

Permit Fact Sheet

General Information

Permit Number:	WI-0030627-10-0	
Permittee Name:	JAMESTOWN SANITARY DISTRICT NO 2	
Address:	673 Maryville Heights Drive	
City/State/Zip:	Hazel Green WI 53811	
Discharge Location:	West bank of the Menominee River, SW ¼ of NE 1/4, Section 28, T1N R2W (Lat: 42.53303° N / Lon: 90.60927° W)	
Receiving Water:	Tributary to the Menominee River (Galena River Watershed, GP01 – Grant Platte River Basin) in Grant County	
StreamFlow (Q _{7,10}):	0 cfs	
Stream Classification:	Limited Aquatic Life (LAL), non-public water supply, recreational use	
Discharge Type:	Existing, Continuous	
Design Flow(s)	Daily Maximum	0.029 MGD
	Weekly Maximum	0.0169 MGD
	Annual Average	0.015 MGD
Significant Industrial Loading?	None	
Operator at Proper Grade?	Yes. Facility is Basic with subclasses A1 – Suspended Growth Processes, B – Solids Separation, C – Biological Solids/Sludges, SS – Sanitary Sewage Collection System.	
Approved Pretreatment Program?	N/A	

Facility Description

The Jamestown Sanitary District #2 Wastewater Treatment Facility serves the subdivision of Maryville Heights and operates an extended aeration activated sludge wastewater treatment facility that includes a coarse screen, aeration tank, and final clarifier. Sludge that is produced is aerobically digested and hauled to another permitted facility for final storage and application on DNR approved sites. The facility is designed to treat an average flow of 15,000 gallons per day and currently treats an average of 6,900 gallons per day. Treated effluent is discharged to a tributary of the Menominee River.

Substantial Compliance Determination

The permittee is in the process of meeting agreed upon actions as part of the enforcement process. A desk top review of all discharge monitoring reports, CMARs, land application reports, compliance schedule items, and a site visit on June 05, 2024 was conducted to review compliance status. Compliance schedules are included in the proposed permit to provide a path to compliance.

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	N/A – Not required to report	Influent: Representative grab samples shall be collected at the inlet pipe to the aeration tank.
001	0.0069 MGD (Average January 2019 – February 2024)	Effluent: 24-hr flow proportional composite sampler intake located after the final clarifier, prior to discharge to the tributary of the Menominee River. Grab samples shall be collected directly after the final clarifier. Flow meter is in the same location as the composite sampler intake.
002	9,500 gallons/year Sludge hauled to another facility (2023 Permit Application)	Aerobically digested, Liquid, Class B. Representative sludge grab samples shall be collected from the aerobic digester. Hauled sludge reports shall be submitted on Form 3400-52 'Other Methods of Disposal or Distribution Report' following each year that the sludge is hauled from the existing WWTF.

1 Influent – Monitoring Requirements

Sample Point Number: 701- INFLUENT

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
BOD ₅ , Total		mg/L	2/Week	Grab	
Suspended Solids, Total		mg/L	2/Week	Grab	

Changes from Previous Permit:

Influent limitations and monitoring requirements were evaluated for this permit term and no changes were made from the previous permit.

Explanation of Limits and Monitoring Requirements

BOD₅ and Total Suspended Solids: Tracking of BOD₅ and Suspended Solids are required for percent removal requirements found in s. NR 210.05, Wis. Adm. Code and in the standard requirements section of the permit. The minimum monitoring frequency of 2x/week was retained while the facility evaluates potential compliance strategies, including facility upgrades, regionalization, and other alternatives to achieve long-term permit compliance. Monitoring frequencies may be reevaluated and updated at the next permit reissuance.

2 Surface Water - Monitoring and Limitations

Sample Point Number: 001- EFFLUENT

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow Rate		MGD	Daily	Continuous	
BOD5, Total	Weekly Avg	30 mg/L	2/Week	24-Hr Flow Prop Comp	
BOD5, Total	Monthly Avg	20 mg/L	2/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total	Weekly Avg	30 mg/L	2/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total	Monthly Avg	20 mg/L	2/Week	24-Hr Flow Prop Comp	
pH Field	Daily Max	9.0 su	5/Week	Grab	
pH Field	Daily Min	6.0 su	5/Week	Grab	
Dissolved Oxygen	Daily Min	4.0 mg/L	5/Week	Grab	
Nitrogen, Ammonia Variable Limit		mg/L	2/Week	See Table	Look up the variable ammonia limit from the 'Variable Ammonia Limitation' table and report the variable limit in the Ammonia Variable Limit column on the eDMR.
Nitrogen, Ammonia (NH3-N) Total	Daily Max - Variable	mg/L	2/Week	24-Hr Flow Prop Comp	Report the daily maximum Ammonia result in the Nitrogen, Ammonia (NH3-N) Total column of the eDMR. See Ammonia Limitation Section.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	59 mg/L	2/Week	24-Hr Flow Prop Comp	April
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	17 mg/L	2/Week	24-Hr Flow Prop Comp	May-September
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	67 mg/L	2/Week	24-Hr Flow Prop Comp	October-March
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	24 mg/L	2/Week	24-Hr Flow Prop Comp	April
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	6.7 mg/L	2/Week	24-Hr Flow Prop Comp	May-September
Nitrogen, Ammonia	Monthly Avg	27 mg/L	2/Week	24-Hr Flow	October-March

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
(NH3-N) Total				Prop Comp	
E. coli	Geometric Mean - Monthly	126 #/100 ml	Weekly	Grab	Monitoring and limit effective May through September starting in 2030 per the Effluent Limitations for E. coli Schedule.
E. coli	% Exceedance	10 Percent	Monthly	Calculated	Monitoring and limit effective May through September starting in 2030 per the Effluent Limitations for E. coli Schedule. See the E. coli Percent Limit section below. Enter the result in the DMR on the last day of the month
Phosphorus, Total	Monthly Avg	0.225 mg/L	2/Week	24-Hr Flow Prop Comp	
Phosphorus, Total	6-Month Avg	0.075 mg/L	2/Week	24-Hr Flow Prop Comp	The six-month average should be averaged during the months of May - October and November - April.
Phosphorus, Total	6-Month Avg	0.0094 lbs/day	2/Week	Calculated	The six-month average should be averaged during the months of May - October and November - April.
Copper, Total Recoverable	Daily Max	47 ug/L	Monthly	24-Hr Flow Prop Comp	This is an interim limit. See Copper Schedule.
Copper, Total Recoverable	Weekly Avg	32 ug/L	Monthly	24-Hr Flow Prop Comp	This is an interim limit. See Copper Schedule.
Copper, Total Recoverable	Monthly Avg	32 ug/L	Monthly	24-Hr Flow Prop Comp	This is an interim limit. See Copper Schedule.
Copper, Total Recoverable	Daily Max	36 ug/L	Monthly	24-Hr Flow Prop Comp	Limit effective April 30, 2030 per the Copper Schedule.
Copper, Total Recoverable	Weekly Avg	22 ug/L	Monthly	24-Hr Flow Prop Comp	Limit effective April 30, 2030 per the Copper Schedule.
Copper, Total	Monthly Avg	22 ug/L	Monthly	24-Hr Flow	Limit effective April 30, 2030 per the Copper

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Recoverable				Prop Comp	Schedule.
Copper, Total Recoverable	Daily Max	0.0087 lbs/day	Monthly	Calculated	
Copper, Total Recoverable	Weekly Avg - Variable	lbs/day	Monthly	Calculated	Limit effective April 30, 2030 per the Copper Schedule. Report the weekly average mass Copper result in the Copper column of the eDMR. See Copper Mass Limit – Non-Wet Weather and Alternative Wet Weather Mass Limit Section.
Copper Variable Limit		lbs/day	Monthly	See Table	Limit effective April 30, 2030 per the Copper Schedule. Look up the copper mass from the ‘Variable Copper Mass’ table and report the variable limit in the Copper Variable Limit column on the eDMR.
Chloride		mg/L	Monthly	24-Hr Flow Prop Comp	Monitoring in 2028.
Hardness, Total as CaCO ₃		mg/L	Monthly	24-Hr Flow Prop Comp	Monitoring in 2028. Sampling should occur on the same day Copper sampling is completed.
Nitrogen, Total Kjeldahl		mg/L	See Listed Qtr(s)	24-Hr Flow Prop Comp	Annual in rotating quarters. See Nitrogen Series Monitoring section.
Nitrogen, Nitrite + Nitrate Total		mg/L	See Listed Qtr(s)	24-Hr Flow Prop Comp	Annual in rotating quarters. See Nitrogen Series Monitoring section.
Nitrogen, Total		mg/L	See Listed Qtr(s)	Calculated	Annual in rotating quarters. See Nitrogen Series Monitoring section. Total Nitrogen shall be calculated as the sum of reported values for Total Kjeldahl Nitrogen and Total Nitrite + Nitrate Nitrogen.

