. NR 210.06(1)(c), Wis. Adm. Code.

Total Phosphorus: Phosphorus requirements are based on the Phosphorus Rules as detailed in ch. 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 WQBEL determined from water quality criteria and an effluent limit based on a total maximum daily load (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 monthly average phosphorus loading is more than 150 lbs/month. However, the current interim monthly average total phosphorus limit of 0.7 mg/L is more restrictive than the TBEL limitation; therefore, a TBEL of 1.0 mg/L is not necessary.
- Section NR 102.06(5)(b), Wis. Adm. Code, specifies that a total phosphorus criterion of 7 µg/L (0.007 mg/L) applies for the open and nearshore water of Lake Michigan. For direct discharges to Lake Michigan, s. NR 217.13(4), Wis. Adm. Code, states that the department shall set effluent limits consistent with nearshore or whole lake models approved by the department. In the absence of an approved model, a WQBEL of 0.6 mg/L as a six-month average is recommended. This six-month average limit has also been set for other municipal wastewater treatment facilities that discharge to Lake Michigan. These facilities have proven that this limit is achievable. Past total phosphorus effluent data from reissuance -10 demonstrates that the facility can meet 0.6 mg/L as a six-month average. The interim six-month average limit of 0.6 mg/L remains in effect and unchanged from the previous permit.
- The discharge is directly to Lake Michigan. There is no approved TMDL effective for Lake Michigan. Therefore, an effluent limit based on a TMDL allocation is not applicable.

Ammonia Nitrogen: 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 WQBELs for ammonia. The discharge currently does not have reasonable potential to exceed the calculated ammonia nitrogen weekly average and monthly average limits. However, the department has continued monitoring for ammonia nitrogen to help optimize the treatment processes for ammonia nitrogen removal. The ammonia nitrogen monitoring has not been changed from the previous permit.

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. The nitrogen series monitoring has not been changed from the previous permit.

Mercury: Through implementation of the mercury pollutant minimization program via variance in the previous permits, the facility continues to reduce the sources of mercury. As a result, the department determined that there is no reasonable potential to exceed calculated WQBELs for mercury. Nevertheless, the permittee shall continue to implement the mercury

pollutant minimization measures as a part of the pollutant minimization program to ensure effluent quality is maintained at or below mercury water quality standards. Also, the department has continued quarterly monitoring during the permit term to evaluate reasonable potential and need for limits in the next permit reissuance.

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**.**

Chloride: Effluent chloride concentrations are below the calculated WQBELs; therefore, limits are not required. However, monthly monitoring is required in 2028 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.

Arsenic: The sample that was collected for the permit reissuance application had a limit of detection (LOD) of 1.1 µg/L which is greater than the most stringent calculated limit of 0.2 µg/L based on the human cancer criteria. Because the LODs are greater than the most stringent calculated limit, reasonable potential cannot be determined at this time. Monthly monitoring is required in 2028 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. The arsenic test method shall be sensitive enough to extend technically feasible to achieve a LOD that is near or below 0.2 µg/L and reasonable potential can be determined for the next permit reissuance. The permittee may perform monthly monitoring of arsenic from drinking water supply wells. During the next issuance, the department will use this well data as part of the evaluation if the drinking water supply wells and Lake Michigan would be considered the "same waterbody" under s. NR 106.03(11m), Wis. Adm. Code and demonstrate whether SBU does not contribute additional mass of arsenic at the point of discharge.

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 11 TUc expressed as a monthly average.

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 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.

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 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.

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 (Dry Tons/Year)**
004	A	Liquid	Fecal Coliform and PFRP Equivalent	Volatile Solids Reduction	Not Used	Not Used
005	A	Cake	Fecal Coliform and PFRP Equivalent	Volatile Solids Reduction	Distributed as exceptional quality sludge	352 Metric Dry Tons (2021 to 2024)
006	A	Liquid	Fecal Coliform and PFRP Equivalent	New Outfall	New Outfall	New Outfall
007	A	Cake	Fecal Coliform and PFRP Equivalent	New Outfall	New Outfall	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 land applying sludge from this facility

Is a priority pollutant scan required? **No.**

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.

4.1 Sample Point Number: 004- CLASS A/EQ LIQUID 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 liquid sludge outfall is active.
Arsenic Dry Wt	Ceiling	75 mg/kg	Quarterly	Composite	Monitoring required and limits applicable only when liquid sludge outfall is active.
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	Monitoring required only when liquid sludge outfall is active.
Nitrogen, Ammonium (NH4-N) Total		Percent	Quarterly	Composite	
Phosphorus, Total		Percent	Quarterly	Composite	
Phosphorus, Water Extractable		% of Tot P	Quarterly	Composite	
Potassium, Total Recoverable		Percent	Quarterly	Composite	
PFOA + PFOS		ug/kg	Annual	Calculated	Monitoring required only when liquid sludge outfall is active. Report the sum of

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
					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.

Changes from Previous Permit:

- The sludge sampling frequency has been increased to quarterly when the outfall is active.
- Annual PFAS monitoring has been added to the permit.

Explanation of Limits and Monitoring Requirements

Outfall 004: Outfall 004 remains in the permit as an emergency outfall in case producing cake sludge is not available and shall remain inactive unless the permittee needs to use this outfall. The permittee will have the ability to land apply the liquid sludge from the anaerobic digesters to department approved sites or distribute it as Class A and exceptional quality sludge. The permittee shall contact the department to activate this outfall if it will be used. 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.

Exceptional Quality Sludge: The permittee will continue to produce Class A and exceptional quality sludge which is being tracked under Outfall 004 if it will be used. 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. If the facility cannot generate Class A and exceptional quality sludge, the facility shall comply with the Class B sludge requirements under this Outfall.

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.

PFAS: The presence and fate of PFAS in municipal and industrial sludges is an emerging public health concern. EPA has developed a draft risk assessment to determine future land application rates and released this risk assessment in January of 2025. The department is evaluating this new information. Until a decision is made, the "Interim Strategy for Land Application of Biosolids and Industrial Sludges Containing PFAS" should be followed

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 this WPDES permit pursuant to ss. NR 214.18(5)(b) and 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 each year pursuant to s. NR 204.06(2)(c)3., Wis. Adm. Code. The facility generated and distributed on annual average of 352 dry metric tons each year (2021 to 2024). 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.

