

Permit Fact Sheet

1 General Information

Permit Number:	WI-0032531-07-0	
Permittee Name:	Stephensville Sanitary District No. 1	
Address:	N3661 Elm Street	
City/State/Zip:	Hortonville WI 54944-9710	
Discharge Location:	West bank of Bear Creek on Pew St approx. ¼ mile downstream where Pew St intersects with State Road 76	
Receiving Water:	Bear Creek (WBIC=316000)	
StreamFlow (Q _{7,10}):	0.25 cfs (Q _{7,2} =0.62cfs)	
Stream Classification:	Limited forage fish, not classified as a public water supply	
Discharge Type:	Existing, Continuous	
Design Flow(s)	Daily Maximum	0.112 MGD
	Weekly Maximum	0.0478 MGD
	Monthly Maximum	0.0387 MGD
	Annual Average	0.024 MGD
Significant Industrial Loading?	None	
Operator at Proper Grade?	The OIC is certified at proper grade. SS Subclass certification is needed within 6 months of the effective date of permit.	
Approved Pretreatment Program?	N/A	

2 Facility Description

Stephensville Sanitary District operates an orbital oxidation ditch style secondary wastewater treatment facility that receives primarily domestic wastewater. Wastewater flows by gravity to the treatment plant location. A lift station at the head of the plant pumps the wastewater to a 1-inch parshall flume which discharges to a 9-foot wide circular oxidation ditch. The facility's hydraulic, annual average design flow is 0.024 million gallons per day (MGD), and existing effluent flows have been averaging approximately 0.015 MGD.

Waste activated sludge (WAS) from the final clarifier is treated in the aerobic digester for volatile solids removal. This stabilized liquid is then held in the reedbed vessels for drying prior to disposal at an approved landfill. The reed vegetation has great water absorbing capability for processing the sludge mass, thereby providing extensive cake sludge storage within the beds. Cake sludge removal is anticipated every 7 to 8 years. Reed vegetation needs to be harvested and disposed of annually. The facility serves a population of 290 people.

3 Substantial Compliance Determination

Enforcement During Last Permit: The facility has completed all previously required actions as part of the enforcement process. No enforcement action took place during previous permit.

After a desk top review of all discharge monitoring reports, CMARs, land app reports, CMOM, compliance schedule items, and a site visit on April 11, 2023, this facility has been found to be in substantial compliance with their current permit.

Compliance determination entered by Barti Oumarou on February 8, 2024.

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	0.014 MGD, July 2017-December 2023	Influent - Flow is monitored continuously before the Parshall flume. Representative 24-hr flow proportional composite samples shall be collected from the channel in front of the Parshall flume.
001	No data provided.	Effluent- Flow is monitored continuously before the V-notch weir in the former chlorine contact chamber. 24-hr flow proportional composite samples are collected before the weir, while grab samples are collected after the weir, prior to the end of the effluent chamber.
002	No discharge during the previous permit term. Sample point included in permit for emergency use.	Feed Sludge - Liquid sludge from the sludge holding tank that is fed to the reed beds.
003	50.3 metric tons hauled to Outagamie County Landfill in spring of 2022.	Reed Bed Cake - Cake sludge from the reed beds. The permittee shall report the volume of sludge on Form 3400-52 "Other Methods of Disposal or Distribution Report" following each year that sludge is disposed at any landfill. Limits assigned to this outfall are only applicable when sludge is land applied.

4 Influent – Monitoring Requirements

4.1 Sample Point Number: 701- Influent

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

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Total				Prop Comp	

4.1.1 Changes from Previous Permit:

No changes from the previous permit.

4.1.2 Explanation of Limits and Monitoring Requirements

Influent monitoring is needed to assess loading to the facility and treatment performance. Requirements for flow, BOD, and TSS are established in accordance with ch. NR 210.04(2), Wis. Adm. Code.

5 Surface Water - Monitoring and Limitations

5.1 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	Daily Max	30 mg/L	2/Week	24-Hr Flow Prop Comp	
BOD5, Total	Monthly Avg	15 mg/L	2/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total	Daily Max	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	
Suspended Solids, Total	Monthly Avg	3.7 lbs/day	2/Week	Calculated	
Suspended Solids, Total	Weekly Avg	5.4 lbs/day	2/Week	Calculated	
Suspended Solids, Total		lbs/month	Monthly	Calculated	Calculate the Total Monthly Discharge of TSS and report on the last day of the month on the DMR. See TMDL Calculations permit section.
Suspended Solids, Total		lbs/yr	Monthly	Calculated	Calculate the 12-month rolling sum of total monthly mass of TSS discharged and report on the last day of

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
					the month on the DMR. See TMDL Calculations permit section.
Dissolved Oxygen	Daily Min	4.0 mg/L	5/Week	Grab	
pH Field	Daily Max	9.0 su	5/Week	Grab	
pH Field	Daily Min	6.0 su	5/Week	Grab	
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	21 mg/L	2/Week	24-Hr Flow Prop Comp	Limit applicable January-March. Monitoring only June- December.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	22 mg/L	2/Week	24-Hr Flow Prop Comp	Limit applicable April-May.
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	14 mg/L	2/Week	24-Hr Flow Prop Comp	Limit applicable January-March. Monitoring only June- December.
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	15 mg/L	2/Week	24-Hr Flow Prop Comp	Limit applicable April-May.
Phosphorus, Total	Monthly Avg	4.52 mg/L	2/Week	24-Hr Flow Prop Comp	
Phosphorus, Total		lbs/day	2/Week	Calculated	Monitoring only upon permit effective date. Final TMDL-based mass limits go into effect per the phosphorus compliance schedule. See Phosphorus TMDL permit section.
Phosphorus, Total		lbs/month	Monthly	Calculated	Calculate the Total Monthly Discharge of phosphorus and report on the last day of the month on the DMR. See TMDL Calculations permit section.
Phosphorus, Total		lbs/yr	Monthly	Calculated	Calculate the 12-month rolling sum of total monthly mass of phosphorus discharged and report on the last day of the month on the DMR. See TMDL Calculations permit section.
Chloride		mg/L	4/Month	24-Hr Flow Prop Comp	Monitoring only 2027. Sampling shall be done on