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Acute WET		TUa	See Listed Qtr(s)	24-Hr Flow Prop Comp	See Whole Effluent Toxicity (WET) Testing section.

Changes from Previous Permit

Flow: The sample frequency has been changed to ‘Daily’ for eDMR reporting purposes.

DO and pH: The sample frequency for these parameters has increased.

Disinfection & E. coli: At the end of the Disinfection and Effluent Limitations for E. coli compliance schedule, disinfection requirements and E. coli limits of 126 #/100 ml as a monthly geometric mean that may not be exceeded and 410 #/100 ml as a daily maximum that may not be exceeded more than 10 percent of the time in any calendar month will apply. Monitoring is not required until the limit becomes effective at the end of the compliance schedule.

Phosphorus: A final mass limit is included in the permit, expressed as a six-month average.

Copper and Alternative Wet Weather Mass Limit: Changes have been made to the concentration and mass limits. An alternative wet weather mass limit has been included in the permit.

Chloride: The sample frequency has changed to monthly.

Hardness: Monthly monitoring for one year is included in the permit.

Total Nitrogen Monitoring (TKN, N02+N03 and Total N): Annual monitoring in rotating quarters throughout the permit term was added to the proposed permit.

Explanation of Limits and Monitoring Requirements

Please refer to the Water Quality Based Effluent Limits memo for the Jamestown Sanitary District No. 2 prepared by Zainah Masri, dated July 2, 2024, updated October 8 2024, and used for reissuance.

BOD₅, Total Suspended Solids, DO, and pH: These limits are based on the Limited Aquatic Life (LAL) community of the immediate receiving water as described in s. NR 104.02(3)(b), Wis. Adm. Code.

Ammonia: Current acute and chronic ammonia toxicity criteria for the protection of aquatic life are included in Tables 2C and 4B of ch. NR 105, Wis. Adm. Code. Subchapter IV of ch. NR 106 establishes the procedure for calculating water quality based effluent limitations (WQBELs) for ammonia.

Disinfection & E. coli: Revisions to bacteria surface water quality criteria to protect recreational uses and accompanying E. coli WPDES permit implementation procedures became effective May 1, 2020.

Section NR 102.04(5)(a), Wis. Adm. Code, states that all surface waters shall be suitable for recreational use and meet the E. coli criteria established to protect this use. Section NR 102.04(5)(b), Wis. Adm. Code, states that exceptions to the disinfection requirement can be made if the department determines, in accordance with the procedures specified in s. NR 210.06(3), Wis. Adm. Code, that disinfection is not required to meet water quality criteria. As part of the reissuance process, the requirements for disinfection were reviewed under s. NR 210.06(3), Wis. Adm. Code.

It was determined that the permittee is required to disinfect, during the following months May – September. See WQBEL memo for further explanation.

Phosphorus: Phosphorus requirements are based on the Phosphorus Rules that became effective 12/1/2010 as detailed in NR 102 Water Quality Standards and NR 217 Effluent Standards and Limitations for Phosphorus. Chapter NR 217 of the Wis. Adm. Code addresses point source dischargers of phosphorus to surface waters. WQBELs for phosphorus are needed

whenever the discharge contains phosphorus at concentrations or loadings that will cause or contribute to an exceedance of the water quality standards.

For the reasons explained in the April 30, 2012 paper entitled ‘Justification for Use of Monthly, Growing Season and Annual Average Periods for Expression of WPDES Permit Limits for Phosphorus Discharges in Wisconsin’, WDNR has determined that it is impracticable to express the phosphorus WQBEL for the permittee as a maximum daily, weekly or monthly values. The final effluent limit for phosphorus is expressed as a six-month average. It is also expressed as a monthly average equal to three times the derived WQBEL. This final effluent limit was derived from and complies with the applicable water quality criterion. A mass limit is also required, pursuant to s. NR 217.14(1)(a), Wis. Adm. Code. The final mass limit is 0.0094 lbs/day expressed as a six-month average. The six-month average should be averaged during the months of May – October and November – April.

Copper and Alternative Wet Weather Mass Limit: The maximum effluent concentration and the 1-day P99 of the effluent data exceed the calculated daily maximum limit, therefore concentration and mass limits are required. An alternative wet weather mass limit is included in accordance with s. NR 106.07(9), Wis. Adm. Code.

Chloride: Acute and chronic chloride toxicity criteria for the protection of aquatic life are included in Tables 1 and 5 of ch. NR 105, Wis. Adm. Code. Subchapter VII of ch. NR 106 establishes the procedure for calculating water quality based effluent limitations (WQBELs) for chloride. The permittee’s monitoring data shows that there is no reasonable potential to exceed the calculated WQBELs for chloride. Monitoring is included in the permit to ensure that 11 sample results are available at the next permit issuance to meet the data requirements of s. NR 106.85, Wis. Adm. Code.

Hardness: Monitoring is included because of the relationship between hardness and daily maximum limits based on acute toxicity criteria. Sampling for hardness should occur on the same day Copper sampling is completed.

Total Nitrogen Monitoring (NO₂+NO₃, TKN and Total N): The Department has included effluent monitoring for Total Nitrogen in the permit through the authority under §§ 283.55(1)(e), Wis. Stats., which allows the department to require the permittee to submit information necessary to identify the type and quantity of any pollutants discharged from the point source, and through s. NR 200.065(1)(h), Wis. Adm. Code, which allows for this monitoring to be collected during the permit term. More information on the justification to include total nitrogen monitoring in wastewater permits can be found in the “Guidance for Total Nitrogen Monitoring in Wastewater Permits” dated October 1, 2019.

Whole Effluent Toxicity: Whole effluent toxicity (WET) testing requirements and limits (if applicable) are determined in accordance with ss. NR 106.08 and NR 106.09, Wis. Adm. Code, as revised August 2016. (See the current version of the Whole Effluent Toxicity Program Guidance Document and checklist and WET information, guidance and test methods at <http://dnr.wi.gov/topic/wastewater/wet.html>). Two acute wet tests are required during the permit term during the following months: January – March 2027; July – September 2029.

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 fairness and consistency in permits issued across the state. Guidance and requirements in administrative code were considered when determining the appropriate monitoring frequencies for pollutants that have final effluent limits in effect during this permit term.

The department revisits sampling frequencies to evaluate whether current frequencies are appropriate or if an increase is warranted. The frequencies for DO and pH were increased to align Jamestown Sanitary District #2 with other facilities of similar size to ensure statewide consistency and in consideration of department guidance on sampling frequencies. The minimum monitoring frequency of 2x/week for BOD, TSS, Ammonia Nitrogen, and Phosphorus was retained while the facility evaluates potential compliance strategies, including facility upgrades, regionalization, and other alternatives to achieve long-term permit compliance. Monitoring frequencies may be reevaluated and updated at the next permit reissuance.

Requirements in administrative code (NR 108, 205, 210, and 214 Wis. Adm. Code) and Sections 283.55, Wis. Stats., were considered, where applicable, when determining the appropriate monitoring frequencies for pollutants that have final

effluent limits in effect during this permit term. The department has determined at this time that the aforementioned changes in monitoring frequency are warranted based on the size and type of the facility.

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.

PFOS and PFOA: NR 106 Subchapter VIII – Permit Requirements for PFOS and PFOA Dischargers became effective on August 1, 2022. Pursuant to s. NR 106.98(3)(b), Wis. Adm. Code, the department evaluated the need for PFOS and PFOA monitoring taking into consideration the presence of potential PFOS or PFOA industrial wastes, remediation sites and other potential sources of PFOS or PFOA. Based on information available at the time the proposed permit was drafted, the department has determined the permittee does not need to sample effluent for PFOS or PFOA as part of this permit reissuance. The department may re-evaluate the need for sampling at the next permit reissuance if new information becomes available that suggests PFOS or PFOA may be present in the discharge.

3 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 (Gallons/Year)
002	B	Liquid	N/A	N/A	Hauled to another facility	9,500
Does sludge management demonstrate compliance? Yes.						
Is additional sludge storage required? No.						
Is Radium-226 present in the water supply at a level greater than 2 pCi/liter? No.						
If yes, special monitoring and recycling conditions will be included in the permit to track any potential problems in landapplying sludge from this facility						
Is a priority pollutant scan required? No, design flow is less than 5 MGD.						
Priority pollutant scans are required once every 10 years at facilities with design flows between 5 MGD and 40 MGD, and once every 5 years if design flow is greater than 40 MGD.						