Sample Point Number: 005- CLASS A/EQ CAKE 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 (NH4-N) Total		Percent	Quarterly	Composite	
Phosphorus, Total		Percent	Quarterly	Composite	
Phosphorus, Water Extractable		% of Tot P	Quarterly	Composite	

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Potassium, Total Recoverable		Percent	Quarterly	Composite	
PFOA + PFOS		ug/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.

Changes from Previous Permit:

- Annual PFAS monitoring has been added to the permit.
- PCB monitoring once during the permit has been removed.

Explanation of Limits and Monitoring Requirements

Outfall 005: Outfall 005 remain the permit to track the compliance and distribution of Class A, exceptional quality sludge produced from the approved equivalent process to further reduce pathogens (PFRP). 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 is used to track meeting vector attraction requirements and retesting for Class A pathogen control requirements immediately following the anaerobic digestion processes and belt presses. The sludge shall be retested for Class A fecal coliform or salmonella requirements to ensure that regrowth of the organisms has not occurred pursuant to s. NR 204.07(6)(a)1., Wis. Adm. Code. 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.

Exceptional Quality Sludge: The permittee will continue to produce Class A and exceptional quality sludge which is being tracked under Outfall 005. 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. If the facility cannot generate Class A and exceptional quality sludge, the facility shall comply with the Class B sludge requirements under this Outfall.

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.

PFAS: The presence and fate of PFAS in municipal and industrial sludges is an emerging public health concern. EPA has developed a draft risk assessment to determine future land application rates and released this risk assessment in January of

2025. The department is evaluating this new information. Until a decision is made, the "Interim Strategy for Land Application of Biosolids and Industrial Sludges Containing PFAS" should be followed

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 this WPDES permit pursuant to ss. NR 214.18(5)(b) and 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 each year pursuant to s. NR 204.06(2)(c)3., Wis. Adm. Code. The facility generated and distributed on annual average of 352 dry metric tons each year (2021 to 2024). 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 sample frequency remains unchanged from the previous permit.

PCB monitoring: PCB monitoring is not required this permit term but will be included in the next reissuance. There are no potential industrial sources and a review of historic PCB data shown results well below high quality and ceiling limitations as stated in s. NR 204.07(3)(k), Wis. Adm. Code.

Sample Point Number: 006- PFRP EQ LIQUID SLUDGE

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Solids, Total		Percent	Quarterly	Composite	

Changes from Previous Permit:

- Outfall 006 was added to track the compliance of testing for Class A pathogen control requirements following the thermophilic digester.

Explanation of Limits and Monitoring Requirements

This sampling point is used to track meeting Class A pathogen control requirements immediately following the thermophilic anaerobic digestion process. 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 selected treatment process.

Sample Point Number: 007- PFRP EQ CAKE SLUDGE STORAGE

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 storage outfall is active.
PFOA + PFOS		ug/kg	Annual	Calculated	Monitoring required only when cake sludge storage

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
					outfall is active. 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.

Changes from Previous Permit:

- Outfall 007 was added as a placeholder unless the permittee retains ownership of the sewage sludge within the off-site storage facility.

Explanation of Limits and Monitoring Requirements

Outfall 007: This outfall is a placeholder and shall remain inactive unless the permittee retains ownership of the sewage sludge within the off-site storage facility. The permittee shall contact the department to activate this outfall if it will be used. The department was also added Outfall 007 to track the compliance if the Class A and exceptional quality 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.

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.

5 Schedules

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.	12/31/2026
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.	12/31/2027

Explanation of Schedule

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

A management plan is required for the sludge management program.

Required Action	Due Date
Sludge Management Plan Submittal: Submit an updated 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; 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 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) Tracking 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.	06/30/2026

Explanation of Schedule

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.

6 Standard Requirements

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.
- Section 6.4.11: The department has added the laboratory certification requirements for PFOA and PFOS testing.
- Sections 6.5.11 to 6.5.21: The department has added all applicable sludge treatment process, pathogen control and vector attraction reduction requirements that may be applicable to the permittee.
- Sections with requirement related to fecal coliform and total residual chlorine have been removed as the permittee is no longer required to monitor for these parameters.
- Section on monitoring and calculation requirements for PCB Concentrations in Sludge has been removed as the permittee is not required to monitoring for PCBs in the sludge this permit term.

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 requested or granted as part of this permit reissuance.

Attachments:

"Water Quality-Based Effluent Limitations for Sturgeon Bay Utilities Wastewater Treatment Facility (WI-0021113-11)" memo dated October 30, 2025.

Prepared By:

Trevor Moen
Wastewater Engineer
Bureau of Water Quality

Date: 11/04/2025

Post Fact Check Revision Date:

Post Public Notice Revision Date:

CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: 10/30/2025

TO: Trevor Moen – NER

FROM: Nicole Krueger – SER Nicole Krueger

SUBJECT: Water Quality-Based Effluent Limitations for Sturgeon Bay Utilities Wastewater Treatment Facility
WPDES Permit No. WI-0021113-11

This is in response to your request for an evaluation of the need for water quality-based effluent limitations (WQBELs) using Chapters NR 102, 104, 105, 106, 207, 210, 212, and 217 of the Wisconsin Administrative Code (where applicable), for the discharge from the Sturgeon Bay Utilities in Door County. This municipal wastewater treatment facility (WWTF) discharges to Sturgeon Bay (Lake Michigan), located in the Red River and Little Sturgeon Bay Watershed. The evaluation of the permit recommendations is discussed in more detail in the attached report.