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
					four consecutive days one week per month.
Temperature Maximum	Weekly Avg	83 deg F	3/Week	Measure	Limit applicable in February. Monitoring only May- September and January.
Temperature Maximum	Weekly Avg	77 deg F	3/Week	Measure	Limit applicable in March.
Temperature Maximum	Weekly Avg	79 deg F	3/Week	Measure	Limit applicable in April.
Temperature Maximum	Weekly Avg	75 deg F	3/Week	Measure	Limit applicable in October.
Temperature Maximum	Weekly Avg	69 deg F	3/Week	Measure	Limit applicable in November.
Temperature Maximum	Weekly Avg	76 deg F	3/Week	Measure	Limit applicable in December.
Nitrogen, Total Kjeldahl		mg/L	See Listed Qtr(s)	24-Hr Flow Prop Comp	See Nitrogen Series Monitoring permit section.
Nitrogen, Nitrite + Nitrate Total		mg/L	See Listed Qtr(s)	24-Hr Flow Prop Comp	See Nitrogen Series Monitoring permit section.
Nitrogen, Total		mg/L	See Listed Qtr(s)	Calculated	See Nitrogen Series Monitoring permit section. Total Nitrogen shall be calculated as the sum of reported values for Total Kjeldahl Nitrogen and Total Nitrite + Nitrate Nitrogen.
Chronic WET		TUc	See Listed Qtr(s)	24-Hr Flow Prop Comp	See permit section 2.2.1.9 for WET testing requirements and schedule.

5.1.1 Changes from Previous Permit

Flow- A new ultra sonic flow meter was added in May 2020. Flow monitoring has been added to the permit so data collected can be recorded via monthly eDMR.

Total Suspended Solids TMDL Limits- Mass based TSS limits of 5.4 lbs/day expressed as a weekly average and 3.7 lbs/day expressed as a monthly average have been added to the permit to comply with requirements of the Upper Fox Wolf River TMDL. Effluent concentration (mg/L) shall be monitored and reported twice per week upon permit reissuance and will be used to calculate amounts reported for mass-based limits. An additional reporting requirement for lbs/month

will be used to calculate the facility's 12-month rolling sum of total monthly discharge, which can be compared directly to the facility's designated annual WLA.

Phosphorus TMDL Limits- An interim limit of 4.52 mg/L will remain in effect unless a more stringent limit is required at a future permit issuance by ss. NR 217.13 and NR 217.16(2), Wis. Adm. Code, or the limit is relaxed following procedures outlined in ch. NR 207, Wis. Adm. Code. Discharge effluent concentration (mg/L) shall be reported twice per week upon permit reissuance and will be used to calculate amounts reported for mass-based parameters. An additional reporting requirement for lbs/month will be used to calculate the facility's 12-month rolling sum of total monthly discharge, which can be compared directly to the facility's designated annual WLA. Final TMDL WLA-based effluent limits of 0.13 lbs/day expressed as a monthly average and 0.043 lbs/day expressed as a 6-month average will go into effect in accordance with compliance schedule 4.1.

Nitrogen, Ammonia- Monitoring has been increased to 2/week to meet the minimum monitoring frequency applied to minor municipal facilities that discharge less than 0.25 MGD across the state.

Chloride- One year of chloride monitoring has been added to provide data for the calculation of WQBELs for the next permit term.

Temperature- Temperature limits for February- April and October- December have been adjusted based on data collected from 10/01/2017- 11/30/2022. Temperature shall be monitored and reported year-round.

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

Whole Effluent Toxicity- Chronic monitoring has been added twice during the permit term.

5.1.2 Explanation of Limits and Monitoring Requirements

Refer to the WQBEL memo for the detailed calculations, prepared by the Water Quality Bureau dated 01/30/2024 used for this reissuance.

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.

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.

BOD₅ and pH- Categorical limits are included in the permit as outlined in s. NR 210.04, Wis. Adm. Code. The effluent limitations for BOD₅ and pH are carried over into this permit and are not subject to change at this time because the receiving water characteristics have not changed.

Upper Fox Wolf River Total Maximum Daily Load (TMDL)- The permitted facility is located within the Upper Fox Wolf River Basin Total Maximum Daily Load (UFWRB TMDL), which was approved by EPA February 27, 2020. The TMDL establishes Waste Load Allocations (WLAs) for point source dischargers and determines the maximum amounts of phosphorus and total suspended solids that can be discharged and still protect water quality. The final effluent limits and monitoring expressed in the permit were derived from and comply with the applicable water quality criterion and are consistent with the assumptions and requirements of the EPA-approved WLAs in the TMDL, which are 12 lbs/yr for phosphorus and 877 lbs/year for TSS for the permitted facility.

The approved TMDL expresses WLAs as lbs/year and lbs/day (maximum annual load divided by 365 days). As outlined in Section 4.6 of the department's 2020 TMDL Implementation Guidance for Wastewater Permits, TMDL limits must be given in the permit that are consistent with the TMDL WLA permit limits derived from the TMDL and need to be expressed as specified by 40 CFR 122.45 (d), s. NR 212.76 (4), and s. NR 205.065 (7), Wis. Adm. Code, unless

determined to be impracticable. Impracticability has already been determined for phosphorus limits as laid out in the phosphorus impracticability agreement that was approved by USEPA in 2012 (see NPDES MOA Addendum dated July 12, 2012 at <https://prodoasint.dnr.wi.gov/swims/downloadDocument.do?id=167886175>).

For phosphorus, continuously discharging facilities covered by the UFWRB TMDL are given monthly average mass limits. If the equivalent effluent concentration is less than or equal to 0.3 mg/L, six-month average mass limits (averaging period of May through October and November through April) are also included. The equivalent effluent concentration of 0.16 mg/L was calculated for the facility, thus, TMDL based mass limits are expressed as a six-month average and a monthly average equal to three times the six-month average limits.

For TSS, continuously discharging municipal/industrial facilities covered by the UFWRB TMDL are given monthly average and weekly average/daily max mass limits.

Facilities with UFWRB TMDL based effluent limits for phosphorus and TSS must report the 12-month rolling sum of total monthly discharge (lbs/yr). If reported 12-month rolling sums exceed the facility's max annual WLA, the facility's mass limits (monthly average and six-month average) may be recalculated using more appropriate CVs or monitoring frequencies when the permit is reissued to bring discharge levels into compliance with the facility's given WLA.

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.

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. If the permittee's effluent data shows that a calculated WQBEL for chloride cannot be met, then the permit will include a chloride effluent limitation. S. NR 106.83 of subchapter VII also provides for some permittees to obtain temporary relief from a chloride WQBEL through the use of a "chloride variance". (See chloride guidance dated March 2010 at this link: [Implementation plan for the chloride rule](#))

Thermal- Requirements for Temperature are included in NR 102 Subchapter II Water Quality Standards for Temperature and NR 106 Subchapter V Effluent Limitations for Temperature. Thermal discharges must meet the Public Health criterion of 120 degrees F and the Fish & Aquatic Life criteria which are established to protect aquatic communities from lethal and sub-lethal thermal effects.