Sample Point Number: 002- HAULED 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	

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
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	Once	Composite	Once when land application occurs.
Nitrogen, Ammonium (NH ₄ -N) Total		Percent	Once	Composite	Once when land application occurs.
Phosphorus, Total		Percent	Once	Composite	Once when land application occurs.
Phosphorus, Water Extractable		% of Tot P	Once	Composite	Once when land application occurs.
Potassium, Total Recoverable		Percent	Once	Composite	Once when land application occurs.
PCB Total Dry Wt	Ceiling	50 mg/kg	Once	Composite	Once in 2027
PCB Total Dry Wt	High Quality	10 mg/kg	Once	Composite	Once in 2027
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

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
					PFAS List. See PFAS Permit Sections for more information.

Changes from Previous Permit:

List 1 Metals: Annual monitoring has been added to the permit.

List 2 Nutrients: Monitoring once during the permit term has been added should land application occur and for planning purposes.

PFAS: Monitoring annually during the permit term is included in the permit pursuant s. NR 204.06(2)(b)9, Wis. Adm. Code.

Explanation of Limits and Monitoring Requirements

Requirements for 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), Wis. Adm. Code. Requirements for pathogens are specified in s. NR 204.07(6) and in s. NR 204.07 (7), Wis. Adm. Code for vector attraction requirements. Limitations for PCBs are addressed in s. NR 204.07(3)(k), Wis. Adm. Code.

List 2 Nutrients: Monitoring for list 2 (nutrients) is highly recommended to be completed at the same time as the monitoring of List 1 (metals) in year 2 of the permit (2027). Results will assist in the determination of the acres needed for land application of sludge should it be necessary. List 2 nutrient sampling is required when land application occurs.

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

Collecting sludge data on PFAS concentrations from a wide range of wastewater treatment facilities will help protect public health from exposure to elevated levels of PFAS and determine the department’s implementation of EPA’s recommendations. To quantitate this risk, PFAS sampling has been included in the proposed WPDES permit pursuant to ss. NR 214.18(5)(b) and NR 204.06(2)(b)9, Wis. Adm. Code.

Water Extractable Phosphorus: Water extractable phosphorus (WEP) is the coefficient for determining plant available phosphorus from measured total phosphorus. In Wisconsin, the Penn State Method is utilized and is expressed in percent. While a total P may be significant, the WEP may show that only a small percentage of the P is available to plants because of factors such as treatment processes and chemical addition that “tie-up” phosphorus limiting the amount of phosphorus that is plant available. As part of Wisconsin’s nutrient management plan (NMP) requirements, the accounting of all fertilizers must be included over the NMP cycle. The fertilizer value of the waste needs to be communicated to the farmer and accounted for in the NMP.

Change in form submittal: Due to moving to electronic submittal of forms via Switchboard, forms 3400-049 (“Characteristics Report”), 3400-052 (“Other Methods of Disposal”) and 3400-055 (“Annual Land Application”) will now be generated by the department and the permittee will be required to submit all three reports each year of the permit term. This is used to officially report that no land application of sludge has occurred, and annual submittal of the forms is required per the standard requirements section.

4 Schedules

4.1 Disinfection and Effluent Limitations for E. coli

The permittee shall install disinfection treatment and 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.

Required Action	Due Date
Submit Facility Plan: The permittee shall submit a Facility Plan per s. NR 110.09, Wis. Adm. Code for meeting disinfection requirements and complying with E. coli surface water limitations. The permittee may submit an abbreviated facility plan if the Department determines that the modifications are minor.	12/31/2026
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 meet disinfection requirements per s. NR 210.06(1), Wis. Adm. Code, achieve compliance with final E. coli limitations, and a schedule for completing construction of the upgrades by the complete construction date specified below.	07/31/2027
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.	01/31/2028
Construction Upgrade Progress Report: The permittee shall submit a progress report on construction upgrades.	06/30/2028
Complete Construction: The permittee shall complete construction of wastewater treatment system upgrades.	01/31/2029
Achieve Compliance: The permittee shall achieve compliance with final E. coli limitations.	04/30/2030

Explanation of Schedule

A compliance schedule is included in the permit to provide time for the permittee to submit plans and specifications and install disinfection treatment for meeting effluent E. coli water quality-based effluent limits and disinfection requirements pursuant s. NR 210.06, Wis. Adm. Code.

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

Required Action	Due Date
Intent to Apply: Provide confirmation that a notice of Intent to Apply (ITA) with Priority Evaluation and Ranking Formula (PERF), as authorized by s. 281.58, Wis. Stats., and Ch. NR 162, Wis. Adm. Code, was submitted online to the Department's Clean Water Fund Program by October 31, 2026.	11/01/2026
Facility Plan: The permittee shall submit an updated comprehensive facility plan, pursuant to s. NR 110.09, Wis. Adm. Code, to the Department addressing treatment plant upgrades.	12/31/2026
Final Plans and Specification: The permittee shall submit final construction plans and specifications to the Department for approval pursuant to s. 281.41, Wis. Stats., specifying treatment plant upgrades that must be constructed to achieve compliance with limits and regulations, and a schedule for completing construction of the upgrades by the complete construction date specified below. Note: If the permittee intends to regionalize, the final construction plans and specifications shall also	07/31/2027

include documentation of a signed intergovernmental agreement. If applicable, as a condition of the facility plan approval, the permittee shall submit a 208-conformance letter from the regional planning commission stating that the project is consistent with the sewer service area plan	
Financial Assistance Application: Provide confirmation that a Financial Assistance Application and Principal Forgiveness (PF) request, as authorized by s. 281.58, Wis. Stats., and Ch. NR 162, Wis. Adm. Code, was submitted online to the Department's Clean Water Fund Program by September 30, 2027.	10/01/2027
Initiate Construction: 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, Wis. 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, Wis. Stats., the permittee shall construct the upgrades in accordance with the approved plans and specifications.	01/31/2028
Complete Construction: The permittee shall complete construction of wastewater treatment system upgrades and shall inform the department of the substantial completion.	01/31/2029
Permit Discontinuation Request: If applicable, the permittee shall notify the Department in writing that all regionalization actions have been completed and the individual WPDES permit can be discontinued. Additionally, coverage under the Satellite Sewage Collection Systems WPDES General Permit (No. WI-0047341) shall be requested by submitting the notice of intent (NOI) for coverage.	03/31/2030
Achieve Compliance: The permittee shall comply with the WQBELs and WPDES Permit.	04/30/2030

Explanation of Schedule

This schedule is provided as a result of ongoing issues of noncompliance; the schedule is included to bring the permittee back into compliance.

4.3 Copper Schedule

Required Action	Due Date
Report on Effluent Discharge: Submit a report on copper effluent discharges with conclusions regarding compliance with the more restrictive copper limitations that become effective at the end of this compliance schedule. The report shall summarize monitoring results, report on possible copper reduction efforts, assess corrosion control activities, and describe any other options for meeting effluent limitations.	12/31/2026
Action Plan: Submit an action plan for complying with the more restrictive effluent limitations. If construction is required, include plans and specifications with the submittal.	07/31/2027
Initiate Action: Initiate actions identified in the action plan.	01/31/2028
Complete Actions: The permittee shall achieve compliance with the more restrictive effluent copper limitations.	04/30/2030

Explanation of Schedule

The permittee's effluent copper data exceed the calculated daily maximum limit, therefore concentration and mass limits, as well as monitoring are included in the permit. The schedule is included to update the department on efforts to reduce or eliminate copper from the effluent and to provide the permittee time to achieve compliance with the limit.

Special Reporting Requirements

None.

Other Comments:

None.

Attachments:

Water Quality Based Effluent Limits, dated July 02, 2024 and updated October 8, 2024.

Expiration Date:

September 30, 2031

Justification Of Any Waivers From Permit Application Requirements

No waivers were requested or given from permit application requirements.

