

Permit Fact Sheet

General Information

Permit Number	WI-0025593-10-0
Permittee Name and Address	Superior Sewage Disposal System 51 E First St, Superior, WI 54880
Permitted Facility Name and Address	Superior Sewage Disposal System 51 E First St, Superior, WI 54880
Permit Term	January 01, 2026 to December 30, 2031
Discharge Location	Main Plant: 51 East 1st Street at UTM zone 15N at 571158E, 5175495N. This point is NE of the E corner of the CSTP 2 basin berm. Combined Sewer Treatment Plant (CSTP) 2: 51 East 1st Street at UTM zone 15N at 570743E, 5175425N. This is a point just north of the W end of the CSTP 2 basin berm. CSTP 5: 61st Street and Birch Ave at UTM zone 15N at 569966E, 5168287N, with the flow joining the river approximately 366m to the E. The outfall is just E of the E side of the CSTP 5 facility perimeter. CSTP 6: Texas Avenue and 17th Street at UTM zone 15N at 5174112E, 565849N. The outfall is just W of the W side of the CSTP 6 facility perimeter.
Receiving Water	Main Plant: Superior Bay of Lake Superior CSTP 2: A slip emptying into Superior Bay of Lake Superior CSTP 5: The Nemadji River CSTP 6: St. Louis Bay of Lake Superior St. Louis and Lower Nemadji River Watershed of Lake Superior River Basin in Douglas County
Stream Flow (Q _{7,10})	The low flow of the Nemadji River is 32 cfs near the discharge from CSTP 5. The other plants discharge into waters that do not exhibit a unidirectional flow at the point of discharge.
Stream Classification	Superior Bay (WBIC 2751300) and the slip are classified as Great Lakes Communities, outstanding resource water (ORW), a cold-water community and public water supply St. Louis Bay (WBIC 2843800) is classified as a warm-water sport fish community and non-public water supply. The Nemadji (WBIC 2835300) is classified as a warm-water sport fish community and non-public water supply. All of the listed waters are within the ceded territory and used recreationally. Wisconsin's latest approved 303d list shows the Lake Superior shoreline as impaired due to a fish tissue consumption advisory, with mercury and PCBs as causative pollutants. St Louis River Area of Concern (AOC) is listed as impaired for several chemicals; unspecified metals, PAHs, PCBs, Mercury, Lead, 2,3,7,8-Tetrachlorodibenzo p-dioxin, DDT, Dieldrin and PAHs with the following impairments: Chronic Aquatic toxicity and contaminated fish. The AOC boundary encompasses the Nemadji River at the point just before & where it meets Lake Superior, St Louis River just before & where it discharges into Lake Superior and Lake Superior. Superior Bay at Hog Island inlet is listed for Poor

	Fish & Aquatic life conditions
Wild Rice Impacts	No impacts identified at these locations. Wild rice has not been inventoried on the Nemadji River, but the St. Louis and Allouez Bay downstream have documented wild rice reports and state-sponsored wild rice restoration activities occur annually. The conclusion of no impact is based on low effluent volumes in comparison to receiving water and the continued presence of rice beds. (Evaluation completed March 2017)
Discharge Type	Main Plant: Existing continuous CSTPs 2, 5 and 6: Existing intermittent
Annual Average Design Flow (MGD)	Main Plant: 7.6 MGD CSTP 2: 90 MGD (Maximum daily) CSTP 5: 8.0 MGD (Maximum daily) CSTP 6: 8.0 MGD (Maximum daily)
Industrial or Commercial Contributors	Yes, there are multiple industries. The City has a pretreatment program and is the control authority for regulation of industrial discharges to the City's system.
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?	Yes, January 1, 1994 (effective date for the start of the program).

Facility Description

The City of Superior owns and operates 4 wastewater treatment plants.

The **Main Plant** is an activated sludge facility, which receives the bulk of the domestic, industrial and combined sewer wastewater flow. It is designed to treat 7,600,000 gallons per day with actual flows averaging 3,500,000 gallons per day (2021-2025 data). The facility consists of screen and grit chambers to remove debris; chemical addition to enhance phosphorus removal; primary settling tanks; aeration basins where wastewater mixes with activated sludge; final settling tanks and UV disinfection prior to discharge to Superior Bay of Lake Superior. Activated sludge is composed of solids containing naturally occurring bacteria recycled from the treatment system which is used to metabolize organics in the wastewater. The settled solids (sludge) from the clarifiers (waste activated sludge), is removed and treated through anaerobic digestion to reduce harmful pathogens. Sludge is dewatered using a belt filter press and hauled to a landfill for final disposal.

The other treatment plants are referred to as "Combined Sewer Treatment Plants or "CSTPs". These are overflow locations within the combined sewer districts that have the ability to provide treatment prior to discharge.

CSTP 2, located adjacent to the Main Plant, receives the excess flows during wet weather events which cannot be handled effectively by the Main Plant. Discharges are intermittent and depend on the incoming wasteload and volume of stormwater from the combined collection system. From 2021 through 2025 there was a total of 18 days of discharge through the CSTP 2 outfall. The facility consists of screening; chemical addition to enhance phosphorous removal; an aerated basin for biological treatment and settling; chlorine disinfection followed by dechlorination prior to discharged to a boat slip connected to Superior Bay.

Effluent from the CSTP 2 basin can also be discharged using the "parallel biological treatment system" option. The parallel biological treatment system involves combining biologically treated effluent from the CSTP 2 basin with treated effluent from the main plant at a point located just upstream of the main plant's UV disinfection system; the combined effluent is ultimately discharged via the main plant outfall (001). CSTP 2 chlorine disinfection and discharge via Outfall 002 is only used when the capacity of main plant UV system and outfall 001 has been maximized.

CSTP 5 and **CSTP 6** are physical/chemical treatment facilities. Both plants receive only stormwater and wastewater from domestic sources. At each facility large asphalt-lined retention ponds store collected wastewater. This wastewater can either be held and pumped to the Main Plant for treatment during low-flow periods, or treated on-site by two stage settling with coarse and fine screening during high flow periods. CSTP 5 is located on the south edge of the City near South Superior, and CSTP 6 is located in the northwest corner of the community in Billings Park. The plants are operated about 4.0 days each year (2021 to 2025 data) after large rainfall and snowmelt events. CSTP 5 discharges to the Nemadji River and CSTP 6 discharges to St. Louis Bay.

Proposed Permit Reissuance

The Department anticipates an effective date of January 1, 2027 for the proposed permit. Therefore, to allow a full permit term of five years, the proposed permit's expiration date is December 31, 2031. If the permit reissuance process takes more or less time than anticipated, the permit's dates of effectiveness and expiration may be changed accordingly.

Substantial Compliance Determination

There have been several minor violations of effluent limits, most (all but 1) of which were a result of atypical operations during a construction/upgrade project to ensure worker safety. The other violation was a result of a discharge from an industrial point source during a cleaning event; appropriate response action was taken. No further action is required.

All other conditions and standard requirements of the current permit are being met.

After a desktop review of all discharge monitoring reports, CMARs, biosolids reports, compliance schedule items, and a site visit on 02/11/2025, by Eric de Venecia, WDNR, the Superior Sewage Disposal System has been found to be in substantial compliance with their current permit.

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	INFLUENT – MAIN PLANT An average of 3.5 MGD (2021 – 2025 data)	MAIN PLANT: 24-hr time proportional composite samples shall be taken immediately downstream of the aerated grit chamber.
702	INFLUENT – CSTP 2 Flow is not a required parameter.	COMBINED SEWER TREATMENT PLANT 2: When flow is present through the CSTP 2 Screen Building 24-hr time proportional composite samples shall be taken immediately downstream of the automatic bar screens. When flow is not present in the CSTP 2 Screen Building, but there is significant flow to the basin via the main WWTP pumps, representative sample results from the main WWTP influent shall be used.
705	INFLUENT – CSTP 5 2021-2025 - Flows average 4 days per year. - During days of discharge the average flow is 4.43 MGD - Flows range from 1.79 to 6.64 MGD	COMBINED SEWER TREATMENT PLANT 5: 24-hr time proportional composite samples shall be taken just upstream from the Parshall flume in the drum screen room.
706	INFLUENT – CSTP 6	COMBINED SEWER TREATMENT PLANT 6: 24-hr time proportional composite samples shall be taken just upstream from

Sample Point Designation		
Sample Point Number	Discharge Flow, Units, and Averaging Period	Sample Point Location, Waste Type/Sample Contents and Treatment Description (as applicable)
	2021-2025 • Flows average 3 days per year. • During days of discharge the average flow is 4.62 MGD • Flows range from 0.1 to 7.12 MGD	the Parshall flume in the drum screen room.
001	EFFLUENT – MAIN PLANT Flow has not been a required parameter in previous permit terms.	MAIN PLANT: 24-hr time proportional composite samples shall be collected immediately following disinfection. Grab samples shall be taken at the UV disinfection weir. The permittee is authorized to discharge to Superior Bay within the Lake Superior drainage basin.
002	EFFLUENT – CSTP 2 2021-2025 • Discharges average 3.6 days per year. • During days of discharge the average flow is 21.72 MGD • Flows range from 3.5 to 38.29 MGD	COMBINED SEWER TREATMENT PLANT 2: 24-hr time proportional composite samples shall be collected after chlorination and dechlorination on the discharge line leading to the slip. Grab samples shall be taken from the retention tank effluent weir. The permittee is authorized to discharge to Superior Bay within the Lake Superior drainage basin.
003	EFFLUENT – CSTP 5 Flow is not a required parameter.	COMBINED SEWER TREATMENT PLANT 5: 24-hr time proportional composite samples shall be collected in the effluent discharge pipe prior to discharge. Grab samples shall be taken from the effluent weir. The permittee is authorized to discharge to the Nemadji River within the Lake Superior drainage basin.
004	EFFLUENT – CSTP 6 Flow is not a required parameter.	COMBINED SEWER TREATMENT PLANT 6: 24-hr time proportional composite samples shall be collected in the effluent discharge pipe prior to discharge. Grab samples shall be taken from the effluent weir. The permittee is authorized to discharge to St. Louis Bay within the Lake Superior drainage basin.
005	SLUDGE This is a new outfall recording information previously reported on the annual 4900-52 form. An average of 24.8 dry US tons (Information provided by the applicant.)	SLUDGE – DIGESTER CLEANOUT: Composite samples are required only during cleanout of one or both digesters, up to but not more than annual. Currently all digester sludge is landfilled, but if sludge is land applied the permittee shall notify their department compliance staff prior to disposal.
006	SLUDGE An average of 529 dry US tons (Information provided in application.)	SLUDGE – CAKE: Composite samples shall be taken after the belt-press. Currently all sludge is landfilled, but if sludge is land applied the permittee shall notify their department compliance staff prior to disposal.
101	IN PLANT – MERCURY BLANK Flow is not a required parameter.	Field blank sample shall be collected using standard sample handling procedures

Sample Point Designation		
Sample Point Number	Discharge Flow, Units, and Averaging Period	Sample Point Location, Waste Type/Sample Contents and Treatment Description (as applicable)
102	IN PLANT – PARALLEL TREATMENT This is a new sample point for this permit term.	During periods of discharge grab samples shall be taken prior to combining CSTP 2 effluent with the main plant upstream of UV disinfection.

Permit Requirements

1 Influent – Monitoring Requirements

1.1 Sample Point Number: 701- INFLUENT MAIN PLANT

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow Rate		MGD	Daily	Continuous	
BOD5, Total		mg/L	Daily	24-Hr Comp	
CBOD5		mg/L	Daily	24-Hr Comp	
Suspended Solids, Total		mg/L	Daily	24-Hr Comp	
Phosphorus, Total		mg/L	Daily	24-Hr Comp	
Arsenic, Total Recoverable		ug/L	Quarterly	24-Hr Comp	
Cadmium, Total Recoverable		ug/L	Monthly	24-Hr Comp	
Chromium, Total Recoverable		ug/L	Monthly	24-Hr Comp	
Copper, Total Recoverable		ug/L	Monthly	24-Hr Comp	
Lead, Total Recoverable		ug/L	Monthly	24-Hr Comp	
Nickel, Total Recoverable		ug/L	Monthly	24-Hr Comp	
Zinc, Total Recoverable		ug/L	Monthly	24-Hr Comp	
Cyanide, Total		ug/L	Monthly	Grab	

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Mercury, Total Recoverable		ng/L	Quarterly	Grab	See the permit Mercury Monitoring section for more information.

Changes from Previous Permit:

Influent limitations and monitoring requirements were evaluated for this permit term and the following changes were made from the previous permit. See additional explanation of limits under “Explanation of Limits and Monitoring Requirements” below.

- Flow- The sample frequency for flow has been changed from “continuous” to “daily” for eDMR reporting purposes.

Explanation of Limits and Monitoring Requirements

Monitoring of influent flow, BOD5 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.

Metals – Since the permittee is a control authority subject to state and federal pretreatment requirements influent and effluent monitoring for total recoverable arsenic, cadmium, chromium, copper, cyanide, lead, mercury, nickel and zinc will continue. Influent and effluent levels can be compared to determine removal efficiency.

Mercury – Continued influent monitoring is required as part of mercury variance requirements as well as a standard requirement of the pretreatment program. The data provides a base line for removal effectiveness.

BOD5 - The permittee continues to receive a variance as provided in Wis. Admin. Code NR 210.07 (4) and (5) to replace BOD limits with CBOD limits. Department guidance for the variance review process was utilized, submitted data fit within the required criteria and the request was granted in the March 9, 2006 Water Quality Based Effluent Limits Memo (WQBEL). Influent monitoring for BOD5 and CBOD5 is required as part of the variance. In addition, percent removal requirements for combined sewers shall be made on a “case-by-case” basis per s. NR 210.07(6) and were determined to be impractical for this facility at this time. Percent removal requirements will be re-evaluated during next permit term.

1.2 Sample Point Number: 702- INFLUENT CSTP 2

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
BOD5, Total		mg/L	Daily	24-Hr Comp	
Suspended Solids, Total		mg/L	Daily	24-Hr 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.

Explanation of Limits and Monitoring Requirements

Monitoring of influent flow, BOD5 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.

1.3 Sample Point Number: 705- INFLUENT CSTP 5 and 706- INFLUENT CSTP 6

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

Changes from Previous Permit:

Influent limitations and monitoring requirements were evaluated for this permit term and the following changes were made from the previous permit. See additional explanation of limits under “Explanation of Limits and Monitoring Requirements” below.

- Flow- The sample frequency for flow has been changed from “continuous” to “daily” for eDMR reporting purposes.

Explanation of Limits and Monitoring Requirements

Monitoring of influent flow, BOD5 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.

2 CSO Long Term Control Plan

Changes from Previous Permit:

Additional combined sewer overflows (CSO) requirements have been added which correspond to the requirements of the Long Term Control Plan (LTCP). Discharges from the CSOs shall be limited, monitored, and reported by the permittee in accordance with permit conditions, s. NR 210.205, Wis. Adm. Code, and the U.S. EPA CSO Control Policy.

2.1.1 Inventory of Overflow Locations within the Combined Sewer Districts – All combined sewer treatment plants (CSTP) locations remain the same.

2.1.2 Collection System Operational Requirements – This is a new section included to direct the permittee to implement and properly maintain the selected CSO controls.

2.1.3 Operational and Technology-Based Requirements – This is a new section that contains the nine minimum controls required by EPA and is consistent with the CSO Control Policy and public notification requirements.

2.1.4 CSO Performance Standards for Water Quality-Based Requirements – This is a new section that defines operational performance standards for the permittee to maximize storage and treatment of combined sewer waste.

2.1.5 Primary Treatment and Disinfection – This is a new section that defines operational standards.

2.1.6 CSO Discharge Reporting Requirements – This is a new section which outlines by whom and when reports shall be made after a CSO.

Tier 2 Industrial Stormwater Requirements

Tier 2 Industrial Stormwater Requirements (NR 216 Wis. Adm. Code) were included in the previous permit. All stormwater discharges are covered under a separate WPDES Tier II Stormwater permit.

3 Inplant - Monitoring and Limitations

3.1 Sample Point Number: 101- Mercury field blank

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Mercury, Total Recoverable		ng/L	Quarterly	Blank	See the Mercury Monitoring permit section for more information.

Changes from Previous Permit:

In-plant limitations and monitoring requirements were evaluated for this permit term and no changes were required in this permit section.

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.

3.2 Sample Point Number: 102- Parallel Treatment Effluent

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow Rate		MGD	Daily	Continuous	
CBOD5		mg/L	Daily	Grab	
Suspended Solids, Total		mg/L	Daily	Grab	

Changes from Previous Permit:

This is a new in-plant sample point this permit term. Biologically treated effluent from CSTP 2 can be transferred via pipeline to the Main Plant just prior to the UV disinfection unit. Effluent is discharged via Outfall 001.

Explanation of Limits and Monitoring Requirements

Flow Rate – The volume of wastewater routed from CSTP 2 to the Main Plant is recorded at Sample Point 102 and subsequently added to the influent volume from Sample Point 701 to report the total volume discharged from the Main Plant.

CBOD and Total Suspended Solids – All discharges from Outfall 001 must meet identified effluent limits. Monitoring via Sample Point 102 will assist with limits compliance and process control.

4 Surface Water - Monitoring and Limitations

4.1 Sample Point Number: 001- EFFLUENT MAIN PLANT

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow Rate		MGD	Daily	Calculated	Equals the sum of the flow rates for Sample Points 701 and 102.
CBOD5	Monthly Avg	25 mg/L	Daily	24-Hr Comp	
CBOD5	Weekly Avg	40 mg/L	Daily	24-Hr Comp	
Suspended Solids, Total	Monthly Avg	30 mg/L	Daily	24-Hr Comp	
Suspended Solids, Total	Weekly Avg	45 mg/L	Daily	24-Hr Comp	
pH Field	Daily Max	9.0 su	Daily	Grab	
pH Field	Daily Min	6.0 su	Daily	Grab	
E. coli	Geometric Mean - Monthly	126 #/100 ml	2/Week	Grab	Monitoring and limit are effective year-round.
E. coli	% Exceedance	10 Percent	Monthly	Calculated	Monitoring and limit are effective year-round. See the E. coli Percent Limit permit section. Enter the result in the DMR on the last day of the month.
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	39 mg/L	Daily	24-Hr Comp	
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	39 mg/L	Daily	24-Hr Comp	
Nitrogen, Ammonia (NH3-N) Total	Daily Max - Variable	mg/L	Daily	24-Hr Comp	Report the daily maximum ammonia result in the Nitrogen, Ammonia Total column of the eDMR. See

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
					Ammonia Limitation permit section.
Nitrogen, Ammonia Variable Limit		mg/L	Daily	See Table	Use the daily pH result to look up the applicable ammonia limit in the permit Variable Ammonia Limitation table and report the limit in the Ammonia Variable Limit column on the eDMR.
Phosphorus, Total	Monthly Avg	0.7 mg/L	Daily	24-Hr Comp	
Phosphorus, Total	Monthly Avg	28 lbs/day	Daily	Calculated	Use the sum of the flow rates for Sample Points 701 and 102 to calculate the mass phosphorus discharged.
Mercury, Total Recoverable	Daily Max	4.8 ng/L	Quarterly	Grab	INTERIM LIMIT. See the Mercury Variance permit section for more information.
Heptachlor		ug/L	Monthly	24-Hr Comp	
Chromium +6		ug/L	Monthly	24-Hr Comp	Monitoring is required during the 2028 calendar year.
PFOS		ng/L	1/ 2 Months	Grab	Monitoring only. See PFOS/PFOA Minimization Plan Determination of Need permit schedule.
PFOA		ng/L	1/ 2 Months	Grab	Monitoring only. See PFOS/PFOA Minimization Plan Determination of Need permit schedule.
Arsenic, Total Recoverable		ug/L	Quarterly	24-Hr Comp	
Cadmium, Total Recoverable		ug/L	Monthly	24-Hr Comp	
Chromium, Total Recoverable		ug/L	Monthly	24-Hr Comp	
Copper, Total Recoverable		ug/L	Monthly	24-Hr Comp	

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Cyanide, Total		ug/L	Monthly	Grab	
Lead, Total Recoverable		ug/L	Monthly	24-Hr Comp	
Nickel, Total Recoverable		ug/L	Monthly	24-Hr Comp	
Zinc, Total Recoverable		ug/L	Monthly	24-Hr Comp	
Hardness, Total as CaCO ₃		mg/L	Monthly	24-Hr Comp	
Nitrogen, Total Kjeldahl		mg/L	Quarterly	24-Hr Comp	
Nitrogen, Nitrite + Nitrate Total		mg/L	Quarterly	24-Hr Comp	
Nitrogen, Total		mg/L	Quarterly	Calculated	Total Nitrogen = Total Nitrogen Kjeldahl (mg/L) + Nitrite + Nitrate Nitrogen (mg/L).
Acute WET		TUa	See Listed Qtr(s)	24-Hr Comp	Annual monitoring is required. See the Whole Effluent Toxicity (WET) Testing permit section for the schedule.
Chronic WET	Monthly Avg	11 TUc	See Listed Qtr(s)	24-Hr Comp	Annual monitoring is required. See the Whole Effluent Toxicity (WET) Testing permit section for the schedule.

Changes from Previous Permit

Effluent limitations and monitoring requirements were evaluated for this permit term and the following changes were made from the previous permit. See additional explanation of limits under “Explanation of Limits and Monitoring Requirements” below.

- **Flow-** The effluent flow is new this permit term. It shall be calculated by adding the flow of influent entering the Main Plant (Sample Point 701) with the amount sent via the Parallel Treatment Effluent pipe (Sample Point 702) to the Main Plant.
- **E. coli-** Fecal coliform monitoring and limits have been replaced with Escherichia coli (E. coli) monitoring and limits.
- **Nitrogen Ammonia** – The monitoring frequency has increased from weekly to daily to remain consistent with the Monitoring Frequencies for Individual Wastewater Permits guidance identified below.
- **Phosphorus** – A mass limit of 28 lb/day Monthly Average has been added this permit term.

- **Mercury** - The permittee has requested a renewal of the variance to the mercury limit. An alternative mercury effluent limitation under s. 106.145, Wisconsin Administrative Code, represents a variance to water quality standards authorized by s. 283.15, Wis. Stats. The department reviewed Superior's application for a mercury variance. The information supplied in the application supports the request. The proposed permit requires the permittee to implement a mercury pollutant minimization program (PMP) plan and submit annual reports each year by January 31st. The permit interim limit has been reduced from 13 ng/L daily maximum limit to 4.8 ng/L daily maximum limit. The department concludes that the City of Superior is qualified for a variance from the water quality standard for mercury and proposes reissuance of this permit with the proposed variance.
- **Heptachlor and Chromium +6** – Monitoring is required to better determine the need for limits in the next permit reissuance and support potential future source reduction activities.
- **PFOS and PFOA** – Based on the type of discharge and the effluent flow rate (NR 106.98(2), Wis. Adm. Code) monitoring once every two months and a schedule to determine if a Minimization Plan is needed has been included this permit term.
- **Total Nitrogen Monitoring (TKN, N02+N03 and Total N)** – Per the October 1, 2019, Guidance for Total Nitrogen Monitoring in Wastewater Permits quarterly monitoring is required beginning this permit term.
- **Acute and Chronic WET testing** – Monitoring is required once a year in rotating quarters during normal operating or treatment conditions.

Explanation of Limits and Monitoring Requirements

Detailed discussions of limits and monitoring requirements can be found in the attached water quality-based effluent limits (WQBEL) memo dated February 25, 2025, and the addendum "Update Phosphorus Water Quality-Based Effluent Limitations for the Superior Sewage Disposal System" dated March 16, 2026.

CBOD5 - The permittee continues to receive a variance as provided in Wis. Admin. Code NR 210.07 (4) and (5) to replace BOD limits with CBOD limits. Department guidance for the variance review process was utilized, submitted data fit within the required criteria and the request was granted in the March 9, 2006 Water Quality Based Effluent Limits Memo (WQBEL).