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. Annual tests are scheduled in the following rotating quarters: October – December 2024; April – June 2025; January – March 2026; July – September 2027; and October – December 2028.

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 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.

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>)

Chronic tests are required during the following quarters: April – June 2025; and October – December 2028.

6 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)
002	Class B	Liquid	Fecal Coliform	Injection	Land Application	No discharge planned
003	Class B	Cake	N/A	N/A	Landfill	10 dry U.S. tons/yr
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 date available.						
Is a priority pollutant scan required? No						
Priority pollutant scans are required once every 10 years at facilities with design flows between 5 MGD and 40 MGD, and once every 5 years if design flow is greater than 40 MGD.						

6.1 Sample Point Number: 002- Feed Sludge

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Solids, Total		Percent	Per Occurrence	Composite	
Arsenic Dry Wt	Ceiling	75 mg/kg	Per Occurrence	Composite	
Arsenic Dry Wt	High Quality	41 mg/kg	Per Occurrence	Composite	
Cadmium Dry Wt	Ceiling	85 mg/kg	Per Occurrence	Composite	
Cadmium Dry Wt	High Quality	39 mg/kg	Per Occurrence	Composite	
Copper Dry Wt	Ceiling	4,300 mg/kg	Per Occurrence	Composite	
Copper Dry Wt	High Quality	1,500 mg/kg	Per Occurrence	Composite	

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Lead Dry Wt	Ceiling	840 mg/kg	Per Occurrence	Composite	
Lead Dry Wt	High Quality	300 mg/kg	Per Occurrence	Composite	
Mercury Dry Wt	Ceiling	57 mg/kg	Per Occurrence	Composite	
Mercury Dry Wt	High Quality	17 mg/kg	Per Occurrence	Composite	
Molybdenum Dry Wt	Ceiling	75 mg/kg	Per Occurrence	Composite	
Nickel Dry Wt	Ceiling	420 mg/kg	Per Occurrence	Composite	
Nickel Dry Wt	High Quality	420 mg/kg	Per Occurrence	Composite	
Selenium Dry Wt	Ceiling	100 mg/kg	Per Occurrence	Composite	
Selenium Dry Wt	High Quality	100 mg/kg	Per Occurrence	Composite	
Zinc Dry Wt	Ceiling	7,500 mg/kg	Per Occurrence	Composite	
Zinc Dry Wt	High Quality	2,800 mg/kg	Per Occurrence	Composite	
Nitrogen, Total Kjeldahl		Percent	Per Occurrence	Composite	
Nitrogen, Ammonium (NH4-N) Total		Percent	Per Occurrence	Composite	
Phosphorus, Total		Percent	Per Occurrence	Composite	
Phosphorus, Water Extractable		% of Tot P	Per Occurrence	Composite	
Potassium, Total Recoverable		Percent	Per Occurrence	Composite	
PCB Total Dry Wt	Ceiling	50 mg/kg	Once	Composite	
PCB Total Dry Wt	High Quality	10 mg/kg	Once	Composite	

6.1.1 Changes from Previous Permit:

No changes from previous permit.

6.1.2 Explanation of Limits and Monitoring Requirements

Requirements for 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 ch. NR 204.07(5). Requirements for pathogens are specified in ch. NR 204.07(6) and in ch. NR 204.07 (7) for vector attraction requirements. Limitations for PCBs are addressed in ch. NR 204.07(3)(k).

6.2 Sample Point Number: 003- Reed Bed Cake

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Solids, Total		Percent	Once	Composite	
Arsenic Dry Wt	Ceiling	75 mg/kg	Once	Composite	
Arsenic Dry Wt	High Quality	41 mg/kg	Once	Composite	
Cadmium Dry Wt	Ceiling	85 mg/kg	Once	Composite	
Cadmium Dry Wt	High Quality	39 mg/kg	Once	Composite	
Copper Dry Wt	Ceiling	4,300 mg/kg	Once	Composite	
Copper Dry Wt	High Quality	1,500 mg/kg	Once	Composite	
Lead Dry Wt	Ceiling	840 mg/kg	Once	Composite	
Lead Dry Wt	High Quality	300 mg/kg	Once	Composite	
Mercury Dry Wt	Ceiling	57 mg/kg	Once	Composite	
Mercury Dry Wt	High Quality	17 mg/kg	Once	Composite	
Molybdenum Dry Wt	Ceiling	75 mg/kg	Once	Composite	
Nickel Dry Wt	Ceiling	420 mg/kg	Once	Composite	
Nickel Dry Wt	High Quality	420 mg/kg	Once	Composite	
Selenium Dry Wt	Ceiling	100 mg/kg	Once	Composite	
Selenium Dry Wt	High Quality	100 mg/kg	Once	Composite	
Zinc Dry Wt	Ceiling	7,500 mg/kg	Once	Composite	
Zinc Dry Wt	High Quality	2,800 mg/kg	Once	Composite	
PCB Total Dry Wt	Ceiling	50 mg/kg	Once	Composite	Once in 2025.
PCB Total Dry Wt	High Quality	10 mg/kg	Once	Composite	Once in 2025.
PFOA + PFOS		ug/kg	Once	Calculated	Report the sum of PFOA and PFOS. See PFAS Permit Sections for more information.

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
PFAS Dry Wt			Once	Grab	Perfluoroalkyl and Polyfluoroalkyl Substances based on updated DNR PFAS List. See PFAS Permit Sections for more information.

6.2.1 Changes from Previous Permit:

PFAS – Monitoring is included in the permit once pursuant to s. NR 204.06(2)(b)9., Wis. Adm. Code.

6.2.2 Explanation of Limits and Monitoring Requirements

Requirements for 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 ch. NR 204.07(5). Requirements for pathogens are specified in ch. NR 204.07(6) and in ch. NR 204.07 (7) for vector attraction requirements. Limitations for PCBs are addressed in ch. NR 204.07(3)(k).

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

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

7 Schedules

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

The permittee shall comply with the WQBELs for Phosphorus 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 requirement.