Based on our review, the following recommendations are made on a chemical-specific basis at Outfall 001:

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Flow Rate						1,2
$CBOD_5$			25 mg/L	15 mg/L		1
TSS			25 mg/L	15 mg/L		1
pH	9.0 s.u.	6.0 s.u.				1
Ammonia Nitrogen						1,2
E. coli April – October				126 #/100 mL geometric mean		1,3
Chloride						4
Mercury						1,2
Arsenic						2,5
PFOS and PFOA						6
Phosphorus				0.7 mg/L	0.6 mg/L	1
TKN, Nitrite+Nitrate, and Total Nitrogen						1,7
Acute WET						8,9
Chronic WET				11 TUc		8,9

Footnotes:

1. No changes from the current permit.
2. Monitoring only.
3. Additional limit: No more than 10 percent of *E. coli* bacteria samples collected in any calendar month may exceed 410 count/100 mL.
4. Monitoring at a frequency to ensure that 11 samples are available at the next permit issuance.
5. Arsenic samples should be evaluated using a highly sensitive method.
6. PFOS and PFOA monitoring is recommended at a frequency of once every two months in accordance with s. NR 106.98(2), Wis. Adm. Code.
7. As recommended in the Department's October 1, 2019 Guidance for Total Nitrogen Monitoring in Wastewater Permits, quarterly total nitrogen monitoring is recommended for all municipal

major permittees. Sections 283.37(5) and 283.55(1)(e), Wis. Stats, and ss. NR 200.065(1)(g) and NR 200.065(1)(h), Wis. Adm. Codes, provide the authority to request this monitoring during the permit term. Total Nitrogen is the sum of nitrate (NO_3), nitrite (NO_2), and total Kjeldahl nitrogen (TKN) (all expressed as N).

8. Annual acute and chronic WET testing is recommended. The Instream Waste Concentration (IWC) to assess chronic test results is 9%. According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), chronic testing shall be performed using a dilution series of 100%, 30%, 10%, 3% & 1%. The primary control water used in chronic WET tests conducted on Outfall 001 shall be a grab sample collected from the receiving water outside of Sturgeon Bay's mixing zone.
9. Sampling WET concurrently with any chemical-specific toxic substances is recommended. Tests should be done in rotating quarters, to collect seasonal information about this discharge. Testing should continue after the permit expiration date (until the permit is reissued).

The recommended limits meet the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Codes, and additional limits are not required.

Please consult the attached report for details regarding the above recommendations. If there are any questions or comments, please contact Nicole Krueger at Nicole.Krueger@wisconsin.gov or Diane Figiel at Diane.Figiel@wisconsin.gov.

Attachments (2) – Narrative & Map

PREPARED BY: Nicole Krueger, Water Resources Engineer – SER

E-cc: Heidi Schmitt Marquez, Regional Wastewater Supervisor – NER
Diane Figiel, Water Resources Engineer – WY/3
Nate Willis, Wastewater Engineer – WY/3

Attachment #1

Water Quality-Based Effluent Limitations for
Sturgeon Bay Utilities Wastewater Treatment Facility

WPDES Permit No. WI-0021113-11

Prepared by: Nicole Krueger

PART 1 – BACKGROUND INFORMATION

Facility Description

The Sturgeon Bay Utilities uses the conventional activated sludge process and consists of fine screens, grit removal, primary clarification, activate sludge, secondary clarification, phosphorus removal with ferric chloride before discharging to Sturgeon Bay (Lake Michigan). Chlorine disinfection was replaced with UV disinfection in 2024.

Attachment #2 is a map of the area showing the approximate location of Outfall 001.

Existing Permit Limitations

The current permit, expiring on 12/31/2025, includes the following effluent limitations and monitoring requirements.

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Flow Rate						1
$CBOD_5$			25 mg/L	15 mg/L		2,3
TSS			25 mg/L	15 mg/L		2,3
pH	9.0 s.u.	6.0 s.u.				2
Residual Chlorine April – Oct	38 µg/L		**38 µg/L**	**38 µg/L**		4
Ammonia Nitrogen						1
Bacteria						5
Interim Fecal coliform April – Oct				400 #/100 mL geometric mean		
Final *E. coli* April – Oct				126 #/100 mL geometric mean		
Mercury						1
Phosphorus				0.7 mg/L	0.6 mg/L	
TKN, Nitrite+Nitrate, and Total Nitrogen						1
Acute WET						6
Chronic WET						6

Footnotes:

1. Monitoring only.

2. These limitations are not being evaluated as part of this review. Because the water quality criteria (WQC), reference effluent flow rates, and receiving water characteristics have not changed, limitations for these water quality characteristics do not need to be re-evaluated at this time.
3. These limits are based on the Cold Water (CW) community of the immediate receiving water as described in s. NR 210.05(1), Wis. Adm. Code. The limits are 60% of the categorical limits which were negotiated with the Department prior to 2000.
4. Sturgeon Bay no longer uses chlorine for disinfection so chlorine limits may be removed in accordance with antibacksliding requirements in s. NR 207.12, Wis. Adm. Code.
5. *E. coli* limits became effective 03/31/2025. Additional limit: No more than 10 percent of *E. coli* bacteria samples collected in any calendar month may exceed 410 count/100 mL. An extended disinfection season is recommended for Sturgeon Bay due to the high amount of recreation in the area.
6. Annual acute and chronic WET testing is required. The IWC for chronic WET was 9%.

Receiving Water Information

- Name: Sturgeon Bay (Lake Michigan)
- Waterbody Identification Code (WBIC): 88
- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code: Cold Water and Public Water Supply
- Flow: A ten-to-one dilution ratio will be used for calculating effluent limitations based on chronic or long-term impacts, in accordance with s. NR 106.06(4)(b)2, Wis. Adm. Code, because the receiving water does not exhibit a unidirectional flow at the point of discharge.
- Hardness = 133 mg/L as $CaCO_3$. This value represents the geometric mean of data from chronic WET testing from 01/11/2022 – 04/14/2025.
- Source of background concentration data: Metals data from Green Bay at the North Store Study Station (Station ID 53316) and chloride data from Green Bay at DNR Study Station 28 (Station ID 433010) is used for this evaluation The numerical values are shown in the tables below. If no data is available, the background concentration is assumed to be negligible and a value of zero is used in the computations. Background data for calculating effluent limitations for ammonia nitrogen are described later.
- Multiple dischargers: There are several other dischargers to Lake Michigan; however, they are not in the immediate vicinity and the mixing zones do not overlap. Therefore, the other dischargers do not impact this evaluation.
- Impaired water status: Lake Michigan is 303(d) listed as impaired for PCBs and mercury.

