

Village of Necedah Public Noticed Permit Fact Sheet

General Information

Permit Number:	WI-0020133-09-0
Permittee Name:	Village of Necedah, PO Box 371, Necedah, WI 54646
Discharge Location:	Necedah Wastewater Treatment Plant, 210 East 9th St., Necedah, WI 54646 West bank of the Yellow River north of the Ninth Street boat landing. SW1/4 NE1/4, Section 19, T18N R04E, Village of Necedah, Juneau County, WI
Receiving Water:	the Yellow River in the Lower Yellow River Watershed of the Upper Wisconsin River Southern Sub-Basin in Juneau County
Stream Flow (Q _{7,10}):	8.70 cfs
Stream Classification:	Warm Water Sport Fish (WWSF) community, non-public water supply.
Discharge Type:	Existing, continuous
Design Flow:	0.250 MGD
Significant Industrial Loading?	None
Operator at Proper Grade?	Yes
Approved Pretreatment Program?	N/A

Facility Description

The Necedah Wastewater Treatment Facility, which has annual average design flow of 0.25 million gallons per day (MGD), treats domestic wastewater from the Village of Necedah. Annual average influent flow in 2023 was 0.0784 MGD. Treatment of the wastewater consists of mechanical screening for the removal of large solid particles, grit removal, influent pumping and secondary activated sludge treatment via two sequencing batch reactor (SBR) units. Effluent is then seasonally disinfected via ultraviolet (UV) radiation prior to discharge to the Yellow River. Sludge is aerobically digested and stored as a liquid until land applied on Department approved sites. The only major operational change during the last permit term was addition of the new chemical building to assist in controlling phosphorus limits. Although the facility has not had to add chemical (ferric) to treat for phosphorus because they were able to meet the phosphorus limits, the lower limits in this permit term will require they begin adding regular chemical to meet the lower limits. Significant effluent monitoring and/or limit changes in this permit term are as follows: 1) the addition of annual monitoring for total nitrogen, nitrite + nitrate nitrogen and total Kjeldahl nitrogen, 2) an increase in the monitoring frequency for BOD, TSS and phosphorus, 3) fecal coliform monitoring & limit have been replaced with *Escherichia coli* (*E. coli*), 4) monitoring for PFOS and PFOA added every other month in accordance with s. NR 106.98(2)(c), Wis. Adm. Code along with an associated compliance schedule, 5) a decrease in the required number of acute WET tests, 6) a reduction in the phosphorus limit based on the site specific criteria in the Wisconsin River Basin Total Maximum Daily Load (TMDL), along with a compliance schedule to meet the lower mass limit, and 7) ammonia monitoring is required throughout the permit term and not just during two years of the permit. The influent & effluent flow monitoring frequency has been changed from “continuous” to “daily”. Additionally, to quantitate the risk, PFAS sludge sampling has been included in the permit pursuant to ss. NR 214.18(5)(b) and NR 204.06(2)(b)9., Wis. Adm. Code.

Substantial Compliance Determination

After a desktop review of all discharge monitoring reports, land application reports, compliance schedule items, and a site visit on 3/14/2024, The permittee has been found to be in substantial compliance with their current WPDES permit.

Compliance determination entered by Tanner Connors on 05/28/2024.

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	0.0784 MGD (2023)	Representative influent samples shall be collected at the influent channel upstream of the mechanical bar screen.
001	0.0657 (2023)	Representative composite effluent samples shall be collected downstream of the SBRs and upstream of the effluent flow meter, prior to UV disinfection. Grab samples shall be collected after UV disinfection.
004	4.5 dry US tons	Representative sludge samples shall be collected annually and monitored for Lists 1, 2, 3 & 4 and PFAS, as well as once in 2025 for PCBs.

1 Influent – Monitoring Requirements

Sample Point Number: 701- UPSTREAM of BAR SCREEN

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, Total		mg/L	2/Week	24-Hr Flow Prop Comp	

Changes from Previous Permit:

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

Explanation of Limits and Monitoring Requirements

Monitoring of influent flow, BOD5 and total suspended solids is required by s. NR 210.04(2), Wis. Adm. Code, to assess wastewater strengths and volumes and to demonstrate the percent removal requirements in s. NR 210.05, Wis. Adm. Code, and in the Standard Requirements section of the permit.

2 Surface Water - Monitoring and Limitations

Sample Point Number: 001- EFFLUENT TO WISCONSIN RIVER

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow Rate		MGD	Daily	Continuous	
BOD5, Total	Monthly Avg	30 mg/L	3/Week	24-Hr Flow Prop Comp	
BOD5, Total	Weekly Avg	45 mg/L	3/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total	Monthly Avg	30 mg/L	3/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total	Weekly Avg	45 mg/L	3/Week	24-Hr Flow Prop Comp	
pH Field	Daily Max	9.0 su	Daily	Grab	
pH Field	Daily Min	6.0 su	Daily	Grab	
Nitrogen, Ammonia (NH3-N) Total		mg/L	Monthly	24-Hr Flow Prop Comp	
E. coli	Geometric Mean - Monthly	126 #/100 ml	Weekly	Grab	Limit & monitoring required May - Sept
E. coli	% Exceedance	10 Percent	Monthly	Calculated	Limit & monitoring apply May-Sept. See the E. coli Percent Limit section below & in the permit. Enter the result in the DMR on the last day of the month.
Copper, Total Recoverable	Daily Max	34 ug/L	Monthly	24-Hr Flow Prop Comp	Collect sample at the same time as a hardness sample
Copper, Total Recoverable	Weekly Avg	34 ug/L	Monthly	24-Hr Flow Prop Comp	
Copper, Total Recoverable	Monthly Avg	34 ug/L	Monthly	24-Hr Flow Prop Comp	
Copper, Total Recoverable	Daily Max	0.077 lbs/day	Monthly	Calculated	
Zinc, Total Recoverable		ug/L	Quarterly	24-Hr Flow Prop Comp	Collect sample at the same time as a hardness sample
Hardness, Total as CaCO3		mg/L	Quarterly	24-Hr Flow Prop Comp	Collect sample at the same time as a copper & zinc sample