Required Action	Due Date
Progress Report on Plans & Specifications: Submit progress report regarding the progress of preparing final plans and specifications. Note: See ‘Alternative Approaches to Phosphorus WQBEL Compliance’ in the Surface Water section of this permit.	09/30/2024
Final Plans and Specifications: Unless the permit has been modified, revoked and reissued, or reissued to include Adaptive Management or Water Quality Trading measures or to include a revised schedule based on factors in s. NR 217.17, Wis. Adm. Code, the permittee shall submit final construction plans to the Department for approval pursuant to s. 281.41, Stats., specifying treatment plant upgrades that must be constructed to achieve compliance with final phosphorus WQBELs, and a schedule for completing construction of the upgrades by the complete construction date specified	06/30/2025

below. (Note: Permit modification, revocation and reissuance, and reissuance are subject to s. 283.53(2), Stats.) Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	
Treatment Plant Upgrade to Meet WQBELs: The permittee shall initiate construction of the upgrades. The permittee shall obtain approval of the final construction plans and schedule from the Department pursuant to s. 281.41, Stats. Upon approval of the final construction plans and schedule by the Department pursuant to s. 281.41, Stats., the permittee shall construct the treatment plant upgrades in accordance with the approved plans and specifications. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	06/30/2026
Construction Upgrade Progress Report #1: The permittee shall submit a progress report on construction upgrades. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	03/31/2027
Construction Upgrade Progress Report #2: The permittee shall submit a progress report on construction upgrades. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	03/31/2028
Complete Construction: The permittee shall complete construction of wastewater treatment system upgrades. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	03/31/2029
Achieve Compliance: The permittee shall achieve compliance with final phosphorus WQBELs. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	04/01/2029

7.1.1 Explanation of Schedules

A nine-year compliance schedule was included in the previous permit to give the facility time to comply with WQBELs for phosphorus. During the permit term, the Upper Fox Wolf River Total Maximum Daily Load was approved, leading to the calculation of new final limits for the facility. This compliance schedule has been put in the permit to give the facility time to plan for the more stringent TMDL-based limits and to arrange for Water Quality Trading (WQT) if the facility chooses to utilize that method to meet final limits.

7.2 Reed Bed Phragmites Survey

An annual survey of adjacent lands for phragmites is required.

Required Action	Due Date
Submit an Annual Phragmites Survey: The permittee shall conduct an annual survey of adjacent lands for new Phragmites growth. Surveys shall be done at a time of the year when Phragmites are biologically active. The annual surveys shall contain the name and qualifications of the person(s) completing the inspection, the date of the survey, and at a minimum include descriptions of the area(s) inspected, land use(s), dominant plant community, existing Phragmites stands, and any areas of potential concern or newly discovered Phragmites growth. Photographic documentation of the survey area(s) is also recommended. The survey area should be as large as practicable and include any area potentially susceptible to phragmites growth. Survey results shall be submitted to the Department within 60 days of survey completion. The Department shall be notified within 24 hours whenever new growths of Phragmites are discovered. The Department may require the permittee to eradicate specific stands of Phragmites in these areas.	10/31/2024

Submit an Annual Phragmites Survey: Report results of the survey to your department wastewater compliance engineer by October 31st or within 60 days of survey completion, whichever is sooner. NOTE: Department notification is required within 24 hours whenever new growths of non-native Phragmites are discovered.	10/31/2025
Submit an Annual Phragmites Survey: Report results of the survey to your department wastewater compliance engineer by October 31st or within 60 days of survey completion, whichever is sooner. NOTE: Department notification is required within 24 hours whenever new growths of non-native Phragmites are discovered.	10/31/2026
Submit an Annual Phragmites Survey: Report results of the survey to your department wastewater compliance engineer by October 31st or within 60 days of survey completion, whichever is sooner. NOTE: Department notification is required within 24 hours whenever new growths of non-native Phragmites are discovered.	10/31/2027
Submit an Annual Phragmites Survey: Report results of the survey to your department wastewater compliance engineer by October 31st or within 60 days of survey completion, whichever is sooner. NOTE: Department notification is required within 24 hours whenever new growths of non-native Phragmites are discovered.	10/31/2028
Submit an Annual Phragmites Survey: Continue to report results of the survey to your department wastewater compliance engineer by October 31st or within 60 days of survey completion, whichever is sooner. NOTE: Department notification is required within 24 hours whenever new growths of non-native Phragmites are discovered.	

7.2.1 Explanation of Schedule

The beds were planted with the non-native reed grass *Phragmites australis australis*, which can be highly invasive in natural wetland habitats if the seeds or rhizomes escape to the natural environment. A Compliance Schedule has been included requiring an annual survey of the wastewater treatment facility and surrounding area. See the Reed Bed Requirements found in section 3 of the permit for more information.

7.3 Subclass SS - Sanitary Sewage Collection System Operator Certification

Required Action	Due Date
Wastewater Operator Certification for Subclass SS: The permittee shall have at least one person obtain certification for Subclass SS - Sanitary Sewage Collection System by the due date.	09/30/2024

7.3.1 Explanation of Schedule

Ch. NR 113, Wis. Adm. Code, was revised to create Subclass SS and requires that facilities have at least one person certified in Subclass SS at the end of the first permit term after the rules effective date (June 2014).

8 Attachments:

Water Quality-Based Effluent Limitations for Stephenville Sanitary District No. 1, WPDES Permit No. WI-0032531-07, 01/30/2024, Nicole Krueger, Water Resources Engineer.

9 Expiration Date:

March 31, 2029

10 Justification Of Any Waivers From Permit Application Requirements

No waivers were granted from permit application requirements.

Prepared By: Amanda Perdzoek, Wastewater Specialist

Date: February 20, 2024

Notice of reissuance was published in the Post-Crescent, 306 W Washington St., Appleton, WI 54911-4745.

CORRESPONDENCE/MEMORANDUM

DATE: 10/14/2022

TO: Sarah Adkins – NER

FROM: Nicole Krueger – SER *Nicole Krueger*

SUBJECT: Water Quality-Based Effluent Limitations for the Poy Sippi Sanitary District
WPDES Permit No. WI-0031691-09

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 Poy Sippi Sanitary District in Waushara County. This municipal wastewater treatment facility (WWTF) discharges to the Pine River, located in the Pine and Willow River Watershed in the Wolf River Basin. This discharge is included in the Upper Fox and Wolf River Basin TMDL as approved by EPA. The evaluation of the permit recommendations is discussed in more detail in the attached report.

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

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Flow Rate						1,2
BOD ₅			45 mg/L	30 mg/L		1
TSS TMDL			75 lbs/day	60 mg/L 46 lbs/day		3
pH	9.0 s.u.	6.0 s.u.				1
Bacteria						4
Interim Limit Fecal Coliform				400 #/100 mL geometric mean		
Final Limit <i>E. coli</i>				126 #/100 mL geometric mean		
Ammonia Nitrogen	Variable		34 mg/L	34 mg/L		5
Phosphorus Interim Limit Final TMDL				4.5 mg/L 0.24 lbs/day	0.080 lbs/day	6
TKN, Nitrate+Nitrite, and Total Nitrogen						7

Footnotes:

1. No changes from the current permit.
2. Monitoring only.
3. The TSS and phosphorus mass limits are based on the Total Maximum Daily Load (TMDL) for the Upper Fox and Wolf River Basin to address phosphorus water quality impairments within the TMDL area. The TMDL was approved by EPA in February 2020.
4. 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.