Prepared By: BetsyJo Howe, Wastewater Specialist

Date: 8/26/2024; 9/12/2024; 06/09/2026

Updated (post fact check): 8/17/2026

Updated (post public notice):

CORRESPONDENCE/MEMORANDUM**State of Wisconsin**

DATE: October 8, 2024

TO: BetsyJo Howe – SCR/Fitchburg Office

FROM: Zainah Masri – WY/3

SUBJECT: Water Quality-Based Effluent Limitations for Jamestown Sanitary District #2
WPDES Permit No. WI-0030627

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 Jamestown Sanitary District #2 in Grant County. This municipal wastewater treatment facility (WWTF) discharges to the Menominee River Tributary, located in the Galena River Watershed in the Mississippi River 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 at Outfall 001:

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Flow Rate						1
BOD ₅			30 mg/L	20 mg/L		2
TSS			30 mg/L	20 mg/L		2
pH	9.0 s.u.	6.0 s.u.				2
Dissolved Oxygen		4.0 mg/L				2
Ammonia Nitrogen						2,6
April	Variable		59 mg/L	24 mg/L		
May – September	Variable		17 mg/L	6.7 mg/L		
October– March	Variable		67 mg/L	27 mg/L		
Bacteria <i>E. coli</i>				126 #/100 mL geometric mean		3
Copper						4
Concentration Limit	36 µg/L		22 µg/L	22 µg/L		
Mass Limit	0.0087 lbs/day		0.0028 lbs/day			
Wet Weather Mass Limit	-		0.0031 lbs/day			
Chloride						5
Residual chlorine	19 µg/L		7.3 µg/L	7.3 µg/L		6
Hardness						8
Phosphorus						9
Final				0.225 mg/L	0.075 mg/L 0.0094 lbs/day	
TKN, Nitrate+Nitrite, and Total Nitrogen						10
Acute WET						11

Footnotes:

1. Monitoring only.
2. No changes from the current permit.
3. Bacteria limits apply during the disinfection season of May through September. Additional final limit: No more than 10 percent of *E. coli* bacteria samples collected in any calendar month may exceed 410 count/100 mL.
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. Monitoring at a frequency to ensure that 11 samples are available at the next permit issuance.
6. If chlorine is used to comply with disinfection requirements, these limits would apply, and additional WET testing may be needed.
7. 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.

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	83	7.0 < pH ≤ 7.1	51	8.0 < pH ≤ 8.1	11
6.1 < pH ≤ 6.2	82	7.1 < pH ≤ 7.2	46	8.1 < pH ≤ 8.2	8.8
6.2 < pH ≤ 6.3	80	7.2 < pH ≤ 7.3	40	8.2 < pH ≤ 8.3	7.3
6.3 < pH ≤ 6.4	78	7.3 < pH ≤ 7.4	35	8.3 < pH ≤ 8.4	6.0
6.4 < pH ≤ 6.5	75	7.4 < pH ≤ 7.5	31	8.4 < pH ≤ 8.5	5.0
6.5 < pH ≤ 6.6	72	7.5 < pH ≤ 7.6	26	8.5 < pH ≤ 8.6	4.1
6.6 < pH ≤ 6.7	69	7.6 < pH ≤ 7.7	22	8.6 < pH ≤ 8.7	3.4
6.7 < pH ≤ 6.8	65	7.7 < pH ≤ 7.8	19	8.7 < pH ≤ 8.8	2.8
6.8 < pH ≤ 6.9	60	7.8 < pH ≤ 7.9	16	8.8 < pH ≤ 8.9	2.4
6.9 < pH ≤ 7.0	56	7.9 < pH ≤ 8.0	13	8.9 < pH ≤ 9.0	2.0

8. Hardness monitoring monthly for the last 12 months of the permit term is recommended because of the relationship between hardness and daily maximum limits based on acute toxicity criteria.
9. The final WQBEL for phosphorus was effective starting July 1, 2023.
10. As recommended in the Department's October 1, 2019 Guidance for Total Nitrogen Monitoring in Wastewater Permits, annual total nitrogen monitoring is recommended for all minor municipal permittees. Total Nitrogen is the sum of nitrate (NO₃), nitrite (NO₂), and total kjeldahl nitrogen (TKN) (all expressed as N).
11. Two acute WET tests are required.

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

Attachments (3) – Narrative, Site Map, and Ammonia Nitrogen Calculations

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**Water Quality-Based Effluent Limitations for
Jamestown Sanitary District #2**

WPDES Permit No. WI-0030627

Prepared by: Zainah Masri

PART 1 – BACKGROUND INFORMATION

Facility Description

The subdivision of Maryville Heights is serviced by a small extended aeration activated sludge wastewater treatment facility with final clarification. Discharge is to a tributary of the Menominee River. Sludge is aerobically digested and hauled to another permitted wastewater treatment facility for final storage and disposal to Department-approved land application sites.

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

Existing Permit Limitations

The current permit, expiring on June 30, 2024, includes the following effluent limitations and monitoring requirements.

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Flow Rate						1
BOD ₅			30 mg/L	20 mg/L		2
TSS			30 mg/L	20 mg/L		2
pH	9.0 s.u.	6.0 s.u.				2
Dissolved Oxygen		4.0 mg/L				2
Ammonia Nitrogen						3
April	Variable		59 mg/L	24 mg/L		
May – September	Variable		17 mg/L	6.7 mg/L		
November – March	Variable		67 mg/L	27 mg/L		
Chloride						1
Copper	47 µg/L 0.0087 lbs/day		32 µg/L 0.004 lbs/day	32 µg/L		-
Phosphorus						4
Interim				2.3 mg/L		
Final				0.225 mg/L	0.075 mg/L	
Acute WET						5

Footnotes:

1. Monitoring only
2. These limits are based on the Limited Aquatic Life (LAL) community of the immediate receiving water as described in s. NR 104.02(3)(b), Wis. Adm. Code.
3. The variable daily maximum ammonia nitrogen limit table corresponding to various effluent pH values are included in the permit in place of the single limit. These limits apply year-round.

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	83	7.0 < pH ≤ 7.1	51	8.0 < pH ≤ 8.1	11
6.1 < pH ≤ 6.2	82	7.1 < pH ≤ 7.2	46	8.1 < pH ≤ 8.2	8.8
6.2 < pH ≤ 6.3	80	7.2 < pH ≤ 7.3	40	8.2 < pH ≤ 8.3	7.3
6.3 < pH ≤ 6.4	78	7.3 < pH ≤ 7.4	35	8.3 < pH ≤ 8.4	6.0
6.4 < pH ≤ 6.5	75	7.4 < pH ≤ 7.5	31	8.4 < pH ≤ 8.5	5.0
6.5 < pH ≤ 6.6	72	7.5 < pH ≤ 7.6	26	8.5 < pH ≤ 8.6	4.1
6.6 < pH ≤ 6.7	69	7.6 < pH ≤ 7.7	22	8.6 < pH ≤ 8.7	3.4
6.7 < pH ≤ 6.8	65	7.7 < pH ≤ 7.8	19	8.7 < pH ≤ 8.8	2.8
6.8 < pH ≤ 6.9	60	7.8 < pH ≤ 7.9	16	8.8 < pH ≤ 8.9	2.4
6.9 < pH ≤ 7.0	56	7.9 < pH ≤ 8.0	13	8.9 < pH ≤ 9.0	2.0

4. A compliance schedule is in the current permit to meet the final WQBEL by July 1, 2023.
5. Two acute WET tests are required.

Receiving Water Information

- Name: Menominee River Tributary
- Waterbody Identification Code (WBIC): None for Menominee River Tributary, for Menominee River: 941700
- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code: Listed in ch. NR 104 as a Limited Aquatic Life (LAL) community, non-public water supply from the treatment plant to the Menominee River.
- Low Flow: Where Outfall 001 is located.
 $7-Q_{10} = 0$ cfs (cubic feet per second)
 $7-Q_2 = 0$ cfs
- Low flows used in accordance with chs. NR 106 and 217, Wis. Adm. Code: The following $7-Q_{10}$ and $7-Q_2$ values are the Menominee River, approximately 0.14 miles downstream from Outfall 001. Data collected is from USGS for Station NW $\frac{1}{4}$ of SW $\frac{1}{4}$ of Section 22, TIN-R2E, at the bridge 2.6 miles South of Kieler, Wisconsin in Grant County.
 $7-Q_{10} = 0.6$ cfs (cubic feet per second)
 $7-Q_2 = 1.2$ cfs
- Hardness = 244 mg/L as CaCO_3 which is the geomean of data from the permit application. This value represents the geometric mean of data ($n=7$) from the additional samples taken from April 2024 to April 2024. Effluent hardness is used in place of receiving water because there is no receiving water flow upstream of the discharge. NOTE: The previous hardness was 372 mg/L.
- % of low flow used to calculate limits in accordance with s. NR 106.06(4)(c)5., Wis. Adm. Code: Not applicable where the receiving water low flows are zero. 25% mixing is assumed for calculating limits for downstream protection.

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- Source of background concentration data: Background concentrations are not included because they don't impact the calculated WQBEL when the receiving water low flows are equal to zero.
- Multiple dischargers: None
- Impaired water status: The Menominee River is listed as impaired for total phosphorus.