Effluent Information

- Design flow rate(s):
  Annual average = 2.816 million gallons per day (MGD)
  For reference, the actual average flow from 01/01/2021 – 08/31/2025 was 1.61 MGD.
- Hardness = 342 mg/L as $CaCO_3$. This value represents the geometric mean of four samples collected in August 2024 which were reported on the permit application.
- Acute dilution factor used in accordance with s. NR 106.06(3)(c), Wis. Adm. Code: Not applicable – this facility does not have an approved Zone of Initial Dilution (ZID).
- Wastewater source: Domestic wastewater with one industrial contributor: Hatco Corporation.
- Water supply: Municipality waterworks from Lake Michigan.
- Additives: Sturgeon Bay has included 2 additives in the permit application that have the potential to be present in Outfall 001. These additives are listed below:

- PVS Ferric Chloride – Phosphorus removal
- Polydyne Clarifloc C-6286X – Biosolids thickening
- An additive review is not necessary for any additives where either the toxicity is well documented and understood, can be controlled by a WQBEL, or are not believed to be present in the discharge. The listed additives are expected to be removed in the biosolids, so an additive review is not necessary.

- Effluent characterization: This facility is categorized as a major municipal, so the permit application required effluent sample analyses for all the "priority pollutants" except for the Dioxins and Furans as specified in s. NR 200.065, Table 1, Wis. Adm. Code. The permit-required monitoring for ammonia, mercury, and phosphorus is used in this evaluation.
- Effluent data for substances for which a single sample was analyzed is shown in the tables in Part 2, in the column titled "MEAN EFFL. CONC.". Otherwise, substances with multiple effluent data are shown in the tables below or in their respective parts in this evaluation.

Copper Effluent Data

Sample Date	Copper (µg/L)	Sample Date	Copper (µg/L)	Sample Date	Copper (µg/L)
08/06/2024	28	08/19/2024	15	09/03/2024	19
08/09/2024	17	08/22/2024	17	09/06/2024	20
08/12/2024	17	08/26/2024	15	09/09/2024	20
08/15/2024	31	08/29/2024	27		
1-day P_{99} = 36.8 µg/L					
4-day P_{99} = 27.8 µg/L					

Mercury Effluent Data

	Mercury (ng/L)
1-day P_{99}	2.79
4-day P_{99}	1.74
30-day P_{99}	1.21
Mean	0.97
Std	0.53
Sample size	18
Range	0.43 - 2.5

Chloride Effluent Data

Sample Date	Chloride (mg/L)	Sample Date	Chloride (mg/L)	Sample Date	Chloride (mg/L)
07/15/2014	350	02/10/2020	220	08/06/2024	330
07/18/2014	360	02/13/2020	250	08/09/2024	330
07/21/2014	380	02/17/2020	220	08/12/2024	330
07/24/2014	360	02/20/2020	250	08/15/2024	360
1-day P_{99} = 475 mg/L					
4-day P_{99} = 387 mg/L					

The following table presents the average concentrations and loadings at Outfall 001 from 01/01/2021 – 08/31/2025 for all parameters with limits in the current permit to meet the requirements of s. NR 201.03(6), Wis. Adm. Code:

Attachment #1

Parameters with Effluent Limits

	Average Measurement
$CBOD_5$	3.11 mg/L*
TSS	6.23 mg/L
pH field	6.8 s.u.
E. coli	37.9 #/100 mL**
Phosphorus	0.47 mg/L

*Results below the limit of detection (LOD) were included as zeroes in calculation of average.
** The average measurement for bacteria is calculated as a geometric mean. Values reported below the LOD are replaced with a value of 1 for the calculation of the geometric mean.

PART 2 – $CBOD_5$ AND TSS CONCENTRATION LIMITS

Sturgeon Bay has had $CBOD_5$ limits of 15 mg/L as a monthly average and 25 mg/L as a weekly average in their permit since at least 2000. These limits are more restrictive than the categorical $CBOD_5$ limits of 25 mg/L as a monthly average and 40 mg/L as a weekly average which are listed in NR 210.05(1)(d) Wis. Adm. Code, for a full fish and aquatic life receiving water. These $CBOD_5$ limits were requested by the permittee as alternatives to the BOD_5 limits of 30 mg/L as a monthly average and 45 mg/L as a weekly average per NR 210.05(1)(a) Wis. Adm. Code. The more restrictive limits of 15 mg/L and 25 mg/L were negotiated between the Department and the facility as an alternative to extending their outfall which would provide more mixing. Other Lake Michigan discharges have been given the full categorical limits per NR 210.05(1)(a) Wis. Adm. Code. The facility has previously met the requirements per NR 210.07(4)(a) Wis. Adm. Code, which requires facilities to concurrently sample their effluent for BOD_5 and $CBOD_5$ to ensure the $CBOD_5$ limits are protective and can replace the BOD_5 limits. **No changes to the $CBOD_5$ limits are recommended in the reissued permit.**

There are not numerical water quality standards for TSS; however, TSS concentration limits are typically set equal to $CBOD_5$ limits. **No changes are recommended for the TSS concentration limits.** See the TSS TMDL section of this evaluation for additional limits.

PART 3 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR TOXIC SUBSTANCES – EXCEPT AMMONIA NITROGEN

Permit limits for toxic substances are required whenever any of the following occur:

1. The maximum effluent concentration exceeds the calculated limit (s. NR 106.05(3), Wis. Adm. Code)
2. If 11 or more detected results are available in the effluent, the upper 99^{th} percentile (or P_{99}) value exceeds the comparable calculated limit (s. NR 106.05(4), Wis. Adm. Code)
3. If fewer than 11 detected results are available, the mean effluent concentration exceeds 1/5 of the calculated limit (s. NR 106.05(6), Wis. Adm. Code)

Attachment #1

Daily Maximum Limits based on Acute Toxicity Criteria (ATC)

10:1 dilution

SUBSTANCE	REF. HARD.* mg/L	ATC	MEAN BACK-GRD.	MAX. EFFL. LIMIT**	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	1-day P_{99}	1-day MAX. CONC.
Arsenic		340	1.75	680	136	<1.1		
Cadmium	342	17.9	0.19	35.7	7.14	<0.17		
Chromium	301	4446	9.7	8892	1778	<3.3		
Copper	342	49.5	3.75	99.0			36.8	31.0
Lead	342	351	2.75	702	140.3	<5.4		
Mercury (ng/L)		830	0.13	830			2.79	2.5
Nickel	268	1080	1.5	2161	432	<4.7		
Zinc	333	345	14.1	689	137.9	33		
Chloride (mg/L)		757	9.2	1514				475

* The indicated hardness may differ from the effluent hardness because the effluent hardness exceeded the maximum range in ch. NR 105, Wis. Adm. Code, over which the acute criteria are applicable. In that case, the maximum of the range is used to calculate the criterion.