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.

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

6. The monthly average phosphorus concentration limit functions as an interim limit for the phosphorus compliance schedule.
7. 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).

No WET testing is required because information related to the discharge indicates low to no risk for toxicity.

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

Attachments (3) – Narrative, Map, and 2010 Ammonia Limits Calculations

PREPARED BY: Nicole Krueger, Water Resources Engineer – SER

E-cc: Barti Oumarou, Wastewater Engineer – NER
 Heidi Schmitt Marquez, Regional Wastewater Supervisor – NER
 Laura Dietrich, Wastewater Specialist – Waukesha
 Diane Figiel, Water Resources Engineer – WY/3

Attachment #1
**Water Quality-Based Effluent Limitations for
Poy Sippi Sanitary District**

WPDES Permit No. WI-0031691-09

Prepared by: Nicole Krueger

PART 1 – BACKGROUND INFORMATION

Facility Description

Poy Sippi Sanitary District (Poy Sippi), in eastern Waushara County, operates an existing wastewater treatment facility consisting of three synthetic-lined earthen lagoons with a diffused aeration system. All wastewater flows by gravity or is pumped to a final lift station then through a 6-inch force main to the head of the three-cell aerated lagoon system. Following treatment in the lagoons, the effluent is disinfected with ultraviolet (UV), and discharged to the Pine River.

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

Existing Permit Limitations

The current permit, expiring on 06/30/2022, includes the following effluent limitations and monitoring requirements.

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Footnotes
Flow Rate					1
BOD ₅			45 mg/L	30 mg/L	2
TSS				60 mg/L	3
pH	9.0 s.u.	6.0 s.u.			2
Fecal Coliform May – September			656#/100 mL geometric mean	400#/100 mL geometric mean	
Residual Chlorine	38 µg/L		38 µg/L	38 µg/L	4
Ammonia Nitrogen	Variable		34 mg/L	34 mg/L	5

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. This is a TSS variance 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. The need for TSS limits does not need to be demonstrated at subsequent permit reissuances if the treatment quality is expected to remain similar from the time the variance was implemented in the permit.
4. UV disinfection is now used, and chlorine is no longer added to the treatment system. Chlorine limits or monitoring are no longer needed.
5. The variable daily maximum ammonia limits are shown below:

Attachment #1

Effluent pH - s.u.	NH ₃ -N Limit – mg/L	Effluent pH - s.u.	NH ₃ -N Limit – mg/L
pH ≤ 7.5	> 34	8.2 < pH ≤ 8.3	9.4
7.5 < pH ≤ 7.6	34	8.3 < pH ≤ 8.4	7.8
7.6 < pH ≤ 7.7	29	8.4 < pH ≤ 8.5	6.4
7.7 < pH ≤ 7.8	24	8.5 < pH ≤ 8.6	5.3
7.8 < pH ≤ 7.9	20	8.6 < pH ≤ 8.7	4.4
7.9 < pH ≤ 8.0	17	8.7 < pH ≤ 8.8	3.7
8.0 < pH ≤ 8.1	14	8.8 < pH ≤ 8.9	3.1
8.1 < pH ≤ 8.2	11	8.9 < pH ≤ 9.0	2.6
		9.0 < pH	< 2.6

Receiving Water Information

- Name: Pine River
- Waterbody Identification Code (WBIC): 247800
- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code: Warm water sport fish (WWSF) community, non-public water supply. Note: Cold water and public water supply criteria are used for bioaccumulating compounds of concern, because the discharge is within the Great Lakes basin.
- Low flows used in accordance with chs. NR 106 and 217, Wis. Adm. Code: The following 7-Q₁₀ and 7-Q₂ values are from USGS for Station W66, at Highway 49 upstream of where Outfall 001 is located.
 - 7-Q₁₀ = 52 cfs (cubic feet per second)
 - 7-Q₂ = 59 cfs
 - Harmonic Mean Flow = 78 cfs using a drainage area of 99.4 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).
- Hardness = 234 mg/L as CaCO₃. This value represents the geometric mean of data from 05/28/2009 – 03/03/2020 from WET testing from Wild Rose WWTF which discharges to Pine River upstream of Poy Sippi.
- % 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 from the Wolf River is used for this evaluation because there is no data available for the Pine River. The Wolf River is within the same ecological landscape so ambient water quality characteristics are expected to be similar. The numerical values are shown in the tables below. If no data is available, the background concentration is assumed to be negligible and a value of zero is used in the computations. Background data for calculating effluent limitations for ammonia nitrogen are described later.
- Multiple dischargers: None.
- Impaired water status: The immediate receiving water is not 303(d) listed as impaired. Lake Poygan approximately 5 miles downstream of Outfall 001 is impaired for PCBs, total phosphorus, and TSS.

Effluent Information

- Design flow rate(s):
 - Annual average = 0.048 MGD (million gallons per day)

Attachment #1

For reference, the actual average flow from 07/01/2017 to 02/28/2022 was 0.035 MGD.

- Hardness = 352 mg/L as CaCO₃. This value represents the geometric mean of data from the permit reissuance application from 02/02/2022 – 02/15/2022.
- 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.
- 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.

Effluent Copper Data

Statistics	µg/L
1-day P ₉₉	24
4-day P ₉₉	20
30-day P ₉₉	17
Mean	16
Std	2.9
Sample size	11
Range	13 – 21

The following table presents the average concentrations and loadings at Outfall 001 from 07/01/2017 to 02/28/2022 for all parameters with limits in the current permit to meet the requirements of s. NR 201.03(6), Wis. Adm. Code:

Averages of Parameters with Limits

	Average Measurement
BOD ₅	15.6 mg/L
TSS	17.3 mg/L*
pH field	7.37 s.u.
Ammonia Nitrogen	5.55 mg/L*
Fecal Coliform	71.9 #/100 mL

*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)

- 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)

Daily Maximum Limit Calculation Method

Daily maximum effluent limitations for toxic substances are based on the acute toxicity criteria (ATC), listed in ch. NR 105, Wis. Adm. Code. In accordance with s. NR 106.06(3)(b), limitations based on acute toxicity are either set equal to two times the acute criteria (the final acute value) or calculated using the mass balance equation below, whichever is more restrictive.

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

Where:

WQC =ATC 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.

In this case, limits set equal to two times the acute criteria are more restrictive and this method is used to calculate the daily maximum limits shown in the table below.