Monitoring Frequencies- The Monitoring Frequencies for Individual Wastewater Permits guidance (April 12, 2021) recommends that standard monitoring frequencies be included in individual wastewater 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 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.

Expression of Limits- In accordance with the federal regulation 40 CFR 122.45(d) and s. NR 205.065, Wis. Adm. Code, limits in this permit are to be expressed as weekly average and monthly average limits whenever practicable.

4.2 Sample Point Number: 002- EFFLUENT CSTP 2

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow Rate		MGD	Daily	Continuous	
BOD5, Total	Monthly Avg	30 mg/L	Daily	24-Hr Comp	
BOD5, Total	Weekly Avg	45 mg/L	Daily	24-Hr Comp	

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Suspended Solids, Total	Monthly Avg	60 mg/L	Daily	24-Hr Comp	
pH Field	Daily Max	9.0 su	Daily	Grab	
pH Field	Daily Min	6.0 su	Daily	Grab	
Fecal Coliform	Geometric Mean - Monthly	400 #/100 ml	Daily	Grab	Effective as interim limit year-round until the final E. coli limit goes into effect per the Effluent Limitations for E. coli permit schedule.
E. coli		#/100 ml	Daily	Grab	Monitoring only year-round until the final limit goes into effect per the Effluent Limitations for E. coli permit schedule.
E. coli	Geometric Mean - Monthly	126 #/100 ml	Daily	Grab	Monitoring and limit effective year-round per the Effluent Limitations for E. coli permit schedule
E. coli	% Exceedance	10 Percent	Monthly	Calculated	Monitoring and limit effective year-round per the Effluent Limitations for E. coli permit schedule. See the E. coli Percent Limit permit section. Enter the result in the DMR on the last day of the month.
Chlorine, Total Residual	Monthly Avg	38 ug/L	Daily	Grab	
Chlorine, Total Residual	Weekly Avg	38 ug/L	Daily	Grab	
Chlorine, Total Residual	Daily Max	38 ug/L	Daily	Grab	
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	39 mg/L	Daily	24-Hr Comp	
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	39 mg/L	Daily	24-Hr Comp	
Nitrogen, Ammonia (NH3-N) Total	Daily Max - Variable	mg/L	Daily	24-Hr Comp	Report the daily maximum ammonia result in the Nitrogen, Ammonia Total column of the eDMR. See

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
					Ammonia Limitation permit section.
Nitrogen, Ammonia Variable Limit		mg/L	Daily	See Table	Use the daily pH result to look up the applicable ammonia limit in the Variable Ammonia Limitation permit table and report the limit in the Ammonia Variable Limit column on the eDMR.
Phosphorus, Total	Monthly Avg	1.0 mg/L	Daily	24-Hr Comp	
Phosphorus, Total	Monthly Avg	320 lbs/day	Daily	Calculated	
Acute WET	Monthly Avg	1.0 TUa	Annual	24-Hr Comp	See the Whole Effluent Toxicity (WET) Testing permit section for more information.

Changes from Previous Permit

Effluent limitations and monitoring requirements were evaluated for this permit term and the following changes were made from the previous permit. See additional explanation of limits under “Explanation of Limits and Monitoring Requirements” below.

- **Flow-** The sample frequency for flow has been changed from “continuous” to “daily” for eDMR reporting purposes.
- **pH** – It appears field pH was inadvertently missing from the previous permit. This has been corrected.
- **E. coli-** Fecal coliform monitoring and limits have been replaced with Escherichia coli (E. coli) monitoring and limits which will begin at the end of the “Effluent Limitations for E. coli - CSTPs 2, 5 & 6” schedule.
- **Nitrogen Ammonia** – The monitoring frequency has increased from weekly to daily to remain consistent with the Monitoring Frequencies for Individual Wastewater Permits guidance identified below.
- **Phosphorus** – A mass limit of 320 lb/day has been added based on requirements of s. NR 217.14(1)(a), Wis. Adm. Code. Compliance will be measured by the sum of mass loads from CSTP 2 and the Main Plant.

Explanation of Limits and Monitoring Requirements

Detailed discussions of limits and monitoring requirements can be found in the attached water quality-based effluent limits (WQBEL) memo dated February 25, 2025, and the addendum “Update Phosphorus Water Quality-Based Effluent Limitations for the Superior Sewage Disposal System” dated March 16, 2026.

Monitoring Frequencies- The Monitoring Frequencies for Individual Wastewater Permits guidance (April 12, 2021) recommends that standard monitoring frequencies be included in individual wastewater 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 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.

Expression of Limits- In accordance with the federal regulation 40 CFR 122.45(d) and s. NR 205.065, Wis. Adm. Code, limits in this permit are to be expressed as weekly average and monthly average limits whenever practicable.

4.3 Sample Point Number: 003- EFFLUENT CSTP 5

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
BOD5, Total	Monthly Avg	30 mg/L	Daily	24-Hr Comp	
BOD5, Total	Weekly Avg	45 mg/L	Daily	24-Hr Comp	
Suspended Solids, Total	Weekly Avg	65 mg/L	Daily	24-Hr Comp	
pH Field	Daily Max	9.0 su	Daily	Grab	
pH Field	Daily Min	6.0 su	Daily	Grab	
Fecal Coliform		#/100 ml	Daily	Grab	Monitoring is required year-round during periods of discharge until the final E. coli limit goes into effect per the Effluent Limitations for E. coli permit schedule.
E. coli		#/100 ml	Daily	Grab	Monitoring is required year-round during periods of discharge until the final limit goes into effect per the Effluent Limitations for E. coli permit schedule.
E. coli	Geometric Mean - Monthly	126 #/100 ml	Daily	Grab	Monitoring and limit are effective year-round during periods of discharge per the Effluent Limitations for E. coli permit schedule.
E. coli	% Exceedance	10 Percent	Monthly	Calculated	Monitoring and limit are effective year-round per the Effluent Limitations for E. coli permit schedule. See the E. coli Percent Limit permit section. Enter the result in the DMR on the last day of the month.
Chlorine, Total Residual	Monthly Avg	38 µg/L	Daily	Grab	Monitoring and limit are effective only when chlorine is used.
Chlorine, Total Residual	Weekly Avg	38 µg/L	Daily	Grab	Monitoring and limit are effective only when

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
					chlorine is used.
Chlorine, Total Residual	Daily Max	38 µg/L	Daily	Grab	Monitoring and limit are effective only when chlorine is used.
Phosphorus, Total	Monthly Avg	1.0 mg/L	Daily	24-Hr Comp	
Phosphorus, Total	Monthly Avg	55 lbs/day	Daily	Calculated	
Nitrogen, Ammonia (NH ₃ -N) Total		mg/L	Monthly	24-Hr Comp	

Changes from Previous Permit

Effluent limitations and monitoring requirements were evaluated for this permit term and the following changes were made from the previous permit. See additional explanation of limits under “Explanation of Limits and Monitoring Requirements” below.

- **Disinfection** – While the CSTPs discharges have been limited to periods of excessive period of precipitation during warm weather months there may be instances where a discharge could occur during any month. All combined sewer overflows are required to meet the following minimum treatment: primary clarification (or equivalent) for the removal of floatables and settleable solids; solids and floatables disposal and disinfection of effluent, if necessary, to meet water quality standards and protect human health. Year-round disinfection at all CSTPs is needed to meet the disinfection condition.
- **E. coli** - Fecal coliform monitoring has been replaced with Escherichia coli (E. coli) monitoring and limits which will begin at the end of the “Effluent Limitations for E. coli - CSTPs 2, 5 & 6” Schedule.
- **Chlorine** – There is an “Effluent Limitations for E. coli - CSTPs 2, 5 & 6” Schedule in the permit. One disinfection option is the use of a chlorine contact system. If this is the option used the parameter has been included in the permit. Monitoring is required only if chlorine is used.
- **Phosphorus** – A monthly average mass limit has been added per s. NR 217.14(1)(a), Wis. Adm. Code.

Explanation of Limits and Monitoring Requirements

Detailed discussions of limits and monitoring requirements can be found in the attached water quality-based effluent limits (WQBEL) memo dated February 25, 2025, and the addendum “Update Phosphorus Water Quality-Based Effluent Limitations for the Superior Sewage Disposal System” dated March 16, 2026.

Monitoring Frequencies- The Monitoring Frequencies for Individual Wastewater Permits guidance (April 12, 2021) recommends that standard monitoring frequencies be included in individual wastewater 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 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.

Expression of Limits- In accordance with the federal regulation 40 CFR 122.45(d) and s. NR 205.065, Wis. Adm. Code, limits in this permit are to be expressed as weekly average and monthly average limits whenever practicable.

4.4 Sample Point Number: 004- EFFLUENT CSTP 6

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
BOD5, Total	Monthly Avg	30 mg/L	Daily	24-Hr Comp	
BOD5, Total	Weekly Avg	45 mg/L	Daily	24-Hr Comp	
Suspended Solids, Total	Weekly Avg	65 mg/L	Daily	24-Hr Comp	
pH Field	Daily Max	9.0 su	Daily	Grab	
pH Field	Daily Min	6.0 su	Daily	Grab	
Fecal Coliform		#/100 ml	Daily	Grab	Monitoring is required year-round during periods of discharge until the final E. coli limit goes into effect per the Effluent Limitations for E. coli permit schedule.
E. coli		#/100 ml	Daily	Grab	Monitoring is required year-round during periods of discharge until the final limit goes into effect per the Effluent Limitations for E. coli permit schedule.
E. coli	Geometric Mean - Monthly	126 #/100 ml	Daily	Grab	Monitoring and limit are effective year-round during periods of discharge per the Effluent Limitations for E. coli permit schedule.
E. coli	% Exceedance	10 Percent	Daily	Calculated	Monitoring and limit are effective year-round per the Effluent Limitations for E. coli Schedule. See the E. coli Percent Limit section. Enter the result in the DMR on the last day of the month.
Chlorine, Total Residual	Monthly Avg	38 ug/L	Daily	Grab	Monitoring and limit are effective only when chlorine is used.
Chlorine, Total Residual	Weekly Avg	38 ug/L	Daily	Grab	Monitoring and limit are effective only when chlorine is used.
Chlorine, Total Residual	Daily Max	38 ug/L	Daily	Grab	Monitoring and limit are effective only when

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
					chlorine is used.
Phosphorus, Total	Monthly Avg	1.0 mg/L	Daily	24-Hr Comp	
Phosphorus, Total	Monthly Avg	59 lbs/day	Daily	Calculated	
Nitrogen, Ammonia (NH3-N) Total		mg/L	Monthly	24-Hr Comp	

Changes from Previous Permit

Effluent limitations and monitoring requirements were evaluated for this permit term and the following changes were made from the previous permit. See additional explanation of limits under “Explanation of Limits and Monitoring Requirements” below.

- **Disinfection** – While the CSTPs discharges have been limited to periods of excessive period of precipitation during warm weather months there may be instances where a discharge could occur during any month. All combined sewer overflows are required to meet the following minimum treatment: primary clarification (or equivalent) for the removal of floatables and settleable solids; solids and floatables disposal and disinfection of effluent, if necessary, to meet water quality standards and protect human health. Year-round disinfection at all CSTPs is needed to meet the disinfection condition.
- **E. coli** - Fecal coliform monitoring has been replaced with Escherichia coli (E. coli) monitoring and limits which will begin at the end of the “Effluent Limitations for E. coli - CSTPs 2, 5 & 6” Schedule.
- **Chlorine** – There is an “Effluent Limitations for E. coli - CSTPs 2, 5 & 6” Schedule in the permit. One disinfection option is the use of a chlorine contact system. If this is the option used the parameter has been included in the permit. Monitoring is required only if chlorine is used.
- **Phosphorus** – A monthly average mass limit has been added per s. NR 217.14(1)(a), Wis. Adm. Code.

Explanation of Limits and Monitoring Requirements

Detailed discussions of limits and monitoring requirements can be found in the attached water quality-based effluent limits (WQBEL) memo dated February 25, 2025, and the addendum “Update Phosphorus Water Quality-Based Effluent Limitations for the Superior Sewage Disposal System” dated March 16, 2026.

Monitoring Frequencies- The Monitoring Frequencies for Individual Wastewater Permits guidance (April 12, 2021) recommends that standard monitoring frequencies be included in individual wastewater 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 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.

Expression of Limits- In accordance with the federal regulation 40 CFR 122.45(d) and s. NR 205.065, Wis. Adm. Code, limits in this permit are to be expressed as weekly average and monthly average limits whenever practicable.

5 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)
005	B	Liquid	All sludge is landfilled			24.8 dry US tons
006	B	Cake	Fecal Coliform	All sludge is landfilled		529 dry US tons
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, the most recent sample from 2026 had a result of 0.052 pCi/liter.						
Is a priority pollutant scan required? No, a priority pollutant scan was performed in 2023; another scan will not be due until 2033.						
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.						

5.1.1 Sampling Point (Outfall) 005 - Anaerobic Digester Sludge

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Volume		dry tons	Annual	Measure	
Solids, Total		Percent	Annual	Composite	
PFOA + PFOS		µg/kg	Annual	Calculated	Report the sum of PFOA and PFOS. See PFAS permit sections for more information.
PFAS Dry Wt			Annual	Grab	Perfluoroalkyl and Polyfluoroalkyl Substances based on updated DNR PFAS List. See PFAS Permit Sections for more information.

Changes from Previous Permit

This is a new sample point this permit term. The outfall measures the amount of liquid cleaned from the two anaerobic digesters. The cleaning rotation of is one digester every three years. The volume was previously recorded on the annual 4900-52 form. Historically all sludge has been landfilled. Monitoring is required only when sludge is removed with monitoring not to exceed annually.

Explanation of Limits and Monitoring Requirements

Requirements for disposal, including land application of municipal sludge, are determined in accordance with ch. NR 204, Wis. Adm. Code.

5.2 Sample Point Number: 006- Belt-Pressed Cake Sludge

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Solids, Total		Percent	Annual	Composite	
Arsenic Dry Wt	Ceiling	75 mg/kg	Annual	Composite	
Arsenic Dry Wt	High Quality	41 mg/kg	Annual	Composite	
Cadmium Dry Wt	Ceiling	85 mg/kg	Annual	Composite	
Cadmium Dry Wt	High Quality	39 mg/kg	Annual	Composite	
Copper Dry Wt	Ceiling	4,300 mg/kg	Annual	Composite	
Copper Dry Wt	High Quality	1,500 mg/kg	Annual	Composite	
Lead Dry Wt	Ceiling	840 mg/kg	Annual	Composite	
Lead Dry Wt	High Quality	300 mg/kg	Annual	Composite	
Mercury Dry Wt	Ceiling	57 mg/kg	Annual	Composite	
Mercury Dry Wt	High Quality	17 mg/kg	Annual	Composite	
Molybdenum Dry Wt	Ceiling	75 mg/kg	Annual	Composite	
Nickel Dry Wt	Ceiling	420 mg/kg	Annual	Composite	
Nickel Dry Wt	High Quality	420 mg/kg	Annual	Composite	
Selenium Dry Wt	Ceiling	100 mg/kg	Annual	Composite	
Selenium Dry Wt	High Quality	100 mg/kg	Annual	Composite	
Zinc Dry Wt	Ceiling	7,500 mg/kg	Annual	Composite	
Zinc Dry Wt	High Quality	2,800 mg/kg	Annual	Composite	
Nitrogen, Total Kjeldahl		Percent	Per Application	Composite	
Nitrogen, Ammonium (NH ₄ -N) Total		Percent	Per Application	Composite	
Phosphorus, Total		Percent	Per Application	Composite	
Phosphorus, Water Extractable		% of Tot P	Per Application	Composite	
Potassium, Total Recoverable		Percent	Per Application	Composite	

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
PCB Total Dry Wt	Ceiling	50 mg/kg	Once	Composite	See the Sludge Analysis for PCBs permit section.
PCB Total Dry Wt	High Quality	10 mg/kg	Once	Composite	See the Sludge Analysis for PCBs permit section.
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:

Sludge limitations and monitoring requirements were evaluated for this permit term and the following changes were made from the previous permit. See additional explanation of limits under “Explanation of Limits and Monitoring Requirements” below.

Metals (List 1) – Metal monitoring (Total Solids, Arsenic, Cadmium, Copper, Lead, Mercury, Molybdenum, Nickel, Selenium, Zinc) has been added to remain consistent with other facilities that landfill their sludge.

Nutrients (List 2) – Nutrient monitoring (Total Kjeldahl Nitrogen, Ammonium (NH₄-N) Nitrogen, Total Phosphorus, Water Extractable Phosphorus and Total Recoverable Potassium) is only needed if land spreading occurs.

PFAS –Monitoring is required annually pursuant to s. NR 204.06(2)(b)9., Wis. Adm. Code.

Explanation of Limits and Monitoring Requirements

Requirements for disposal, including land application of municipal sludge, are determined in accordance with ch. NR 204, Wis. Adm. Code. Ceiling and high-quality limits for metals in sludge are specified in s. NR 204.07(5). Requirements for pathogens are specified in s. NR 204.07(6) and in s. NR 204.07 (7) for vector attraction requirements. Limitations for PCBs are addressed in s. NR 204.07(3)(k).

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.

6 Schedules

6.1 PFOS/PFOA Minimization Plan Determination of Need

Required Action	Due Date
Report on Effluent Discharge: Submit a report on effluent PFOS and PFOA concentrations and include an analysis of trends in monthly and annual average PFOS and PFOA concentrations. This analysis should also include a comparison to the applicable narrative standard in s. NR 102.04(8)(d), Wis. Adm. Code. This report shall include all additional PFOS and PFOA data that may be collected including any influent, intake, in-plant, collection system sampling, and blank sample results.	09/30/2027
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.	09/30/2028

Explanation of Schedule

PFOS/PFOA Minimization Plan Determination of Need- As stated above, ch. NR 106 Subchapter VIII – Permit Requirements for PFOS and PFOA Dischargers became effective on August 1, 2022. Section 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.

6.2 Effluent Limitations for E. coli - CSTPs 2, 5 & 6

The permittee shall comply with surface water limitations for E. coli as specified. No later than 14 days following each compliance date, the permittee shall notify the Department in writing of its compliance or noncompliance. If a submittal is required, a timely submittal fulfills the notification

Required Action	Due Date
Progress Report: The permittee shall submit a progress report on development and submittal of a facility plan for upgrades to meet disinfection requirements and E. coli limits.	03/31/2027

Submit Facility Plan: If the previous evaluation concluded that the permittee cannot achieve final E. coli limitations with operational improvements alone, the permittee shall submit a Facility Plan per s. NR 110.09, Wis. Adm. Code. The permittee may submit an abbreviated facility plan if the Department determines that the modifications are minor.	09/30/2027
Final Plans and Specifications: The permittee shall submit final construction plans to the Department for approval pursuant to ch. NR 108, Wis. Adm. Code, specifying treatment plant upgrades that must be constructed to achieve compliance with final E. coli limitations and a schedule for completing construction of the upgrades by the complete construction date specified below.	09/30/2028
Treatment Plant Upgrade to Meet Limitations: The permittee shall initiate bidding, procurement, and/or construction of the project. The permittee shall obtain approval of the final construction plans and schedule from the Department pursuant to s. 281.41, Stats., prior to initiating activities defined as construction under ch. NR 108, Wis. Adm. Code. Upon approval of the final construction plans and schedule by the Department pursuant to s. 281.41, Stats., the permittee shall construct the treatment plant upgrades in accordance with the approved plans and specifications.	03/31/2029
Construction Upgrade Progress Report: The permittee shall submit a progress report on construction upgrades.	03/31/2030
Complete Construction: The permittee shall complete construction of wastewater treatment system upgrades.	09/30/2030
Achieve Compliance: The permittee shall achieve compliance with final E. coli limitations.	10/31/2030

Explanation of Schedule

E. coli- A compliance schedule is included in the permit to provide time for the permittee to investigate options for meeting and coming into compliance with effluent E. coli water quality-based effluent limits for the combined sewer treatment plants (CSTP) to ensure that water quality standards are met and also to be in compliance with EPA's CSO Policy.

6.3 Updated Long Term Control Plan (LTCP)

Required Action	Due Date
Submit update #1: Provide a summary of the number of plan/program related actions and activities conducted during the period. Include the status of implementation of the plan, related plans, and programs, including the status of meeting plan/program actions, and corrective actions for identified deficiencies.	01/31/2028
Submit update #2: Continue to provide the information outlined in Update #1.	01/31/2031

Explanation of Schedule

Updated Long Term Control Plan (LTCP) Submit updates how through the combined sewer over flow long term control plan the City is working toward accomplishing its objectives.

6.4 Mercury Pollutant Minimization Program

As a condition of the variance to the water quality based effluent limitation(s) for mercury granted in accordance with s. NR 106.145(6), Wis. Adm. Code, the permittee shall perform the following actions.

Required Action	Due Date
Annual Mercury Progress Reports: Submit an annual mercury progress report related to the pollutant minimization activities for the previous year. The annual mercury progress report shall: Indicate which mercury pollutant minimization activities or activities outlined in the Pollutant Minimization Program Plan have been implemented and state which, if any, activities from the Pollutant Minimization Program Plan were not pursued and why; Include an assessment of whether each implemented pollutant minimization activity appears to be effective or ineffective at reducing pollutant discharge concentrations and identify actions planned for the upcoming year; Identification of barriers that have limited program effectiveness and adjustments to the program that will be implemented during the next year to help address these barriers; Include an analysis of trends in total effluent mercury concentrations based on mercury sampling; and Include an analysis of how influent and effluent mercury varies with time and with significant loading of mercury. The first annual mercury progress report is to be submitted by the Due Date.	01/31/2027
Annual Mercury Progress Report #2: Submit a mercury progress report, related to the pollutant minimization activities for the previous year, as defined above.	01/31/2028
Annual Mercury Progress Report #3: Submit a mercury progress report, related to the pollutant minimization activities for the previous year, as defined above.	01/31/2029
Annual Mercury Progress Report #4: Submit a mercury progress report, related to the pollutant minimization activities for the previous year, as defined above.	01/31/2030
Final Mercury Report: Submit a final report documenting the success in reducing mercury concentrations in the effluent, as well as the anticipated future reduction in mercury sources and mercury effluent concentrations. The report shall: Summarize mercury pollutant minimization activities that have been implemented during the current permit term and state which, if any, activities from the Pollutant Minimization Program Plan were not pursued and why; Include an assessment of which pollutant minimization activities appear to have been effective or ineffective. Evaluate any needed changes to the pollutant reduction strategy accordingly; Identification of barriers that have limited program effectiveness and adjustments to the program that will be implemented during the next variance term (if applicable) to help address these barriers; Include an analysis of trends in mercury concentrations based on sampling and data during the current permit term; and Include an analysis of how influent and effluent mercury varies with time and with significant loadings of mercury. If the permittee intends to reapply for a mercury variance per s. NR 106.145, Wis. Adm. Code, for the reissued permit, a detailed Pollutant Minimization Program Plan outlining the pollutant minimization	01/31/2031

activities proposed for the upcoming permit term shall be submitted along with the final report. An updated pollutant minimization plan shall: Include an explanation of why or how each pollutant minimization activity will result in reduced discharge of the target pollutant; Evaluate any new available information on pollutant sources, timing, and concentration to update the mass balance assumptions and expected sources of the pollutant, and Identify any information needs that would help to better determine pollutant sources and make plans to collect that information.	
Annual Mercury Reports After Permit Expiration: In the event that this permit is not reissued by the date the permit expires, the permittee shall continue to submit annual mercury reports for the previous year following the due date of Annual Mercury Progress Reports listed above. Annual Mercury Progress reports shall include the information as defined above.	

Explanation of Schedule

Mercury Pollutant Minimization Program - The facility is required to continue implementation of a Mercury Pollution Pollutant Minimization Plan Program (PMP) Plan meeting the requirements of s. NR 106.145(7), Wis. Adm. Code, as a condition of a variance approval. The schedule also requires annual PMP reports be submitted each year by January 31st.

