

# Permit Fact Sheet

## General Information

Permit Number	WI-0022004-11-0
Permittee Name and Address	City of Eagle River Box 1269, 323 West Division Street, Eagle River, WI 54521
Permitted Facility Name and Address	City of Eagle River 323 West Division Street, Eagle River, Wisconsin
Permit Term	April 01, 2026 to March 31, 2031
Discharge Location	323 West Division Street, Eagle River, Wisconsin (SW1/4 SW1/4 of section 28; T40N-R10E)
Receiving Water	Eagle River within the Deerskin River Watershed in the Upper Wisconsin River Drainage Basin in Vilas County.
Stream Flow (Q <sub>7,10</sub> )	97 cfs
Stream Classification	Warm Water Sport Fish (WWSF) community, non-public water supply, recreational use and within the ceded territory
Wild Rice Impacts <i>(no specific wild rice standards exist at this time)</i>	No impacts identified at this location. There are reported rice beds downstream where Eagle River meets the Wisconsin River. The conclusion of no impact is based on the long existence of the facility, low effluent volumes in comparison to the river volumes and the continued presence of said rice beds. (Evaluation completed March 2017)
Discharge Type	Existing continuous discharger
Annual Average Design Flow (MGD)	0.571 MGD
Industrial or Commercial Contributors	Vilas County Highway Department garage holding tanks.
Plant Classification	A1 - Suspended Growth Processes; B - Solids Separation; C - Biological Solids/Sludges; P - Total Phosphorus; D - Disinfection; L - Laboratory; SS - Sanitary Sewage Collection System
Approved Pretreatment Program?	N/A

## Facility Description

The City of Eagle River owns and operates a domestic wastewater treatment system. The plant designed to treat 570,000 gallons per day currently treats an average of 214,000 gallons per day (October 2020 – September 2025). The facility is an activated sludge plant which consists of headworks (fine and manual bar screens and grit separators) that remove debris, aeration providing secondary treatment, final settling and disinfection. Activated sludge is composed of sludge containing naturally occurring microorganisms recycled from the treatment system. It is mixed with the wastewater in the selector tanks starting the organic matter metabolism process. There is also ferric chloride addition capability in the effluent channel of the oxidation ditch to further precipitate phosphorus. Effluent flows by gravity into final clarifiers where the remaining solids including phosphorus settles. The cleaned wastewater (effluent) is seasonally disinfected using an ultraviolet light system and discharged to the Eagle River in Vilas County.

Settled solids (sludge) are removed from the clarifiers; some is returned to the selector tanks to re-seed the new wastewater entering the system. The sludge that is not used as activated sludge is treated by aerobic digestion, reducing harmful pathogens. Sludge is thickened using a gravity belt and transferred to a storage tank prior to land application on Department approved agricultural sites. Land application of waste is done in accordance with permit conditions and applicable codes.

## Substantial Compliance Determination

After a desk top review of all discharge monitoring reports, CMARs, land app reports, compliance schedule items, and a site visit on November 11, 2025, by Brook Klingbeil, WDNR Specialist, this facility has been found to be in substantial compliance with their current permit.

## Sample Point Descriptions

Sample Point Designation		
Sample Point Number	Discharge Flow, Units, and Averaging Period	Sample Point Location, Waste Type/Sample Contents and Treatment Description (as applicable)
701	Influent An average of 0.214 MGD (Oct 1, 2020 – Sept 30, 2025)	Representative samples shall be collected in the headworks building prior to the returning side streams.
001	Effluent Flow is not a required parameter	Representative samples shall be collected after the ultraviolet disinfection unit.
003	Sludge 32 US tons per year (information provided in application)	All sludge samples shall be collected at a point and in a manner that will yield sample results representative of the sludge being tested and collected at an appropriate time for the specific test.

## Permit Requirements

### 1 Influent – Monitoring Requirements

#### 1.1 Sample Point Number: 701- INFLUENT TO PLANT

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow Rate		MGD	Daily	Continuous	Measured by a magnetic flow meter.
BOD5, Total		mg/L	3/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total		mg/L	3/Week	24-Hr Flow Prop Comp	

## Changes from Previous Permit:

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

The **Flow Rate** sample frequency was changed from “Continuous” to “Daily” to reflect currently acceptable practices at the facility.