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
PFOS		ng/L	1/ 2 Months	Grab	Monitoring only. See PFOS/PFOA Minimization Plan Determination of Need schedule.
PFOA		ng/L	1/ 2 Months	Grab	
Phosphorus, Total	Monthly Avg	3.8 mg/L	3/Week	24-Hr Flow Prop Comp	Limits applies at permit effective date. See associated compliance schedule & TMDL section in permit.
Phosphorus, Total	Monthly Avg	2.70 lbs/day	3/Week	Calculated	Limit effective through 03/31/2025. See associated compliance schedule & TMDL section in permit.
Phosphorus, Total	Monthly Avg	1.20 lbs/day	3/Week	Calculated	Limits effective 04/01/2025. See associated compliance schedule & TMDL section in permit.
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 section in permit.
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 section in permit.
Nitrogen, Total Kjeldahl		mg/L	See Listed Qtr(s)	24-Hr Flow Prop Comp	Monitoring required annually in specific quarters. See Nitrogen Series Monitoring section below.
Nitrogen, Nitrite + Nitrate Total		mg/L	See Listed Qtr(s)	24-Hr Flow Prop Comp	
Nitrogen, Total		mg/L	See Listed Qtr(s)	Calculated	
Acute WET		TUa	See Listed Qtr(s)	24-Hr Flow Prop Comp	See WET testing section below. Collect sample at the same time as a copper & zinc sample.

Changes from Previous Permit

Significant effluent monitoring and/or limit changes in this permit term are as follows: 1) the addition of annual monitoring for total nitrogen, nitrite + nitrate nitrogen and total Kjeldahl nitrogen, 2) an increase in the monitoring frequency for BOD, TSS and phosphorus, 3) fecal coliform monitoring & limit have been replaced with *Escherichia coli* (*E. coli*), 4) monitoring for PFOS and PFOA added every other month in accordance with s. NR 106.98(2)(c), Wis. Adm. Code, 5) an decrease the required number of acute WET tests, 6) a reduction in the phosphorus limits & a compliance schedule to meet the lower mass limit, 7) ammonia monitoring is required throughout the permit term and not just during two years of the permit and 8) the sample frequency for flow has been changed from “continuous” to “daily” for eDMR reporting purposes.

Explanation of Limits and Monitoring Requirements

The effluent monitoring frequency for all parameters were considered. Monitoring frequencies are based on the size and type of the facility and are established to best characterize effluent quality and variability, to detect events of noncompliance, and to ensure fairness and consistency in permits issued across the state. Requirements in administrative code (NR 108, 205, 210 and 214 Wis. Adm. Code) and Section 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. For more information see the March 22, 2021 version of the Bureau of Water Quality Program Guidance Document “Monitoring Frequencies for Individual Wastewater Permits”. Using the criteria previously stated, the department has determined an increase in monitoring frequency from 2/week to 3/week is appropriate for BOD, TSS and phosphorus. These monitoring frequency increases are necessary in order to effectively characterize the effluent quality and variability, and to best determine compliance with effluent limitations.

Limits were determined for Necedah’s existing discharge to the Yellow River using chs. NR 102, 104, 105, 106, 207, 210, 212 and 217 of the Wisconsin Administrative Code (where applicable). For additional information on any of the limits see the June 14, 2024 memo from Ben Hartenbower to Holly Heldstab titled “Water Quality-Based Effluent Limitations for the Necedah Wastewater Treatment Facility WPDES Permit No. WI-0020133”.

MUNICIPAL EFFLUENT LIMITS – In accordance with the federal regulation 40 CFR 122.45(d), and to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Codes, limits in this permit are to be expressed as weekly average and monthly average limits whenever practicable.

BOD, TSS and pH: Monitoring frequency for these parameters have increased in order to effectively characterize the effluent quality and variability, and to best determine compliance with effluent limitations. However, limits for these pollutants correspond to the requirements of the current permit since the facility has not increased the capacity of the wastewater treatment system since the last permit issuance, nor are increases expected during the term of the permit.

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. Effluent data demonstrates there is no reasonable potential for the discharge to exceed any of the calculated limits, therefore no limits are required but monitoring is required throughout the permit term.

Disinfection/E. Coli/Fecal Coliform: Necedah disinfects the effluent May-Sept using ultraviolet (UV) light prior to discharge to the Yellow River. Fecal coliform monitoring and limits have been replaced with *Escherichia coli* (*E. coli*) monitoring and limits. Revisions to bacteria surface water quality criteria to protect recreational uses and accompanying *E. coli* WPDES permit implementation procedures became effective May 1, 2020. The new rule requires that WPDES permits for facilities with required disinfection include monitoring for *E. coli* while facilities are disinfecting during the recreation period and establish effluent limitations for *E. coli* established in s. NR 210.06 (2), Wis. Adm Code. The administrative code rule changes included the following actions: revised the bacteria water quality criteria from fecal coliform to *E. coli* to protect recreation in ch. NR 102, Wis. Adm. Code.; removed fecal coliform criteria for certain individual waters from ch. NR 104, Wis. Adm. Code.; revised permit requirements for publicly and privately owned

sewage treatment works in ch. NR 210, Wis. Adm. Code.; and, updated approved analytical methods for bacteria in ch. NR 219, Wis. Adm. Code.

Phosphorus: Necedah is included within the Wisconsin River Basin (WRB) total maximum daily load (TMDL), which was approved by EPA April 26, 2019. The TMDL establishes Waste Load Allocations (WLAs) for point source dischargers and determines the maximum amount of phosphorus that can be discharged and still protect water quality. The final effluent limits and monitoring expressed in the permit were derived from Site-Specific Criteria (SSC) for Lakes Petenwell, Castle Rock, and Wisconsin originally included in Appendix K of the TMDL report and approved by the U.S. Environmental Protection Agency on July 9, 2020.

The permittee's approved SSC-based WLA for this permittee is 279 lbs/yr and results in a calculated phosphorus mass limit of 1.2 lbs/day which goes into effect 04/01/2025. Until then a monthly average mass limit of 2.70 lbs/day will be in effect. The 12-month rolling sum of total monthly phosphorus (lbs/yr) shall be reported each month for direct comparison to the facility's WLA.

The monthly average phosphorus limit of 3.8 mg/L is an interim limit, set in accordance with s. NR. 217.17, Wis. Adm. Code. The interim limit 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.

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 *TMDL Development and Implementation Guidance: Integrating the WPDES and Impaired Waters Program*, mass limits must be given in the permit that are consistent with the TMDL WLA and 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 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 or weekly value. The final effluent limits for phosphorus are expressed as a monthly average. This final effluent limits were derived from and comply with the applicable water quality criterion.

Facilities with WRB TMDL based effluent limits for phosphorus 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) 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.