Standard Requirements

The standard requirement for percent removal (paragraph below) has been removed this permit term. The permittee requested removal of the requirement because the parallel treatment through CSTP 2 reduces the risk of combined sewer overflow risk while not compromising the quality of the Main Plant discharge. The treatment the percent removal restrictions represent are captured within the concentration based limits found within the permit. In addition, percent removal requirements for combined sewers shall be made on a “case-by-case” basis per s. NR 210.07(6) and were determined to be impractical for this facility at this time. Percent removal requirements will be re-evaluated during next permit term.

Percent Removal - During any 30 consecutive days, the average effluent concentrations of BOD₅ and of total suspended solids shall not exceed 15% of the average influent concentrations, respectively. This requirement does not apply to removal of total suspended solids if the permittee operates a lagoon system and has received a variance for suspended solids granted under NR 210.07(2), Wis. Adm. Code.

Attachments

Water Flow Schematic of the main plant, CSTP 2, 5 and 6 provided by the permittee

Water Quality Based Effluent Limits memo dated February 25, 2025

The addendum “Update Phosphorus Water Quality-Based Effluent Limitations for the Superior Sewage Disposal System” dated March 16, 2026

Mercury Pollutant Minimization Program (PMP) Plan, dated 6/23/2026

Mercury Variance EPA Data Sheet

Justification Of Any Waivers From Permit Application Requirements

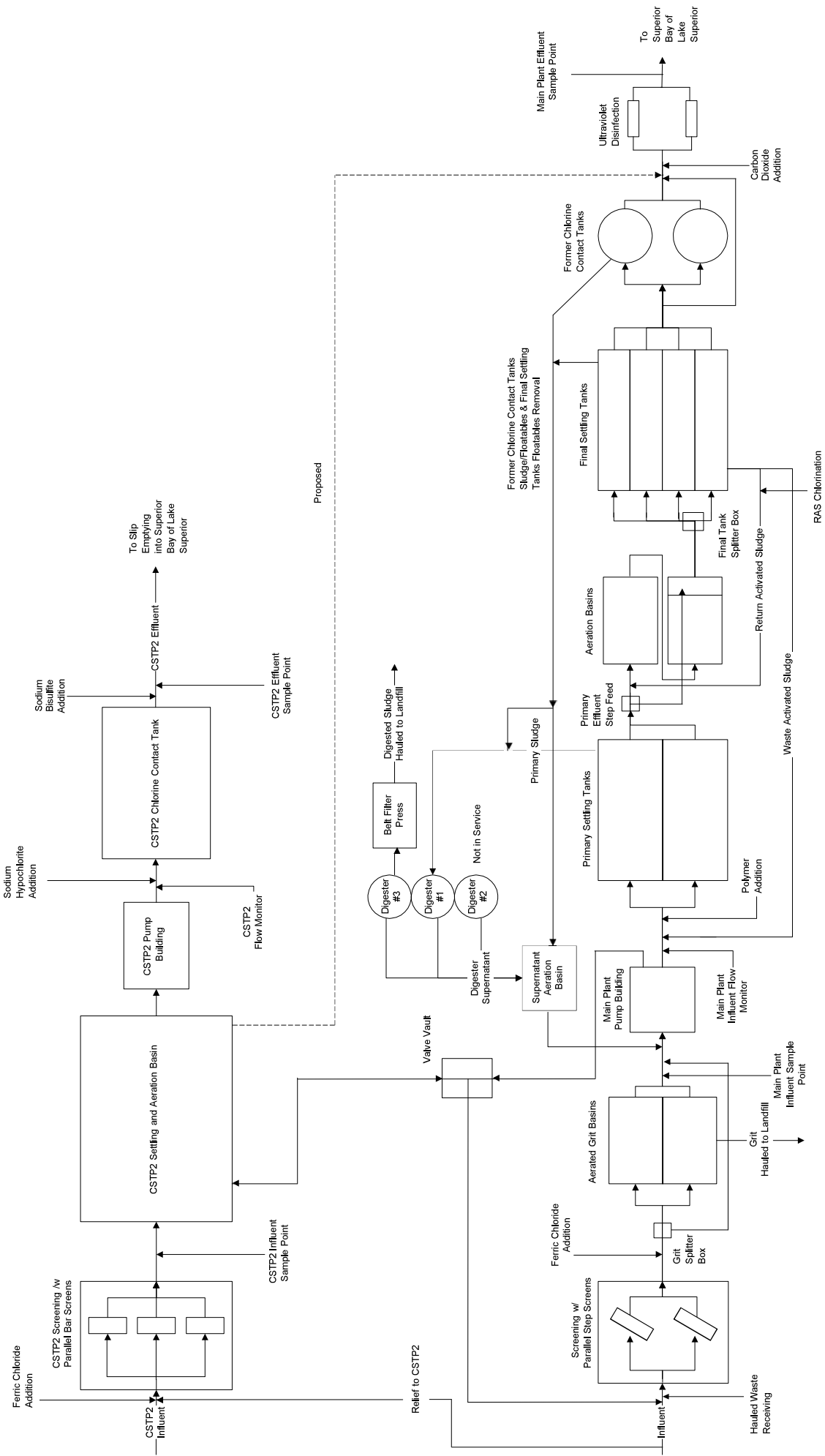
No waivers requested or granted as part of this permit reissuance

Prepared By: Sheri A. Snowbank

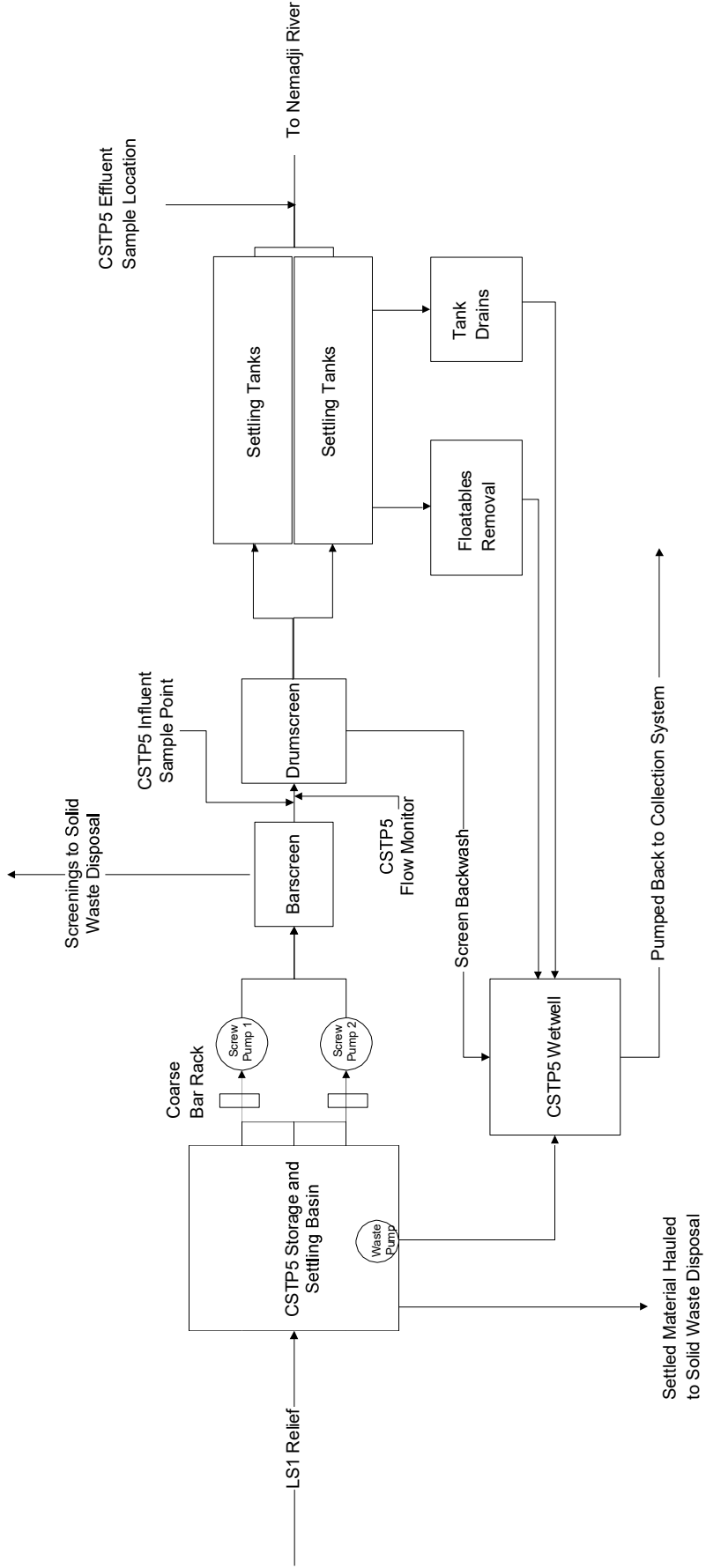
Wastewater Specialist

Date: April 30, 2026

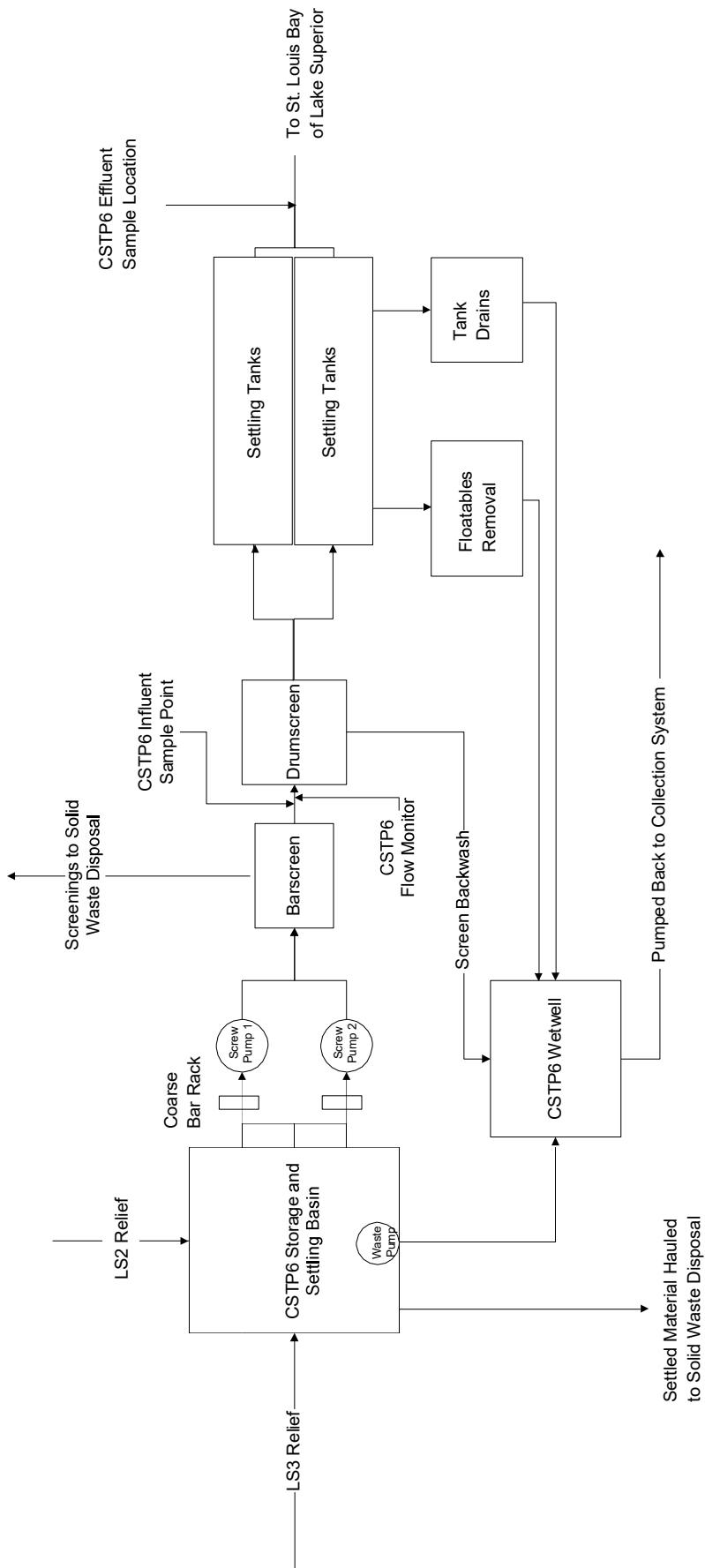
Main Plant and CSTP2 Treatment Schematic



CSTP5 Treatment Schematic



CSTP6 Treatment Schematic



CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: February 25, 2025

TO: Sheri Snowbank – NOR/Spooner Service Center

FROM: Michael Polkinghorn – NOR/Rhineland Service Center



SUBJECT: Water Quality-Based Effluent Limitations for the Superior Sewage Disposal System
WPDES Permit No. WI-0025593-10-0

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 Superior Sewage Disposal System in Douglas County. This municipal wastewater treatment facility (WWTF) discharges to Lake Superior, St. Louis Bay, and the Nemadji River, all located in the St. Louis and Lower Nemadji Rivers Watershed in the Lake Superior Basin. 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:

Outfall 001

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Footnotes
CBOD ₅			40 mg/L	25 mg/L	1, 2, 3
TSS			45 mg/L	30 mg/L	1, 3
pH	9.0 s.u.	6.0 s.u.			1, 3
<i>E. coli</i>				126 #/100 mL geometric mean	4
Ammonia Nitrogen	Variable		39 mg/L	39 mg/L	5, 6
Phosphorus					7
Interim				0.7 mg/L	
Final				0.44 mg/L 210 lbs/day	
Mercury (Total Recoverable)	4.8 ng/L				8
Heptachlor					9
Chromium (+6)					10
PFOS and PFOA					11
Toxic Substances – Multiple					1, 12
TKN, Nitrate+Nitrite, and Total Nitrogen					13
Acute WET					1, 14, 16
Chronic WET				11 TUc	15, 16

Footnotes:

1. No changes from the current permit.

2. This facility meets the conditions as described in s. NR 210.07(4), Wis. Adm. Code. An additional requirement is the 30-day average CBOD₅ percent removal may not be less than 85%. Significant improvements to treatment quality at the facility will prompt a re-evaluation of this variance. Otherwise the need for CBOD₅ limits does not need to be demonstrated at subsequent permit reissuances if the treatment quality is expected to remain similar as compared to when the limits were implemented in the permit.
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.
4. Additional final limit: No more than 10 percent of *E. coli* bacteria samples collected in any calendar month may exceed 410 count/100 mL.
5. The variable daily maximum ammonia nitrogen limit table corresponding to various effluent pH values may be included in the permit in place of the single limit. These limits apply year-round.

Daily Maximum Ammonia Nitrogen Limits

Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L
6.0 ≤ pH ≤ 6.1	72	7.0 < pH ≤ 7.1	44	8.0 < pH ≤ 8.1	9.3
6.1 < pH ≤ 6.2	71	7.1 < pH ≤ 7.2	39	8.1 < pH ≤ 8.2	7.6
6.2 < pH ≤ 6.3	69	7.2 < pH ≤ 7.3	35	8.2 < pH ≤ 8.3	6.3
6.3 < pH ≤ 6.4	67	7.3 < pH ≤ 7.4	31	8.3 < pH ≤ 8.4	5.2
6.4 < pH ≤ 6.5	65	7.4 < pH ≤ 7.5	27	8.4 < pH ≤ 8.5	4.3
6.5 < pH ≤ 6.6	63	7.5 < pH ≤ 7.6	23	8.5 < pH ≤ 8.6	3.5
6.6 < pH ≤ 6.7	60	7.6 < pH ≤ 7.7	19	8.6 < pH ≤ 8.7	3.0
6.7 < pH ≤ 6.8	56	7.7 < pH ≤ 7.8	16	8.7 < pH ≤ 8.8	2.5
6.8 < pH ≤ 6.9	52	7.8 < pH ≤ 7.9	14	8.8 < pH ≤ 8.9	2.1
6.9 < pH ≤ 7.0	48	7.9 < pH ≤ 8.0	11	8.9 < pH ≤ 9.0	1.8

6. Additional limits to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Codes, are included in bold.
7. The previous monthly average phosphorus WQBEL will serve as the interim limit for the phosphorus compliance schedule.
8. An alternative effluent limitation of 4.8 ng/L, equal to the 1-day P₉₉ of representative data, as a daily maximum may be included in the permit in place of the WQBELs if a mercury variance application is submitted and approved by EPA. In the absence of a mercury variance, the monthly average mercury WQBEL or 1.3 ng/L, mass limits, and additional concentration limits to meet the expression of limits requirements in s. NR 106.07, Wis. Adm. Code, would be required.
9. Monthly monitoring is recommended during the reissued permit term to better determine the need for heptachlor limits at the next permit issuance and support future potential source reduction activities.
10. Monthly monitoring for 1 year is recommended during the reissued permit term.
11. Monitoring at a once every two months frequency is required in accordance with s. NR 106.98(2), Wis. Adm. Code.
12. Monitoring for total recoverable cadmium, chromium, copper, lead, nickel, zinc, and hardness is required because this facility operates a local pretreatment program for the many industries that discharge to the treatment facility.
13. 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 major municipal major permittees. Total nitrogen is the sum of nitrate (NO₃), nitrite (NO₂), and total Kjeldahl nitrogen (TKN) (all expressed as N).

14. Twice/yr acute whole effluent toxicity (WET) tests are recommended during the reissued permit term. 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.
15. Twice/yr chronic WET tests are recommended during the reissued permit term. The chronic WET limit shall be expressed as 11 TUc as a monthly average in the effluent limits table of the permit for Outfall 001. 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% and the dilution water used in WET tests conducted on Outfall 001 shall be a grab sample collected from Superior Bay outside of the influence of Outfall 001 and other discharges.
16. 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 and should continue after the permit expiration date (until the permit is reissued). If a satisfactory phosphorus chemical SOP is established and implemented at the facility prior to permit reissuance, then acute and chronic WET testing can be reduced to annually in the reissued permit.

Outfall 002

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Footnotes
Flow Rate					1
BOD ₅			45 mg/L	30 mg/L	1, 2
TSS				60 mg/L	1, 2, 3
pH	9.0 s.u.	6.0 s.u.			1, 2
Bacteria					4
Interim Limit Fecal Coliform				400 #/100 mL geometric mean	
Final Limit <i>E. coli</i>				126 #/100 mL geometric mean	
Chlorine (Total Residual)	38 µg/L		38 µg/L	38 µg/L	1, 5
Ammonia Nitrogen	Variable		39 mg/L	39 mg/L	5, 6
Phosphorus				1.0 mg/L 320 lbs/day	7
Acute WET	1.0 TUa				1, 8

Footnotes:

1. No changes from the current permit.
2. These limits are based on the CW community of the immediate receiving water as described in s. NR 210.05(1), Wis. Adm. Code.
3. This is a TSS effluent limit variance category limit as described in s. NR 210.07(2), Wis. Adm. Code, where aerated lagoons or waste stabilization ponds are the principal treatment processes. Significant improvements to treatment quality at the facility will prompt a re-evaluation of this variance. Otherwise the need for TSS limits does not need to be demonstrated at subsequent permit reissuances if the treatment quality is expected to remain similar as compared to when the limits were implemented in the permit.
4. Bacteria limits apply year round. The fecal coliform interim limit will apply until the end of the compliance schedule when *E. coli* limits take effect. Additional final limit: No more than 10

percent of *E. coli* bacteria samples collected in any calendar month may exceed 410 count/100 mL.

5. Additional limits to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Codes, are included in bold.
6. The variable daily maximum ammonia nitrogen limit table corresponding to various effluent pH values may be included in the permit in place of the single limit. These limits apply year-round.

Daily Maximum Ammonia Nitrogen Limits

Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L
6.0 ≤ pH ≤ 6.1	72	7.0 < pH ≤ 7.1	44	8.0 < pH ≤ 8.1	9.3
6.1 < pH ≤ 6.2	71	7.1 < pH ≤ 7.2	39	8.1 < pH ≤ 8.2	7.6
6.2 < pH ≤ 6.3	69	7.2 < pH ≤ 7.3	35	8.2 < pH ≤ 8.3	6.3
6.3 < pH ≤ 6.4	67	7.3 < pH ≤ 7.4	31	8.3 < pH ≤ 8.4	5.2
6.4 < pH ≤ 6.5	65	7.4 < pH ≤ 7.5	27	8.4 < pH ≤ 8.5	4.3
6.5 < pH ≤ 6.6	63	7.5 < pH ≤ 7.6	23	8.5 < pH ≤ 8.6	3.5
6.6 < pH ≤ 6.7	60	7.6 < pH ≤ 7.7	19	8.6 < pH ≤ 8.7	3.0
6.7 < pH ≤ 6.8	56	7.7 < pH ≤ 7.8	16	8.7 < pH ≤ 8.8	2.5
6.8 < pH ≤ 6.9	52	7.8 < pH ≤ 7.9	14	8.8 < pH ≤ 8.9	2.1
6.9 < pH ≤ 7.0	48	7.9 < pH ≤ 8.0	11	8.9 < pH ≤ 9.0	1.8

7. The concentration limit is a technology-based limit as described in subch. II of NR 217, Wis. Adm. Code. The mass limit is based on the requirements of s. NR 217.14(1)(a), Wis. Adm. Code.
8. Twice/yr acute WET tests are recommended during the reissued permit term. 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. 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 and should continue after the permit expiration date (until the permit is reissued). If a satisfactory phosphorus chemical SOP is established and implemented at the facility prior to permit reissuance, then acute WET testing can be reduced to annually in the reissued permit.

Outfall 003

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
BOD ₅			45 mg/L	30 mg/L		1
TSS			65 mg/L			1
pH	9.0 s.u.	6.0 s.u.				1
Bacteria						2
Interim Limit Fecal Coliform				400 #/100 mL geometric mean		
Final Limit <i>E. coli</i>				126 #/100 mL geometric mean		
Phosphorus				1.0 mg/L 55 lbs/day		3
Ammonia Nitrogen						1

Footnotes:

1. No changes from the current permit.
2. Bacteria limits apply during the disinfection season of May through September. The fecal coliform interim limit will apply until the end of the compliance schedule when *E. coli* limits take effect. Additional final limit: No more than 10 percent of *E. coli* bacteria samples collected in any calendar month may exceed 410 count/100 mL.
3. The concentration limit is a technology-based limit as described in subch. II of NR 217, Wis. Adm. Code. The mass limit is based on the requirements of s. NR 217.14(1)(a), Wis. Adm. Code.

No WET testing is required because information related to the discharge indicates low to no risk for toxicity. Additional limits to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Codes, are not required due to the non-continuous nature of the discharge.

Outfall 004

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
BOD ₅			45 mg/L	30 mg/L		1
TSS			65 mg/L			1
pH	9.0 s.u.	6.0 s.u.				1
Bacteria						2
Interim Limit Fecal Coliform				400 #/100 mL geometric mean		
Final Limit <i>E. coli</i>				126 #/100 mL geometric mean		
Phosphorus				1.0 mg/L 59 lbs/day		3
Ammonia Nitrogen						1

Footnotes:

1. No changes from the current permit.
2. Bacteria limits apply during the disinfection season of May through September. The fecal coliform interim limit will apply until the end of the compliance schedule when *E. coli* limits take effect. Additional final limit: No more than 10 percent of *E. coli* bacteria samples collected in any calendar month may exceed 410 count/100 mL.
3. The concentration limit is a technology-based limit as described in subch. II of NR 217, Wis. Adm. Code. The mass limit is based on the requirements of s. NR 217.14(1)(a), Wis. Adm. Code.

No WET testing is required because information related to the discharge indicates low to no risk for toxicity. Additional limits to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Codes, are not required due to the non-continuous nature of the discharge.

Please consult the attached report for details regarding the above recommendations. If there are any questions or comments, please contact Michael Polkinghorn at (715) 360-3379 or Michael.Polkinghorn@wisconsin.gov and Diane Figiel at Diane.Figiel@wisconsin.gov.

Attachments (4) – Narrative, discharge area map, & thermal tables.