Effluent Information

- Design flow rates:
Annual average = 0.015 MGD (Million Gallons per Day)
Peak Daily= 0.029 MGD
Peak Weekly=0.0169 MGD
The Peak Daily and Peak Weekly Design Flows were calculated using the "Worksheet for Estimating Maximum Design Flows for Municipal WWTPs".
For reference, the actual average flow from January 2019 to February 2024 was 0.0069 MGD.
- Hardness =244 mg/L as CaCO₃. This value represents the geometric mean of data (n=7) from the additional samples taken during the month of May 2024. The data taken from the permit application from December 2022 to January 2023 for hardness, gave a geometric mean of 174 mg/L as CaCO₃. This value is not believed to be representative of the discharge and additional samples were taken.
- 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 water supply from wells.
- Additives: None
- Effluent characterization: This facility is categorized as a minor municipality, so the permit application required effluent sample analyses for a limited number of common pollutants, as specified in s. NR 200.065, Table 1, Wis. Adm. Code, primarily metal substances plus ammonia, chloride, hardness, and phosphorus.
- The following table presents the average concentrations and loadings at Outfall 001 from October 2019 to February 2024 for all parameters with limits in the current permit to meet the requirements of s. NR 201.03(6), Wis. Adm. Code

	Copper µg/L	Chloride mg/L
1-day P ₉₉	121	398
4-day P ₉₉	63	364
30-day P ₉₉	27	218
Mean	14	144
Std	33	48
Sample size	156	98
Range	14-180	159-399

Sample Date	Hardness mg/L as CaCO ₃	Sample Date	Hardness mg/L as CaCO ₃
05/12/2024	260	05/21/2024	220
05/14/2024	230	05/23/2024	290
05/16/2024	220	05/28/2024	310
05/18/2024	200		
Geomean= 244 mg/L as CaCO ₃			

Parameter Averages with Limits

	Average Measurement
BOD ₅	10.9 mg/L
Dissolved Oxygen	5.3 mg/L
TSS	7.8 mg/L
pH field	7.5 s.u.
Phosphorus	1.2 mg/L
Ammonia Nitrogen	5.6 mg/L
Copper	42.4 mg/L

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)

Acute Limits based on 1-Q₁₀

Daily maximum effluent limitations for toxic substances are based on the acute toxicity criteria (ATC), listed in ch. NR 105, Wis. Adm. Code. Changes to ch. NR 106, Wis. Code, (September 1, 2016) require the Department to calculate acute limitations using the same mass balance equation as used for other limits along with the 1-Q₁₀ receiving water low flow to determine if more restrictive effluent limitations are needed to protect the receiving stream from discharges which may cause or contribute to an exceedance of the acute water quality standards. The mass balance equation is provided below.

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

Where:

WQC = Acute toxicity criterion or secondary acute value according to ch. NR 105, Wis. Adm. Code.

Q_s = average minimum 1-day flow which occurs once in 10 years (1-day Q₁₀)
if the 1-day Q₁₀ flow data is not available = 80% of the average minimum 7-day flow which occurs once in 10 years (7-day Q₁₀).

Q_e = Effluent flow (in units of volume per unit time) as specified in s. NR 106.06(4)(d), Wis. Adm. Code.

f = Fraction of the effluent flow that is withdrawn from the receiving water, and

C_s = Background concentration of the substance (in units of mass per unit volume) as specified in s. NR 106.06(4)(e), Wis. Adm. Code.

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If the receiving water is effluent dominated under low stream flow conditions, the 1-Q₁₀ method of limit calculation produces the most stringent daily maximum limitations and should be used while making reasonable potential determinations. This is the case for Jamestown Sanitary District #2 Wastewater Treatment Facility.

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).

Daily Maximum Limits based on Acute Toxicity Criteria (ATC)

RECEIVING WATER FLOW = 0 cfs, (1-Q₁₀ (estimated as 80% of 7-Q₁₀)), as specified in s. NR 106.06(3)(bm), Wis. Adm. Code.

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		19.0	19.0	3.81			
Arsenic		340	339.8	68.0	<1.1		
Cadmium	244	80.3	80.3	16.1	0.23		
Chromium	244	3744	3743.5	749	<1.1		
Copper	244	36.0	36.0			121	180
Lead	244	253	253.2	50.63	6.0		
Nickel	244	997.9	997.9	200	1.9		
Zinc	244	195.4	195.4			124	98
Chloride (mg/L)		757	757			398	399

* Per the changes to s. NR 106.07(3), Wis. Adm. Code, effective 09/01/2016 consideration of ambient concentrations and 1-Q₁₀ flow rates yields a more restrictive limit than the 2 × ATC method of limit calculation.

Weekly Average Limits based on Chronic Toxicity Criteria (CTC)

RECEIVING WATER FLOW = 0 cfs (¼ of the 7-Q₁₀), as specified in s. NR 106.06(4)(c), Wis. Adm. Code

SUBSTANCE	REF. HARD. mg/L	CTC	WEEKLY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	4-day P ₉₉
Chlorine		7.28	7.28	1.46		
Arsenic		152.2	152	30.4	<1.1	
Cadmium	244	3.82	3.82	0.8	0.23	
Chromium	244	274.29	274	54.9	<1.1	
Copper	244	22.21	22.21			63
Lead	244	47.83	47.8	9.6	6.0	
Nickel	244	117.33	117	23.5	1.9	
Zinc	244	262.61	263			90
Chloride (mg/L)		395	395			364

Monthly Average Limits based on Wildlife Criteria (WC)

The effluent characterization did not include any effluent sampling results for substances for which Wildlife Criteria exist.

Monthly Average Limits based on Human Threshold Criteria (HTC)

RECEIVING WATER FLOW = 0 cfs ($\frac{1}{4}$ of Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

SUBSTANCE	HTC	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Cadmium	880	880	176.0	0.23
Chromium (+3)	8400000	8400000	1680000	<1.1
Lead	2240	2240	448.0	6.0
Nickel	110000	110000	22000	1.9

Monthly Average Limits based on Human Cancer Criteria (HCC)

RECEIVING WATER FLOW = 0 cfs ($\frac{1}{4}$ of Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

SUBSTANCE	HCC	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Arsenic	40	40.0	8.0	<1.1

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 no effluent limits are needed based on HCC, determination of the cumulative cancer risk is not needed per s. NR 106.06(8), Wis. Adm. Code.

Conclusions and Recommendations:

Based on a comparison of the effluent data and calculated effluent limitations, **effluent limitations are required for copper.**

Total Residual Chlorine – If chlorine is added as a disinfectant in order to meet the disinfection requirements described in Part 4, 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. **Specifically, a daily maximum limit of 19 µg/L and weekly and monthly average limits of 7.3 µg/L are required.** Due to revisions to s. NR 106.07(2), Wis. Adm. Code, mass limitations are no longer required.

Copper – Considering available effluent data from the current permit term (beginning monitoring from October 2019 and February 2024), the 1-day P₉₉ concentration is 121 µg/L, with a maximum concentration of 180 µg/L. **The maximum effluent concentration and the 1-day P₉₉ of the effluent data exceed the calculated daily maximum limit, therefore concentration and mass limits, as well as monthly monitoring, are required.**

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The acute mass limitation of 0.0087 lbs/day is based on the concentration limit and the peak daily design flow rate of 0.029 MGD ($36 \mu\text{g/L} \times 0.029 \text{ MGD} \times 8.34/1000$) in accordance with s. NR 106.07(2)(a), Wis. Adm. Code.

The chronic mass limitation of 0.0028 lbs/day is based on the concentration limit and the annual average design flow rate of 0.015 MGD ($22.2 \mu\text{g/L} \times 0.015 \text{ MGD} \times 8.34/1000$) in accordance with s. NR 106.07(2)(a), Wis. Adm. Code.

An alternative wet weather mass limit of 0.0031 lbs/day ($22.2 \mu\text{g/L} \times 0.0169 \text{ MGD} \times 8.34/1000$) **should also be included** in accordance with s. NR 106.07(9), Wis. Adm. Code. The peak weekly design flow was used to calculate the wet weather mass limit. The wet weather mass limit applies when the dry weather mass limit is exceeded, and the facility demonstrates to the Department the exceedance occurred during a wet weather event.

Monthly hardness monitoring for the last year of the permit term is recommended because of the relationship between hardness and daily maximum limits based on acute toxicity criteria.

Zinc - A single data point collected on January 12, 2023, reported on the permit application, has a maximum concentration of $430 \mu\text{g/L}$. This value exceeds both the calculated daily maximum limit and the calculated weekly average limit, and therefore, additional testing commenced from April 2024 to May 2024. Eleven data points were collected shown in the table below.

Sample Date	Zinc $\mu\text{g/L}$	Sample Date	Zinc $\mu\text{g/L}$	Sample Date	Zinc $\mu\text{g/L}$
04/27/2024	62	05/14/2024	44	05/23/2024	47
04/30/2024	56	05/16/2024	81	05/28/2024	53
05/02/2024	39	05/18/2024	65	06/20/2024	93
05/12/2024	42	05/21/2024	68		
1-day $P_{99} = 125 \mu\text{g/L}$					
4-day $P_{99} = 90 \mu\text{g/L}$					

This falls below both the chronic and acute zinc limits and therefore, no limits or monitoring are required.