* * The 2 × ATC method of limit calculation yields a more restrictive limit than 10:1 dilution

*** A mixing zone is not allowed for discharges of bioaccumulating compounds of concern (BCCs) in the Great Lakes system as described in s. NR 106.06(2)(br), Wis. Adm. Code.

Weekly Average Limits based on Chronic Toxicity Criteria (CTC)

10:1 dilution

SUBSTANCE	REF. HARD.* mg/L	CTC	MEAN BACK-GRD.	WEEKLY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	4-day P_{99}
Arsenic		148	1.75	1611	322	<1.1	
Cadmium	133	3.08	0.19	32.0	6.4	<0.17	
Chromium	133	109	9.7	1101	220	<3.3	
Copper	133	13.2	3.75	108			27.8
Lead	133	36.9	2.75	378	75.7	<5.4	
Mercury (ng/L)		440	0.13	440			1.74
Nickel	133	66.4	1.5	716	143	<4.7	
Zinc	133	154	14.1	1559	312	33.00	
Chloride (mg/L)		395	9.2	4253			387

* The indicated hardness may differ from the receiving water hardness because the receiving water hardness exceeded the maximum range in ch. NR 105, Wis. Adm. Code, over which the chronic criteria are applicable. In that case, the maximum of the range is used to calculate the criterion.

Monthly Average Limits based on Wildlife Criteria (WC)

10:1 dilution

SUBSTANCE	WC	MEAN BACK-GRD.	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	30-day P_{99}
Mercury (ng/L)	1.3		1.3			1.21

Monthly Average Limits based on Human Threshold Criteria (HTC)

10:1 dilution

SUBSTANCE	HTC	MEAN BACK-GRD.	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	30-day P_{99}
Cadmium	4.4	0.19	47	9.3	<0.17	
Chromium (+3)	100	9.70	1003	201	<3.3	
Lead	10	2.75	83	16.5	<5.4	
Mercury (ng/L)	1.5	0.13	1.5			1.21
Nickel	100	1.50	1085	217	<4.7	

Monthly Average Limits based on Human Cancer Criteria (HCC)

10:1 dilution

SUBSTANCE	HCC	MEAN BACK-GRD.	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Arsenic	0.2	1.75	0.2		<1.1
Chloroform	53		583	117	0.38

Conclusions and Recommendations

Based on a comparison of the effluent data and calculated effluent limitations, effluent limitations are not required for parameters listed in this section. Limits and/or monitoring recommendations are made in the paragraphs below:

Chloride – Considering available effluent data from the previous 3 permit applications, the 1-day P_{99} chloride concentration is 475 mg/L, and the 4-day P_{99} of effluent data is 387 mg/L. Data from previous applications were used in this evaluation in order to have 11 data points to calculate P_{99}'s for reasonable potential and the data is still representative of current conditions.

These effluent concentrations are below the calculated WQBELs for chloride, therefore no effluent limits are needed. **Chloride monitoring is recommended to ensure that 11 sample results are available at the next permit issuance to meet the data requirements of s. NR 106.85, Wis. Adm. Code.**

Arsenic – The arsenic data from the permit application was reported as <1.1 µg/L, which is above the human cancer criteria of 0.2 µg/L. The limit of detection of this analytical method is higher than $1/5^{th}$ of the calculated limit so it is not certain if the nondetect sample is actually lower than the limit. However, municipal wastewater typically exceeds the limit of 0.2 µg/L based on HCC.

Section NR 106.06(6), Wis. Adm. Code, allows a facility to demonstrate that a pollutant present in intake water, which is passed through the facility and discharged does not cause, have the reasonable potential to cause, or contribute to the excursion of water quality criteria in the receiving water. The demonstration has five conditions, all of which must be met:

1. The permittee withdraws 100 percent of its intake water containing the substance from the same body of water into which the discharge is made;
2. The permittee does not contribute any additional mass of the substance to the wastewater;
3. The permittee does not alter the substance chemically or physically in a manner that would cause adverse water quality impacts to occur that would not occur if the pollutants were left in-stream;

4. The permittee does not increase the concentration at the edge of the mixing zone, or at the point of discharge if a mixing zone is not allowed, as compared to the concentration in the intake water, unless the increased concentration does not cause or contribute to an excursion above an applicable water quality standard; and
5. The timing and location of the discharge would not cause adverse water quality impacts to occur that would not occur if the identified intake pollutant were left instream.

In order for Sturgeon Bay to meet all of the conditions listed above, **effluent monitoring shall be included in the reissued permit**. **Samples should be evaluated using a highly sensitive method so that reasonable potential can be determined at the next issuance. It is also recommended that Sturgeon Bay water also be monitored for arsenic to determine if Sturgeon Bay is contributing additional arsenic mass.**

The department will determine whether the groundwater source that provides drinking water to Sturgeon Bay can be considered the same water body (Lake Michigan) that effluent is discharged to in order to satisfy the first condition in s. NR 106.06(6), Wis. Adm. Code.

If Sturgeon Bay meets all of the conditions in s. NR 106.06(6), Wis. Adm. Code, arsenic limits would not be recommended in the next evaluation.

Mercury – The WQBEL for total recoverable mercury is set equal to the most stringent criterion of 1.3 ng/L, according to s. NR 106.06(6), Wis. Adm. Code, because the background concentration in the receiving water and similar inland streams is known to exceed 1.3 ng/L.

The current permit requires quarterly monitoring of the influent and effluent for total recoverable mercury. A total of 18 effluent sampling results are available from 01/19/2021 – 04/08/2025 for total recoverable mercury. The average concentration was 0.97 ng/L, and the maximum was 2.5 ng/L. Because the 30-day P_{99} of available data (1.21 ng/L) is less than the most stringent WQBEL of 1.3 ng/L, **no WQBEL for mercury is required for permit reissuance. Mercury monitoring is recommended to continue,** consistent with other discharges to waters of the Great Lakes.

Sturgeon Bay previously had a mercury limit based on the mixing zone phase-out exception but had implemented a pollutant minimization program (PMP), so a limit was no longer needed and was removed during the previous limits evaluation. It is recommended that Sturgeon Bay continue the PMP so that the effluent mercury data does not increase in the future.

PFOS and PFOA – The need for PFOS and PFOA monitoring is evaluated in accordance with s. NR 106.98(2), Wis. Adm. Code.