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Water Quality-Based Effluent Limitations for Superior Sewage Disposal System

WPDES Permit No. WI-0025593-10-0

Prepared by: Michael A. Polkinghorn

PART 1 – BACKGROUND INFORMATION

Facility Description

The City of Superior owns and operates 4 wastewater treatment plants. The Main Plant is an activated sludge facility, which receives the bulk of the domestic, industrial and combined sewer wastewater flow. The facility consists of screen and grit chambers that remove debris. Chemicals are added to enable the phosphorus to settle out of the wastewater. The wastewater then enters the primary clarifier where solids settle before entering aeration tanks where it mixes with activated sludge which breaks down the organic matter. Activated sludge is composed of settled solids containing naturally occurring bacteria recycled from the treatment system. The water then flows by gravity into a final clarifier where remaining solids are settled out. The wastewater passes through an ultraviolet disinfection system to discharge. Effluent is discharged on a continuous basis via Outfall 001 to Superior Bay (Lake Superior) at 51 East 1st St. northeast of the combined sewer treatment plant 2 east berm corner.

The other treatment plants are referred to as “Combined Sewer Treatment Plants (CTSPs)”. These are not stormwater and or wastewater bypass discharge points, but rather treatment units for a combination of wastewater and stormwater. Consistent with EPA guidance, there is a regulatory difference between untreated discharges from the combined sewer system (limited to an average of up to 4 events per year), treated combined sewer overflows (having received primary clarification, floatable solids removal, and disinfection if necessary for water quality standards), and discharged from permitted treatment facilities.

- CSTP 2 located adjacent to the Main Plant receives any flows more than can be handled effectively by the Main Plant. Discharges from this facility are intermittent, depending on the incoming wasteload and volume of stormwater from the combined collection system. The facility consists of an aerated basin where naturally occurring bacteria and organisms already present in the wastewater break down the organic matter. Wastewater is disinfected by chlorination and dechlorination. Effluent is discharged on a noncontinuous basis via Outfall 002 to Superior Bay (Lake Superior), by a boat slip north of the CSTP 2 west berm corner. The facility has been actively testing the concept of parallel biological treatment, by routing biologically treated water from the CSTP 2 Basin and completing the treatment process with the Main Plant ultraviolet disinfection system, with discharge via Outfall 001. **All discharges would need to meet the limitations of Outfall 001.** If the pilot testing continues to be successful, the changes will be added to the next permit issuance.
- CSTP 5 and CSTP 6 are physical/chemical treatment facilities. Both plants receive only stormwater and wastewater from domestic sources. At each facility large asphalt-lined retention ponds store collected wastewater. This wastewater can either be pumped back to the Main Plant for treatment during low-flow periods or treated on-site by two stage settling with coarse and fine screening. CSTP 5 is located on the south edge of the City near South Superior, and CSTP 6 is located in the northwest corner of the community in Billings Park. The plants are operated after large rainfall and snowmelt

Attachment #1

events. CSTP 5 discharges on a noncontinuous basis via Outfall 003 to the Nemadji River, east of the CSTP 5 east facility perimeter. CSTP 6 discharges on a noncontinuous basis via Outfall 004 to St. Louis Bay, west of the CTSP 6 west facility perimeter.

Attachment #2 is a discharge area map of Outfalls 001 – 004.

Existing Permit Limitations

The current permit, expired on 03/31/2024, includes the following effluent limitations and monitoring requirements.

Outfall 001

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Footnotes
CBOD ₅			40 mg/L	25 mg/L	1, 2, 3
TSS			45 mg/L	30 mg/L	1, 3
pH	9.0 s.u.	6.0 s.u.			1, 3
Fecal Coliform			780#/100 mL geometric mean	400#/100 mL geometric mean	4
Ammonia Nitrogen	Variable		39 mg/L	39 mg/L	4, 5
Phosphorus				0.7 mg/L	
Mercury (Total Recoverable)	13 ng/L				6
<i>E. coli</i>					7
Toxic Substances – Multiple					8
Cyanide (Total)					7
Acute WET					9
Chronic WET					9

Footnotes:

1. **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.
2. This facility meets the conditions as described in s. NR 210.07(4), Wis. Adm. Code. An additional requirement is the 30-day average CBOD₅ percent removal may not be less than 85%. Significant improvements to treatment quality at the facility will prompt a re-evaluation of this variance. Otherwise the need for CBOD₅ limits does not need to be demonstrated at subsequent permit reissuances if the treatment quality is expected to remain similar as compared to when the limits were implemented in the permit.
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.
4. Additional limits to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Codes, are included in bold.
5. The variable daily maximum ammonia nitrogen limit table corresponding to various effluent pH values may be included in the permit in place of the single limit. These limits apply year-round.

Variable Limits Table					
<i>Daily maximum ammonia limits based on Effluent pH</i>					
Effluent pH (s.u.)	Limit (mg/L)	Effluent pH (s.u.)	Limit (mg/L)	Effluent pH (s.u.)	Limit (mg/L)
pH $\leq$ 7.1	>39	7.7 < pH $\leq$ 7.8	16	8.4 < pH $\leq$ 8.5	4.3
7.1 < pH $\leq$ 7.2	39	7.8 < pH $\leq$ 7.9	14	8.5 < pH $\leq$ 8.6	3.5
7.2 < pH $\leq$ 7.3	35	7.9 < pH $\leq$ 8.0	11	8.6 < pH $\leq$ 8.7	2.9
7.3 < pH $\leq$ 7.4	31	8.0 < pH $\leq$ 8.1	9.3	8.7 < pH $\leq$ 8.8	2.5
7.4 < pH $\leq$ 7.5	27	8.1 < pH $\leq$ 8.2	7.6	8.8 < pH $\leq$ 8.9	2.1
7.5 < pH $\leq$ 7.6	23	8.2 < pH $\leq$ 8.3	6.3	8.9 < pH $\leq$ 9.0	1.8
7.6 < pH $\leq$ 7.7	19	8.3 < pH $\leq$ 8.4	5.2		

6. This interim limit is an alternative mercury effluent limit based on the variance granted by EPA as described in s. NR 106.145(4), Wis. Adm. Code, for the current permit term. This limit is based on the 1-day P₉₉ of effluent data and includes implementation of a pollutant minimization plan.
7. Monitoring only.
8. Monitoring for total recoverable cadmium, chromium, copper, lead, nickel, zinc, and hardness is required because this facility operates a local pretreatment program for the many industries that discharge to the treatment facility.
9. Annual acute and chronic whole effluent toxicity (WET) testing was required in the current permit. The IWC for chronic WET was 9%.

Outfall 002

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Footnotes
Flow Rate					1
BOD ₅			45 mg/L	30 mg/L	2, 3
TSS				60 mg/L	2, 3, 4
pH	9.0 s.u.	6.0 s.u.			2, 3
Fecal Coliform			972#/100 mL geometric mean	400#/100 mL geometric mean	5
Chlorine (Total Residual)	38 µg/L		38 µg/L	38 µg/L	5
Ammonia Nitrogen	Variable		39 mg/L	39 mg/L	5, 6
Phosphorus				1.0 mg/L	7
<i>E. coli</i>					1
Chloride					1
Acute WET	1.0 TU _a				8

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 CW community of the immediate receiving water as described in s. NR 210.05(1), Wis. Adm. Code.
4. This is a TSS effluent limit variance category limit as described in s. NR 210.07(2), Wis. Adm. Code, where aerated lagoons or waste stabilization ponds are the principal treatment processes. Significant improvements to treatment quality at the facility will prompt a re-evaluation of this variance. Otherwise the need for TSS limits does not need to be demonstrated at subsequent permit reissuances if the treatment quality is expected to remain similar as compared to when the limits were implemented in the permit.
5. Additional limits to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Codes, are included in bold.
6. The variable daily maximum ammonia nitrogen limit table corresponding to various effluent pH values may be included in the permit in place of the single limit. These limits apply year-round.

Variable Limits Table					
<i>Daily maximum ammonia limits based on Effluent pH</i>					
Effluent pH (s.u.)	Limit (mg/L)	Effluent pH (s.u.)	Limit (mg/L)	Effluent pH (s.u.)	Limit (mg/L)
pH ≤ 7.1	>39	7.7 < pH ≤ 7.8	16	8.4 < pH ≤ 8.5	4.3
7.1 < pH ≤ 7.2	39	7.8 < pH ≤ 7.9	14	8.5 < pH ≤ 8.6	3.5
7.2 < pH ≤ 7.3	35	7.9 < pH ≤ 8.0	11	8.6 < pH ≤ 8.7	2.9
7.3 < pH ≤ 7.4	31	8.0 < pH ≤ 8.1	9.3	8.7 < pH ≤ 8.8	2.5
7.4 < pH ≤ 7.5	27	8.1 < pH ≤ 8.2	7.6	8.8 < pH ≤ 8.9	2.1
7.5 < pH ≤ 7.6	23	8.2 < pH ≤ 8.3	6.3	8.9 < pH ≤ 9.0	1.8
7.6 < pH ≤ 7.7	19	8.3 < pH ≤ 8.4	5.2		

7. This is a technology-based limit as described in subch. II of NR 217, Wis. Adm. Code.
8. Three acute WET tests were required in the current permit.

Outfalls 003 & 004

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Footnotes
BOD ₅			45 mg/L	30 mg/L	1, 2
TSS			65 mg/L		1, 3
pH	9.0 s.u.	6.0 s.u.			1, 2
Phosphorus				1.0 mg/L	4
Fecal Coliform					5
<i>E. coli</i>					5
Ammonia Nitrogen					5

Footnotes:

1. **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.
2. These limits are based on the Warm Water Sport Fish (WWSF) communities of the immediate receiving waters as described in s. NR 210.05(1), Wis. Adm. Code.
3. This TSS limit is based on treatment equivalent to secondary treatment as described in s. NR 210.07(5), Wis Adm. Code, and is applicable to facilities as defined in s. NR 210.03(6), Wis. Adm. Code.
4. This is a technology-based limit as described in subch. II of NR 217, Wis. Adm. Code.
5. Monitoring only.

Receiving Water Information

- Name & Waterbody Identification Code (WBIC):
 - Superior Bay (Lake Superior): 2751220
 - St. Louis Bay: 2843800
 - Nemadji River: 2835300
- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code:
 - Superior Bay (Lake Superior): CW community, public water supply, outstanding resource water (ORW).
 - St. Louis Bay: WWSF community, non-public water supply.
 - Nemadji River: WWSF community, non-public water supply.
 - Cold Water and Public Water Supply criteria are used for bioaccumulating compounds of concern, because the discharges are within the Great Lakes basin.
- Low flows used in accordance with chs. NR 106 and 217, Wis. Adm. Code:
 - Superior Bay & St. Louis Bay: 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 waters do not exhibit a unidirectional flow at the point of discharge. The 7-Q₂ low-flow of 791 cubic feet per second (cfs) is used in calculation of the phosphorus WQBEL. It is based on the 7-day 99th percentile low-flow of the St. Louis River at the Scanlon, MN dam (747 cfs) with a proportional flow adjustment for the additional drainage area between Scanlon and Superior, WI. This change in methodology is described later in Part 5 of this evaluation.
 - Nemadji River: The following 7-Q₁₀ and 7-Q₂ values are from USGS for Station SW ¼, SE ¼, Section 1, T48N – R14W, in South Superior. This is approx. 1.2 mi downstream of Outfall 003.
 7-Q₁₀ = 32 cfs
 7-Q₂ = 49 cfs
 90-Q₁₀ = 39 cfs
 Harmonic Mean Flow = 124 cfs using a drainage area of 431 mi²
 The Harmonic Mean has been estimated based on average flow and the 7-Q₁₀ using an equation from U.S. EPA's *Technical Support Document for Water Quality-Based Toxics Control* (March 1991, EPA/505/2-90-001, pgs. 88-89).
 - 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.
- Hardness = 62 mg/L as CaCO₃. This value represents the geometric mean of data (n = 3, May 2019 – October 2021) from WET testing.
- % of low flow used to calculate limits in accordance with s. NR 106.06(4)(c)5., Wis. Adm. Code:

25%.

- Source of background concentration data: Metals data for Superior Bay, St. Louis Bay, and the St. Louis River is very limited. Because 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 and phosphorus are described later in this evaluation.
- Multiple dischargers: The Western Lake Superior Sanitary District (WLSSD) discharges 48.4 MGD (annual average design flow) of effluent wastewater to St. Louis Bay upstream of Outfall 001. The previous limit evaluation (November 2017) used an annual average design flow of 43.6 MGD for WLSSD but has increased since a rerating in 2023. Combined discharge-based phosphorus WQBEL has been historically utilized between WLSSD and Outfall 001 due to the expected shared assimilative capacity via overlapping mixing zones. This consideration will be continued with respect to phosphorus WQBELs only.
- Impaired water status:
 - Superior Bay (Lake Superior): Lake Superior is on the Clean Water Act (CWA) Section 303(d) list for mercury, polychlorinated biphenols (PCBs), and perfluorinated alkylated substances (PFOS) contamination in fish tissue. These pollutants do not impact the WQBELs due to the concerned concentrations being limited to the fish tissue.
 - St. Louis Bay: The St. Louis River and associated areas of concern are listed in the CWA Section 303(d) list. Areas of concern are from the confluence with Lake Superior upstream to the Wisconsin – Minnesota border. Identified impairments include chronic aquatic toxicity, dieldrin contaminated sediment, mercury contaminated fish tissue, DDT contaminated sediments, dioxin contaminated sediments, and PCBs contaminated fish tissue.
 - Nemadji River: The Nemadji River (Stream mi 0 – 38.2) is on the CWA Section 303(d) list for sediment/TSS impairments.

Effluent Information

- Flow rates (April 2019 – November 2024):
 - Outfall 001
 - Annual average design: 7.6 million gallons per day (MGD)
 - Overall average: 3.6 MGD
 - Outfall 002
 - Maximum daily: 38 MGD
 - Overall average: 22 MGD
 - Outfall 003
 - Maximum daily: 6.6 MGD
 - Overall average: 4.6 MGD
 - Outfall 004
 - Maximum daily: 7.1 MGD
 - Overall average: 5.0 MGD

Overall averages exclude days discharge did not occur. Maximum daily flows are used for Outfalls 002 – 004 to account for the noncontinuous nature of those discharges where discharge occurrences last 1 – 4 days/month.

- Hardness (Outfall 001) = 180 mg/L as CaCO₃. This value represents the geometric mean of data (n = 68, April 2019 – November 2024) from the current permit required monitoring.
- 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).
- Water source: Domestic wastewater with 7 industrial contributors. Water supply from Superior Water/Light/Power, private wells, and Kent Precision Food Group. Outfalls 003 and 004 only receive

domestic wastewater.

- Additives: The facility has included 7 additives in the permit application that will be used in the process waste stream to Outfall 001 and 3 additives for Outfall 002. These additives are listed below:
 - Minneapolis Oxygen Company Carbon Dioxide Gas – pH control.
 - Hawkins Magnesium Hydroxide – pH control.
 - BASF Magnafloc LT22S – Coagulant.
 - Hawkins Ferric Chloride (001 & 002) – Chemical phosphorus treatment.
 - Beckart Environmental B-144 – Biosolids dewatering.
 - Mid-American Research Chemical Citric Aluminum Clnr – UV bulb sleeve cleaner.
 - Hawkins Sodium Hypochlorite (001 & 002) – RAS chlorination and disinfection in CSTP 2.
 - Hawkins Sodium Bisulfite (002) – Dechlorination.
 - 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. This is the case upon initial review of the listed additives. **Therefore, an additive review is not needed at this time.**
- Effluent characterization (Outfall 001): 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 current permit required monitoring for Cd, Cr, Cu, Pb, Ni, Hg, Zn, and cyanide.
- Effluent characterization (Outfalls 002 – 004): This facility received instructions in the application notification letter that exempt it from standard monitoring requirements. The current permit required chloride and copper monitoring for Outfall 002 and ammonia nitrogen and phosphorus for Outfalls 003 and 004.
- Effluent data for substances for which a single sample was analyzed is shown in the tables in Part 2 below, 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.
- Mercury field blanks (Sample Point 101) have not indicated contamination was present from either sample transportation or environmental sources. Therefore, no effluent mercury samples were excluded from this evaluation due to this consideration.
- Additional effluent chromium (+6) data (n = 1, 08/29/2017) is utilized in this evaluation to better determine the need for chromium (+6) limits in the permit.

Outfall 001 Toxic Substances Effluent Data

Statistic	Mercury (ng/L)	Cyanide (µg/L)	Arsenic (µg/L)	Copper (µg/L)
1-day P ₉₉	4.81	19.4	1.9	12.7
4-day P ₉₉	3.03	9.5	1.5	9.1
30-day P ₉₉	2.13	4.4	1.2	7.3
Mean	1.70	1.9	1.1	6.3
Std	0.91	5.6	0.3	2.1
Sample size	67	70	23	68
Range	0.609 - 4.69	<1.8 - 27.6	<0.44 - 1.8	3.2 - 14.2

Statistic	Zinc (µg/L)	Cadmium (µg/L)	Chromium (µg/L)	Lead (µg/L)
1-day P ₉₉	35.8	0.10	9.2	1.1
4-day P ₉₉	26.6	0.05	5.8	0.70
30-day P ₉₉	21.7	0.02	3.8	0.44

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Mean	19.2	0.01	2.9	0.33
Std	5.6	0.03	1.8	0.21
Sample size	68	68	68	68
Range	9.7 - 38.4	<0.016 - 0.15	<1.4 - 12.4	<0.18 - 1.1

Statistic	Nickel (µg/L)	Chloride (mg/L)	Chromium (+6) (µg/L)
1-day P ₉₉	13.7		
4-day P ₉₉	9.4		
30-day P ₉₉	6.4		
Mean	5.1	105	5.1
Std	2.5		
Sample size	68	4	2
Range	<1.7 - 15.5	68.3 - 135	<1.2 - 10.1

“<” means that the pollutant was not detected at the indicated level of detection. The mean concentration was calculated using zero in place of the non-detected results.

Outfall 002 Copper Effluent Data

Sample Date	Conc. (µg/L)	Sample Date	Conc. (µg/L)
09/24/2023	8.7	06/19/2024	7.0
12/26/2023	6.8	06/28/2024	7.0
05/21/2024	10.2	11/19/2024	5.9
06/04/2024	7.0	12/28/2024	5.9
Mean = 7.3 µg/L			

The following table presents the average concentrations and loadings at Outfalls 001 – 004 from April 2019 – November 2024 for all parameters with limits in the current permit to meet the requirements of s. NR 201.03(6), Wis. Adm. Code:

Parameter Averages with Limits

Outfall	Parameter	Average Measurement*
001	CBOD ₅	5 mg/L
	TSS	12 mg/L
	pH	7.0 s.u.
	Fecal Coliform	147 #/100 mL
	Ammonia Nitrogen	7.2 mg/L
	Phosphorus	0.51 mg/L
	Mercury	1.70 ng/L
002	BOD ₅	13 mg/L
	TSS	23 mg/L
	pH	NA
	Fecal Coliform	18 #/100 mL
	Chlorine	<100 µg/L
	Ammonia Nitrogen	4.9 mg/L

Attachment #1		
	Phosphorus	0.38 mg/L
003	BOD ₅	10 mg/L
	TSS	15 mg/L
	pH	7.7 s.u.
	Phosphorus	0.37 mg/L
004	BOD ₅	16 mg/L
	TSS	31 mg/L
	pH	7.7 mg/L
	Phosphorus	0.86 mg/L

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

PART 2 – 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 99th percentile (or P₉₉) 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)

The following tables list the calculated WQBELs for this discharge along with the results of effluent sampling for all the detected substances. All concentrations are expressed in terms of micrograms per liter (µg/L), except for hardness and chloride (mg/L) and mercury (ng/L). All effluent data presented below is from Outfall 001 unless otherwise noted.

Daily Maximum Limits based on Acute Toxicity Criteria (ATC)

RECEIVING WATER FLOW = 10:1 dilution.

SUBSTANCE	REF. HARD. mg/L	ATC	MAX. EFFL. LIMIT*	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	1-day P ₉₉	1-day MAX. CONC.
Chlorine (Outfall 002)		19.0	38.1				
Arsenic		340	680			1.9	1.8
Cadmium	180	8.6	17.1			0.10	0.15
Chromium (+3)	180	2,918	5,836			9.2	12.4
Copper	180	27.0	54.0			12.7	14.2
Copper (Outfall 002)	180	27.0	54.0	10.8	7.3		10.2
Lead	180	189	377.4			1.1	1.1
Mercury (ng/L)**		830	830			4.81	4.69
Nickel	180	771	1,543			13.7	15.5
Zinc	180	201	402.5			35.8	38.4
Chloride (mg/L)		757	1,514	303	105		135
Chromium (+6)		16.0	32.0	6.4	5.1		10.1
Toluene***		2,107.59	2,107.59	422	0.24		0.24

Attachment #1

* Limits are calculated based on 2 X ATC because they are more stringent than limits based on a 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.

*** The limit for this substance is based on a secondary value. Acute limits are set equal to the secondary value rather than two times or using the 1-Q₁₀ s. NR 106.06(3)(b)2 and s. NR 105.05(2)(f)6, Wis. Adm. Code.

Weekly Average Limits based on Chronic Toxicity Criteria (CTC)

RECEIVING WATER FLOW = 10:1 dilution.

SUBSTANCE	REF. HARD. mg/L	CTC	WEEKLY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	4-day P ₉₉
Chlorine		7.28	80.08			
Arsenic		148	1,628			1.5
Cadmium	62	1.70	18.70			0.05
Chromium (+3)	62	58.42	643			5.8
Copper	62	6.89	75.8			9.1
Copper (Outfall 002)	62	6.89	75.8	15.2	7.3	
Lead	62	17.70	194.7			0.70
Mercury (ng/L)*		440	440			3.03
Nickel	62	34.92	384			9.4
Zinc	62	79.45	874			26.6
Chloride (mg/L)		395	4,345	869	105	
Chromium (+6)		10.98	120.8	24.16	10.1	
Selenium		5.0	55	11	0.42	
Toluene**		117.08	1,288	258	0.24	

* 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.

** The limit for this substance is based on a secondary value.

Monthly Average Limits based on Wildlife Criteria (WC)

RECEIVING WATER FLOW = 10:1 dilution.

SUBSTANCE	WC	MO'LY AVE. LIMIT	30-day P ₉₉
Mercury (ng/L)*	1.3	1.3	2.13

* 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.

Monthly Average Limits based on Human Threshold Criteria (HTC)

RECEIVING WATER FLOW = 10:1 dilution.

SUBSTANCE	HTC	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	30-day P ₉₉
Cadmium	4.4	48			0.02
Chromium (+3)	100	1,100			3.8
Lead	10	110			0.44
Mercury (ng/L)*	1.5	1.5			2.13

Attachment #1

Nickel	100	1,100			6.4
Antimony	5.6	62	12.3	0.77	
Chromium (+6)	83.5	919	184	10.1	
Selenium	50	550	110	0.42	
Cyanide (Total)	138.6	1,525			4.4
Toluene	1,000	11,000	2,200	0.24	
Thallium**	1.4	15	3.08	0.040	

* 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.

** The limit for this substance is based on a secondary value.

Monthly Average Limits based on Human Cancer Criteria (HCC)

RECEIVING WATER FLOW = 10:1 dilution.

SUBSTANCE	HCC	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	30-day P ₉₉
Arsenic	0.2	2.2			1.2
Heptachlor*	0.00151	0.017	0.0033	0.065	

* The limit for this substance is based on a secondary value.

In addition to evaluating the need for limits for each individual substance for which HCC exist, s. NR 106.06(8), Wis. Adm. Code, requires the evaluation of the cumulative cancer risk. Because only one effluent limit is needed based on HCC, determination of the cumulative cancer risk is not needed per s. NR 106.06(8), Wis. Adm. Code.

Monthly Average Limits based on Taste & Odor Criteria (TOC)

RECEIVING WATER FLOW = 10:1 dilution.