Chloride – Considering available effluent data collected during 2023 the 1-day P_{99} chloride concentration is 398 mg/L , and the 4-day P_{99} of effluent data is 364 mg/L . These effluent concentrations are below the calculated WQBELs for chloride; therefore, no effluent limits are needed. **Chloride monitoring is recommended to ensure that 11 sample results are available at the next permit issuance to meet the data requirements of s. NR 106.85, Wis. Adm. Code.**

Mercury – The permit application did not require monitoring for mercury because Jamestown Sanitary District #2 Wastewater Treatment Facility is categorized as a minor facility as defined in s. NR 200.02(8), Wis. Adm. Code. In accordance with s. NR 106.145(3)(a)3., Wis. Adm. Code, a minor municipal

discharger shall monitor, and report results of influent and effluent mercury monitoring once every three months if, “there are two or more exceedances in the last five years of the high-quality sludge mercury concentration of 17 mg/kg specified in s. NR 204.07(5).” However, sludge sampling is not available because Jamestown Sanitary District #2 Wastewater Treatment Facility generates solids which are hauled away. It is not expected that there are exceedances of the high-quality mercury concentration based on similar municipal treatment plants and the lack of industries. **No monitoring is recommended.**

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 lack of indirect dischargers, **PFOS and PFOA monitoring is not recommended.** The Department may re-evaluate the need for sampling at the next permit reissuance if new information becomes available that suggests PFOS or PFOA may be present in the discharge.

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. These limits are re-evaluated at this time due to the following changes:

- Subchapter IV of ch. NR 106, Wis. Adm. Code allows limits based on available dilution instead of limits set to twice the acute criteria.
- The maximum expected effluent pH has changed.

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.

Daily Maximum Limits based on Acute Toxicity Criteria (ATC)

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

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

Where:

A = 0.411 and B = 58.4 for a Warm Water Sport fishery, and
A = 0.633 and B = 90.0 for Limited Aquatic Life, and
pH (s.u.) = that characteristic of the effluent.

The effluent pH data was examined as part of this evaluation. A total of 451 sample results were reported from October 2019 to February 2024. The maximum reported value was 8.30 s.u. (Standard pH Units). The effluent pH was 8.20 s.u. or less 99% of the time. The 1-day P₉₉, calculated in accordance with s. NR 106.05(5), Wis. Adm. Code, is 8.41 s.u. The mean plus the standard deviation multiplied by a factor of 2.33, an estimate of the upper ninety ninth percentile for a normally distributed dataset, is 8.20 s.u.

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Therefore, a value of 8.30 s.u. is believed to represent the maximum reasonably expected pH, and therefore most appropriate for determining daily maximum limitations for ammonia nitrogen. Substituting a value of 8.30 s.u. into the equation above yields an ATC = 7.3 mg/L.

Daily Maximum Ammonia Nitrogen Effluent Limitations Calculation Method

In accordance with s. NR 106.32(2), Wis. Adm. Code, daily maximum ammonia limitations are calculated using the 1-Q₁₀ receiving water low flow if it is determined that the previous method of acute ammonia limit calculation (2×ATC) is not sufficiently protective of the fish and aquatic life. The more restrictive calculated limits shall apply.

The calculated daily maximum ammonia nitrogen effluent limits using the mass balance approach with the 1-Q₁₀ (estimated as 80 % of 7-Q₁₀) and the 2×ATC approach is shown below.

Daily Maximum Ammonia Nitrogen Determination

	Ammonia Nitrogen Limit mg/L
2×ATC	14.6
1-Q ₁₀	7.3

The 1-Q₁₀ method yields the most stringent limits for Jamestown Sanitary District #2 Wastewater Treatment Facility.

The current permit has variable daily maximum effluent limits based on effluent pH. Presented below is a table of daily maximum limitations corresponding to various effluent pH values.

Daily Maximum Ammonia Nitrogen Limits – LAL

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	83	7.0 < pH ≤ 7.1	51	8.0 < pH ≤ 8.1	11
6.1 < pH ≤ 6.2	82	7.1 < pH ≤ 7.2	46	8.1 < pH ≤ 8.2	8.8
6.2 < pH ≤ 6.3	80	7.2 < pH ≤ 7.3	40	8.2 < pH ≤ 8.3	7.3
6.3 < pH ≤ 6.4	78	7.3 < pH ≤ 7.4	35	8.3 < pH ≤ 8.4	6.0
6.4 < pH ≤ 6.5	75	7.4 < pH ≤ 7.5	31	8.4 < pH ≤ 8.5	5.0
6.5 < pH ≤ 6.6	72	7.5 < pH ≤ 7.6	26	8.5 < pH ≤ 8.6	4.1
6.6 < pH ≤ 6.7	69	7.6 < pH ≤ 7.7	22	8.6 < pH ≤ 8.7	3.4
6.7 < pH ≤ 6.8	65	7.7 < pH ≤ 7.8	19	8.7 < pH ≤ 8.8	2.8
6.8 < pH ≤ 6.9	60	7.8 < pH ≤ 7.9	16	8.8 < pH ≤ 8.9	2.4
6.9 < pH ≤ 7.0	56	7.9 < pH ≤ 8.0	13	8.9 < pH ≤ 9.0	2.0

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

No changes are recommended to the current weekly and monthly average ammonia limits because there have been no changes in the effluent and receiving water flow rates. The calculations from the previous WQBEL memo are shown in Attachment #3.

Effluent Data

The following table evaluates the statistics based upon ammonia data reported from October 2019 to February 2024, with those results being compared to the calculated limits to determine the need to include ammonia limits in the Jamestown Sanitary District #2 Wastewater Treatment Facility 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.

Ammonia Nitrogen mg/L	April	May - September	October - March
1-day P ₉₉	26.24	18.20	23.82
4-day P ₉₉	15.83	9.90	14.21
30-day P ₉₉	10.59	4.90	9.36
Mean	8.19	2.87	7.17
Std	5.08	3.86	4.64
Sample size	33	167	246
Range	0.05 -18.57	0.05-15.97	0.03-18.76

Based on this comparison, daily limits are required year-round. Additionally, since the permit currently has weekly and monthly limits year-round, **these limits must be retained regardless of reasonable potential**, consistent with s. NR 106.33(1)(b), Wis. Adm. Code: 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.

Conclusions and Recommendations

In summary, after rounding to two significant figures, the following ammonia nitrogen limitations are recommended. No mass limitations are recommended in accordance with s. NR 106.32(5), Wis. Adm Code.

Final Ammonia Nitrogen Limits

	Daily Maximum mg/L	Weekly Average mg/L	Monthly Average mg/L
April	Variable	59.0	24.0
May – September	Variable	17.0	6.7
October – March	Variable	67.0	27.0

**PART 4 – WATER QUALITY-BASED EFFLUENT LIMITATIONS
FOR BACTERIA**

Section NR 102.04(5), Wis. Adm. Code, says 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 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.

Jamestown Sanitary District #2 Wastewater Treatment Facility had previously been exempted from disinfection based on the limited aquatic life classification of the receiving water at the outfall location. Section NR 210.06(3)(g), Wis. Adm. Code, states that disinfection decisions may be made based on the hydrologic classifications listed in s. NR 104.02(1), Wis. Adm. Code (not on the water quality classifications - i.e., limited forage fish or limited aquatic life - that are defined in s. NR 104.02(3), Wis. Adm. Code). The hydrologic classification of the Tributary to the Menominee River is listed in ch. NR 104, Wis. Adm. Code, as a diffused surface water. Discharges to diffuse surface waters that have very little to no flow most often result in effluent-dominated situations. The risk of illness is related to the concentration of *E. coli* and therefore dilution is an important consideration when considering risk to human health. Since little to no dilution is present in these situations, disinfection should not be exempted based solely on this hydrological classification.

The Department has considered the factors in s. NR 210.06(3), Wis. Adm. Code, and has determined that the discharge cannot meet *E. coli* criteria without disinfection. 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.

These limits are required during May through September and a compliance schedule will be given to meet these limits.

PART 5 – PHOSPHORUS

Technology-Based Effluent Limit

Subchapter II of Chapter NR 217, Wis. Adm. Code, requires municipal wastewater treatment facilities that discharge greater than 150 pounds of Total Phosphorus per month to comply with a monthly average limit of 1.0 mg/L, or an approved alternative concentration limit. **Since phosphorus limits in effect are currently a final limit of 0.225 mg/L expressed as a monthly average and 0.075 mg/L as a six month average, which are more restrictive than the TBEL, the need for a TBEL will not be considered further.**

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.