The following tables list the calculated WQBELs for this discharge along with the results of effluent sampling. 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 = 41.6 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.
Arsenic		340	680	136	<14		
Cadmium	457	58.9	118	23.6	<0.3		
Chromium	301	4446	8892	1778	<1.3		
Copper	495	70.2	140			24	21
Lead	356	365	729	146	<3.5		
Nickel	268	1080	2161	432	5.1		
Zinc	333	345	689	138	47		
Chloride (mg/L)		757	1514	303	213		

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

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

Attachment #1

Weekly Average Limits based on Chronic Toxicity Criteria (CTC)

RECEIVING WATER FLOW = 13.0 cfs (¼ of the 7-Q₁₀), as specified in s. NR 106.06(4)(c), Wis. Adm. Code

SUBSTANCE	REF. HARD.* mg/L	CTC	MEAN BACK-GRD.	WEEKLY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	4-day P ₉₉
Arsenic		152		26793	5359	<14	
Cadmium	175	3.82	0.01	670.58	134	<0.3	
Chromium	301	326		57345	11469	<1.3	
Copper	495	40.7	0.46	7080.8			20
Lead	356	95.5		16813.5	3363	<3.5	
Nickel	268	120		21156	4231	5.1	
Zinc	333	345	1.05	60494	12099	47	
Chloride (mg/L)		395		69536	13907	213	

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

Monthly Average Limits based on Wildlife Criteria (WC)

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 = 18.2 cfs (¼ of Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

SUBSTANCE	HTC	MEAN BACK-GRD.	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Cadmium	370	0.01	91069	18214	<0.3
Chromium (+3)	3818000		939758255	187951651	<1.3
Lead	140		34459	6892	<3.5
Nickel	43000		10583972	2116794	5.1

Monthly Average Limits based on Human Cancer Criteria (HCC)

RECEIVING WATER FLOW = 18.2 cfs (¼ 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	13.3	3274	655	<14

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 not required for any substances in this section.

Total Residual Chlorine – Because Poy Sippi has upgraded disinfection treatment to UV and no longer adds chlorine into the treatment system, the prior limits may be removed. Limit continuation requirements as described in s. NR 205.067(5), Wis. Adm. Code, are not applicable when the facility ceases adding chlorine into the treatment system. The antidegradation requirements do not apply to remove these limits as the change in chlorine concentration will not result in exceeding the existing limits in the reissued permit as described in s. NR 207.02(6)(a), Wis. Adm. Code.

Mercury – The permit application did not require monitoring for mercury because Poy Sippi 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), Wis. Adm. Code.” There is only one available mercury sample from the past five years from 10/23/2018 which had a result of <0.606 mg/kg. Therefore, **no mercury monitoring is recommended at Outfall 001.**

PFOS and PFOA – The need for PFOS and PFOA monitoring is evaluated in accordance with s. NR 106.98(3)(b), Wis. Adm. Code. Based on the effluent flow rate and the lack of industrial discharges contributing to the collection system, **PFOS and PFOA monitoring is not recommended.**

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

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

The effluent pH data was examined as part of this evaluation. A total of 1425 sample results were reported from 07/01/2017 to 12/31/2021. The maximum reported value was 8.7 s.u. (Standard pH Units). The effluent pH was 8.2 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 8.4 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 8.4 s.u. Therefore, a value of 8.2 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 8.2 s.u. into the equation above yields an ATC = 5.73 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 either set equal to two times the ATC (the final acute value) or calculated using the mass balance equation in s. NR 106.32(2)(e), Wis. Adm. Code.

In this case, limits calculated set equal to two times the acute criteria are more restrictive. This method is used to calculate the daily maximum limit of **11.5 mg/L**.

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 updated using the 1-Q₁₀.

Daily Maximum Ammonia Nitrogen Limits – WWSF, WWFF & LFF

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

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 table has been expanded from the table in the current permit to included ammonia nitrogen limits throughout the pH range.

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

Weekly and monthly average limits are not included in the current permit but are being evaluated here due to changes to ch. NR 106, Wis. Adm. Code. **The weekly and monthly average ammonia nitrogen limits calculation from the previous memo do not change** 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 07/04/2017 to 12/28/2021:

Attachment #1

Effluent Ammonia Nitrogen Data

Statistics	mg/L
1-day P ₉₉	37.1
4-day P ₉₉	20.2
30-day P ₉₉	9.77
Mean*	5.55
Std	8.04
Sample size	233
Range	<0.03 – 70

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

The permit currently has daily maximum, weekly average, and monthly average limits year-round. 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.

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
Year round	Variable	34	34

PART 4 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR BACTERIA

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.

E. coli monitoring is recommended at the same frequency that fecal coliform monitoring is required in the current permit. Because Poy Sippi’s permit requires weekly monitoring, 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.

These limits are required during May through September. No changes are recommended to the current recreational period and the required disinfection season.

Effluent Data

Poy Sippi has monitored effluent *E. coli* from 06/01/2021 to 09/21/2021 and a total of 23 results are available. A geometric mean cannot be calculated on a monthly basis because there are not enough detected samples each month sampling was completed. A maximum monthly geometric mean of 300 counts/100 mL was reported. Effluent data has exceeded 410 counts/100 mL 0 times. The maximum reported value was 300 counts/100 mL. Based on this effluent data, it is unclear if the facility can meet new *E. coli* limits and a short compliance schedule is recommended in the reissued permit.

Interim Limit

At this time, there is no effluent *E. coli* data available. *E. Coli* data indicates that the new limitations are not readily attainable. The permit will include a compliance schedule to meet these limits. 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.

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.

Because Poy Sippi does not currently have an existing technology-based limit, the need for this limit in the reissued permit is evaluated. The data demonstrates that the annual monthly average phosphorus loading is less than 150 lbs/month, which is the threshold for municipalities in accordance to s. NR 217.04(1)(a)1, Wis. Adm. Code, **and therefore no technology-based limit is required.**

Month	Phosphorus Result Concentration (mg/L)	Total Effluent Flow (Million Gallons)	Calculated Mass (lbs/month)
Jan 2021	4.5	0.687	25.8
Feb 2021	1.3	0.605	6.56
Mar 2021	4.6	1.01	38.8
Apr 2021	3.2	1.14	30.5
May 2021	3.3	0.913	25.1
Jun 2021	2.9	0.888	21.5
Jul 2021	4.2	1.63	57.0
Aug 2021	3.3	1.63	44.8
Sep 2021	0.97	0.859	6.95
Oct 2021	5.0	0.628	26.2
Nov 2021	1.6	0.616	8.22
Average			26.5

Attachment #1

$$\text{Total P (lbs/month)} = \text{Result (mg/L)} \times \text{total flow (MG/month)} \times 8.34 \text{ (lbs/gallon)}$$

Where total flow is the sum of the actual (not design) flow (in MGD) for that month

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

TMDL Limits

Total phosphorus (TP) effluent limits in lbs/day are calculated as recommended in the *TMDL Development and Implementation Guidance: Integrating the WPDES and Impaired Waters Programs* (April 2020) and are based on the annual phosphorus wasteload allocation (WLA) given in pounds per year. This WLA found in Appendix H of the *Total Maximum Daily Loads for Total Phosphorus and Total Suspended Solids in the Upper Fox and Wolf River Basins (UFW TMDL)* report dated February 2020 are expressed as maximum annual loads (lbs/year). The annual WLA for Poy Sippi is 24 lbs/year.