SUBSTANCE	HCC	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	30-day P ₉₉
Copper	1,000	11,000			7.3
Copper (Outfall 002)	1,000	11,000	2,200	7.3	
Zinc	5,000	55,000			21.7

Conclusions and Recommendations

Based on a comparison of the effluent data and calculated effluent limitations, **effluent limitations are required for chlorine, mercury, and heptachlor**. Limits and monitoring recommendations are made in the paragraphs below:

Total Residual Chlorine – Because chlorine is added as a disinfectant for Outfall 002, effluent limitations are recommended to assure proper operation of the de-chlorination system. Section NR 210.06(2)(b), Wis. Adm. Code, states, “When chlorine is used for disinfection, the daily maximum total residual chlorine concentration of the discharge may not exceed 0.10 mg/L.” Because the WQBELs are more restrictive, they are recommended instead. **Therefore the current chlorine limits are recommended to continue during the reissued permit term for Outfall 002.**

Mercury – A review of data from April 2019 – December 2024 indicates the 30-day P₉₉ is 2.13 ng/L, which is above the wildlife criterion of 1.3 ng/L. **Therefore, 1.3 ng/L as a monthly average is recommended during the reissued permit term for Outfall 001.**

Section NR 106.145(4), Wis. Adm. Code, allows for eligibility for an alternative mercury effluent limitation if the permittee applies for an alternative mercury limit, which includes the submittal of a pollutant minimization plan. Superior SDS has submitted this application. Section NR 106.145(5), Wis. Adm. Code, specifies that an alternative limitation shall equal the 1-day P₉₉ of the effluent data and shall be expressed as a daily maximum concentration. The 1-day P₉₉ of effluent mercury data is 21.7 ng/L. **Therefore, if a variance is granted and approved by US Environmental Protection Agency, then an alternative mercury limitation of 4.8 ng/L as a daily maximum would be recommended during the reissued permit term.** The current permit included an alternative mercury effluent limit of 13 ng/L as a daily maximum.

In the absence of a mercury variance, mass limits and additional concentration limits to meet the expression of limits requirements in s. NR 106.07, Wis. Adm. Code, would be required.

Heptachlor – Considering available effluent data from July 2023, the mean effluent concentration is 0.065 µg/L. This concentration is greater than the calculated WQBEL based on the HCC secondary value; therefore, the monthly average limit of 0.017 µg/L would be recommended during the reissued permit term for Outfall 001. In the absence of a heptachlor variance, mass limits and additional concentration limits to meet the expression of limits requirements in s. NR 106.07, Wis. Adm. Code, would be required.

Heptachlor was used as an insecticide in the 1960s and 1970s. The use of heptachlor was phased out in the late 1970s and ultimately banned for commercial sale in the United States in 1988. The sole permitted existing commercial use of heptachlor is fire ant control in power transformers. It is resistant to environmental degradation and can be detected in multiple sources including homes treated for termites with heptachlor, fish, shellfish, dairy products, meat, poultry, and drinking water wells. Source reduction measures for heptachlor in the sewershed would be difficult due to the multiple sources potentially affected by its legacy contamination. **Therefore, heptachlor limits are not recommended during the reissued permit term. Monthly monitoring is recommended during the reissued permit term to better determine the need for heptachlor limits at the next permit issuance and support future potential source reduction activities.**

Chromium (+6) – Considering available effluent data from August 2017 – July 2023, the mean effluent concentration is 5.1 µg/L. This concentration is below the calculated chromium (+6) WQBELs; therefore, chromium (+6) limits are not recommended during the reissued permit term. **Monthly monitoring for 1 year is recommended during the reissued permit term for Outfall 001** due to the likelihood of reasonable potential being demonstrated when a single sample is compared to 1/5th of the calculated daily maximum chromium (+6) WQBEL.

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 type of discharge and the effluent flow rate, **PFOS and PFOA monitoring is recommended at a once every two months frequency during the reissued permit term for Outfall 001.**

PART 3 – 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. The current permit has daily maximum, weekly average and monthly average limits for Outfalls 001 and 002. These limits are re-evaluated at this time due to the following changes:

- Section NR 106.07(3), Wis. Adm. Code requires weekly and monthly average limits for municipal treatment plants.
- Expansion of the variable daily maximum limit table based on effluent pH to include entire pH limit range four Outfalls 001 and 002.
- The need for limits for Outfalls 003 and 004.

Daily Maximum Limits based on Acute Toxicity Criteria (ATC)

Daily maximum limitations are based on acute toxicity criteria (ATC) in ch. NR 105, Wis. Adm. Code, which are a function of the effluent pH and the receiving water classification. The 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 = 0.411 and B = 58.4 for a WWSF community (Nemadji River and St. Louis Bay)

A = 0.275 and B = 39.0 for a CW community Category 1 (Lake Superior), and

pH (s.u.) = that characteristic of the effluent.

Effluent pH data from Outfalls 003 – 004 were examined as part of this evaluation and are included in the table below along with the applicable ATC. Effluent pH data from Outfall 001 and 002 is not examined at this time because daily maximum limits are already effective year round in the current permit.

pH Effluent Data

Statistic (s.u.)	Outfall 003	Outfall 004
Maximum Value	8.0	9.4
1-day P ₉₉	8.2	8.8
99 th Percentile (Norm. Dis.)	8.2	8.8
Sample size	23	18
Data Range	7.2 – 8.0	7.0 – 9.4
Date Range	09/30/2019 – 06/29/2024	12/30/2019 – 08/21/2024
ATC	6.03	1.69

Daily Maximum Ammonia Nitrogen Effluent Limitations Calculation Method

In accordance with s. NR 106.32(2), Wis. Adm. Code daily maximum ammonia limitations are set equal to the mass balance method based on the 1-Q₁₀ 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-Q₁₀ (estimated as 80 % of 7-Q₁₀) and the 2×ATC approach are shown below.

Attachment #1

Daily Maximum Ammonia Nitrogen Determination

Method (mg/L)	Outfall 003	Outfall 004
2×ATC	12	3.4
1-Q ₁₀	19	18

The 2×ATC method yields the most stringent limits for Outfalls 003 and 004.

Presented below is a table of daily maximum limitations corresponding to various effluent pH values for Outfalls 001 – 004. Use of this table is not necessarily recommended in the permit, but it is presented herein for informational purposes.

Daily Maximum Ammonia Nitrogen Limits – Outfalls 001 & 002

Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L
6.0 ≤ pH ≤ 6.1	72	7.0 < pH ≤ 7.1	44	8.0 < pH ≤ 8.1	9.3
6.1 < pH ≤ 6.2	71	7.1 < pH ≤ 7.2	39	8.1 < pH ≤ 8.2	7.6
6.2 < pH ≤ 6.3	69	7.2 < pH ≤ 7.3	35	8.2 < pH ≤ 8.3	6.3
6.3 < pH ≤ 6.4	67	7.3 < pH ≤ 7.4	31	8.3 < pH ≤ 8.4	5.2
6.4 < pH ≤ 6.5	65	7.4 < pH ≤ 7.5	27	8.4 < pH ≤ 8.5	4.3
6.5 < pH ≤ 6.6	63	7.5 < pH ≤ 7.6	23	8.5 < pH ≤ 8.6	3.5
6.6 < pH ≤ 6.7	60	7.6 < pH ≤ 7.7	19	8.6 < pH ≤ 8.7	3.0
6.7 < pH ≤ 6.8	56	7.7 < pH ≤ 7.8	16	8.7 < pH ≤ 8.8	2.5
6.8 < pH ≤ 6.9	52	7.8 < pH ≤ 7.9	14	8.8 < pH ≤ 8.9	2.1
6.9 < pH ≤ 7.0	48	7.9 < pH ≤ 8.0	11	8.9 < pH ≤ 9.0	1.8

Daily Maximum Ammonia Nitrogen Limits – Outfalls 003 & 004

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

The current permit has variable daily maximum effluent limits based on effluent pH for Outfalls 001 and 002. Section NR 106.33(2), Wis. Adm. Code, was updated effective September 1, 2016. As a result, seasonal 20 and 40 mg/L thresholds for including ammonia limits in municipal discharge permits are no longer applicable under current rules. **As such, the tables have been expanded from the tables in the current permit to include ammonia nitrogen limits throughout the pH range for Outfalls 001 and 002.**

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

The weekly and monthly average ammonia nitrogen limits calculation for Outfalls 001 and 002 from previous limit evaluation (May 2008) do not change because there have been no changes in the effluent and receiving water flow rates. Those calculations are included as attachment #3. The remainder of this section will focus on Outfalls 003 and 004.

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 as a WWSF 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 $1.45 \times 10^{(0.028 \times (25 - T))}$ – (Early Life Stages Present), or

C = $1.45 \times 10^{(0.028 \times (25 - T))}$ – (Early Life Stages Absent), and

T = the temperature (°C) of the receiving water – (Early Life Stages Present), or

T = the maximum of the actual temperature (°C) and 7 – (Early Life Stages Absent)

The 4-day criterion is equal to the 30-day criterion multiplied by 2.5. For the Nemadji River, the 4-day criteria are used in a mass-balance equation with the 7-Q₁₀ (4-Q₃, if available) to derive weekly average limitations. And the 30-day criteria are used with the 30-Q₅ (estimated as 85% of the 7-Q₂ if the 30-Q₅ 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 °C, 25% of the flow is used if the Temperature < 11 °C, and 50% of the flow is used if the Temperature ≥ 11 °C but < 16 °C. For St. Louis Bay, 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.

Section NR 106.32 (3), Wis. Adm. Code, provides a mechanism for less stringent weekly average and monthly average effluent limitations when early life stages (ELS) of critical organisms are absent from the receiving water. This applies only when the water temperature is less than 14.5 °C, during the winter and spring months. Burbot, an early spawning species, are believed to be present in both St. Louis Bay and the Nemadji River. So “ELS Absent” criteria apply from October through December, and “ELS Present” criteria will apply from January through September for a WWSF community.

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 & Monthly Ammonia Nitrogen Limits – Outfall 003

Nemadji River		Jan. – March	April – June	July – Sept.	Oct. – Dec.
Effluent Flow	Qe (MGD)	6.6	6.6	6.6	6.6
Background Information	7-Q ₁₀ (cfs)	32	32	32	32
	7-Q ₂ (cfs)	49	49	49	49
	Ammonia (mg/L)	0.03	0.03	0.02	0.03
	Average Temperature (°C)	2	14	19	5

Attachment #1

Nemadji River		Jan. – March	April – June	July – Sept.	Oct. – Dec.
	Maximum Temperature (°C)	3	19	21	10
	pH (s.u.)	7.55	7.69	7.75	7.63
	% of Flow used	25	50	100	25
	Reference Weekly Flow (cfs)	8	16	32	8
	Reference Monthly Flow (cfs)	10	21	42	10
Criteria mg/L	4-day Chronic				
	Early Life Stages Present	10.43	6.82	5.72	
	Early Life Stages Absent				12.90
	30-day Chronic				
	Early Life Stages Present	4.17	2.73	2.29	
	Early Life Stages Absent				5.16
Effluent Limitations mg/L	Weekly Average				
	Early Life Stages Present	19	17	24	
	Early Life Stages Absent				23
	Monthly Average				
	Early Life Stages Present	8.4	8.2	12	
	Early Life Stages Absent				10

Weekly & Monthly Ammonia Nitrogen Limits – Outfall 004

St. Louis Bay		Jan. – March	April – June	July – Sept.	Oct. – Dec.
Background Information	Ammonia (mg/L)	0.03	0.03	0.02	0.03
	Maximum Temperature (°C)	2	22	24	11
	pH (s.u.)	7.55	7.69	7.75	7.63
Criteria mg/L	4-day Chronic				
	Early Life Stages Present	10.43	6.82	5.72	
	Early Life Stages Absent				12.90
	30-day Chronic				
	Early Life Stages Present	4.17	2.73	2.29	
	Early Life Stages Absent				5.16
Effluent Limitations mg/L	Weekly Average				
	Early Life Stages Present	110	75	63	
	Early Life Stages Absent				140
	Monthly Average				
	Early Life Stages Present	46	30	25	
	Early Life Stages Absent				56

Effluent Data

The following table evaluates the statistics based upon ammonia data for Outfalls 001 – 004 reported from April 2019 – November 2024, with those results being compared to the calculated limits to determine the need to include ammonia limits in the Superior SDS permit for the respective month ranges. That need is determined by calculating 99th upper percentile (or P₉₉) values for ammonia during each of the month ranges and comparing the daily maximum values to the daily maximum limit.

Outfall 001 Ammonia Nitrogen Effluent Data

Statistics (mg/L)	May – October	November – April
1-day P ₉₉	21.1	32.9
4-day P ₉₉	11.7	19.6

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30-day P ₉₉	6.8	12.9
Mean*	4.7	9.9
Std	4.2	6.4
Sample size	147	131
Range	0.09 - 19.16	0.15 - 31.3

Outfall 002 Ammonia Nitrogen Effluent Data

Statistics (mg/L)	Conc. (mg/L)
1-day P ₉₉	9.5
4-day P ₉₉	6.9
30-day P ₉₉	5.6
Mean*	4.9
Std	1.5
Sample size	17
Range	2.82 - 8.6

Outfall 003 Ammonia Nitrogen Effluent Data

Statistics (mg/L)	Conc. (mg/L)
1-day P ₉₉	2.12
4-day P ₉₉	1.46
30-day P ₉₉	1.11
Mean*	0.95
Std	0.37
Sample size	12
Range	0.5 - 1.8

Outfall 004 Ammonia Nitrogen Effluent Data

Sample Date	Conc. (mg/L)
10/05/2019	1.4
12/30/2019	1.9
03/29/2020	0.98
05/13/2022	1.2
04/10/2023	1.21
12/27/2023	1.51
06/19/2024	1.05
07/08/2024	0.95
08/21/2024	0.77
Mean	1.22

Based on this comparison, **daily maximum limits are recommended year round for Outfall 004. The Superior SDS shall notify the Department if the single limit or the variable daily maximum limits based on effluent pH are preferred.** The current permit has daily maximum, weekly average and monthly average limits for Outfalls 001 and 002. **Where there are existing ammonia nitrogen limits in the permit, the limits must be retained regardless of reasonable potential, consistent with s. NR 106.33(1)(b), Wis. Adm. Code:**

(b) If a permittee is subject to an ammonia limitation in an existing permit, the limitation shall be included in any reissued permit. Ammonia limitations shall be included in the permit if the permitted facility will be providing treatment for ammonia discharges.

PART 4 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR BACTERIA

Section NR 102.04(5), Wis. Adm. Code, states that all surface waters shall be suitable for supporting recreational use and shall meet *E. coli* criteria during the recreation season. Section NR 102.04(5)(b), Wis. Adm. Code, allows the Department to make exceptions when it determines, in accordance with s. NR 210.06(3), Wis. Adm. Code, that wastewater disinfection is not required to meet *E. coli* limits and protect the recreational use. Section NR 210.06(3), Wis. Adm. Code, tasks the Department with determining the need for disinfection using a site-specific analysis based on potential risk to human or animal health. It sets out the factors that must be considered in determining the necessity to disinfect municipal wastewater or to change the length of the disinfection season.

On May 1, 2020, revisions to chs. NR 102 and NR 210, Wis. Adm. Codes, became effective which replace fecal coliform limits with new *Escherichia coli* (*E. coli*) limits for protection of recreational uses. 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:

1. The geometric mean of *E. coli* bacteria in effluent samples collected in any calendar month may not exceed 126 counts/100 mL.
2. No more than 10 percent of *E. coli* bacteria samples collected in any calendar month may exceed 410 counts/100 mL.

Outfalls 001 & 002

E. coli monitoring is recommended at the same frequency that fecal coliform monitoring is required in the current permit. Because the current permit requires 2x/wk monitoring for Outfall 001, the 410 counts/100 mL limit will effectively function as a daily maximum limit unless the facility performs additional monitoring. Any additional monitoring beyond what is required by the permit must also be reported on the DMR as required in the standard requirements section of the permit.

The current permit requires Outfalls 001 and 002 to disinfect year-round for protection of the public water supply, because the drinking water intake for the City of Superior is located approx. 2,000 ft from the Minnesota Point shoreline. Because the *E. coli* limits listed in NR 210.06(2)(a)1, Wis. Adm. Code, are set for protection of recreational uses and not drinking water supply, these *E. coli* limits do not necessarily need to be applied year-round. However, either *E. coli* or fecal coliform bacteria limits are needed year-round in order to ensure that there is no reduction from the current level of disinfection needed to protect the public drinking water source.

In accordance with s. NR 210.06(2)(a)2, Wis. Adm. Code, outside of the recreational season, bacteria limits may either be set equal to the previous fecal coliform limits or the listed *E. coli* limits. Therefore, the facility can select one of the two possible sets of permit limits:

- *E. coli* limits as listed above during the recreation period of May through September and a fecal coliform limit of 400 counts/100 mL as a monthly geometric mean in November through April. Any fecal coliform weekly geometric mean limit which was included in the previous permit for expression of limits purposes does not need to be included in the reissued permit.

- *E. coli* limits as listed above apply year-round.

Effluent Data

Outfall 001 has monitored effluent *E. coli* from April 2019 – November 2024 and a total of 704 results are available. A geometric mean of 126 counts/100 mL was exceeded once out of the last 68 months, with a maximum monthly geometric mean of 149 counts/100 mL. Effluent data has exceeded 410 counts/100 mL 10 times (which is 1% of the total sample results). The maximum reported value was 66,000 counts/100 mL. **Based on this effluent data it appears that the facility can meet new *E. coli* limits and a compliance schedule is not needed in the reissued permit.**

Outfall 002 has monitored effluent *E. coli* from April 2019 – November 2024 and a total of 40 results are available. A geometric mean of 126 counts/100 mL was exceeded in 3 out of the last 11 months, with a maximum monthly geometric mean of 6,167 counts/100 mL. Effluent data has exceeded 410 counts/100 mL once (which is 3% of the total sample results). The maximum reported value was 6,167 counts/100 mL. **Based on this effluent data it appears that the facility cannot meet the new *E. coli* limits and a compliance schedule is needed in the reissued permit.** During the compliance schedule, an interim limit applies to prevent back-sliding from the current level of disinfection during the compliance schedule period. **Therefore, the current fecal coliform limit shall be included in the reissued permit as an interim limit of 400 counts/100 mL as a monthly geometric mean. Any weekly geometric mean limit which was included in the current permit for expression of limits purposes does not need to be included in the permit as an interim limit.**

Outfalls 003 & 004

Fecal coliform limits and disinfection have not been historically required for Outfalls 003 and 004 based on the amount of dilution present in the receiving waters, the infrequency of the discharges during the applicable disinfection season (May – September), and the low concentrations of fecal coliform in both outfalls. A stream study was performed during 1997 – 2003 required by the 6th permit to determine the need for disinfection at the outfalls by determining the impact each outfall had on bacteria water quality on St. Louis Bay and the Nemadji River. This was done by: 1) Monitoring Instream fecal coliform at various locations up and downstream of the mixing zones of both outfalls with their respective receiving waters during the applicable disinfection season, and 2) Analyzing the discharge frequency of both outfalls relative to the applicable disinfection season. The results of the stream study are documented in the Disinfection Report (December 2004) available in the permit file for Superior SDS.

Outfall 003 has monitored effluent *E. coli* from May 2019 – June 2024 and Outfall 004 from May 2022 – August 2024. This monitoring data is included in the tables below:

Outfalls 003 & 004 *E. Coli* Effluent Data

Outfall 003		Outfall 004	
Sample Date	Conc. (#/100 mL)	Sample Date	Conc. (#/100 mL)
05/22/2019	11,500	05/13/2022	45,000
09/30/2019	139,000	05/14/2022	4,600
05/13/2022	88,667	06/19/2024	145,000
09/25/2023	55,000	06/20/2024	49,000
05/06/2024	87	07/08/2024	10,500
05/22/2024	166,000	07/11/2024	68,500
06/05/2024	47,000	08/21/2024	3,600
Geomean	24,495	Geomean	23,371

Comparing this effluent data to the applicable limits demonstrates both limits would have been exceeded 100% of the time. Given the magnitude of the *e. coli* samples and the difference in indicator bacteria between the bacteria WQS vs. the disinfection study, it is uncertain if the dilution and mixing characteristics of St. Louis Bay and the Nemadji River would allow bacteria WQSs to be met during when either discharge occurs 1 – 4x/month during May – September. **Therefore, *e. coli* limits are recommended during the reissued permit term for Outfalls 003 and 004. The fecal coliform limit of 400 counts/100 mL as a monthly geometric mean will serve as the interim limit for the compliance schedule..**

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.

Outfall 001 currently has a monthly average limit of 0.7 mg/L which is more stringent than the technology-based limit. Outfalls 002 – 004 currently have a limit of 1.0 mg/L, so they should be included in the reissued permit. This limit remains applicable unless a more stringent WQBEL is given. 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(3)(a), Wis. Adm. Code, specifically names river segments for which a phosphorus criterion of 0.100 mg/L applies. For other stream segments that are not specified in s. NR 102.06(3)(a), Wis. Adm. Code, s. NR 102.06(3)(b), Wis. Adm. Code, specifies a phosphorus criterion of 0.075 mg/L. The phosphorus criterion of 0.100 mg/L applies for St. Louis Bay as described in s. NR 102.06(3)(a)37 Wis. Adm. Code, from the state line to the opening between Minnesota Point and Wisconsin Point at Lake Superior. Because the prior receiving water description encapsulates the area of Superior Bay, the 0.100 mg/L criterion will also be utilized for Superior Bay. The phosphorus criterion of 0.075 mg/L applies for the Nemadji River.

The St. Louis Bay and Superior Bay do not meet the definition of a lake or reservoir but generally exhibit a nonunidirectional flow at Outfalls 001, 002, and 004. Typically, the effluent limit would be set equal to the applicable criterion of the receiving water (0.100 mg/L) as described in s. NR 217.13(3), Wis. Adm. Code. In this case, Outfalls 001, 002, and 004 must meet the river and stream based criterion that applies to the primary river or stream entering the impounded water as described in s. NR 102.06(3)(c), Wis. Adm. Code. Because the phosphorus criterion for the St. Louis River is applicable, the methodology described below for rivers and streams is used to calculate the effluent limit for the impounded water.

The conservation of mass equation is described in s. NR 217.13(2)(a), Wis. Adm. Code, for phosphorus WQBELs and includes variables of water quality criterion (WQC), receiving water flow rate (Qs),

effluent flow rate (Qe), and upstream phosphorus concentrations (Cs) provided below.

$$\text{Limitation} = [(WQC)(Q_s + (1-f) Q_e) - (Q_s - f Q_e) (C_s)]/Q_e$$

Where:

WQC = 0.100 mg/L for St. Louis Bay and Superior Bay and 0.075 mg/L for the Nemadji River.

Qs = 100% of the 7-Q₂ = 791 cfs for St. Louis Bay and Superior Bay and 32 cfs for Nemadji River.

Cs = background concentration of phosphorus in the receiving water pursuant to s. NR 217.13(2)(d), Wis. Adm. Code

Qe = effluent flow rate

- o Outfall 001 = 7.6 + 48.4 (WLSSD) = 56.0 MGD = 86.8 cfs
- o Outfall 002 = 38 MGD = 59 cfs
- o Outfall 003 = 6.6 MGD = 10 cfs
- o Outfall 004 = 7.1 MGD = 11 cfs

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

Section NR 217.13(2)(d), Wis. Adm. Code, specifies that the background phosphorus concentration used in the limit calculation formula shall be calculated as a median using the procedures specified in s. NR 102.07(1)(b) to (c), Wis. Code. All representative data from the most recent 5 years shall be used, but data from the most recent 10 years may be used if representative of current conditions.

A review of all available in stream total phosphorus data stored in the Surface Water Integrated Monitoring System (SWIMS) database indicates the median background total phosphorus concentration in the St. Louis River upstream of the discharges is 0.0628 mg/L. This is the median of phosphorus samples (n = 29, May 2015 – October 2017) taken from the St. Louis River at the Oliver (SWIMS ID: 163001) and Kimballs Bay (SWIMS ID: 10048292 and 10048783) locations.