Attachment #1

Phosphorus criteria in s. NR 102.06, Wis. Adm. Code, do not apply to limited aquatic life waters as described in s. NR 102.06(6)(d), Wis. Adm. Code. These waters were not included in the USGS/WDNR stream and river studies and, therefore, the Department lacked the technical basis to determine and propose applicable criteria. At some time in the future, the Department may adopt phosphorus criteria based on new studies focusing on limited aquatic life waters. The *Guidance for Implementing Wisconsin's Phosphorus Water Quality Standards for Point Source Discharges* (2020) suggests that during the interim, WQBELs should be based on the criteria and flow conditions for the next stream segment downstream (or downstream lake or reservoir, if appropriate), because ss. 217.12 and 217.13, Wis. Adm. Code, state that the Department must set WQBELs to protect downstream waters. The discharge location of the wastewater from Jamestown Sanitary District #2 Wastewater Treatment Facility is classified as limited aquatic life downstream from the point of discharge downstream 0.14 miles where the tributary joins the Menominee River. The Menominee River is classified for warm water sport fishery uses and is listed as "impaired water" for total phosphorus.

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 (Q_s), effluent flow rate (Q_e), and upstream phosphorus concentrations (C_s) provided below.

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

Where:

WQC = 0.075 mg/L for the Menominee River

Q_s = 100% of the 7- Q_2 = 1.2 cfs

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

Q_e = effluent flow rate = 0.015 MGD

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

Substituting a background concentration into the limit calculation equation above would result in a calculated limit that is less than the applicable criterion of 0.075 mg/L. However, s. NR 217.13(7), Wis. Adm. Code, specifies that "if the WQBEL calculated pursuant to the procedures in this section is less than the phosphorus criterion specified in s. NR 102.06, Wis. Adm. Code, for the waterbody, the effluent limit shall be set equal to the criterion."

The impaired water listing of the Menominee River at the confluence with the tributary also supports that effluent phosphorus limits equal to the water quality criterion are needed to prevent the discharge from contributing to further impairment of the downstream water. *The Guidance for Implementing Wisconsin's Phosphorus Water Quality Standards for Point Source Discharges* (2020) suggests setting effluent limits equal to the criterion in the absence of an EPA approved total maximum daily load for discharges of phosphorus, to phosphorus impaired waters.

Effluent Data

The following table summarizes effluent total phosphorus monitoring data from October 2019 to February 2024.

Total Phosphorus Effluent Data

	Phosphorus mg/L	From July 2023 mg/L
1-day P ₉₉	2.32	1.9
4-day P ₉₉	1.72	1.5
30-day P ₉₉	1.40	1.29
Mean	1.24	1.17
Std	0.36	0.26
Sample size	446	69
Range	0.065 - 3.81	0.72 - 1.99

Limit Expression

According to s. NR 217.14(2), Wis. Adm. Code, because the calculated WQBEL is less than or equal to 0.3 mg/L, the effluent limit of 0.075 mg/L may be expressed as a six-month average. If a concentration limitation expressed as a six-month average is included in the permit, a monthly average concentration limitation of 0.225 mg/L, equal to three times the WQBEL calculated under s. NR 217.13, Wis. Adm. Code shall also be included in the permit. The six-month average should be averaged during the months of May – October and November – April.

Mass Limits

A mass limit is also required, pursuant to s. NR 217.14(1)(a), Wis. Adm. Code, because the discharge is to a surface water that is to or upstream to an impaired water. **This final mass limit shall be 0.075 mg/L × 8.34 × 0.015 MGD = 0.0094 lbs/day expressed as a six-month average.**

PART 5 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR THERMAL

Surface water quality standards for temperature took effect on October 1, 2010. These regulations are detailed in Chapters NR 102 (Subchapter II – Water Quality Standards for Temperature) and NR 106 (Subchapter V – Effluent Limitations for Temperature) of the Wisconsin Administrative Code.

The daily maximum effluent temperature limitation shall be 86 °F for discharges to surface waters classified as Limited Aquatic Life according to s. NR 104.02(3)(b)1, Wis. Adm. Code, except for those classified as wastewater effluent channels and wetlands regulated under ch. NR 103 and described in s. NR 106.55(2), Wis. Adm. Code, which has a daily maximum effluent temperature limitation of 120°F. The 86 °F limit applies because the hydrologic classification is listed as diffused surface water in ch. NR 104, Wis. Adm. Code.

Reasonable Potential

Attachment #1

Based on the available discharge temperature data from January 2018 through December 2018, summarized in the table below, the maximum daily effluent temperature reported was 68°F; therefore, no reasonable potential for exceeding the daily maximum limit exists, and **no limits or monitoring are recommended**. Downstream impacts were considered, but the calculated limits are less restrictive.

Month	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit LAL		Calculated Effluent Limit WWSF	
	Weekly Maximum (°F)	Daily Maximum (°F)	Weekly Average Effluent Limitation (°F)	Daily Maximum Effluent Limitation (°F)	Weekly Average Effluent Limitation (°F)	Daily Maximum Effluent Limitation (°F)
JAN	41	42	-	86	NA	120
FEB	41	42	-	86	NA	120
MAR	40	42	-	86	NA	120
APR	43	46	-	86	NA	120
MAY	59	62	-	86	NA	120
JUN	62	63	-	86	NA	120
JUL	67	68	-	86	NA	120
AUG	67	68	-	86	NA	120
SEP	66	68	-	86	NA	120
OCT	57	60	-	86	NA	120
NOV	48	54	-	86	NA	120
DEC	48	50	-	86	NA	120

PART 6 – 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

Attachment #1

estimate of the proportion of effluent to total volume of water (receiving water + effluent). The IWC of 13%, shown in the WET Checklist summary below, was calculated according to the following equation, as specified in s. NR 106.03(6), Wis. Adm Code:

$$\text{IWC (as \%)} = Q_e \div \{(1 - f) Q_e + Q_s\} \times 100$$

Where:

Q_e = annual average flow = 0.015 MGD = 0.023 cfs

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

Q_s = $\frac{1}{4}$ of the 7- Q_{10} = 0.6 cfs = 0.15 cfs in the Menominee River

The IWC is calculated for protection of the first downstream full fish and aquatic life water, using 25% mixing because this point is 0.14 mi downstream from the outfall.

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.

Shown below is a tabulation of all available WET data for Outfall 001. Efforts are made to ensure that decisions about WET monitoring and limits are made based on representative data, as specified in s. NR 106.08(3), Wis. Adm Code. Data which is not believed to be representative of the discharge was not included in reasonable potential calculations. The table below differentiates between tests used and not used when making WET determinations.

WET Data History

Date Test Initiated	Acute Results LC ₅₀ %				Footnotes or Comments
	<i>C. dubia</i>	Fathead minnow	Pass or Fail?	Used in RP?	
07/27/2010	>100	>100	Pass	No	1
03/07/2012	>100	>100	Pass	Yes	
06/30/2020	>100	>100	Pass	Yes	
10/24/2023	>100	>100	Pass	Yes	

Footnotes:

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

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

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

Acute Reasonable Potential = $0 < 1.0$, therefore, reasonable potential is not shown, and **an acute WET limit is not required.**

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>.