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 the phosphorus WQBELs set equal to WLAs would not be consistent with the assumptions and requirements of the TMDL. Therefore, limits given to facilities included in the Upper Fox and Wolf River Basins TMDL are given monthly average mass limits and, if the equivalent effluent concentration is less than or equal to 0.3 mg/L, six-month average mass limits are also included. The following equation shows the calculation of equivalent effluent concentration:

$$\begin{aligned} \text{TP Equivalent Effluent Concentration} &= \text{WLA} \div (\text{365 days/yr} * \text{Flow Rate} * \text{Conversion Factor}) \\ &= 24 \text{ lbs/yr} \div (\text{365 days/yr} * \text{0.048 MGD} * \text{8.34}) \\ &= \text{0.16 mg/L} \end{aligned}$$

Since this value is less than 0.3 mg/L, both a six-month average mass limit and a monthly average mass limit are applicable for total phosphorus. The monthly average limit is set equal to three times the six-month average limit.

$$\begin{aligned} \text{TP 6-Month Average Permit Limit} &= \text{WLA} \div \text{365 days/yr} * \text{multiplier} \\ &= (24 \text{ lbs/yr} \div \text{365 days/yr}) * \text{1.22} \\ &= \text{0.080 lbs/day} \end{aligned}$$

$$\begin{aligned} \text{TP Monthly Average Permit Limit} &= \text{TP 6-Month Average Permit Limit} * \text{3} \\ &= \text{0.080 lbs/day} * \text{3} \\ &= \text{0.24 lbs/day} \end{aligned}$$

The multiplier used in the six-month average calculation was determined according to the implementation guidance. A coefficient of variation was calculated, based on phosphorus mass monitoring data, to be 0.42. This is the standard deviation divided by the mean of mass data. This value, along with monitoring frequency, is used to select the multiplier. The current permit specifies phosphorus monitoring as weekly; if a different monitoring frequency is used, the stated limits should be reevaluated.

The six-month average and monthly average mass effluent limits of 0.080 lbs/day and 0.24 lbs/day respectively are recommended for this discharge. The limits are equivalent to the concentrations of 0.20 mg/L and 0.60 mg/L respectively at the facility design flow of 0.048 MGD.

Attachment #1

The UFW TMDL establishes TP wasteload allocations to reduce the loading in the entire watershed including WLAs to meet water quality standards for tributaries to the Upper Fox and Wolf River. Therefore, WLA-based WQBELs are protective of immediate receiving waters and TP WQBELs derived according to s. NR 217.13, Wis. Adm. Code are not required.

Since wasteload allocations are expressed as annual loads (lbs/yr), permits with TMDL-derived monthly average permit limits should require the permittee to calculate and report rolling 12-month sums of total monthly loads for TP. Rolling 12-month sums can be compared directly to the annual wasteload allocation.

Effluent Data

The following table summarizes effluent total phosphorus monitoring data from 07/04/2017 – 07/27/2022.

Total Phosphorus Effluent Data

	Phosphorus mg/L	Phosphorus lbs/day
1-day P ₉₉	6.6	1.6
4-day P ₉₉	4.5	1.1
30-day P ₉₉	3.5	0.83
Mean	3.0	0.69
Std	1.1	0.29
Sample size	32	31
Range	0.97 – 5.0	0.24 – 1.4

Poy Sippi cannot currently meet the TMDL-based limits, so a compliance schedule and an interim limit is needed in the reissued permit.

Interim Limit – Phosphorus

An interim limit is needed when a compliance schedule is included in the permit to meet the TMDL limits. This limit should reflect a value which the facility is able to currently meet; however, it should also consider the receiving water quality, keeping the water from further impairment. **It is recommended that the interim limit be set equal to 4.5 mg/L, expressed as a monthly average.** This value reflects the 4-day P₉₉ concentration from the previous two permit applications from 01/02/2020 – 08/02/2022. This value is recommended instead of the 30-day P₉₉ concentration of 3.5 mg/L to allow operational flexibility when the facility begins to initiate phosphorus treatment optimization activities, which often consist of trial and error.

PART 6 – TOTAL SUSPENDED SOLIDS

TMDL Limits – TSS

Total Suspended Solids (TSS) effluent limits in lbs/day are calculated as recommended in the *TMDL Development and Implementation Guidance: Integrating the WPDES and Impaired Waters Programs* (April 2020). This WLAs found in Appendix I of the *Total Maximum Daily Loads for Total Phosphorus and Total Suspended Solids in the Upper Fox and Wolf Basins (UFW TMDL)* report dated February 2020 are expressed as maximum annual loads (lbs/year). The annual WLA for Poy Sippi is 8,774 lbs/year.

Attachment #1

Revisions to chs. NR 106 and 205, Wis. Adm. Code align Wisconsin water quality-based effluent limits with 40 CFR 122.45(d), which requires WPDES permits to contain the following concentration limits, whenever practicable and necessary to protect water quality:

- Weekly average and monthly average limitations for continuous discharges subject to ch. NR 210.
- Daily maximum and monthly average limitations for all other discharges.

Poy Sippi is a municipal treatment facility and is therefore subject to weekly average and monthly average TSS limits derived from TSS annual WLAs.

$$\begin{aligned} \text{TSS Weekly Average Permit Limit} &= \text{WLA} \div 365 \text{ days/yr} * \text{Weekly multiplier} \\ &= (8774 \text{ lbs/yr} \div 365 \text{ days/yr}) * 3.11 \\ &= 75 \text{ lbs/day} \end{aligned}$$

$$\begin{aligned} \text{TSS Monthly Average Permit Limit} &= \text{Daily WLA} * \text{Monthly multiplier} \\ &= (8774 \text{ lbs/yr} \div 365 \text{ days/yr}) * 1.90 \\ &= 46 \text{ lbs/day} \end{aligned}$$

The multiplier used in the weekly average and monthly average calculation was determined according to implementation guidance. A coefficient of variation was calculated, based on TSS mass monitoring data, to be 1.2. This is the standard deviation divided by the mean of mass data. However, it is believed that the optimization of the wastewater treatment system to achieve the WLA-derived permit limits will reduce effluent variability. Thus, the maximum anticipated coefficient of variation expected by the facility is 0.6. This value, along with monitoring frequency, is used to select the multiplier. The current permit specifies TSS monitoring as 3/week; if a different monitoring frequency is used, the stated limits should be reevaluated.