A review of all available in stream total phosphorus data stored in the Surface Water Integrated Monitoring System (SWIMS) database indicates the median background total phosphorus concentration in the St. Louis River upstream of the discharges (except Outfall 003) is 0.0628 mg/L. This is the median of phosphorus samples (n = 29, May 2015 – October 2017) taken from the St. Louis River at the Oliver (SWIMS ID: 163001) and Kimballs Bay (SWIMS ID: 10048292 and 10048783) locations.

A review of all available in stream total phosphorus data stored in the Surface Water Integrated Monitoring System (SWIMS) database for the Nemadji River shows there are no updated samples since February 2016 and the documentation is unavailable to determine the basis for the previous background phosphorus concentration used in the previous limit evaluation (November 2017). Therefore, the concentration 0.046 mg/L will be used for Outfall 003's phosphorus WQBEL. This is the median of phosphorus samples (n = 35, May 2007 – October 2015) taken from the Nemadji River at County Highway C near South Superior (SWIMS station ID: 163003).

Using the variables for each outfall into the limit calculation equation above, the calculated limits are presented in the table below:

Attachment #1
Total Phosphorus WQBELs

Outfall	Limit (mg/L)
001	0.44
002	0.60
003	0.17
004	2.8

Effluent Data

The following table summarizes effluent total phosphorus monitoring data from April 2019 – November 2024.

Total Phosphorus Effluent Data

Statistics (mg/L)	Outfall 001	Outfall 002	Outfall 003	Outfall 004
1-day P ₉₉	1.0	0.590	0.516	5.359
4-day P ₉₉	0.736	0.479	0.436	2.899
30-day P ₉₉	0.589	0.417	0.390	1.449
Mean	0.515	0.384	0.365	0.858
Std	0.165	0.0744	0.0565	1.132
Sample size	2071	26	23	18
Range	0.136 - 3.43	0.257 - 0.528	0.277 - 0.497	0.398 - 5.214

Reasonable Potential Determination

Outfalls 001 and 003 have reasonable potential to cause or contribute to an exceedance of the water quality criterion because their 30-day P₉₉s of reported effluent total phosphorus data are greater than their respective calculated WQBELs. **Therefore, the monthly average limit of 0.44 mg/L is required for Outfall 001.**

A phosphorus WQBEL would also be required for Outfall 003 based on reasonable potential. Outfall 003 discharges only during significant stormwater-based overflow events where ideally a discharge would not occur on an expected basis. **Due to this consideration, a phosphorus WQBEL is not recommended during the reissued permit term for Outfall 003.**

Mass Limits

A mass limit is also required, pursuant to s. NR 217.14(1)(a), Wis. Adm. Code, because Lake Superior is an Outstanding Resource Water (ORW) and a lake, at various distances downstream depending on the outfall. These mass limits are determined as follows:

- **Outfall 001: 0.44 mg/L × 7.6 MGD × 8.34 = 210 lbs/day as a monthly average**
- **Outfall 002: 1.0 mg/L × 38 MGD × 8.34 = 320 lbs/day as a monthly average**
- **Outfall 003: 1.0 mg/L × 6.6 MGD × 8.34 = 55 lbs/day as a monthly average**
- **Outfall 004: 1.0 mg/L × 7.1 MGD × 8.34 = 59 lbs/day as a monthly average**

Interim Limit

An interim limit is required per s. NR 217.17, Wis. Adm. Code, when a compliance schedule is needed in the permit to meet the WQBEL. The interim limit should reflect a concentration that the facility is able to

meet without investing in additional “temporary” treatment, but also should prevent backsliding from current conditions. **Therefore, it is recommended that the interim limit be set equal to the monthly average limit of 0.7 mg/L for Outfall 001 for permit reissuance along with requirements for optimization of phosphorus removal.**

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.

In accordance with s. NR 106.53(2)(b), Wis. Adm. Code, the highest daily maximum flow rate for a calendar month is used to determine the acute (daily maximum) effluent limitation. In accordance with s. NR 106.53(2)(c), Wis. Adm. Code, the highest 7-day rolling average flow rate for a calendar month is used to determine the sub-lethal (weekly average) effluent limitation. These values were based off actual flow reported from April 2019 – November 2024 for all the outfalls.

Due to the amount of upstream flow available for dilution in the limit calculation, the lowest calculated limit is 120 °F as a daily maximum for Outfalls 001 and 004. At temperatures above approximately 103° F, conventional biological treatment systems do not function properly and experience upsets. There is no indication that this has ever occurred in this treatment system, so there is no reasonable potential for the discharge to exceed this limit. **Therefore, temperature limits or monitoring are not recommended during the reissued permit term for Outfalls 001 and 004.**

For Outfall 002, the lowest calculated limit is 107 °F as a daily maximum. Due to the noncontinuous nature of this discharge (up to 4 days/month) and an effluent characterization of domestic wastewater mixed with stormwater, effluent temperatures are unlikely to exceed 107 °F and are expected to be similar to ambient conditions. **Therefore, temperature limits or monitoring are not recommended during the reissued permit term for Outfall 002.** The complete temperature limit calculations are included as attachment #3.

The table below summarizes the calculated temperature limits for Outfall 003:

Outfall 003 Monthly Temperature Limits

Month	Calculated Effluent Limit	
	Weekly Average Effluent Limitation (°F)*	Daily Maximum Effluent Limitation (°F)
MAR	NA	110
APR	63	104

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Month	Calculated Effluent Limit	
	Weekly Average Effluent Limitation (°F)*	Daily Maximum Effluent Limitation (°F)
MAY	110	104
JUN	NA	99
SEP	NA	102
DEC	NA	108

* NA denotes “not applicable” when the calculated weekly average limit is 120 °F or greater.

Due to the noncontinuous nature of this discharge (up to 4 days/month) and an effluent characterization of domestic wastewater mixed with stormwater, effluent temperatures are unlikely to exceed 63 °F and are expected to be similar to ambient conditions, similar to Outfall 004. **Therefore, temperature limits or monitoring are not recommended during the reissued permit term for Outfall 003.** The complete temperature limit calculations are included as attachment #4.

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 LC₅₀ (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 IC₂₅ (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). For Outfall 001, 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.
- Discharges that occur continually for 4 days or more in a 7 day period should be evaluated to determine if chronic testing is necessary. Chronic tests usually are not required for discharges that are less than 96 hours in duration, since the risk for adverse environmental impacts due to chronic toxicity are typically low in these situations. Outfalls 002 – 004 are noncontinuous discharges where

Attachment #1

discharge frequencies are typically 1 – 4 days/month. Although these outfalls have demonstrated they can discharge for 4 consecutive days; they have each reached this condition only once during the current permit term, so planning chronic WET testing during the reissued permit term would be difficult when 4 consecutive days of discharge cannot be guaranteed to occur. **Therefore, chronic WET testing is not recommended during the reissued permit term for Outfalls 002 – 004.** The need for chronic WET limits and testing for the remainder of this section will focus on Outfall 001.

- 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 grab samples 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.
- The tables below show the available WET data for Outfalls 001 – 004. 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. Significant changes were made to WET test methods in 2004 and these changes were assumed to be fully implemented by certified labs by no later than June 2005. Therefore, WET tests conducted from June 2005 to present are shown in the tables below:

Outfall 001 WET Data History

Date Test Initiated	Acute Results LC ₅₀ %				Chronic Results IC ₂₅ %				Footnotes or Comments
	<i>C. dubia</i>	Fathead minnow	Pass or Fail?	Used in RP?	<i>C. dubia</i>	Fathead Minnow	Pass or Fail?	Use in RP?	
08/15/2006	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
09/10/2007	>100	>100	Pass	Yes	70.6	45.2	Pass	Yes	
04/25/2008	>100	>100	Pass	Yes					
08/04/2008	>100	>100	Pass	Yes	>100	42.5	Pass	Yes	
08/03/2009	>100	>100	Pass	Yes	43.4	>100	Pass	Yes	
09/20/2010	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
09/12/2011	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
12/13/2011	>100	>100	Pass	Yes	>100	78	Pass	Yes	
07/16/2012	>100	>100	Pass	Yes	>100	56.3	Pass	Yes	
09/23/2013	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
06/23/2014	>100	>100	Pass	Yes	52.2	36.7	Pass	Yes	
03/16/2015	>100	>100	Pass	Yes	28.2	54	Pass	Yes	
10/31/2016	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
08/14/2017	>100	>100	Pass	Yes	13.3	>100	Pass	Yes	
05/06/2019	>100	>100	Pass	Yes	62.1	63.9	Pass	Yes	

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09/14/2020	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
10/11/2021	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
01/10/2022	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
06/05/2023	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
07/08/2024	>100	>100	Pass	Yes	>100	>100	Pass	Yes	

Outfall 002 WET Data History

Date Test Initiated	Acute Results LC ₅₀ %				Footnotes or Comments
	<i>C. dubia</i>	Fathead minnow	Pass or Fail?	Used in RP?	
03/30/2006	>100	>100	Pass	Yes	
03/14/2007	>100	NA	Pass	No	1
04/08/2008	>100	>100	Pass	Yes	
03/18/2009	>100	>100	Pass	Yes	
08/03/2010	>100	>100	Pass	Yes	
11/19/2015	66	>100	Fail	Yes	
12/12/2015	>100	>100	Pass	Yes	Retest
03/17/2016	>100	>100	Pass	Yes	
07/15/2016	35.4	>100	Fail	Yes	
11/29/2016	52.5	>100	Fail	Yes	Retest
02/10/2017	>100	>100	Pass	Yes	Retest
08/10/2017	>100	>100	Pass	Yes	
04/17/2019	>100	>100	Pass	Yes	
08/10/2020	>100	>100	Pass	Yes	
04/14/2021	>100	>100	Pass	Yes	

Footnotes:

1. *Qualified or Inconclusive Data.* Data quality concerns were noted during testing which calls into question the reliability of the test results.

Outfall 003 WET Data History

Date Test Initiated	Acute Results LC ₅₀ %				Footnotes or Comments
	<i>C. dubia</i>	Fathead minnow	Pass or Fail?	Used in RP?	
04/03/2006	>100	>100	Pass	Yes	
09/20/2007	>100	>100	Pass	Yes	
04/08/2008	>100	>100	Pass	Yes	
03/19/2009	>100	>100	Pass	Yes	
03/13/2010	>100	>100	Pass	Yes	
11/19/2015	>100	>100	Pass	Yes	
04/27/2016	>100	>100	Pass	Yes	
08/28/2017	>100	>100	Pass	Yes	

Outfall 004 WET Data History

Acute Results		
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Attachment #1

Date Test Initiated	LC ₅₀ %				Footnotes or Comments
	<i>C. dubia</i>	Fathead minnow	Pass or Fail?	Used in RP?	
06/15/2005	>100	>100	Pass	Yes	
04/03/2006	>100	>100	Pass	Yes	
04/02/2007	>100	>100	Pass	Yes	
03/19/2009	>100	>100	Pass	Yes	
03/15/2010	>100	>100	Pass	Yes	
04/27/2016	>100	>100	Pass	Yes	
08/17/2017	>100	>100	Pass	Yes	
08/28/2017	>100	>100	Pass	Yes	

- 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.

$$\text{Acute Reasonable Potential} = [(TU_a \text{ effluent}) (B)]$$

According to s. NR 106.08(6)(d), Wis. Adm. Code, TU_a and TU_c 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 limits are not required for Outfalls 001, 003 and 004.**

Outfall 002 Acute WET Limit Parameters

TU_a (maximum) $100/LC_{50}$	B (multiplication factor from s. NR 106.08(5)(c), Wis. Adm. Code, Table 4)
$100/35.4 = 2.82$	3.0 Based on 3 detects

$$[(TU_a \text{ effluent}) (B)(AMZ)] = 8.5 > 1.0$$

$$\text{Chronic Reasonable Potential} = [(TU_c \text{ effluent}) (B)(IWC)]$$

Outfall 001 Chronic WET Limit Parameters

TU_c (maximum) $100/IC_{25}$	B (multiplication factor from s. NR 106.08(6)(c), Wis. Adm. Code, Table 4)	IWC
$100/13.3 = 7.52$	1.8 Based on 9 detects	9%

$$[(TU_c \text{ effluent}) (B)(IWC)] = 1.2 > 1.0$$

Attachment #1

Therefore, reasonable potential is shown for an acute WET limit for Outfall 002 and a chronic WET limit for Outfall 001 using the procedures in s. NR 106.08(6), Wis. Adm. Code, and representative data from August 2006 – July 2024.

Expression of WET limits

Acute WET limit = **1.0 TU_a expressed as a daily maximum for Outfall 002.**

Chronic WET limit = [100/IWC] TU_c = **11 TU_c expressed as a monthly average for Outfall 001.**

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>.

Outfall 001 WET Checklist Summary

	Acute	Chronic
AMZ/IWC	Not applicable. 0 Points	IWC = 9%. 0 Points
Historical Data	Twenty tests used to calculate RP. No tests failed. 0 Points	Nine 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	Lake Superior. 15 Points	Same as acute. 15 Points
Chemical-Specific Data	No reasonable potential for limits based on ATC; Ammonia nitrogen limit carried over from the current permit. Multiple substances detected. Additional Compounds of Concern: Multiple substances detected. 5 Points	No reasonable potential for limits based on CTC; Ammonia nitrogen limit carried over from the current permit. Multiple substances detected. Additional Compounds of Concern: Multiple substances detected. 5 Points
Additives	One biocides and six water quality conditioners added. Permittee has proper P chemical SOPs in place: No. 24 Points	One additive used more than once per 4 days. 16 Points
Discharge Category	Seven industrial contributors. 11 Points	Same as acute. 11 Points
Wastewater Treatment	Secondary or better. 0 Points	Same as acute. 0 Points
Downstream	No impacts known.	Same as acute.

Attachment #1

	Acute	Chronic
Impacts	0 Points	0 Points
Total Checklist Points:	55 Points	47 Points
Recommended Monitoring Frequency (from Checklist):	Twice yearly acute tests recommended.	Twice yearly chronic tests recommended.
Limit Required?	No.	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, **2x/yr acute and chronic WET tests are recommended in the reissued permit for Outfall 001**. 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). **If a satisfactory phosphorus chemical SOP is established and implemented at the facility prior to permit reissuance, then acute and chronic WET testing can be reduced to annually in the reissued permit.**
- 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 TU_c as a monthly average in the effluent limits table of the permit for Outfall 001.** Federal regulations in 40 CFR Part 122.44(i) require that monitoring occur at least once per year when a limit is present.

Outfall 002 WET Checklist Summary

	Acute
AMZ/IWC	Not applicable. 0 Points
Historical Data	Fourteen tests used to calculate RP. Three tests failed. 0 Points
Effluent Variability	Little variability, no violations or upsets, consistent WWTF operations. 0 Points
Receiving Water Classification	Lake Superior. 15 Points
Chemical-Specific Data	Reasonable potential for limits for chlorine based on ATC; Ammonia nitrogen limit carried over from the current permit. Copper detected. Additional Compounds of Concern: No. 7 Points
Additives	One biocide and two water quality conditioners added. Permittee has proper P chemical SOPs in place: No. 20 Points
Discharge Category	Seven industrial contributors. 11 Points

Attachment #1

	Acute
Wastewater Treatment	Secondary or better. 0 Points
Downstream Impacts	No impacts known. 0 Points
Total Checklist Points:	53 Points
Recommended Monitoring Frequency (from Checklist):	Twice yearly acute tests recommended.
Limit Required?	Limit = 1.0 TU _a
TRE Recommended? (from Checklist)	No.

- After consideration of the guidance provided in the Department's WET Program Guidance Document (2022) and other information described above, **2x/yr acute WET tests are recommended in the reissued permit for Outfall 002**. 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). **If a satisfactory phosphorus chemical SOP is established and implemented at the facility prior to permit reissuance, then acute WET testing can be reduced to annually in the reissued permit.**
- According to the requirements specified in s. NR 106.08, Wis. Adm. Code, an acute WET limit is required. **The acute WET limit shall be expressed as 1.0 TU_a daily maximum in the effluent limits table of the permit.** Federal regulations in 40 CFR Part 122.44(i) require that monitoring occur at least once per year when a limit is present.

Outfall 003 WET Checklist Summary

	Acute
AMZ/IWC	Not applicable. 0 Points
Historical Data	Eight tests used to calculate RP. No tests failed. No acute tests performed within last 5 years. 5 Points
Effluent Variability	Little variability, no violations or upsets, consistent WWTF operations. 0 Points
Receiving Water Classification	WWSF community. 5 Points
Chemical-Specific Data	No reasonable potential for limits based on ATC. Ammonia nitrogen detected. 1 Point
Additives	None used. 0 Points
Discharge Category	None. 0 Points
Wastewater Treatment	Primary treatment only. 8 Points

Attachment #1

	Acute
Downstream Impacts	No impacts known. 0 Points
Total Checklist Points:	19 Points
Recommended Monitoring Frequency (from Checklist):	Two acute tests during permit term recommended.
Limit Required?	No.
TRE Recommended? (from Checklist)	No.

- After consideration of the guidance provided in the Department's WET Program Guidance Document (2022) and other information described above, 2x acute WET tests would be recommended in the reissued permit for Outfall 003. 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).
- Upon review of the WET data for Outfall 003, acute toxicity has not been present. This is likely due to effluent characterization of domestic wastewater mixed with stormwater with discharges only during significant stormwater-based overflow events. **Due to these consideration, acute WET testing is not recommended during the reissued permit term for Outfall 003.**

Outfall 004 WET Checklist Summary

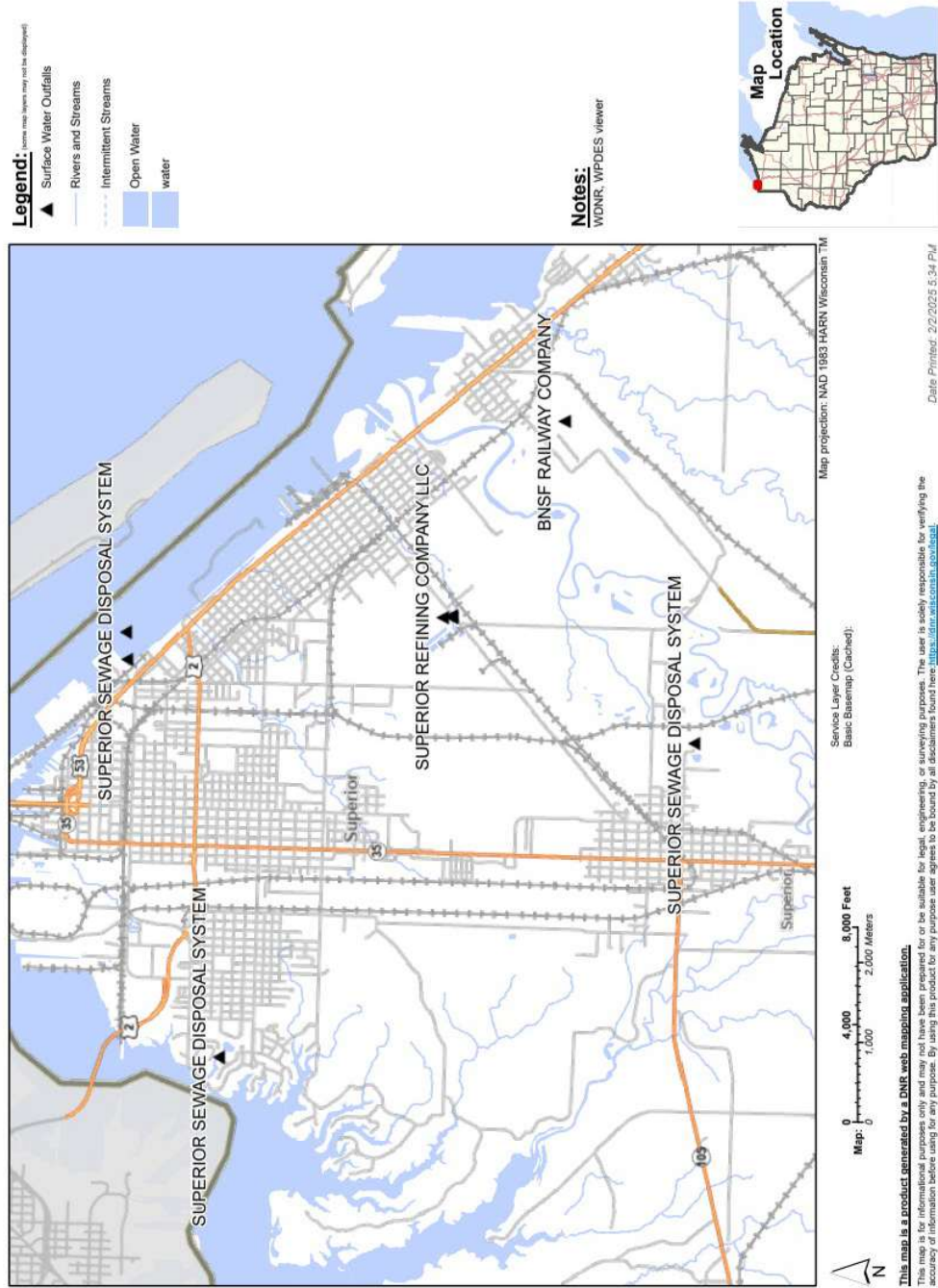
	Acute
AMZ/IWC	Not applicable. 0 Points
Historical Data	Eight tests used to calculate RP. No tests failed. No acute tests performed within last 5 years. 5 Points
Effluent Variability	Little variability, no violations or upsets, consistent WWTF operations. 0 Points
Receiving Water Classification	WWSF community. 5 Points
Chemical-Specific Data	Reasonable potential for ammonia nitrogen limits based on ATC. No other substances detected. 5 Points
Additives	None used. 0 Points
Discharge Category	None. 0 Points
Wastewater Treatment	Primary treatment only. 8 Points
Downstream Impacts	No impacts known. 0 Points

Attachment #1

	Acute
Total Checklist Points:	23 Points
Recommended Monitoring Frequency (from Checklist):	Two acute tests during permit term recommended.
Limit Required?	No.
TRE Recommended? (from Checklist)	No.