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:

- 4th quarter (Oct – Dec) 2024
- 2nd quarter (April – June) 2025
- 1st quarter (Jan – March) 2026
- 3rd quarter (July – Sept) 2027
- 4th quarter (Oct – Dec) 2028

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>). Acute WET tests are required in the following quarters:

- 3rd quarter (July – Sept) 2026
- 4th quarter (Oct – Dec) 2028

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 (Dry Tons/Year)
004	B	Liquid	Fecal Coliform	Injection & Incorporation	Land Application	4.5
Does sludge management demonstrate compliance? Yes						
Is additional sludge storage required? No						
Is Radium-226 present in the water supply at a level greater than 2 pCi/liter? No						
Is a priority pollutant scan required? No						

Sample Point Number: 004- AEROBICALLY DIGESTED SLUDGE

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Solids, Total		Percent	Annual	Composite	
Arsenic Dry Wt	Ceiling	75 mg/kg	Annual	Composite	
Arsenic Dry Wt	High Quality	41 mg/kg	Annual	Composite	
Cadmium Dry Wt	Ceiling	85 mg/kg	Annual	Composite	
Cadmium Dry Wt	High Quality	39 mg/kg	Annual	Composite	
Copper Dry Wt	Ceiling	4,300 mg/kg	Annual	Composite	
Copper Dry Wt	High Quality	1,500 mg/kg	Annual	Composite	
Lead Dry Wt	Ceiling	840 mg/kg	Annual	Composite	
Lead Dry Wt	High Quality	300 mg/kg	Annual	Composite	
Mercury Dry Wt	Ceiling	57 mg/kg	Annual	Composite	
Mercury Dry Wt	High Quality	17 mg/kg	Annual	Composite	
Molybdenum Dry Wt	Ceiling	75 mg/kg	Annual	Composite	
Nickel Dry Wt	Ceiling	420 mg/kg	Annual	Composite	
Nickel Dry Wt	High Quality	420 mg/kg	Annual	Composite	
Selenium Dry Wt	Ceiling	100 mg/kg	Annual	Composite	

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
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	Annual	Composite	
Nitrogen, Ammonium (NH4-N) Total		Percent	Annual	Composite	
Phosphorus, Total		Percent	Annual	Composite	
Phosphorus, Water Extractable		% of Tot P	Annual	Composite	
Potassium, Total Recoverable		Percent	Annual	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	Annual	Calculated	Report the sum of PFOA and PFOS. See PFAS Permit Sections for more information.
PFAS Dry Wt			Annual	Grab	Perfluoroalkyl and Polyfluoroalkyl Substances based on updated DNR PFAS List. See PFAS Permit Sections for more information.

Changes from Previous Permit:

PFAS – Monitoring for PFAS has been added once 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). Requirements for pathogens are specified in s. NR 204.07(6) and in s. NR 204.07 (7) for vector attraction requirements. Limitations for PCBs are addressed in s. NR 204.07(3)(k).

PFAS- The presence and fate of PFAS in municipal and industrial sludges is an emerging public health concern. EPA 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 WPDES permit pursuant to ss. NR 214.18(5)(b) and NR 204.06(2)(b)9., Wis. Adm. Code.

4 Schedules

4.1 Phosphorus TMDL Limits

The permittee shall comply with the new, lower phosphorus limits as specified.

Required Action	Due Date
Submit Report: Permittee shall submit a report on effluent discharges of phosphorus with conclusions regarding compliance with the monthly average limitation of 1.20 lbs/day.	12/31/2024
Complete Actions: Complete actions to achieve compliance with the monthly average phosphorus limit of 1.20 lbs/day. Limitation becomes effective 04/01/2025.	03/31/2025

Explanation of Schedule: The schedule above provides the permittee six months to begin adding ferric & adjust the amount of ferric addition necessary to meet the lower WIRB TMDL phosphorus mass limit that is based on the site specific criteria.

4.2 PFOS/PFOA Minimization Plan Determination of Need

Required Action	Due Date
<p>Report on Effluent Discharge: Submit a report on effluent PFOS and PFOA concentrations and include an analysis of trends in monthly and annual average PFOS and PFOA concentrations. This analysis should also include a comparison to the applicable narrative standard in s. NR 102.04(8)(d), Wis. Adm. Code.</p> <p>This report shall include all additional PFOS and PFOA data that may be collected including any influent, intake, in-plant, collection system sampling, and blank sample results.</p>	09/30/2025
<p>Report on Effluent Discharge and Evaluation of Need: Submit a final report on effluent PFOS and PFOA concentrations and include an analysis of trends in monthly and annual average PFOS and PFOA concentrations of data collected over the last 24 months. The report shall also provide a comparison on the likelihood of the facility needing to develop a PFOS/PFOA minimization plan.</p> <p>This report shall include all additional PFOS and PFOA data that may be collected including any influent, intake, in-plant, collection system sampling, and blank sample results.</p> <p>The permittee shall also submit a request to the department to evaluate the need for a PFOS/PFOA minimization plan.</p> <p>If the Department determines a PFOS/PFOA minimization plan is needed based on a reasonable potential evaluation, the permittee will be required to develop a minimization plan for Department approval no later than 90 days after written notification was sent from the Department. The Department will modify or revoke and reissue the permit to include PFOS/PFOA minimization plan reporting requirements along with a schedule of compliance to meet WQBELs. Effluent monitoring of PFOS and PFOA shall continue as specified in the permit until the modified permit is issued.</p> <p>If, however, the Department determines there is no reasonable potential for the facility to discharge PFOS or PFOA above the narrative standard in s. NR 102.04(8)(d), Wis. Adm. Code, no further</p>	09/30/2026

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

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

Special Reporting Requirements

None

Other Comments:

Publishing Newspaper: Juneau County Star Times, PO Box 220, Mauston, WI 53948-0220

Attachments:

- June 14, 2024 memo from Ben Hartenbower to Holly Heldstab titled “Water Quality-Based Effluent Limitations for the Necedah Wastewater Treatment Facility WPDES Permit No. WI-0020133”

Expiration Date:

September 30, 2029

Justification Of Any Waivers From Permit Application Requirements

N/A

Prepared By: Holly Heldstab, Wastewater Specialist

Date: August 8, 2024

CORRESPONDENCE/MEMORANDUM

DATE: June 14, 2024

TO: Holly Heldstab – WCR/Eau Claire

FROM: Benjamin Hartenbower – WCR/Eau Claire

SUBJECT: Water Quality-Based Effluent Limitations for the Necedah Wastewater Treatment Facility
 WPDES Permit No. WI-0020133