Weekly average and monthly average mass effluent limits are recommended for this discharge. The limits are equivalent to a concentration of 187 mg/L and 114 mg/L respectively at the facility design flow of 0.048 MGD.

Since wasteload allocations are expressed as annual loads (lbs/yr), permits with TMDL-derived monthly average permit limits should require the permittee to calculate and report rolling 12-month sums of total monthly loads for TSS. Rolling 12-month sums can be compared directly to the annual wasteload allocation.

Effluent Data

The following table summarizes effluent TSS monitoring data from 07/04/2017 – 07/27/2022.

Total Suspended Solids Effluent Data

	TSS mg/L	TSS lbs/day
1-day P ₉₉	70.5	31.3
4-day P ₉₉	39.6	16.9
30-day P ₉₉	23.7	8.65
Mean	16.8	5.26
Std	14.1	6.55

Attachment #1

Sample size	263	261
Range	0 – 76	0 – 34.2

Poy Sippi can currently meet the TMDL-based limits, so the limits are recommended to be effective upon permit reissuance and no compliance schedule is needed. The current monthly average concentration limit of 60 mg/L is also recommended to continue in the reissued permit.

**PART 7 – WATER QUALITY-BASED EFFLUENT LIMITATIONS
FOR THERMAL**

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

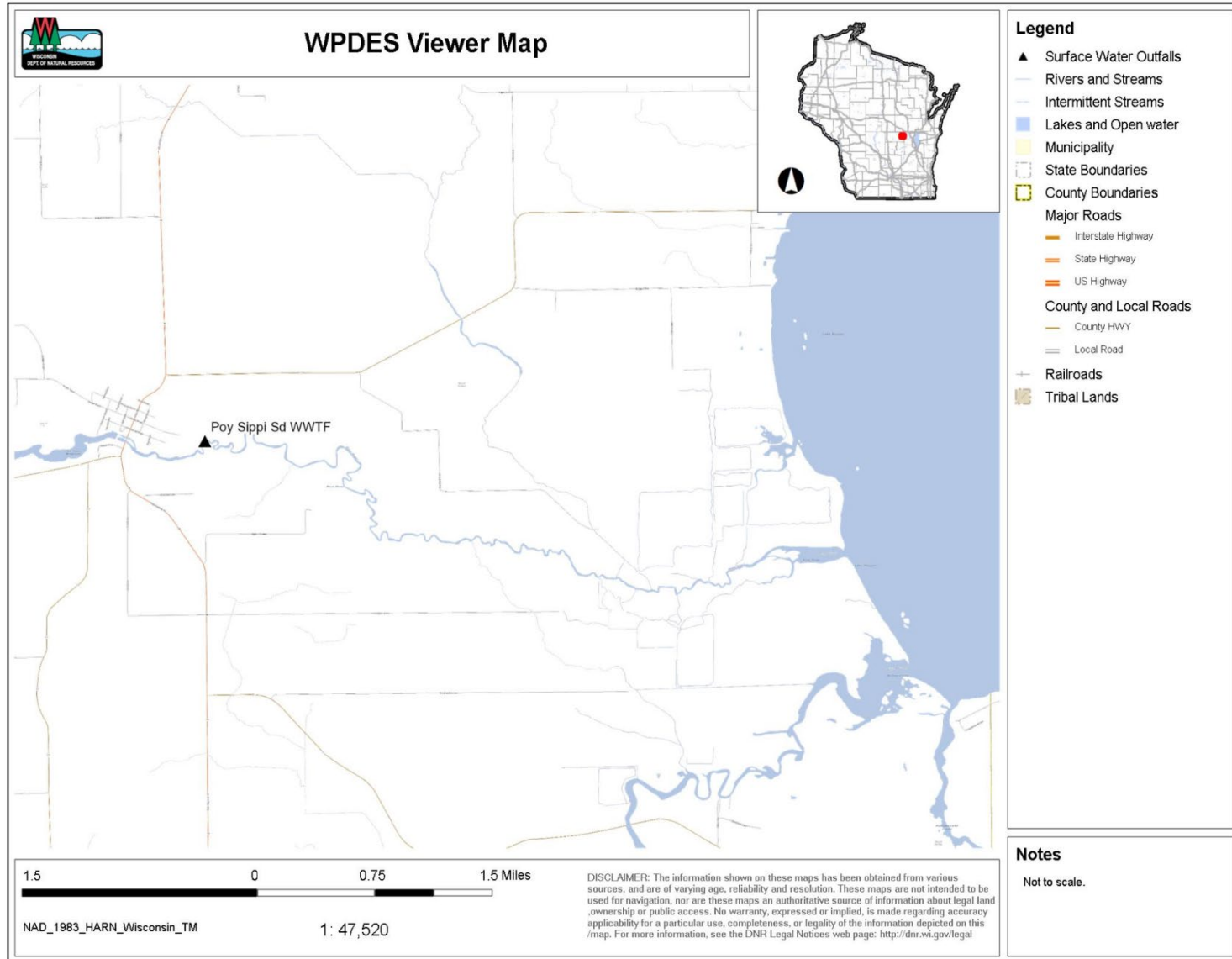
Due to the amount of upstream flow available for dilution in the limit calculation ($Q_s:Q_e > 20:1$), the lowest calculated limitation is 120° F (s. NR 106.55(6)(a), Wis. Adm. Code).

Because this is a lagoon facility treating domestic waste, there is not reasonable potential for the discharge to exceed 120° F. **No limits or monitoring are recommended in the reissued permit.**

PART 8 – 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 (October 29, 2019)*.

Guidance in Chapter 1.11 of the WET Guidance Document (WET Testing of Minor Municipal Discharges) was consulted. This is a minor municipal discharge (< 1.0 MGD) comprised solely of domestic wastewater, with no history of WET failures and no toxic compounds detected at levels of concern. **No WET testing is recommended at this time because of the low risk in effluent toxicity.**



Attachment #3
2010 Ammonia Calculations

Ammonia Limit Calculations Summary – Poy Sippi Sanitary District																						
Classification: EFFLUENT FLOW (mgd): MAX. EFFLUENT pH (s.u.): (seasonal pH p99s)	FAL (Pine River - WWSF) 0.048 7.66 (1 day p99 - summer) 7.51 (1 day p99 - winter)																					
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