Based on the effluent flow rate, the types of indirect dischargers contributing to the collection system and known levels of PFOS/PFOA in the source water, **PFOS and PFOA monitoring is recommended at a once every two months frequency.**

Attachment #1

PART 4 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR AMMONIA NITROGEN

The State of Wisconsin promulgated revised water quality standards for ammonia nitrogen in ch. NR 105, Wis. Adm. Code, effective March 1, 2004 which includes criteria based on both acute and chronic toxicity to aquatic life. Given the fact that Sturgeon Bay does not currently have ammonia nitrogen limits, the need for limits is evaluated at this time.

Daily Maximum Limits based on Acute Toxicity Criteria (ATC)

Daily maximum limitations are based on acute toxicity criteria in ch. NR 105, Wis. Adm. Code, which are a function of the effluent pH and the receiving water classification. The acute toxicity criterion (ATC) for ammonia is calculated using the following equation:

$$\text{ATC in mg/L} = [A \div (1 + 10^{(7.204 - \text{pH})})] + [B \div (1 + 10^{(\text{pH} - 7.204)})]$$

Where:

A = 0.275 and B = 39.0 for a Cold-Water Category 1 fishery, and
pH (s.u.) = that characteristic of the effluent.

The effluent pH data was examined as part of this evaluation. A total of 1216 sample results were reported from 01/04/2021 – 08/29/2025. The maximum reported value was 7.3 s.u. (Standard pH Units). The effluent pH was 7.2 s.u. or less 99% of the time. The 1-day P_{99}, calculated in accordance with s. NR 106.05(5), Wis. Adm. Code, is 7.2 s.u. The mean plus the standard deviation multiplied by a factor of 2.33, an estimate of the upper ninety ninth percentile for a normally distributed dataset, is 7.2 s.u. Therefore, a value of 8.6 s.u. is believed to represent the maximum reasonably expected pH, and therefore most appropriate for determining daily maximum limitations for ammonia nitrogen. Substituting a value of 7.2 s.u. into the equation above yields an ATC = 19 mg/L.

Daily Maximum Ammonia Nitrogen Effluent Limitations Calculation Method

In accordance with s. NR 106.32(2), Wis. Adm. Code daily maximum ammonia limitations are calculated using the the 1-Q_{10} receiving water low flow if it is determined that the previous method of acute ammonia limit calculation (2×ATC) is not sufficiently protective of the fish and aquatic life. The more restrictive calculated limits shall apply.

The calculated daily maximum ammonia nitrogen effluent limits using the mass balance approach with the 1-Q_{10} (estimated as 80 % of 7-Q_{10}) and the 2×ATC approach are shown below.

Daily Maximum Ammonia Nitrogen Determination

	Ammonia Nitrogen Limit mg/L
2×ATC	39
10:1 dilution	217

The 2×ATC method yields the most stringent limits for Sturgeon Bay.

Weekly and Monthly Average Limits based on Chronic Toxicity Criteria (CTC)

Weekly average and monthly average limits for ammonia nitrogen are based on chronic toxicity criteria in ch. NR 105, Wis. Adm. Code.

The 30-day chronic toxicity criterion (CTC) for ammonia in waters classified for a Cold-Water Community is calculated by the following equation, according to subchapter IV of NR 106, Wis. Adm. Code.

$$CTC = E \times \{[0.0676 \div (1 + 10^{(7.688 - pH)})] + [2.912 \div (1 + 10^{(pH - 7.688)})]\} \times C$$

Where:

pH = the pH (s.u.) of the receiving water,
E = 0.854,
C = the minimum of 2.85 or $1.45 \times 10^{(0.028 \times (25 - T))}$,
T = the temperature (ºC) of the receiving water

The 4-day criterion is equal to the 30-day criterion multiplied by 2.5. The 4-day criteria are used in a mass-balance equation with the 7-Q_{10} (4-Q_3, if available) to derive weekly average limitations. And the 30-day criteria are used with the 30-Q_5 (estimated as 85% of the 7-Q_2 if the 30-Q_5 is not available) to derive monthly average limitations. The stream flow value is further adjusted to temperature; 100% of the flow is used if the Temperature ≥ 16 ºC, 25% of the flow is used if the Temperature < 11 ºC, and 50% of the flow is used if the Temperature ≥ 11 ºC but < 16 ºC.

The 4-day criterion is equal to the 30-day criterion multiplied by 2.5. The 4-day criteria are used to derive weekly average limitations, and the 30-day criteria are used to derive monthly average limitations, both by a mass-balance using a ten-to-one dilution ratio.

The "default" basin assumed values are used for Temperature, pH and background ammonia concentrations, because minimum ambient data is available. These values are shown in the table below, with the resulting criteria and effluent limitations.

Weekly and Monthly Ammonia Nitrogen Limits – CW

		Spring	Summer	Winter
		April & May	June – Sept.	Oct. - March
Effluent Flow	Qe (MGD)	2.816	2.816	2.816
Background Information	Ammonia (mg/L)	0.04	0.05	0.105
	Average Temperature (°C)	11	16	4
	Max Temperature (°C)	13	18	9
	pH (s.u.)	8.06	8.08	7.99
	Dilution factor	10	10	10
Criteria mg/L	4-day Chronic	5.6	4.4	6.2
	30-day Chronic	2.2	1.8	2.5
Effluent Limits mg/L	Weekly Average	61	48	67
	Monthly Average	24	19	26

Effluent Data

The following table evaluates the statistics based upon ammonia data reported from 01/03/2021 – 08/31/2025.

Ammonia Nitrogen Effluent Data

	Ammonia Nitrogen mg/L
1-day P_{99}	11.2
4-day P_{99}	6.24

Attachment #1

	Ammonia Nitrogen mg/L
30-day P_{99}	2.71
Mean*	1.25
Std	2.87
Sample size	730
Range	<0.023 - 23.84

*Values lower than the limit of detection were substituted with a zero

Reasonable Potential
The need to include ammonia limits in Sturgeon Bay's permit is determined by calculating 99th upper percentile (or P_{99}) values for ammonia year-round and comparing those to the calculated limits.

Based on this comparison, there is no reasonable potential for the discharge to exceed any of the calculated ammonia nitrogen limits. **No limits are needed; however, monitoring is recommended.**

PART 5 – PHOSPHORUS

Technology-Based Effluent Limit
Subchapter II of Chapter NR 217, Wis. Adm. Code, requires municipal wastewater treatment facilities that discharge greater than 150 pounds of total phosphorus per month to comply with a monthly average limit of 1.0 mg/L, or an approved alternative concentration limit.