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 Necedah Wastewater Treatment Facility in Juneau County. This municipal wastewater treatment facility (WWTF) discharges to the Yellow River, located in the Lower Yellow River Watershed in the Central Wisconsin River Basin. This discharge is included in the Wisconsin River TMDL as approved by EPA on April 26, 2019 with site-specific criteria approved by EPA on July 9, 2020. 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	Footnotes
Flow Rate					1,2
BOD ₅			45 mg/L	30 mg/L	1
TSS			45 mg/L	30 mg/L	1
pH	9.0 s.u.	6.0 s.u.			1
Ammonia Nitrogen					2
E.Coli				126 #/100 mL geometric mean	3
Copper	34 µg/L, 0.077 lbs/day		34 µg/L	34 µg/L	1,4
Zinc					1,2
Hardness					1,5
PFOS and PFOA					6
Phosphorus Interim TMDL Limit				3.8 mg/L 1.20 lbs/day	7
TKN, Nitrate+Nitrite, and Total Nitrogen					8
Acute WET					9

Footnotes:

1. No changes from the current permit.
2. Monitoring only.
3. Bacteria limits apply during the disinfection season of May - September. Additional 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. Hardness monitoring is recommended because of the relationship between hardness and daily maximum limits based on acute toxicity criteria.
6. Monitoring once every two months is required in accordance with s. NR 106.98(2), Wis. Adm. Code.
7. The phosphorus mass limit is based on the Total Maximum Daily Load (TMDL) for the Wisconsin River Basin to address phosphorus water quality impairments within the TMDL area. The TMDL was approved by EPA on April 26, 2019 with site-specific criteria approved by EPA on July 9, 2020.
8. 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).
9. Two acute WET tests are recommended in the reissued permit. Sampling WET concurrently with any chemical-specific toxic substances is recommended. Tests should be done in rotating quarters, to collect seasonal information about this discharge and should continue after the permit expiration date (until the permit is reissued).

Please consult the attached report for details regarding the above recommendations. If there are any questions or comments, please contact Benjamin Hartenbower at (715) 225-4705 or Benjamin.Hartenbower@wisconsin.gov or Diane Figiel at Diane.Figiel@wisconsin.gov.

Attachments (3) – Narrative, Thermal Table, & Map

PREPARED BY:



Benjamin Hartenbower, PE,
Water Resources Engineer

Date: 06/14/2024

E-cc:

Tanner Connors, Wastewater Engineer – SCR/Dodgeville
Geisa Thielen, Regional Wastewater Supervisor – WCR/Eau Claire
Diane Figiel, Water Resources Engineer – WY/3
Kurt Rasmussen, Water Quality Biologist – WCR/La Crosse
Kari Fleming, Environmental Toxicologist – WY/3
Michael Polkinghorn, Water Resources Engineer – NOR/Rhineland
Nate Willis, Wastewater Engineer – WY/3

Attachment #1
**Water Quality-Based Effluent Limitations for
the Necedah Wastewater Treatment Facility
WPDES Permit No. WI-0020133**

Prepared by: Benjamin P. Hartenbower

PART 1 – BACKGROUND INFORMATION

Facility Description:

The Necedah WWTP includes a mechanical fine screen, a vortex grit removal system, influent pumps, a ferric chloride chemical feed system for phosphorus reduction, two-basin sequencing batch reactor, and ultraviolet (UV) light disinfection. Liquid sludge is stabilized in an aerobic digester and stored on site prior to land application by a contract hauler. Outfall 001 is located on the west bank of the Yellow River, north of boat landing at the east end of 9th Street.

Attachment #3 is a map of the area showing the approximate location of Outfall 001.

Existing Permit Limitations

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

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Footnotes
Flow Rate					1,2
BOD ₅			45 mg/L	30 mg/L	1
TSS			45 mg/L	30 mg/L	1
pH	9.0 s.u.	6.0 s.u.			1
Ammonia Nitrogen					2
Fecal Coliform May - September			656 #/100 mL geometric mean	400 #/100 mL geometric mean	3
Copper	34 µg/L, 0.077 lbs/day		34 µg/L	34 µg/L	3
Zinc					2
Hardness					2
Phosphorus Interim TMDL Limit				7.70 mg/L 2.70 lbs/day	
Acute WET					4

Footnotes:

1. These limitations are not being evaluated as part of this review. Because the water quality criteria (WQC), reference effluent flow rates, and receiving water characteristics have not changed, limitations for these water quality characteristics do not need to be re-evaluated at this time.
2. Monitoring only.
3. Additional limits to comply with the expression of limits requirements are included in bold.
4. Acute WET testing required: Oct - Dec 2019, July - Sept 2020, Apr - June 2021, Jan - March 2022, and July - Sept 2023.

Receiving Water Information

- Name: The Yellow River
- Waterbody Identification Code (WBIC): 1352800
- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code: Warm Water Sport Fish (WWSF) community, non-public water supply.
Low flows used in accordance with chs. NR 106 and 217, Wis. Adm. Code: USGS for Station 05403000
 - 7-Q₁₀ = 8.70 cfs (cubic feet per second)
 - 7-Q₂ = 34.0 cfs
 - Harmonic Mean Flow = 67.9 cfs using a drainage area of 526.0 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 = 59 mg/L as CaCO₃. This value represents the geometric mean of 3 samples collected in Yellow River from 10/09/2007 to 08/25/2010.
- % 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: Chloride data is from the Yellow River. Metals data from the East Fork Black River at Hatfield is used for this evaluation because there is no data available for the Yellow River and the the East Fork Black 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: The Pittsville Water and Sewer Department WWTF also discharges to the Yellow River, approximately 30 miles upstream. Because it is not in the immediate vicinity, the mixing zones do not overlap. Therefore, the other dischargers do not impact this evaluation.
- Impaired water status: This discharge is located within the WI River TMDL for phosphorus.

Effluent Information:

- Design Flow Rates(s):
 - Annual Average = 0.250 MGD (Million Gallons per Day)
 - Peak daily = 0.271 MGDFor reference, the actual average flow from November 2019 to March 2024 was 0.064 MGD.
- Hardness = 86 mg/L as CaCO₃. This value represents the geometric mean of 19 effluent samples collected from 02/04/2020 to 01/10/2024.
- 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: ferric chloride
- Total Phosphorus Wasteload Allocation: 279 lbs/year = 0.764 lbs/day
- 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 Chloride. The permit-required monitoring for Ammonia Nitrogen, Copper, Zinc, Hardness, and Phosphorus from November 2019 to March 2024 is used in this evaluation.