WET Checklist Summary

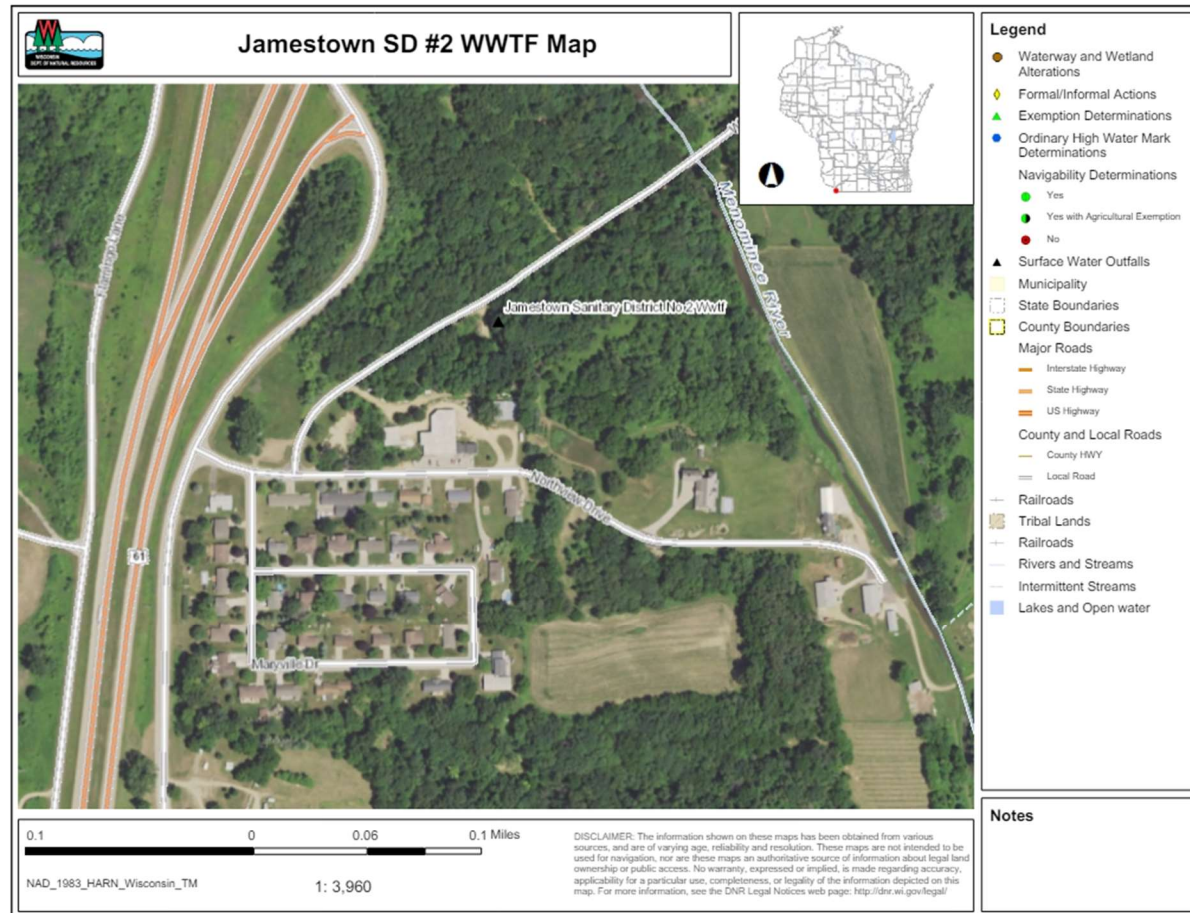
	Acute	Chronic
AMZ/IWC	Not Applicable. 0 Points	IWC = 15% 0 Points
Historical Data	3 tests used to calculate RP. No tests failed. 0 Points	No data. 5 Points
Effluent Variability	Little variability, no violations or upsets, consistent WWTF operations. 0 Points	Same as Acute. 0 Points
Receiving Water Classification	< 4 mi to non-variance waterbody. 5 Points	Same as Acute. 5 Points
Chemical-Specific Data	Reasonable potential for limits for Copper and Ammonia based on ATC; Chloride, Cadmium, Nickel, Zinc and Lead detected. Additional Compounds of Concern: None 10 Points	Reasonable potential for limits for Copper based on CTC; Ammonia nitrogen limit carried over from the current permit. Chloride, Cadmium, Lead and Nickel, Zinc and detected. Additional Compounds of Concern: None 9 Points
Additives	No additives used. 0 Points	No additives used. 0 Points
Discharge Category	No Industrial Contributors. 0 Points	Same as Acute. 0 Points
Wastewater	Secondary or better.	Same as Acute.

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	Acute	Chronic
Treatment	0 Points	0 Points
Downstream Impacts	No impacts known. 0 Points	Same as Acute. 0 Points
Total Checklist Points:	15 Points	19 Points
Recommended Monitoring Frequency (from Checklist):	2 tests during permit term.	None.
Limit Required?	No	No
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, **two acute WET tests are recommended** in the reissued permit. Tests should be done in rotating quarters to collect seasonal information about this discharge. WET testing should continue after the permit expiration date (until the permit is reissued).

Attachment #2 Site Map



Ammonia Nitrogen Calculations from the WQBEL Memo Dated April 16, 2019**Weekly Average & Monthly Average Limits based on Chronic Toxicity Criteria (CTC)**

Weekly and monthly average limits based on chronic toxicity criteria for ammonia are also calculated to determine the weekly and monthly average limits to meet the requirements of s. NR 106.07(3).

Weekly average and monthly average limits for ammonia nitrogen are based on chronic toxicity criteria.

The 30-day chronic toxicity criterion (CTC) for ammonia in waters classified as Limited Aquatic Life is calculated by the following equation.

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

Where:

pH = the pH (s.u.) of the receiving water,

E = 1.0,

C = $8.09 \times 10^{(0.028 \times (25 - T))}$

T = the temperature of the receiving (°C)

The 30-day chronic toxicity criterion (CTC) for ammonia in waters classified as a Warm Water Sport Fish Community is calculated by the following equation.

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

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)

Warm Water Sport Fish (WWSF)

		Spring	Summer	Winter
		April	May – Sept.	Oct. – March
Effluent Flow	Qe (MGD)	0.015	0.015	0.015
Background Information	7-Q ₁₀ (cfs)	0.60	0.60	0.60
	7-Q ₂ (cfs)	1.2	1.2	1.2
	Ammonia (mg/L)	0.11	0.06	0.28
	Temperature (°C)	9	23	3
	pH (s.u.)	7.97	8.21	7.97
	% of Flow used	100	100	100
	Reference Weekly Flow (cfs)	0.60	0.60	0.60
	Reference Monthly Flow (cfs)	1.2	1.2	1.2
	4-day Chronic			
	Early Life Stages Present	6.35	2.55	6.35

Attachment #3

The 4-day criterion is simply equal to the 30-day criterion multiplied by 2.5. 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.

The rules provide 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 not believed to be present in the Menominee River based on conversations with local fisheries biologists. So “ELS Absent” criteria apply from October through March, and “ELS Present” criteria will apply from April through September for a warmwater sport fish classification.

Since minimal ambient data is available, the “default” basin assumed values are used for Temperature, pH and background ammonia concentrations, shown in the table below, with the resulting criteria and effluent limitations.

Limited Aquatic Life (LAL)

		Spring	Summer	Winter
		April	May – Sept.	Oct. – March
Effluent Flow	Qe (MGD)	0.015	0.015	0.015
Background Information	7-Q ₁₀ (cfs)	0	0	0
	7-Q ₂ (cfs)	0	0	0
	Ammonia (mg/L)	0.11	0.06	0.28
	Temperature (°C)	9	23	3
	pH (s.u.)	7.97	8.21	7.97
	% of Flow used	100	100	100
	Reference Weekly Flow (cfs)	0	0	0
	Reference Monthly Flow (cfs)	0	0	0
Criteria mg/L	4-day Chronic	59.22	16.68	67.37
	30-day Chronic	23.69	6.67	26.95
Effluent Limits mg/L	Weekly Average	59	17	67
	Monthly Average	24	6.7	27

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		Spring	Summer	Winter
		April	May – Sept.	Oct. – March
Criteria mg/L	Early Life Stages Absent	9.06	2.55	10.31
	30-day Chronic			
	Early Life Stages Present	2.54	1.02	2.54
	Early Life Stages Absent	3.63	1.02	4.12
Effluent Limitations mg/L	Weekly Average			
	Early Life Stages Present	168	67	
	Early Life Stages Absent			270
	Monthly Average			
	Early Life Stages Present	109	43	
	Early Life Stages Absent			173

Ammonia Decay: Because the calculated limits are more restrictive than the current limits ammonia decay is considered to determine limits at the outfall to protect the downstream classification. The more restrictive calculated limits should be used to protect at the point of discharge and downstream uses. Where the calculated limits are more restrictive based on downstream uses, ammonia decay can be considered to determine if these more restrictive limits are needed or if the ammonia will decay before it reaches the point of the classification change.

Ammonia decay rates are dependent on temperature with in-stream nitrification essentially non-existent in the winter. In-stream decay is expected so a first order decay model will be used. Based on the available literature, a decay rate of 0.25 day^{-1} at 20°C has been suggested as a default rate. A temperature correction factor of $\theta = 1.08$ is ($k_t = k_{20} \theta^{(T-20)}$).

$$N_{\text{Limit}} = \left(\frac{N_{\text{down}}}{\text{EXP}(-k_t T)} \right)$$

Where: N_{Limit} = Ammonia limit needed to protect downstream use (mg/L)
 N_{down} = Ammonia limit calculated based on downstream classification and flow (mg/L)
 $-k_t$ = Ammonia decay rate at background stream temperature (day^{-1})
 T = Travel time from outfall to downstream use (day)

The velocity of receiving water is assumed to be 5 miles per day and the distance from the point of discharge to the classification change is approximately 0.14 mile for a travel time of 0.03 day. This equation shows that at the location where the classification change, 100% of the ammonia is remaining during April. After decay, the limits are increased as shown in the following table.

Attachment #3

	LAL		WWSF		After decay		Current Limits	
Months Applicable	Weekly Average mg/L	Monthly Average mg/L	Weekly Average mg/L	Monthly Average mg/L	Weekly Average mg/L	Monthly Average mg/L	Weekly Average mg/L	Monthly Average mg/L
April	59	24	163	106	164	107	None	24
May – September	17	6.7	79	51	80	51	17	6.7
October – March	67	27	184	115	185	115	None	35

Bold values indicate the most restrictive value.