- After consideration of the guidance provided in the Department's WET Program Guidance Document (2022) and other information described above, 2x acute WET tests would be recommended in the reissued permit for Outfall 004. 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).
- Upon review of the WET data for Outfall 004, acute toxicity has not been present. This is likely due to effluent characterization of domestic wastewater mixed with stormwater with discharges only during significant stormwater-based overflow events. **Due to these consideration, acute WET testing is not recommended during the reissued permit term for Outfall 004.**

Superior SDS Outfalls 001 - 004 Discharge Area



Temperature Limits for Receiving Waters without Unidirectional Flow

(calculation using default ambient temperature data)

Facility:

Superior SDS

Outfall(s):

002

Date Prepared:

1/31/2025

Design Flow (Qe):

38 MGD

Lake Type:

Lake Superior

Discharge Type:

Great Lakes shore discharge

Flow Dates

04/01/19

11/30/24

Start:

End:

Maximum area of mixing zone allowed (coefficient "A"):

3,125,000 ft²

Month	Water Quality Criteria			Representative Highest Effluent Flow Rate (Qe)		B	e ^{-a}		Representative Highest Monthly Effluent Temperature	Calculated Effluent Limit	
	Ta (default) (°F)	Sub-Lethal WQC (°F)	Acute WQC (°F)	7-day Rolling Average (Qesl) (MGD)	Daily Maximum Flow Rate (Qea) (MGD)		(for SL-WQBEL)	e ^{-a} (for A-WQBEL)		Weekly Average Effluent Limitation (°F)	Daily Maximum Effluent Limitation (°F)
JAN	35	41	69	1.40	9.77	0.405	0.000	0.012		NA	120
MAR	34	51	69	3.08	21.54	0.405	0.000	0.134		NA	120
APR	35	57	69	10.96	30.37	0.405	0.019	0.241		NA	120
MAY	41	63	70	4.10	28.69	0.405	0.000	0.222		NA	120
JUN	49	69	72	3.88	27.19	0.405	0.000	0.204		NA	120
AUG	57	71	73	3.52	24.62	0.405	0.000	0.173		NA	120
SEP	57	64	73	5.47	38.28	0.405	0.000	0.323		NA	107
OCT	50	55	72	3.47	24.28	0.405	0.000	0.169		NA	120
NOV	43	45	70	0.11	0.74	0.405	0.000	0.000		NA	120
DEC	38	42	69	5.10	35.73	0.405	0.000	0.298		NA	120

Temperature Limits for Receiving Waters with Unidirectional Flow

(calculation using default ambient temperature data)

Facility:	Superior SDS		7-Q ₁₀ :	32 cfs	Temp Dates	Flow Dates
Outfall(s):	003		Dilution:	25%	NA	04/01/19
Date Prepared:	1/31/2025		f:	0	NA	06/30/24
Design Flow (Q _e):	6.6 MGD		Stream type:	Small warm water sport or forage fish		
Storm Sewer Dist.	0 ft		Q _s :Q _e ratio:	0.8 :1		
			Calculation Needed?:	YES		

Month	Water Quality Criteria		Receiving Water Flow Rate (Qs)	Representative Highest Effluent Rate (Qe)		f	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Ta (default) (°F)	Sub-Lethal WQC (°F)		7-day Rolling Average (Qesl) (MGD)	Daily Maximum Flow Rate (Qea) (MGD)		Weekly Average (°F)	Daily Maximum (°F)	Weekly Average Effluent Limitation (°F)	Daily Maximum Effluent Limitation (°F)
MAR	38	52	32	0.884	6.19	0	NA	110	NA	110
APR	48	55	32	4.33	6.41	0			63	104
MAY	58	65	32	0.803	5.62	0			110	104
JUN	66	76	32	0.867	6.07	0			NA	99
SEP	60	73	32	0.797	5.58	0			NA	102
DEC	35	49	32	0.949	6.64	0			NA	108

DATE: March 16, 2026

TO: Sheri Snowbank – NOR/Spooner Service Center

FROM: Michael Polkinghorn – NOR/Rhineland Service Center *Michael Polkinghorn*

SUBJECT: Updated Phosphorus Water Quality-Based Effluent Limitations for the Superior Sewage Disposal System
WPDES Permit No. WI-0025593-10-0

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 Superior Sewage Disposal System (SDS) in Douglas County. This municipal wastewater treatment facility (WWTF) discharges to Lake Superior, St. Louis Bay, and the Nemadji River, all located in the St. Louis and Lower Nemadji Rivers Watershed in the Lake Superior Basin. The evaluation of the permit recommendations is discussed in more detail in the attached report.

The Department has proposed the use of regulating Outfalls 001 and 002 of Superior SDS as a combined discharge in response to the facility's concerns with meeting the new phosphorus mass WQBEL required for Outfall 001 without pursuing options beyond optimization with the current WWTF capabilities. This WQBEL addendum will reevaluate the applicable phosphorus WQBELs for Outfalls 001 and 002 as a combined discharge consistent with ch. NR 217, Wis. Adm. Code. **Determinations made for other parameters made in the previous WQBEL Evaluation (February 2025) will remain unchanged.**

Receiving Water Information

- Name & Waterbody Identification Code (WBIC):
 - Superior Bay (Lake Superior): 2751220
 - St. Louis Bay: 2843800
- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code:
 - Superior Bay (Lake Superior): CW community, public water supply, outstanding resource water (ORW).
 - St. Louis Bay: WWSF community, non-public water supply.
 - Cold Water and Public Water Supply criteria are used for bioaccumulating compounds of concern, because the discharges are within the Great Lakes basin.
- Low flows used in accordance with chs. NR 106 and 217, Wis. Adm. Code:
 - Superior Bay & St. Louis Bay: 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 waters do not exhibit a unidirectional flow at the point of discharge. The 7-Q₂ low-flow of 791 cubic feet per second (cfs) is used in calculation of the phosphorus WQBEL. It is based on the 7-day 99th percentile low-flow of the St. Louis River at the Scanlon, MN dam (747 cfs) with a proportional flow adjustment for the additional drainage area between Scanlon and Superior, WI.
- Multiple dischargers: WLSSD discharges 48.4 MGD (annual average design flow) of effluent wastewater to St. Louis Bay upstream of Outfall 001. Combined discharge-based phosphorus WQBEL has been historically utilized between WLSSD and Outfall 001 due to the expected shared assimilative capacity via overlapping mixing zones. The overlapping mixing zones is

now believed to also be applicable to Outfall 002, so its representative effluent flow will also be included. This consideration will be continued with respect to phosphorus WQBELs only.

- Impaired water status:
 - Superior Bay (Lake Superior): Lake Superior is on the Clean Water Act (CWA) Section 303(d) list for mercury, polychlorinated biphenols (PCBs), and perfluorinated alkylated substances (PFOS) contamination in fish tissue. These pollutants do not impact the WQBELs due to the concerned concentrations being limited to the fish tissue.
 - St. Louis Bay: The St. Louis River and associated areas of concern are listed in the CWA Section 303(d) list. Areas of concern are from the confluence with Lake Superior upstream to the Wisconsin – Minnesota border. Identified impairments include chronic aquatic toxicity, dieldrin contaminated sediment, mercury contaminated fish tissue, DDT contaminated sediments, dioxin contaminated sediments, and PCBs contaminated fish tissue.

Effluent Information

- Flow rates (April 2019 – November 2024):
 - Outfall 001
 - Annual average design = 7.6 million gallons per day (MGD)
 - 365-day maximum annual average = 4.1 MGD
 - Overall average = 3.6 MGD
 - Outfall 002
 - Maximum daily: 38 MGD
 - Overall average: 22 MGD
 - Overall average: 0.6 MGD including days discharge did not occur.

Averages exclude days discharge did not occur unless otherwise noted. The maximum 365-day average flow of 4.7 MGD will be utilized for the combined discharge of Outfalls 001 (4.1 MGD) and 002 (0.6 MGD) for the determination of phosphorus WQBELs.

- Water source: Domestic wastewater with 7 industrial contributors. Water supply from Superior Water/Light/Power, private wells, and Kent Precision Food Group.

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(3)(a), Wis. Adm. Code, specifically names river segments for which a phosphorus criterion of 0.100 mg/L applies. For other stream segments that are not specified in s. NR 102.06(3)(a), Wis. Adm. Code, s. NR 102.06(3)(b), Wis. Adm. Code, specifies a phosphorus criterion of 0.075 mg/L. The phosphorus criterion of 0.100 mg/L applies for St. Louis Bay as described in s. NR 102.06(3)(a)37 Wis. Adm. Code, from the state line to the opening between Minnesota Point and Wisconsin Point at Lake Superior. Because the prior receiving water description encapsulates the area of Superior Bay, the 0.100 mg/L criterion will also be utilized for Superior Bay. The phosphorus criterion of 0.075 mg/L applies for the Nemadji River.

The St. Louis Bay and Superior Bay do not meet the definition of a lake or reservoir but generally exhibit a nonunidirectional flow at Outfall 001. Typically, the effluent limit would be set equal to the applicable criterion of the receiving water (0.100 mg/L) as described in s. NR 217.13(3), Wis. Adm. Code. In this case, Outfall 001 must meet the river and stream based criterion that applies to the primary river or stream entering the impounded water as described in s. NR 102.06(3)(c),

Wis. Adm. Code. Because the phosphorus criterion for the St. Louis River is applicable, the methodology described below for rivers and streams is used to calculate the effluent limit for the impounded water.

The conservation of mass equation is described in s. NR 217.13(2)(a), Wis. Adm. Code, for phosphorus WQBELs and includes variables of water quality criterion (WQC), receiving water flow rate (Qs), effluent flow rate (Qe), and upstream phosphorus concentrations (Cs) provided below.

$$\text{Limitation} = [(WQC)(Q_s + (1-f) Q_e) - (Q_s - f Q_e) (C_s)]/Q_e$$

Where:

WQC = 0.100 mg/L for St. Louis Bay and Superior Bay.

Qs = 100% of the 7-Q2 = 791 cfs for St. Louis Bay and Superior Bay.

Cs = background concentration of phosphorus in the receiving water pursuant to s. NR 217.13(2)(d), Wis. Adm. Code

Qe = effluent flow rate

o Outfall 001 = 4.1 + 0.6 (Outfall 002) + 35.5*0.75 (WLSSD) = 31.3 MGD = 48.6 cfs

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

The applicable phosphorus WQBELs recommended in the previous limit addendum (August 2025) were 0.70 mg/L and 24 lbs/day as monthly averages due to changes in WLSSD's annual average design flow, the overall effluent flow used between both facilities, the representative percent mixing estimated by the EPA mixing model (75%), and background phosphorus concentration. These limits will be reevaluated due to the inclusion of Outfall 002 in the overall effluent flow as discussed earlier in this addendum while keeping the other parameters constant as determined in the previous evaluation.

Section NR 217.13(2)(d), Wis. Adm. Code, specifies that the background phosphorus concentration used in the limit calculation formula shall be calculated as a median using the procedures specified in s. NR 102.07(1)(b) to (c), Wis. Code. All representative data from the most recent 5 years shall be used, but data from the most recent 10 years may be used if representative of current conditions. A review of all available in stream total phosphorus data stored in the Surface Water Integrated Monitoring System (SWIMS) database indicates the median background total phosphorus concentration in the St. Louis River upstream of the discharges is 0.0628 mg/L. This is the median of phosphorus samples (n = 29, May 2015 – October 2017) taken from the St. Louis River at the Oliver (SWIMS ID: 163001) and Kimballs Bay (SWIMS ID: 10048292 and 10048783) locations.

Using the variables into the limit calculation equation above, the calculated limit for Outfalls 001 and 002 is 0.71 mg/L. **This phosphorus WQBEL is less stringent than the current WQBEL of 0.7 mg/L; therefore, the monthly average limit of 0.7 mg/L is recommended to continue during the reissued permit term.**

Effluent Data

The following table summarizes effluent total phosphorus monitoring data from April 2019 – November 2024.

Total Phosphorus Effluent Data

Statistics (mg/L)	Outfall 001	Outfall 002
1-day P ₉₉	1.0	0.590
4-day P ₉₉	0.736	0.479
30-day P ₉₉	0.589	0.417
Mean	0.515	0.384
Std	0.165	0.0744
Sample size	2,071	26
Range	0.136 - 3.43	0.257 - 0.528

Reasonable Potential Determination

Outfall 001 was previously determined to have reasonable potential to cause or contribute to an exceedance of the water quality criterion and is currently operating the treatment facility to remove phosphorus and meet the WQBELs. **Therefore, the WQBELs are required to continue in the reissued permit per ss. NR 217.15 and 205.067(5), Wis. Adm. Codes, for Outfall 001.**

Flow-weighted concentrations are utilized to determine reasonable potential for combined discharge-based limits. This effort will only be evaluated for substances both discharges have sampled during the current permit term. If 11 or more detectable samples are available for a given substance from both discharges (and if substance effluent data shows nondetectable concentrations for a facility), P₉₉ statistic concentrations will be used to calculate the combined discharge concentration. Otherwise, the overall average concentrations from both discharges will be used. In this case the majority of the effluent flow on an annual basis is from Outfall 001 as flow from Outfall 002 typically occurs only 1 – 4x days/month, so the flow weighted effluent phosphorus data will be very biased towards the effluent concentrations of Outfall 001. Conservatively assuming the representative phosphorus 30-day P₉₉ of the combined discharge is 0.589 mg/L, **Outfall 002 does not have reasonable potential for a phosphorus WQBEL and a limit is not recommended during the reissued permit term.**

Mass Limit

A mass limit is also required, pursuant to s. NR 217.14(1)(a), Wis. Adm. Code, because Lake Superior is an Outstanding Resource Water (ORW) and a lake. Therefore, the mass limit is **0.7 mg/L × 4.1 MGD × 8.34 = 28 lbs/day as a monthly average for Outfall 001**. This limit will apply to the sum of mass phosphorus discharged from Outfalls 001 and 002 should Outfall 002 demonstrate reasonable potential for a phosphorus limit in the future.

Conclusions

In summary, the following phosphorus limits are recommended by this evaluation:

- **Outfall 001: Monthly average limits of 0.70 mg/L and 28 lbs/day**

Please consult the attached report for details regarding the above recommendations. If there are any questions or comments, please contact Michael Polkinghorn at (715) 360-3379 or Michael.Polkinghorn@wisconsin.gov and Diane Figiel at Diane.Figiel@wisconsin.gov.

PREPARED BY: Michael A. Polkinghorn – Water Resources Engineer

E-cc: Eric de Venecia, Wastewater Engineer – NOR/Superior Service Center

Michelle BalkLudwig, Regional Wastewater Supervisor – NOR/Spooner Service Center
Diane Figiel, Water Resources Engineer – WY/3

Please find the mailing address for the DNR location nearest you by visiting our website

<http://dnr.wi.gov/Contact/SSbyCity.html>

Attachment to Variance Application for Municipal Facilities

September 14, 2012

Notice: This form must be completed and submitted to the Department to request the variance. Failure to provide all requested information may result in denial of your application. Personally identifiable information collected on this form will be used to administer the watershed management program and may be provided to requestors as required by Wisconsin Open Records law [ss. 19.31, Wis. Stats.]

Facility and Permit Information
WPDES Permit No. WI-0025593-09-0
Facility Name SUPERIOR SEWAGE DISPOSAL SYSTEM
1. Specifically, what steps do you plan to undertake (and when) in the next 5-year permit term to reduce levels of the pollutant (mercury, chloride or other pollutant for which you request a variance) to the treatment plant? – Examples: “Inspect dental facilities to confirm proper maintenance of amalgam separators”; “Ensure community clean sweep events”; “Evaluate ordinances to require tune-ups of residential point-of-use softeners”. Dental - All dentists using or removing mercury fillings have been issued a general permit under the pretreatment program. All facilities have amalgam separators and are required to report twice annually certifying use of BMPs. We will continue routine inspections and review of amalgam separator maintenance records. Every dental facility will be inspected during the permit cycle at least once. Industrial - We will continue to monitor mercury levels for industries on the pretreatment program. Schools - Superior schools made strong efforts to remove all mercury products many years ago, but during the demolition of the high school many mercury devices were discovered and brought to us for recycling. We will continue to offer recycling services for all mercury containing devices. We will offer to meet with local schools and colleges (UW-Superior and NWTC) to discuss their mercury management activities and possibilities for improvement. General Public - We will ensure community clean sweep events occur annually. We will continue to accept mercury-containing products and provide free mercury bulb recycling for residents of Douglas County and commercial entities in Superior. We will continue to promote mercury reduction through our newsletters and through community education at local outreach events. Sampling - We will continue monitoring mercury levels in the plant as described in our WPDES permit. We will also re-evaluate our hauler station and our vector trucks waste for potential mercury contributions. Elevated levels in the haulers station would trigger working with them to identify a source. Elevated levels in our vector trucks would be evaluated to determine if the sewer is the source of historic mercury or if a source is current and can be identified. Source identification efforts during the current permit cycle did not point to any clear hotspots or controllable sources. At the beginning of this coming permit term, we will assess the effectiveness of previous source reduction efforts and evaluate future, feasible source identification measures. We have had preliminary conversations with the USGS Mercury Research Lab (MRL) to gather information on mercury isotope analysis and mercury-source fingerprinting, one potential avenue for future source identification efforts. Other potential avenues include refining the collections system sampling based on lessons learned during this permit cycle. The direction of the source identification efforts and the specifics of the study design and sampling regime will be shaped in this upcoming assessment. This assessment will include reviewing plant mercury concentrations, mass, and system flow.

2. How significant are the reductions you expect with the steps described above?— Examples: Show expected levels that can be attained over the next five years.

The average influent concentration for the current permit term was 97.94 ng/L (with the highest concentration being 625.00 ng/L), as compared to 139.94 ng/L (412 ng/L max) the previous permit term.

The average effluent concentration for the current permit term was 1.79 ng/L (with the highest concentration being 4.69 ng/L), as compared to 8.08 ng/L the previous permit term (118 ng/L max, a significant outlier).

As many of our mercury reduction efforts in the next permit cycle will be a continuation of current activities and no hotspots were identified in the upstream collections system monitoring, we expect a continued, but less drastic reduction in mercury levels.

3. What is the history of variances at your facility? – Examples: previous variances and previous permit limits, significant changes and efforts made to reduce discharges. Dates of Pollutant Minimization Plans (PMP), Source reduction Measures (SRM) or other plans. Status of annual reports. Summary of steps that have been already taken.

The City received its first mercury variance with the 2012 permit for mercury. Previously, we had submitted Mercury Pollutant Minimization Plans since 2006 as part of the Green Tier Program. Multiple grants for mercury source reduction were received between 1998 and 2009, as are detailed in our annual reports.

Another mercury variance was included in our 2019 WPDES permit (for a Hg concentration of 13 ng/L)

Some highlights of the Mercury PMP and SRM to date include:

- All dental facilities have installed amalgam separators, some with grant funds we acquired, and are monitored as a part of our pretreatment program.
- Passed an ordinance prohibiting the sale of mercury containing thermometers in the City of Superior.
- Conducted thermometer/thermostat exchanges for general public, bring in any mercury containing switch or thermostat get a mercury free one. Gave out over 10,000 thermometers in total in northern Wisconsin.
- Provided bins to wholesalers of thermostats from the thermostat recycling corporation.
- Conducted a project with Murphy Oil to develop a guidance document to help refineries eliminate both mercury and PCBs from their facilities. Distributed guidance throughout the US to list of refineries provided by Murphy Oil.
- Provided mercury-free auto switches to all auto dealers. Partnered with them to remove mercury switches for free when a vehicle owner agrees. Partnered with WITC to conduct a mercury switch switch-out, an event for the public to bring in their car and have the switch replaced for free.
- Developed the Wisconsin Statewide Mercury Pollutant Minimization Program Document for Randy Case. Medical "Becoming a Mercury Free Medical Community" workshop. Goal to present Best Management Practices and presenters included hospitals with great success stories.
- Hosted "Creating a Safe Healthcare Community" workshop. Keynote speakers gave an overview to medical waste reduction, mercury and dioxin alternatives, and making hospitals a safer and healthier place to work.
- Recycled 335,699 mercury-containing bulbs from 2007-present through our bulb shed.

4. Provide trend analysis dating back to before the implementation of PMP, SRM or other variance steps. – Examples: Include influent and effluent data. For mercury include all data and show trends including sludge data. For chlorides include mass and concentration trends. Reference or attach any facility planning or evaluation study that evaluated facility performance capabilities (Note – Only include studies that are recent or otherwise applicable for the evaluation of the existing facility and current conditions).

The City contracts for low-level mercury analysis of the influent and effluent. Our sludge is disposed of at the landfill; no sludge analysis is required.

The analytical results from 2007-present are attached in tabular and graphical form.

Variance Request and Certification

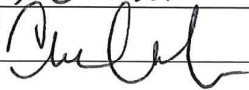
Based on the information provided, I am requesting a variance on the basis that attainment of the applicable water quality standard may cause substantial and widespread adverse social and economic impacts in the area where this discharge is located.

I certify that the information provided is true, accurate and complete.

Print or type name of individual submitting request (must be an Authorized Representative for the treatment facility)

CHRIS CARLSON

Signature of Official



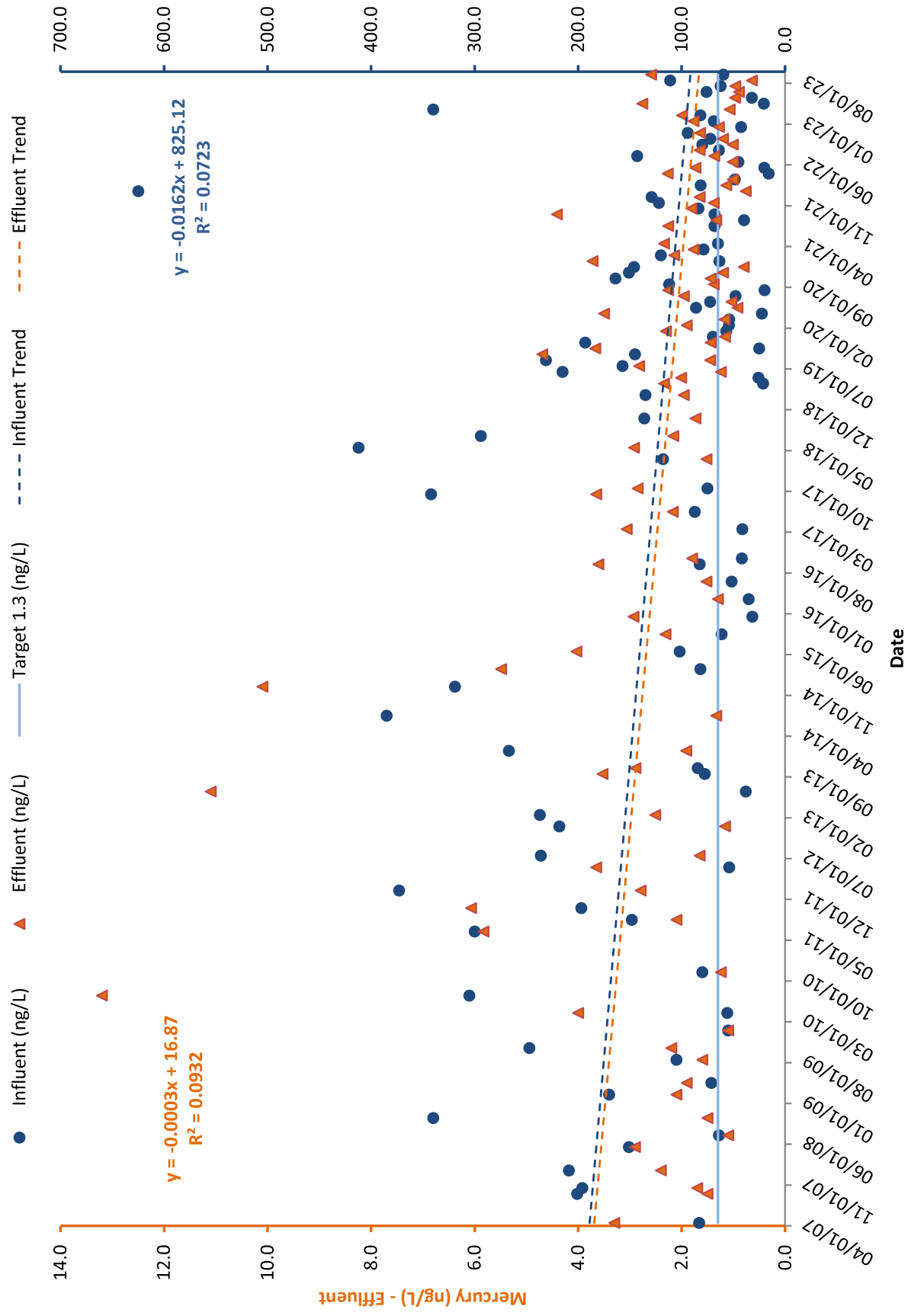
Title

Public Works Dir.