Chemical Specific Effluent Data at Outfall 001

	Copper µg/L	Zinc µg/L
1-day P ₉₉	64.63	123
4-day P ₉₉	35.4	87.6
30-day P ₉₉	19.84	56.5
Mean	13.27	42.4
Std	13.16	22.9
Sample size	55	20
Range	3.27 - 62.8	<26 - 110

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

Chemical Specific Effluent Data at Outfall 001

Sample Date	Chloride mg/L
05/02/2023	79.4
05/09/2023	70.5
05/16/2023	69.9
05/23/2023	66.6
mean	71.6

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.”.

The following table presents the average concentrations and loadings at Outfall 001 from November 2019 to March 2024 for all parameters with limits in the current permit to meet the requirements of s. NR 201.03(6):

Parameter Averages with Limits

	Average Measurement	Average Mass Discharged
BOD ₅	9 mg/L*	
TSS	6 mg/L*	
pH	6.98 s.u.	
Fecal Coliform	305#/100 mL	
Copper	13.27 µg/L	0.0078 lbs/day
Phosphorus	1.52 mg/L*	0.798 lbs/day

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

**PART 2 – WATER QUALITY-BASED EFFLUENT LIMITATIONS
FOR TOXIC SUBSTANCES – EXCEPT AMMONIA NITROGEN**

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

1. The maximum effluent concentration exceeds the calculated limit (s. NR 106.05(3), Wis. Adm. Code)
2. If 11 or more detected results are available in the effluent, the upper 99th percentile (or P₉₉) value exceeds the comparable calculated limit (s. NR 106.05(4), Wis. Adm. Code)
3. If fewer than 11 detected results are available, the mean effluent concentration exceeds 1/5 of the calculated limit (s. NR 106.05(6), Wis. Adm. Code)

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. Previously daily maximum limits for toxic substances were calculated as two times the ATC. However, 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.

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 not the case for the Village of Necedah Wastewater Treatment Facility and the limits are set based on two times the acute toxicity criteria.

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).

Attachment #1

Daily Maximum Limits based on Acute Toxicity Criteria (ATC)

RECEIVING WATER FLOW = 6.96 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	MEAN BACK-GRD.	MAX. EFFL. LIMIT**	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	1-day P ₉₉	1-day MAX. CONC.
Arsenic		339.8		679.6	135.92	<0.77		
Cadmium	86	8.67	0.047	17.34	3.468	<0.084		
Chromium (+3)	86	1594.22	0.995	3188.4	637.7	0.9		
Copper	86	13.46	1.237	26.9			64.6	62.8
Lead	86	92.47	0.647	184.94	36.99	<1.08		
Nickel	86	413.15		826.3	165.26	<0.90		
Zinc	86	105.55	8.012	211			123	110
Chloride		757	19.600	1514	303	72		79

** 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.

Weekly Average Limits based on Chronic Toxicity Criteria (CTC)

RECEIVING WATER FLOW = 2.18 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		152.2		1008	201.6	<0.77	
Cadmium	59	1.64	0.047	10.6	2.1	<0.084	
Chromium (+3)	59	86.23	0.995	565.5	113.1	0.9	
Copper	59	6.63	1.237	37			35.4
Lead	59	16.93	0.647	108.5	21.7	<1.08	
Nickel	59	33.59		222.5	44.5	<0.90	
Zinc	59	76.33	8.012	460.5			87.6
Chloride		395	19.600	2506	501	72	

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 = 17.0 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	0.047	16609	3322	<0.084
Chromium (+3)	3818000	0.995	171409787	34281957	1
Lead	140	0.647	6256.9	1251.4	<1.08
Nickel	43000		1930493	386099	<0.90

Monthly Average Limits based on Human Cancer Criteria (HCC)

RECEIVING WATER FLOW = 17.0 cfs (¼ of Harmonic Mean), as specified in s. NR 106.06 (4), Wis. Adm. Code.

SUBSTANCE	HCC	MEAN BACK-GRD.	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Arsenic	13.3		597.11	119.42	<0.77

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, limits are required for Copper.

Copper – Considering available effluent data from the current permit term (November 2019 to March 2024), the 30-day P₉₉ concentration is 19.8 µg/L, the 4-day P₉₉ concentration is 35.4 µg/L, and the 1-day P₉₉ concentration is 64.6 µg/L, with a maximum concentration of 62.8 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.

The current permit contains dissolved-based limits of 34 µg/L which were evaluated for the Necedah Wastewater Treatment Facility pursuant to chs. NR 105 and 106, Wis. Adm. Code. At the time of permit issuance there was reasonable potential to exceed the daily maximum total recoverable limit of 24 µg/L using an effluent hardness of 77 mg/L. Weekly and monthly average limits were also included in the permit to meet the expression of limits requirements.

Information required for the calculation of dissolved-based limits includes the conversion factors from ss. NR 105.05 (5) (for acute criteria) or NR 105.06 (8) (for chronic criteria), Wis. Adm. Code. Background data is also required to translate the dissolved criteria into a site-specific number (the “translator”) from which a total recoverable limit may be calculated based on the fraction of the discharged metal which would be dissolved in the receiving water. To perform this translation the following background data is required:

$$\text{Translator} = \frac{M_{tr}}{M_d}$$

Where:

M_d: Dissolved metals concentration in the receiving water (µg/L)

M_{Tr}: Total Recoverable metals concentration in the receiving water (µg/L)

Attachment #1

The Village of Necedah has collected data on total recoverable and dissolved copper in the Yellow River such that a preliminary translator may be estimated at their discharge site:

Date	Total Recoverable Copper (µg/L)	Dissolved Copper (µg/L)	Translator
9-Oct-07	2.84, 2.85	2.1, 2.1	1.35
3-Oct-08	0.434	0.263	1.65
25-Aug-10	0.982, 0.988	0.641, 0.628	1.55
01-Nov-11	0.949	0.728	1.30
		Geomean	1.46

Multiplying the translator, the conversion factor from ch. NR 105, Wis. Adm. Code, and the applicable criterion will give an indication of the amount of “relief” potentially available to the recommended permit limits if the dissolved fraction is considered from the available data:

$$\text{Translated Criteria} = \text{NR 105 Criterion} * \text{Conversion Factor} * \text{Translator}$$

$$\text{Copper (Acute)} = 13.46 \mu\text{g/L} * 0.960 * 1.46 = 18.85 \mu\text{g/L}$$

$$\text{Copper (Chronic)} = 6.63 \mu\text{g/L} * 0.960 * 1.46 = 9.28 \mu\text{g/L}$$