Since Sturgeon Bay has phosphorus limits in effect that are more stringent than 1.0 mg/L, the need for a TBEL will not be considered further.

In addition, the need for a WQBEL for phosphorus must be considered.

Water Quality-Based Effluent Limits (WQBEL)
Revisions to administrative rules regulating phosphorus took effect on December 1, 2010. These rule revisions include additions to s. NR 102.06, Wis. Adm. Code, which establish phosphorus standards for surface waters. Subchapter III of NR 217, Wis. Adm. Code, establishes procedures for determining WQBELs for phosphorus, based on the applicable standards in ch. NR 102, Wis. Adm. Code.

Section NR 102.06(5)(b) specifies that a total phosphorus criterion of 7 µg/L (0.007 mg/L) applies for the open and nearshore water of Lake Michigan. For direct discharges to Lake Michigan such as Sturgeon Bay, s. NR 217.13(4), Wis. Adm. Code, states that the Department shall set effluent limits consistent with nearshore or whole lake models approved by the Department. In the absence of an approved model, a WQBEL of 0.6 mg/L as a six-month average is recommended.

The current permit has the WQBEL of 0.6 mg/L as a six-month average which is recommended to continue in the reissued permit.

Effluent Data
The following table summarizes effluent total phosphorus monitoring data from 01/03/2021 – 08/31/2025, for informational purposes.

Attachment #1

Total Phosphorus Effluent Data

	Concentration mg/L
1-day P_{99}	0.93
4-day P_{99}	0.68
30-day P_{99}	0.54
Mean	0.48
Std	0.15
Sample size	726
Range	0.06 - 1.78

PART 6 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR THERMAL

Surface water quality standards for temperature took effect on October 1, 2010. These regulations are detailed in chs. NR 102 (Subchapter II – Water Quality Standards for Temperature) and NR 106 (Subchapter V – Effluent Limitations for Temperature) of the Wisconsin Administrative Code. Daily maximum and weekly average temperature criteria are available for the 12 different months of the year depending on the receiving water classification.

Due to the amount of dilution for a shore discharge to Lake Michigan, the lowest calculated limitation is 120° F.

At temperatures above ~103°F, conventional biological treatment systems stop functioning properly and experience upsets. There is no indication that this has ever occurred at this treatment system. This information, coupled with the lack of significant industrial heat load, lead to the conclusion that there is no reasonable potential for the discharge to exceed the 120°F limitation. **No limits or monitoring are recommended to be included in the reissued permit for temperature.**

PART 7 – WHOLE EFFLUENT TOXICITY (WET)

WET testing is used to measure, predict, and control the discharge of toxic materials that may be harmful to aquatic life. In WET tests, organisms are exposed to a series of effluent concentrations for a given time and effects are recorded. Decisions below related to the selection of representative data and the need for WET limits were made according to ss. NR 106.08 and 106.09, Wis. Adm. Code. WET monitoring frequency and toxicity reduction evaluation (TRE) recommendations were made using the best professional judgment of staff familiar with the discharge after consideration of the guidance in the *Whole Effluent Toxicity (WET) Program Guidance Document* (2022).

- Acute tests predict the concentration that causes lethality of aquatic organisms during a 48 to 96-hour exposure. To assure that a discharge is not acutely toxic to organisms in the receiving water, WET tests must produce a statistically valid LC_{50} (Lethal Concentration to 50% of the test organisms) greater than 100% effluent, according to s. NR 106.09(2)(b), Wis. Adm Code.
- Chronic tests predict the concentration that interferes with the growth or reproduction of test organisms during a seven-day exposure. To assure that a discharge is not chronically toxic to organisms in the receiving water, WET tests must produce a statistically valid IC_{25} (Inhibition Concentration) greater than the instream waste concentration (IWC), according to s. NR 106.09(3)(b), Wis. Adm Code. The

IWC is an estimate of the proportion of effluent to total volume of water (receiving water + effluent). The **IWC of 9%,** shown in the WET Checklist summary below, was calculated according to the following equation, as specified in s. NR 106.03(6), Wis. Adm Code:

The IWC is 9% based on dilution of 10 parts lake water to 1-part effluent, as specified in s. NR 106.06(4)(b)2, Wis. Adm. Code, or a factor of 1 in 11 to calculate the IWC.

- According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), a synthetic (standard) laboratory water may be used as the dilution water and primary control in acute WET tests, unless the use of different dilution water is approved by the Department prior to use. The primary control water must be specified in the WPDES permit.
- According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), receiving water must be used as the dilution water and primary control in chronic WET tests, unless the use of different dilution water is approved by the Department prior to use. The dilution water used in WET tests conducted on Outfall 001 shall be a grab sample collected from the receiving water location, upstream and out of the influence of the mixing zone and any other known discharge. The specific receiving water location must be specified in the WPDES permit.
- Shown below is a tabulation of all available WET data for Outfall 001. Efforts are made to ensure that decisions about WET monitoring and limits are made based on representative data, as specified in s. NR 106.08(3), Wis. Adm Code. Data which is not believed to be representative of the discharge was not included in reasonable potential calculations. The table below differentiates between tests used and not used when making WET determinations.

WET Data History

Date Test Initiated	Acute Results LC_{50} %				Chronic Results IC_{25} %				Footnotes or Comments
	C. dubia	Fathead minnow	Pass or Fail?	Used in RP?	*C. dubia*	Fathead Minnow	Pass or Fail?	Use in RP?	
10/26/2006	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
08/09/2007	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
05/15/2008	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
02/17/2009	>100	>100	Pass	No	>100	>100	Pass	No	1
11/16/2010	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
06/19/2012	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
03/26/2013	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
07/08/2014	>100	>100	Pass	Yes	90.2	>100	Pass	Yes	
04/05/2016	>100	>100	Pass	Yes	98	99.2	Pass	Yes	
01/17/2017	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
10/02/2018	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
07/09/2019	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
04/21/2020	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
04/13/2021	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
01/11/2022	>100	>100	Pass	Yes	15	>100	Pass	Yes	
10/03/2023	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
07/30/2024	>100	>100	Pass	Yes	56.6	>100	Pass	Yes	
04/14/2025	>100	>100	Pass	Yes	>100	>100	Pass	Yes	

Footnotes:

1. *Tests done by S-F Analytical, July 2008 – March 2011.* The DNR has reason to believe that WET tests completed by SF Analytical Labs from July 2008 through March 31, 2011 were not performed using proper test methods. Therefore, WET data from this lab during this period has been disqualified and was not included in the analysis.