Date Signed

6/23/26

Main Plant Mercury Levels 2007-2023



Date	Influent (ng/L)	Effluent (ng/L)
2007	160.00	2.17
2008	191.00	1.98
2009	148.33	1.95
2010	123.98	4.89
2011	388.75	4.05
2012	220.25	2.31
2013	109.33	5.01
2014	257.30	32.84
2015	69.23	3.69
2016	52.85	2.06
2017	136.43	2.93
2018	240.00	2.08
2019	121.79	2.28
2020	82.24	1.66
2021	83.79	2.28
2022	111.03	1.34
2023	71.06	1.14

PMP Activities		Details	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year
1. Mercury Source Identification Efforts							
a. New industry monitoring		Inspect and monitor any new industries within our jurisdiction and educate if necessary. New industries are identified through communication with other City departments (Planning, Building Inspection) and periodic non-residential waste surveys.					
b. Hauler station and vector truck waste evaluation		Reevaluate and resample the hauler station and vector truck waste for potential Hg contributions. Elevated levels in the hauler station would trigger working with haulers to identify a source. Elevated Hg levels in our vector trucks would be evaluated to determine if the sewer is the source of historic mercury or if a source is current and can be identified.					
c. Literature and data review		Review literature, regional data, and case studies from other POTWs regarding potential Hg sources.					
d. Source identification assessment and planning		Assess effectiveness of previous source reduction measures and evaluate future, feasible source identification measures. We have had preliminary conversations with the USGS Mercury Research Lab (MRL) to gather information on mercury isotope analysis and mercury-source fingerprinting, one potential avenue for future source identification efforts. Other potential avenues include refining the collections system sampling based on lessons learned during this permit cycle. The direction of the source identification efforts and the specifics of the study design and sampling regime will be shaped in this upcoming assessment.					
e. Source identification data collection		Implement source identification measures and data collection based on the assessment and review described above.					

2. Actions to Minimize Mercury Sources									
a.	Mercury collection and recycling	Continue to accept mercury-containing products from residents and commercial entities in Superior as a part of our mercury recycling program. Additionally, we will continue to conduct or promote Northwest Cleansweep Program events.							
b.	Dental facility monitoring	Permit, monitor, and inspect dental facilities as a part of the pretreatment program. This includes reviewing semi-annual reports, amalgam separator maintenance logs, and disposal records.							
3. Maintenance of Source Reduction									
a.	Industrial sampling	Sample industries on the pretreatment program for mercury. Wastewater sampling is performed directly by POTW staff and by industry staff through self-monitoring.							
b.	Wastewater treatment plant monitoring	Continue to monitor the WWTP influent/effluent for mercury as described in WPDES permit.							
c.	Ordinance enforcement	Enforce the City of Superior Sewer Use Ordinances related to mercury.							
d.	City facility mercury reduction	Continue to replace mercury-containing devices within City facilities when discovered during routine maintenance.							
e.	Educational literature	Promote mercury reduction and proper disposal in Environmental Services Division's quarterly newsletters distributed with the utility billings.							
f.	Community education and outreach	Continue community education at local outreach events. City Environmental Services Division staff regularly table at community outreach events and engage with residents about issues including mercury reduction and recycling.							

Facility Specific Mercury Variance Data Sheet

Directions: Please complete this form electronically. Record information in the space provided. Select checkboxes by double clicking on them. Do not delete or alter any fields. For citations, include page number and section if applicable. Please ensure that all data requested are included and as complete as possible. Attach additional sheets if needed.

Section I: General Information

A. Name of Permittee: Superior Sewage Disposal System

B. Facility Name: Superior Sewage Disposal System (SSDS) Wastewater Treatment Facility (WWTF)

C. Submitted by: Wisconsin Department of Natural Resources

D. State: Wisconsin **Substance:** Mercury **Date completed:** August 10, 2026

E. Permit #: WI-0025593-10-0 **WQST#:** (EPA USE ONLY)

F. Duration of Variance **Start Date:** January 1, 2027 **End Date:** December 31, 2031

G. Date of Variance Application: June 23, 2026

H. Is this permit a: ☐ First time submittal for variance
☒ Renewal of a previous submittal for variance (Complete Section X)

I. Description of proposed variance:

The Superior Sewage Disposal System (SSDS) seeks a variance to the water quality standards for mercury for its WWTF. The proposed variance for mercury, from the chronic water quality-based effluent limit of 1.3 ng/L, to an alternative mercury effluent limit (AMEL) of 4.8 ng/L, is expressed as a daily maximum limit. The permittee has submitted an application for an alternative mercury effluent limitation (AMEL). The application included a pollutant minimization program (PMP) plan for mercury as required under s. NR 106.145(8), Wis. Adm. Code. This is a request for a renewal of a variance EPA approved for the current permit term that had an AMEL of 13 ng/L. The Department concludes that the AMEL reflects the greatest pollutant reduction achievable by the permittee with the pollutant control technologies currently applied in the permittee's WWTF. The term of the proposed variance is five years, concurrent with the term of the proposed WPDES permit. The underlying designated uses and criteria of Wisconsin's mercury water quality standards (WQS) will be retained, and all other applicable WQS will remain in effect with adoption of the proposed variance.

Citation: An alternative mercury effluent limitation under s. NR 106.145, Wis. Adm. Code, represents a variance to water quality standards authorized by s. 283.15, Wis. Stats.

J. List of all who assisted in the compilation of data for this form

Name	Email	Phone	Contribution
Sheri Snowbank	Sheri.Snowbank@Wisconsin.gov	715-635-4131	Permit Drafter
Eric de Venecia	Eric.deVenecia@Wisconsin.gov	715-685-4155	Compliance Staff
Michael Polkinghorn	Michael.Polkinghorn@Wisconsin.gov	715-360-3379	Limits Calculator
Sarah Donoughe	Sarah.Donoughe@Wisconsin.gov	920-366-6076	Variance Coordinator

Section II: Criteria and Variance Information

A. Water Quality Standard from which variance is sought: 1.3 ng/L Wildlife Criterion

B. List other criteria likely to be affected by variance: 1.5 ng/L Human Threshold Criterion

C. Source of Substance: The majority of the mercury in the wastewater is from legacy contamination of the collection system. With regard to current, continuing sources of mercury, dental facilities are the most significant sources with contributions from medical facilities, industries, schools and residences, and atmospheric deposition.

D. Ambient Substance Concentration: 0 ng/L ☐ Measured ☐ Estimated
☐ Default ☒ Unknown

E. If measured or estimated, what was the basis? Include citation.

Metals data for Superior Bay, St. Louis Bay, and the St. Louis River is very limited. Because no data is available, the background concentration is assumed to be negligible and a value of zero is used in the computations.

F. Average effluent discharge rate: 3.6 MGD (April 2019 – Nov. 2024)	Maximum effluent discharge rate: 4.1 MGD (Max. Annual Avg. April 2019 – Nov. 2024)
G. Effluent Substance Concentration: 4.81 ng/L (1-day P99) 3.03 ng/L (4-day P99) 2.13 ng/L (30-day P99) <u>Mean = 1.70 ng/L</u>	☒ Measured ☐ Default ☐ Estimated ☐ Unknown
H. If measured or estimated, what was the basis? Include Citation. The 30-day P99 is calculated using methods described in s. NR 106.05(5), Wis. Adm. Code, and based on effluent mercury data (April 2019 – Nov. 2024).	
I. Type of HAC: ☐ Type 1: HAC reflects waterbody/receiving water conditions ☐ Type 2: HAC reflects achievable effluent conditions ☒ Type 3: HAC reflects current effluent conditions	
J. Statement of HAC: The Department has determined the highest attainable condition of the receiving water is achieved through the application of the variance limit in the permit, combined with a permit requirement that the permittee implement its Mercury PMP. Thus, the HAC at commencement of this variance is 4.8 ng/L, which reflects the greatest mercury reduction achievable with the current treatment processes, in conjunction with the implementation of the permittee's Mercury PMP. The current effluent condition is reflective of on-site optimization measures that have already occurred. This HAC determination is based on the economic feasibility of available compliance options for SSDS WWTF at this time (see Economic Section below). The permittee may seek to renew this variance in the subsequent reissuance of this permit; the Department will reevaluate the HAC in its review of such a request. A subsequent HAC cannot be defined as less stringent than this HAC.	
K. Variance Limit: 4.8 ng/L as a daily maximum	
L. Level currently achievable (LCA): 4.8 ng/L as a daily maximum	
M. What data were used to calculate the LCA, and how was the LCA derived? (<i>Immediate compliance with LCA is required.</i>) The LCA is the 1-day P99 calculated using the methods described in s. NR 106.05(5), Wis. Adm. Code, and based on effluent mercury data (April 2019 – Nov. 2024). Citation: Section NR 106.145(5), Wis. Adm. Code.	
N. Explain the basis used to determine the variance limit (which must be ≤ LCA). Include citation. The variance limit = 1-day P99. The limit is established in accordance with s. NR 106.145(5), Wis. Adm. Code.	
O. Select all factors applicable as the basis for the variance provided under 40 CFR 131.10(g). Summarize justification below: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ 6 Section NR 106.145(1), Wis. Adm. Code, outlines several findings that justify variances for mercury. The Department intended that this provision be generally applicable to all dischargers of mercury, which produce large volumes of effluent with already extremely low mercury concentrations. The Department considers treating to produce effluent at concentrations to meet the limit to be technically and economically infeasible. Citation: Assessing the Economic Impacts of the Proposed Ohio EPA Water Rules on the Ohio Economy, April 24, 1997, Ohio Environmental Protection Agency, Division of Surface Water and Foster Wheeler Environmental Corporation and DRI/McGraw-Hill in support of Amended and New Rules in OAC Chapters 3745-1, -2, and -33.	
Section III: Location Information	
A. Counties in which water quality is potentially impacted: <u>Douglas (WI); St. Louis (MN)</u>	
B. Receiving waterbody at discharge point: <u>Superior Bay</u>	
C. Flows into which stream/river? <u>Superior Bay/Lake Superior</u> How many miles downstream? <u>~3 mi.</u>	
D. Coordinates of discharge point (UTM or Lat/Long): <u>SE 1/4 of NW 1/4 of Sec 13 T49N R14W</u>	
E. What are the designated uses associated with this waterbody? <u>Superior Bay (Lake Superior) is classified as a Cold Water (CW) community, public water supply, and Outstanding Resource Water (ORW).</u>	
F. What is the distance from the point of discharge to the point downstream where the concentration of the substance falls to less than or equal to the chronic criterion of the substance for aquatic life protection?	

Ambient mercury concentrations in surface water resulting from the variance will be substantially less than levels that result in direct toxicity to aquatic organisms. EPA's current chronic aquatic life criterion for mercury is 0.9081 µg/L, which is approximately three orders of magnitude greater than the wildlife criteria (0.0013 µg/L). Wisconsin's criteria are 0.44 µg/L and 0.83 µg/L for chronic and acute toxicity, respectively. Therefore, instream concentrations are assumed to be well below the chronic criterion immediately at the point of effluent discharge.

G. Provide the equation used to calculate that distance. See above.

H. Identify all other variance permittees for the same substance which discharge to the same stream, river, or waterbody in a location where the effects of the combined variances would have an additive effect on the waterbody: See the "SSDS - Mercury Variance Outfalls" map.

Permit Number	Facility Name	Facility Location	Variance Limit [µg/L]
WI-0003085-09-0	Superior Refining Company LLC*	Superior, WI	N/A – see below.

* Superior Refining Company LLC has come to an agreement with the City of Superior to transfer their wastewater to the SSDS WWTF. The facility is regulated under the City's approved pretreatment program.

Please attach a map, photographs, or a simple schematic showing the location of the discharge point as well as all variances for the substance currently draining to this waterbody on a separate sheet
See the "SSDS - Mercury Variance Outfalls" map.

I. Is the receiving waterbody on the CWA 303(d) list? If yes, please list the impairments below. ☒ Yes ☐ No ☐ Unknown

River Mile	Pollutant	Impairment
0-186.01 Lake Superior Shoreline	Mercury, PFOS, PCBs	Mercury, PFOS and PCBs Contaminated Fish Tissue
5902.36 Acres St. Louis River AOC, St. Louis River	Unspecified Metals, Mercury, PAHs, Dieldrin, 2,3,7,8-Tetrachlorodibenzo-p-dioxin, PCBs, DDT	Mercury and PCBs Contaminated Fish Tissue, DDT, Dieldrin and Dioxin Contaminated Sediments, Chronic Aquatic Toxicity
140.57 Acres St. Louis River AOC, Howards Bay	Mercury, Lead, PCBs	Mercury and PCBs Contaminated Fish Tissue, Lead Contaminated Sediments

Section IV: Pretreatment (complete this section only for POTWs with DNR-Approved Pretreatment Programs. See w:\Variances\Templates and Guidance\Pretreatment Programs.docx)

A. Are there any industrial users contributing mercury to the POTW? If so, please list.

Duluth Landfill Superior; Superior Refinery

B. Are all industrial users in compliance with local pretreatment limits for mercury? If not, please include a list of industrial users that are not complying with local limits and include any relevant correspondence between the POTW and the industry (NOVs, industrial SRM updates and timeframe, etc.)

Yes

C. When were local pretreatment limits for mercury last calculated?

2014

D. Please provide information on specific SRM activities that will be implemented during the permit term to reduce the industry's discharge of the variance pollutant to the POTW

The facility will continue to monitor mercury levels for industries in the pretreatment program. If any additional industries in the City are potential sources of mercury, then possible identified sources will be inspected and sampled. Mercury information via mailings will be provided to other businesses likely to have mercury devices in odd numbered years.

Section V: Public Notice

A. Has a public notice been given for this proposed variance?

☒ Yes ☐ No

B. If yes, was a public hearing held as well?

☒ Yes ☐ No ☐ N/A

C. What type of notice was given?

☒ Notice of variance included in notice for permit ☐ Separate notice of variance	
D. Date of public notice: <u>TBD (est. August 22, 2026)</u>	Date of hearing: <u>October 7, 2026</u>
E. Were comments received from the public in regards to this notice or hearing? <i>(If yes, please attach on a separate sheet)</i>	
Section VI: Human Health	
A. Is the receiving water designated as a Public Water Supply? ☒ Yes ☐ No	
B. Applicable criteria affected by variance: <u>1.5 ng/L Human Threshold Criterion</u>	
C. Identify any expected impacts that the variance may have upon human health, and include any citations: - The proposed variance will not adversely affect human health directly through the drinking water. - Wisconsin's fish consumption advisory program is designed to mitigate the effect of any ambient mercury concentration above the 1.5 ng/L water quality criterion for the protection of the fish-consuming human population by providing advice to the public to guide them on the amount of fish that may be consumed safely. - Given the lack of wastewater treatment technologies capable of reducing mercury concentrations to achieve a 1.3 ng/L effluent limit, granting a variance in this situation is consistent with protecting the public health, safety and welfare because of the substantial public health and safety benefits of providing wastewater treatment, the continued commitment towards further mercury pollutant minimization, the Wisconsin fish advisory program, and the limited impact of the elevated effluent concentrations given the background mercury concentrations. - DNR's findings suggest that mercury in walleye from Wisconsin lakes changed in the range of 0.5 to 0.8% per year depending on geographical position in the state during the period of 1982–2005. These trends may reflect geographically differing temporal trends in the amount of mercury deposited to Wisconsin lakes. However, long-term changes in other factors, such as water chemistry, fish growth rates, and lake levels, known to impact mercury bioavailability and accumulation may also be important. (Temporal trends of mercury concentrations in Wisconsin walleye (<i>Sander vitreus</i>), 1982–2005, Paul W. Rasmussen, Candy S. Schrank, Patrick A. Campfield. <i>Ecotoxicology</i> (2007) 16:541–550)	
Section VII: Aquatic Life and Environmental Impact	
A. Aquatic life use designation of receiving water: <u>Cold Water (CW) community</u>	
B. Applicable criteria affected by variance: <u>1.3 ng/L Wildlife Criterion</u>	
C. Identify any environmental impacts to aquatic life expected to occur with this variance, and include any citations:	
<u>Not Likely to Adversely Affect</u> - Ambient mercury concentrations resulting from the variance will be substantially less than levels that result in direct toxicity to aquatic organisms. EPA's current chronic aquatic life criterion for mercury is 0.9081 µg/L, which is approximately three orders of magnitude greater than the wildlife criteria (0.0013 µg/L). Wisconsin's criteria are 0.44 µg/L and 0.83 µg/L for chronic and acute toxicity, respectively. - Hine's emerald dragonfly (<i>Somatochlora hineana</i>, endangered) - Higgins' Eye mussel (<i>Lampsilis higginsii</i>, endangered) - Winged Mapleleaf mussel (<i>Quadrula fragosa</i>, endangered) - Spectaclecase (<i>Cumberlandia monodonta</i>, candidate) - Sheepnose (<i>Plethobasus cyphus</i>, candidate) - Low trophic level prey where mercury in prey is unlikely to accumulate to toxic levels in the organism. - Piping plover (<i>Charadrius melodus</i>, endangered) - Eastern massasauga rattlesnake (<i>Sistrurus catenatus catenatus</i>, candidate)	
<u>May Affect, Not Likely to Adversely Affect</u> Bald eagle (<i>Haliaeetus leucocephalus</i>, Delisted due to Recovery) Bald eagles consume fish and waterfowl from surface waters, which puts them at risk of exposure to toxic levels of mercury due to bioaccumulation of mercury in their prey organisms. However, despite the potential for exposure, ambient surface water data show that in recent decades, mercury levels have not increased and bald eagle populations have continued to grow. This indicates that current ambient concentrations of mercury and mercury concentrations in prey organisms do not appear to be limiting recovery of bald eagle populations in Wisconsin.	

Although this variance will allow permitted dischargers additional time to identify and control sources of mercury in their discharges, the pollutant minimization component of the variances should result in a net reduction in the amount of mercury discharged to Wisconsin surface waters from permitted point sources, further reducing any risk to bald eagles. In addition, the pollutant minimization programs encourage other pollution prevention efforts, which has a beneficial indirect effect of reducing the use and production of products and processes that use or contribute mercury to the environment. These efforts will also benefit bald eagles.

D. List any Endangered or Threatened species known or likely to occur within the affected area, and include any citations:

Because mercury is pervasive, persistent and bioaccumulating in the environment, we considered all species listed for the entire state of Wisconsin. The following list contains Federally Endangered and Threatened Species in Wisconsin from the U.S. Fish and Wildlife Service, Region 3, May 2026.

BIRDS

Piping Plover (E)

CLAMS

Higgins Eye (E)

Sheepnose Mussel (E)

Snuffbox Mussel (E)

Spectaclecase (mussel) (E)

Winged Mapleleaf (mussel) (E)

FLOWERING PLANTS

Dwarf lake iris (T)

Eastern prairie fringed orchid (T)

Fassett's locoweed (T)

Mead's Milkweed (T)

Northern wild monkwewood (T)

Pitcher's thistle (T)

Prairie Bush Clover (T)

INSECTS

Hine's emerald dragonfly (E)

Karner Blue Butterfly (E)

Poweshiek skipperling (E)

Rusty Patched Bumble Bee (E)

MAMMALS

Indiana bat (E)

Northern Long-eared Bat (E)

REPTILES

Eastern Massasauga (T)

SNAILS

Iowa Pleistocene snail (E)

Citation: U.S. Fish and Wildlife Service – Environmental Conservation Online System (<http://www.fws.gov/endangered/>) and National Heritage Index (<http://dnr.wi.gov/topic/nhi/>)

Section VIII: Economic Impact and Feasibility

A. Describe the permittee's current pollutant control technologies in the treatment process:

The City of Superior owns and operates four wastewater treatment plants. The Main Plant is an activated sludge facility, which receives the bulk of the domestic, industrial and combined sewer wastewater flow. The facility consists of screen and grit chambers that remove debris. Chemicals are added to enable the phosphorus to settle out of the wastewater. The wastewater then enters the primary clarifier where solids settle before entering aeration tanks where it mixes with activated sludge which breaks down the organic matter. Activated sludge is composed of settled solids containing naturally occurring bacteria recycled from the treatment system. The water then flows by gravity into a final clarifier where remaining solids are settled out. The wastewater passes through a UV disinfection system to discharge. Effluent is discharged on a continuous basis via Outfall 001 to Superior Bay (Lake Superior).

B. What modifications would be necessary to comply with the current limits? Include any citations.

The Department did not evaluate what actions, modifications or other changes would be needed to meet limits based on the water quality standard. As discussed below, the Department considers treating to produce effluent at concentrations to meet the limit to be technically and economically infeasible. Citation: Assessing the Economic Impacts of the Proposed Ohio EPA Water Rules on the Ohio Economy, April 24, 1997, Ohio Environmental Protection Agency, Division of Surface Water and Foster Wheeler Environmental Corporation and DRI/McGraw-Hill in support of Amended and New Rules in OAC Chapters 3745-1, -2, and -33.
C. Identify any expected environmental impacts that would result from further treatment, and include any citations: See above.
D. Is it technically and economically feasible for this permittee to modify the treatment process to reduce the level of the substance in the discharge? ☐ Yes ☒ No ☐ Unknown The Department considers treating to produce effluent at concentrations to meet the limit to be technically and economically infeasible. Citation: Assessing the Economic Impacts of the Proposed Ohio EPA Water Rules on the Ohio Economy, April 24, 1997, Ohio Environmental Protection Agency, Division of Surface Water and Foster Wheeler Environmental Corporation and DRI/McGraw-Hill in support of Amended and New Rules in OAC Chapters 3745-1, -2, and -33.
E. If treatment is possible, is it possible to comply with the limits on the substance? ☐ Yes ☒ No ☐ Unknown
F. If yes, what prevents this from being done? Include any citations. N/A – see above.
G. List any alternatives to current practices that have been considered, and why they have been rejected as a course of action, including any citations: N/A – see above.
Section IX: Compliance with Water Quality Standards
A. Describe all activities that have been, and are being, conducted to reduce the discharge of the substance into the receiving stream. This may include existing treatments and controls, consumer education, promising centralized or remote treatment technologies, planned research, etc. Include any citations. The permittee has a Pollutant Minimization Program (PMP) Plan in place to reduce mercury discharges. The current PMP Plan includes medial facility mercury collection/recycling and educational outreach, dental facility inspection of BMPs (operating amalgam separators, maintaining records, and capturing/recycling amalgam), school presentations/tours and mercury collection/recycling, industry sampling and enforcement of pretreatment local limits, general activities (collection of mercury bulbs, thermostat exchange, florescent bulb collection, website and other displays identifying collection sites and instructions, and tours for elected officials, school groups and public groups), and continuation of the CMOM program (including cleaning/repairing of the collection system). See the PMP annual reports for more details.
B. Describe all actions that the permit requires the permittee to complete during the variance period to ensure reasonable progress towards attainment of the water quality standard. Include any citations. The permit contains a variance to the wildlife water quality-based criterion for mercury granted in accordance with s. 283.15, Wis. Stats. As conditions of this variance the permit requires the permittee to (a) maintain effluent quality at or below the interim effluent limitation specified in the permit, (b) implement the mercury pollutant minimization measures specified in the Pollutant Minimization Program Plan dated 6/23/26, and (c) perform the actions listed in the Mercury Pollutant Minimization Program Schedule (see the Schedules section of the proposed permit). <u>Mercury PMP actions include:</u> - Mercury Source Identification • New industry monitoring • Hauler station and vector truck waste evaluation • Literature and data review • Source identification assessment and planning • Source identification data collection

Actions to Minimize Mercury Sources - Mercury collection and recycling - Dental facility monitoring Maintenance of Source Reduction - Industrial sampling - Wastewater treatment plant monitoring - Ordinance enforcement - City facility mercury reduction - Educational literature - Community education and outreach	
Section X: Compliance with Previous Permit <i>(Variance Reissuances Only)</i>	
A. Date of previous submittal: <u>February 25, 2019</u>	Date of EPA Approval: <u>March 29, 2019</u>
B. Previous Permit #: <u>WI-0025593-09-0</u>	Previous WQSTS #: _____ (EPA USE ONLY)
C. Effluent substance concentration: <u>2.13 ng/L (30-day P99)</u>	Variance Limit: <u>13 ng/L</u>
D. Target Value(s): <u>N/A</u>	Achieved? ☒ Yes ☐ No ☐ Partial
E. For renewals, list previous steps that were to be completed. Show whether these steps have been completed in compliance with the terms of the previous variance permit. Attach additional sheets if necessary.	
Condition of Previous Variance	Compliance
Implementation of Mercury PMP Plan	☒ Yes ☐ No
Mercury PMP Annual Reports	☒ Yes ☐ No
Mercury PMP Final Report and Updated PMP Plan	☒ Yes ☐ No
Maintain effluent quality at or below interim effluent limit	☒ Yes ☐ No