Effluent limits calculated based on the translated criteria are as follows:

$$\text{Daily Maximum Limit: } 2 * \text{ATC} = 2 * 18.85 = 37.69 \mu\text{g/L}$$

$$\text{Weekly Average Limit: } = \frac{(CTC)(Q_s + (1-f)Q_e) - (Q_s - fQ_e)(C_s)}{Q_e} = \frac{(9.28)(2.175 + 0.387) - (2.175)(1.237)}{0.387} = 54.52 \mu\text{g/L}$$

Using the dissolved-based approach for copper limits, the 4-day P₉₉ of the effluent data is below the calculated weekly average of 55 µg/L (rounded to two significant digits). The daily maximum limit is 38 µg/L. The acute mass limitation would be 0.085 lbs/day and is based on the concentration limit and the peak daily design flow rate of 0.271 MGD (38 µg/L * 0.271 MGD * 8.34/1000) in accordance with s. NR 106.07(2)(a), Wis. Adm. Code.

Based on the variability of stream data collected to date, further in-stream metals monitoring would not be necessary during this permit term if the permittee chooses to continue the dissolved based approach for copper limits in the reissued permit.

Quarterly hardness monitoring is also recommended because of the relationship between hardness and daily maximum limits based on acute toxicity criteria.

Antidegradation:

The calculated daily maximum limit of 38 µg/L is less restrictive than the limit of 34 µg/L in the current permit. Without a demonstration of need for a higher limit in accordance with s. NR 207.04 Wis. Adm. Code, the current limits of 34 µg/L and 0.077 lbs/day must be continued in the reissued permit.

Expression of Limits:

Revisions to ch. NR 106, Wis. Adm. Code, in September 2016 aligned Wisconsin's WQBELs with 40 CFR § 122.45(d), which specifies that effluent limits for continuous dischargers must be expressed as weekly and monthly averages for publicly owned treatment works and as daily maximums and monthly averages for all other dischargers, unless shown to be impracticable. Because a daily maximum copper limit is necessary for the Necedah Wastewater Treatment Facility, weekly and monthly average limits are also required under this code revision.

The methods for calculating limitations for municipal treatment facilities to conform to 40 CFR 122.45(d) are specified in s. NR 106.07(3), Wis. Adm. Code, and are as follows:

Whenever a daily maximum limitation is determined necessary to protect water quality, a weekly and monthly average limitation shall also be included in the permit and set equal to the daily maximum limit unless a more restrictive limit is already determined necessary to protect water quality.

Therefore, **monthly and weekly average limits of 34 µg/L** are recommended in the permit.

PFOS and PFOA

The need for PFOS and PFOA monitoring is evaluated in accordance with s. NR 106.98, Wis. Adm. Code. Monitoring of the effluent produced a PFOS result of 1.9 ng/L and a PFOA result of 6.5 ng/L. The PFOS result is greater than one fifth of the criterion for the substance. Monitoring of the water supply produced a PFOS result of 0.7 ng/L and a PFOA result of 2.7 ng/L. These results are less than one fifth of the respective criteria for each substance. Based on the known levels of PFOS/PFOA in the effluent, **PFOS and PFOA monitoring is recommended once every two months.**

Mercury – The permit application did not require monitoring for mercury because the Necedah 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). A review of the past five years of sludge characteristics data reveals that all the sample results are within expected analytical ranges and well below the 17 mg/kg level. The average concentration in the sludge from 2020 to 2023 was 0.71 mg/kg, with a maximum reported concentration of 2.57 mg/kg. Therefore, no mercury monitoring is recommended at Outfall 001.

**PART 3 – WATER QUALITY-BASED EFFLUENT LIMITATIONS
FOR AMMONIA NITROGEN**

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

Daily Maximum Limits based on Acute Toxicity Criteria (ATC):

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

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

Where:

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

The effluent pH data was examined as part of this evaluation. A total of 1583 sample results were reported from November 2019 to March 2024. The maximum reported value was 7.80 s.u. (Standard pH Units). The effluent pH was 7.50 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 7.48 s.u. The mean plus the standard deviation multiplied by a factor of 2.33, an estimate of the upper ninety ninth percentile for a normally distributed dataset, is 7.47 s.u. Therefore, a value of 7.50 s.u. is believed to represent the maximum reasonably expected pH, and therefore most appropriate for determining daily maximum limitations for ammonia nitrogen. Substituting a value of 7.50 s.u. into the equation above yields an ATC = 19.89 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 are shown below.

Daily Maximum Ammonia Nitrogen Determination

	Ammonia Nitrogen Limit mg/L
2×ATC	39.78
1-Q ₁₀	376.51

The 2×ATC method yields the most stringent limits for the Necedah Wastewater Treatment Facility.

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

Daily Maximum Ammonia Nitrogen Limits – WWSF

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

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

The ammonia limit calculation also warrants evaluation of weekly and monthly average limits based on chronic toxicity criteria for ammonia, since those limits relate to the assimilative capacity of the receiving water.

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

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

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

Where:

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

E = 0.854,

C = the minimum of 2.85 or $1.45 \times 10^{(0.028 \times (25 - T))}$ – (Early Life Stages Present), or

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

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

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

The 4-day criterion is equal to the 30-day criterion multiplied by 2.5. 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 “default” basin assumed values are used for temperature and background ammonia concentrations, because minimum ambient data is available. The values for pH are based on data collected from the Yellow River. These values are shown in the table below, with the resulting criteria and effluent limitations.

Weekly and Monthly Ammonia Nitrogen Limits – WWSF

		April & May	June-September	October-March
Effluent Flow	Qe (MGD)	0.250	0.250	0.250
Background Information	7-Q ₁₀ (cfs)	8.70	8.70	8.70
	7-Q ₂ (cfs)	34.00	34.00	34.00
	Ammonia (mg/L)	0.07	0.04	0.14
	Temperature (°C)	14.4	20.6	10.0
	pH (s.u.)	7.69	7.69	7.43
	% of Flow used	50	100	25
	Reference Weekly Flow (cfs)	4.350	8.700	2.175
	Reference Monthly Flow (cfs)	14.450	28.900	7.225
Criteria mg/L	4-day Chronic			
	Early Life Stages Present	9.01	6.15	11.55
	Early Life Stages Absent	9.05	6.15	15.45
	30-day Chronic			
	Early Life Stages Present	3.60	2.46	4.62
	Early Life Stages Absent	3.62	2.46	6.18
Effluent Limitations mg/L	Weekly Average			
	Early Life Stages Present	109.49	143.68	75.71
	Early Life Stages Absent	110.01	143.68	101.58
	Monthly Average			
	Early Life Stages Present	135.54	183.40	88.37
	Early Life Stages Absent	136.21	183.40	119.10

Effluent Data

The following table evaluates the statistics based upon ammonia data reported from February 2022 to December 2023, with those results being compared to the calculated limits to determine the need to include ammonia limits in the Necedah Wastewater Treatment Facility permit for the respective month ranges.