- According to s. NR 106.08, Wis. Adm. Code, WET reasonable potential is determined by multiplying the highest toxicity value that has been measured in the effluent by a safety factor, to predict the likelihood (95% probability) of toxicity occurring in the effluent above the applicable WET limit. The safety factor used in the equation changes based on the number of toxicity detects in the dataset. The fewer detects present, the higher the safety factor, because there is more uncertainty surrounding the predicted value. **WET limits must be given, according to s. NR 106.08(6), Wis. Adm. Code, whenever the applicable Reasonable Potential equation results in a value greater than 1.0.**

  Acute Reasonable Potential = [(TUa effluent) (B)(AMZ)]
  Chronic Reasonable Potential = [(TUc effluent) (B)(IWC)]

  According to s. NR 106.08(6)(d), Wis. Adm. Code, TUa and TUc effluent values are equal to zero whenever toxicity is not detected (i.e. when the LC_{50}, IC_{25} or $IC_{50} \geq 100\%$).

  Acute Reasonable Potential = 0 < 1.0, reasonable potential is not shown, and a limit is not required.

  Chronic Reasonable Potential = [(TU_c effluent) (B)(IWC)]

Chronic WET Limit Parameters

TUc (maximum) $100/IC_{25}$	**B** (multiplication factor from s. NR 106.08(6)(c), Wis. Adm. Code, Table 4)	IWC
100/15 = 6.67	2.6 Based on 4 detects	9%

[(TUc effluent) (B)(IWC)] = 1.56 > 1.0

Therefore, reasonable potential is shown for chronic WET limits using the procedures in s. NR 106.08(6), Wis. Adm. Code, and representative data from 10/26/2006 – 04/14/2025.

Expression of WET limits

Chronic WET limit = [100/IWC] TU_c = 11 TU_c expressed as a monthly average

The WET checklist was developed to help DNR staff make recommendations regarding WET limits, monitoring, and other related permit conditions. The checklist indicates whether acute and chronic WET limits are needed, based on requirements specified in s. NR 106.08, Wis. Adm. Code. The checklist steps the user through a series of questions, assesses points based on the potential for effluent toxicity, and suggests monitoring frequencies based on points accumulated during the checklist analysis. As toxicity potential increases, more points accumulate, and more monitoring is recommended to ensure that toxicity is not occurring. A summary of the WET checklist analysis completed for this permittee is shown in the table below. Staff recommendations based on best professional judgment are provided below the summary table. For guidance related to reasonable potential and the WET checklist, see Chapter 1.3 of the WET Guidance Document: https://dnr.wisconsin.gov/topic/Wastewater/WET.html.

Attachment #1

WET Checklist Summary

	Acute	Chronic
AMZ/IWC	Not Applicable. **0 Points**	IWC = 9%. **0 Points**
Historical Data	17 tests used to calculate RP. No tests failed. **0 Points**	17 tests used to calculate RP. No tests failed. **0 Points**
Effluent Variability	Little variability, no violations or upsets, consistent WWTF operations. **0 Points**	Same as Acute. **0 Points**
Receiving Water Classification	Coldwater **5 Points**	Same as Acute. **5 Points**
Chemical-Specific Data	No reasonable potential for limits based on ATC; Ammonia, zinc, chloride, and copper detected. Additional Compounds of Concern: Chloroform **5 Points**	No reasonable potential for limits based on CTC; Ammonia, zinc, chloride, and copper detected. Additional Compounds of Concern: 2 pts if any **5 Points**
Additives	2 Water Quality Conditioners added. Permittee has proper P chemical SOPs in place **2 Points**	All additives used more than once per 4 days. **2 Points**
Discharge Category	1 Industrial Contributor. **5 Points**	Same as Acute. **5 Points**
Wastewater Treatment	Secondary or Better **0 Points**	Same as Acute. **0 Points**
Downstream Impacts	No impacts known **0 Points**	Same as Acute. **0 Points**
Total Checklist Points:	**17 Points**	**17 Points**
Recommended Monitoring Frequency (from Checklist):	1x yearly	1x yearly
Limit Required?	No	Yes Limit = 11 TU_c
TRE Recommended? (from Checklist)	No	No

- After consideration of the guidance provided in the Department's *WET Program Guidance Document* (2022) and other information described above, annual acute and chronic WET tests are recommended in the reissued permit.
- Sampling WET concurrently with any chemical-specific toxic substances is recommended. Tests should be done in rotating quarters, to collect seasonal information about this discharge. Testing should continue after the permit expiration date (until the permit is reissued).

- According to the requirements specified in s. NR 106.08, Wis. Adm. Code, a chronic WET limit is required. The chronic WET limit shall be expressed as 11 TUc as a monthly average in the effluent limits table of the permit.
- A minimum of annual chronic monitoring is required because a chronic WET limit is required. Federal regulations in 40 CFR Part 122.44(i) require that monitoring occur at least once per year when a limit is present.
- A minimum of annual acute and chronic monitoring is recommended because Sturgeon Bay is a major municipal discharger with a design flow greater than 1.0 MGD. Federal regulations at 40 CFR Part 122.21(j) require at least 4 acute and chronic WET tests with each permit application on samples collected since the previous reissuance. Therefore, annual monitoring is recommended in the permit term, so that data will be available for the next permit application.

WISCONSIN DEPARTMENT OF NATURAL RESOURCES

Sturgeon Bay Outfall Location

Legend: (some map layers may not be displayed)

- Surface Water Outfalls
- 24K Streams and Rivers
- 24K Lakes and Open Water
- Rivers and Streams
- Intermittent Streams
- Open Water
- water

Notes:

This map is a product generated by a DNR web mapping application.

This map is for informational purposes only and may not have been prepared for or be suitable for legal, engineering, or surveying purposes. The user is solely responsible for verifying the accuracy of information before using for any purpose. By using this product for any purpose user agrees to be bound by all disclaimers found here: https://dnr.wisconsin.gov/legal

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