Ammonia Nitrogen Effluent Data

Ammonia Nitrogen mg/L	
1-day P ₉₉	25.05
4-day P ₉₉	13.74
30-day P ₉₉	6.25
Mean*	3.20
Std	5.95
Sample size	23
Range	<0.06 - 18.1

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

Based on this comparison, there is no reasonable potential for the discharge to exceed any of the calculated ammonia nitrogen limits. **Monthly monitoring throughout the permit term is recommended.**

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 the Necedah Wastewater Treatment Facility 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 required disinfection season.

Effluent Data

The Necedah Wastewater Treatment Facility has monitored effluent *E. coli* from May 2023 to September 2023 and a total of 22 results are available. A geometric mean of 126 counts/100 mL was never exceeded, with a maximum monthly geometric mean of 39 counts/100 mL. Effluent data exceeded 410 counts/100 mL one time (which is 5% of the total sample results). The maximum reported value was 1844 counts/100 mL. Based on this effluent data it appears that the facility can meet new *E. coli* limits and a compliance schedule is not needed in the reissued permit.

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 the Necedah Wastewater Treatment Facility 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 a technology-based limit is not required.

Annual Average Mass Total Phosphorus Loading

Month	Monthly Avg. mg/L	Total Flow MG/month	Total Phosphorus lb./mo.
Apr 2023	0.42	3.34	11.79
May 2023	1.26	2.86	30.12
Jun 2023	0.23	1.20	2.34
Jul 2023	2.44	1.51	30.70
Aug 2023	2.59	1.77	38.21
Sep 2023	2.26	1.69	31.87
Oct 2023	0.73	1.87	11.41
Nov 2023	2.39	1.72	34.27
Dec 2023	3.02	1.66	41.73
Jan 2024	2.87	1.64	39.18
Feb 2024	2.93	1.64	40.05
Mar 2024	3.44	1.77	50.91
Average =			30.21

Total P (lbs/month) = Monthly average (mg/L) × total flow (MG/month) × 8.34 (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 – Phosphorus

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* (May 2020). The wasteload allocations (WLA) that implement site-specific criteria for Lakes Petenwell, Castle Rock, and Wisconsin are found in Appendix K of the *Total Maximum Daily Loads for Total Phosphorus in the Wisconsin River Basin (WRB TMDL)* report dated April 26, 2019 and are expressed as maximum annual loads (lbs/year) and maximum daily loads (lbs/day). The WLA that implement statewide criteria found in Appendix J of the TMDL report are no longer applicable following approval of these site-specific criteria. The daily WLAs in the WRB TMDL equals the annual WLA divided by the number of days in the year. Therefore, the daily WLA is an annual average. Since the derivation of daily WLAs from annual WLAs does not take effluent variability or monitoring frequency into consideration, maximum daily WLAs from the WRB TMDL should not be used directly as permit effluent limits.

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 continuously discharging facilities covered by the WRB 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 are also included. The following equation shows the calculation of equivalent effluent concentration:

$$\begin{aligned} \text{TP Equivalent Effluent Concentration} &= \text{Daily WLA} \div (\text{Flow Rate} * \text{Conversion Factor}) \\ &= 0.764 \text{ lbs/day} \div (0.250 \text{ MGD} * 8.34) \\ &= 0.37 \text{ mg/L} \end{aligned}$$

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Since this value is greater than 0.3 mg/L, the WLA should be expressed as a monthly average mass limit for total phosphorus and no six-month average limit is required.

$$\begin{aligned}
 \text{TP Monthly Average Permit Limit} &= \text{Daily WLA} * \text{Monthly average multiplier} \\
 &= 0.764 \text{ lbs/day} * 1.57 \\
 &= 1.20 \text{ lbs/day}
 \end{aligned}$$

The multiplier used in the six-month average calculation was determined according to TMDL implementation guidance. A standard coefficient of variation (CV) of 0.6, along with monitoring frequency, is used to select the multiplier. The current permit specifies phosphorus monitoring as twice weekly; if a different monitoring frequency is used, the stated limits should be reevaluated.

The WRB TMDL establishes TP wasteload allocations to reduce the loading in the entire watershed including WLAs to meet water quality standards for tributaries to the Wisconsin 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. Six-month average limits apply in the periods May – October and November – April.

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’s recommended that the interim limit be set equal to 3.8 mg/L, expressed as a monthly average. This value reflects the 4-day P₉₉ concentration of 3.83 mg/L. The following table lists the statistics for effluent phosphorus levels from November 2019 to March 2024 for informational purposes. In the cases where reporting the mass discharge is not required in the current permit, the mass is calculated using the reported phosphorus concentration and the effluent flow rate for that day.

Total Phosphorus Statistics

	Concentration (mg/L)	Mass Discharge (lbs/day)
1-day P ₉₉	6.92	3.43
4-day P ₉₉	3.83	1.90
30-day P ₉₉	2.21	1.10
Mean	1.52	0.76
Std	1.40	0.69
Sample Size	458	454
Range	<0.047 - 12.7	0.03 - 5.75

Conclusions:

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

- Monthly average Total Phosphorus interim limit of 3.8 mg/L
- Monthly average Total Phosphorus mass limit of 1.20 lbs/day

**PART 6 – WATER QUALITY-BASED EFFLUENT LIMITATIONS
FOR THERMAL**

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

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

Monthly Temperature Effluent Data & Limits

Month	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Weekly Maximum	Daily Maximum	Weekly Average Effluent Limitation	Daily Maximum Effluent Limitation
	(°F)	(°F)	(°F)	(°F)
JAN			NA	120
FEB			NA	120
MAR			NA	120
APR			NA	120
MAY			NA	120
JUN			NA	120
JUL			NA	120
AUG			NA	120
SEP			NA	120
OCT			NA	120
NOV			NA	120
DEC			NA	120

Due to the amount of upstream flow available for dilution in the limit calculation, the lowest calculated limitation is 120° F. For treatment systems of domestic waste, there is no reasonable potential for the discharge to exceed this limit. **Therefore, no temperature limits or monitoring are recommended.**

PART 7 – WHOLE EFFLUENT TOXICITY (WET)

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

- Acute tests predict the concentration that causes lethality of aquatic organisms during a 48 to 96-hour exposure. To assure that a discharge is not acutely toxic to organisms in the receiving water, WET tests must produce a statistically valid LC50 (Lethal Concentration to 50% of the test organisms) greater than 100% effluent, according to s. NR 106.09(2)(b), Wis. Adm Code.
- Chronic tests predict the concentration that interferes with the growth or reproduction of test organisms during a seven-day exposure. To assure that a discharge is not chronically toxic to organisms in the receiving water, WET tests must produce a statistically valid IC₂₅ (Inhibition Concentration) greater than the instream waste concentration (IWC), according to s. NR 106.09(3)(b), Wis. Adm Code. The IWC is an estimate of the proportion of effluent to total volume of water (receiving water + effluent). The IWC of **15%** 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 = 0.250 MGD = 0.387 cfs

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

Q_s = ¼ of the 7-Q₁₀ = 8.70 cfs ÷ 4 = 2.18 cfs

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

WET Data History

Date Test Initiated	Acute Results LC ₅₀ %				Chronic Results IC ₂₅ %					Footnotes or Comments
	<i>C. dubia</i>	Fathead minnow	Pass or Fail?	Used in RP?	<i>C. dubia</i>	Fathead Minnow	Algae (IC50)	Pass or Fail?	Use in RP?	
09/22/2004	>100	>100	Pass	No						1
05/30/2007	>100	>100	Pass	Yes						
11/14/2012	>100	>100	Pass	Yes						
07/09/2014	>100	>100	Pass	Yes						
02/12/2020	>100	>100	Pass	Yes						
06/02/2021	>100	>100	Pass	Yes						
03/30/2022	>100	>100	Pass	Yes						
09/06/2023	>100	>100	Pass	Yes						

Footnotes:

1. *Data Not Representative*. Significant changes were made to WET test methods in 2004 and these changes were assumed to be fully implemented by certified labs by no later than June 2005.
- According to s. NR 106.08, Wis. Adm. Code, WET reasonable potential is determined by multiplying the highest toxicity value that has been measured in the effluent by a safety factor, to predict the likelihood (95% probability) of toxicity occurring in the effluent above the applicable WET limit. The safety factor used in the equation changes based on the number of toxicity detects in the dataset. The fewer detects present, the higher the safety factor, because there is more uncertainty surrounding the predicted value. **WET limits must be given, according to s. NR 106.08(6), Wis. Adm. Code, whenever the applicable Reasonable Potential equation results in a value greater than 1.0.**

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

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

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

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WET Checklist Summary

	Acute	Chronic
AMZ/IWC	Not Applicable. 0 Points	IWC = 15% 0 Points
Historical Data	Seven tests used to calculate RP. No tests failed. 0 Points	No tests used to calculate RP. Data not available in past 5 years. 5 Points
Effluent Variability	BOD5, pH, and Fecal Coliform exceedances. 5 Points	Same as Acute. 5 Points
Receiving Water Classification	Warm Water Sport Fish (WWSF) (5 pts) 5 Points	Same as Acute. 5 Points
Chemical-Specific Data	Reasonable potential for copper limits based on ATC; (5 pts) Ammonia, Chromium, Zinc, and Chloride detected. (3 pts) Additional Compounds of Concern: none 8 Points	No reasonable potential for limits based on CTC. Ammonia, Chromium, Copper, Zinc, and Chloride detected. (3 pts) Additional Compounds of Concern: none 3 Points
Additives	One Water Quality Conditioners added. (1 pt) Permittee has proper P chemical SOPs in place 1 Point	Additive used more than once per 4 days. 1 Point
Discharge Category	No Industrial Contributors. 0 Points	Same as Acute. 0 Points
Wastewater Treatment	Secondary or Better 0 Points	Same as Acute. 0 Points
Downstream Impacts	No impacts known 0 Points	Same as Acute. 0 Points
Total Checklist Points:	19 Points	19 Points
Recommended Monitoring Frequency (from Checklist):	2 tests during permit term	No chronic monitoring recommended
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).

Temperature limits for receiving waters with unidirectional flow

(calculation using default ambient temperature data)

Facility:	Necedah WWTF	7-Q₁₀:	8.70 cfs	Temp Dates		Flow Dates	
Outfall(s):	001	Dilution:	25%	Start:	N/A	11/01/19	
Date Prepared:	05/09/2024	f:	0	End:	N/A	03/31/24	
Design Flow (Q_e):	0.250 MGD	Stream type:	Small warm water sport or forage fish community				
Storm Sewer Dist.	0 ft	Q_s:Q_e ratio:	5.6 :1				
		Calculation Needed?	YES				

Month	Water Quality Criteria			Receiving Water Flow Rate (Q _s) (cfs)	Representative Highest Effluent Flow Rate (Q _e)		f	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	T _a (default) (°F)	Sub-Lethal WQC (°F)	Acute WQC (°F)		7-day Rolling Average (Q _{esl}) (MGD)	Daily Maximum Flow Rate (Q _{ea}) (MGD)		Weekly Average (°F)	Daily Maximum (°F)	Weekly Average Effluent Limitation (°F)	Daily Maximum Effluent Limitation (°F)
JAN	33	49	76	2.18	0.071	0.091	0			NA	120
FEB	34	50	76	2.18	0.066	0.087	0			NA	120
MAR	38	52	77	2.18	0.084	0.101	0			NA	120
APR	48	55	79	2.18	0.129	0.147	0			NA	120
MAY	58	65	82	2.18	0.104	0.124	0			NA	120
JUN	66	76	84	2.18	0.096	0.123	0			NA	120
JUL	69	81	85	2.18	0.083	0.109	0			NA	120
AUG	67	81	84	2.18	0.090	0.147	0			NA	120
SEP	60	73	82	2.18	0.077	0.094	0			NA	120
OCT	50	61	80	2.18	0.067	0.099	0			NA	120
NOV	40	49	77	2.18	0.072	0.100	0			NA	120
DEC	35	49	76	2.18	0.066	0.089	0			NA	120