## 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

### 2.1 Sample Point Number: 001- EFFLUENT

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
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	5/Week	Grab	
pH Field	Daily Min	6.0 su	5/Week	Grab	
E. coli	Geometric Mean - Monthly	126 #/100 ml	Weekly	Grab	Monitoring and limit effective May through September.
E. coli	% Exceedance	10 Percent	Monthly	Calculated	Monitoring and limit effective May through September. See the E. coli Percent Limit permit section. Enter the result in the DMR on the last day of the month.
Phosphorus, Total	Monthly Avg	1.0 mg/L	3/Week	24-Hr Flow Prop Comp	
Phosphorus, Total	Monthly Avg	2.3 lbs/day	3/Week	Calculated	See the Total Maximum

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
					Daily Load (TMDL) Limitations 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 the Total Maximum Daily Load (TMDL) Limitations 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 the Total Maximum Daily Load (TMDL) Limitations permit section.
Nitrogen, Ammonia (NH3-N) Total		mg/L	Monthly	24-Hr Flow Prop Comp	Monitoring is required in 2029.
Hardness, Total as CaCO3		mg/L	Monthly	24-Hr Flow Prop Comp	Monitoring is required in 2029.
Copper, Total Recoverable		ug/L	Monthly	24-Hr Flow Prop Comp	Monitoring is required in 2029.
Zinc, Total Recoverable		ug/L	Monthly	24-Hr Flow Prop Comp	Monitoring is required in 2029.
Chloride		mg/L	Monthly	24-Hr Flow Prop Comp	Monitoring is required in 2029.
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	Monitoring only. See PFOS/PFOA Minimization Plan Determination of Need schedule.
Nitrogen, Total Kjeldahl		mg/L	See Listed Qtr(s)	24-Hr Flow Prop Comp	See the Nitrogen Series Monitoring permit section for testing schedule.

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Nitrogen, Nitrite + Nitrate Total		mg/L	See Listed Qtr(s)	24-Hr Flow Prop Comp	See the Nitrogen Series Monitoring permit section for testing schedule.
Nitrogen, Total		mg/L	See Listed Qtr(s)	Calculated	Total Nitrogen = Total Nitrogen Kjeldahl (mg/L) + Nitrite + Nitrate Nitrogen (mg/L). See the Nitrogen Series Monitoring permit section for testing schedule.
Acute WET		TUa	See Listed Qtr(s)	24-Hr Flow Prop Comp	Two tests are required during the permit term. See the Whole Effluent Toxicity (WET) testing permit section for monitoring schedule.

### Changes from Previous Permit

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

- The monitoring frequency for **pH** monitoring has been increased from 3 times a week to 5 times a week. The frequency change was implemented to meet standard monitoring frequencies based on the size and type of the facility.
- Fecal coliform monitoring and limits have been replaced with **Escherichia coli (E. coli)** monitoring and limits.
- **PFOS** and **PFOA** monitoring once every two months has been included based on the type of discharge and the types of indirect dischargers contributing to the collection system.
- Annual **Total Nitrogen Monitoring (TKN, N02+N03 and Total N)** monitoring is required in specific quarters as outlined in the permit.
- Two **Acute Whole Effluent Toxicity (WET)** tests are required in specific quarters as outlined in the permit.

### Explanation of Limits and Monitoring Requirements

Detailed discussions of limits and monitoring requirements can be found in the attached water quality-based effluent limits (WQBEL) memo dated October 17, 2025.

**Monitoring Frequencies-** The Monitoring Frequencies for Individual Wastewater Permits guidance (April 12, 2021) recommends that standard monitoring frequencies be included in individual wastewater permits based on the size and type of the facility, in order to characterize effluent quality and variability, to detect events of noncompliance, and to ensure consistency in permits issued across the state. Guidance and requirements in administrative code were considered when determining the appropriate monitoring frequencies for pollutants that have final effluent limits in effect during this permit term.

### 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)
003	B	Liquid	Fecal Coliform	Specific Oxygen Uptake Rate	Land Application	32 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, the most recent set of samples (2020) were below the limit of detection.						
Is a priority pollutant scan required? No						

#### 3.1 Sample Point Number: 003- 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	
Selenium Dry Wt	High Quality	100 mg/kg	Annual	Composite	

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
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 (NH <sub>4</sub> -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	See the Sludge Analysis for PCBs permit section.
PCB Total Dry Wt	High Quality	10 mg/kg	Once	Composite	See the Sludge Analysis for PCBs permit section.
PFOA + PFOS		ug/kg	Annual	Calculated	Report the sum of PFOA and PFOS. See PFAS permit sections for more information.
PFAS Dry Wt			Annual	Grab	Perfluoroalkyl and Polyfluoroalkyl Substances based on updated DNR PFAS List. See PFAS Permit Sections for more information.

### Changes from Previous Permit:

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

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

### Explanation of Limits and Monitoring Requirements

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

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

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

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

## 4 Schedules

### 4.1 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>	03/31/2027
<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 action is required and effluent monitoring of PFOS and PFOA shall continue as specified in the permit.</p>	03/31/2028

### Explanation of Schedule

*PFOS/PFOA Minimization Plan Determination of Need-* As stated above, ch. NR 106 Subchapter VIII – Permit Requirements for PFOS and PFOA Dischargers became effective on August 1, 2022. Section NR 106.98, Wis. Adm. Code, specifies steps to generate data in order to determine the need for reducing PFOS and PFOA in the discharge. Data generated per the effluent monitoring requirements will be used to determine the need for developing a PFOS/PFOA minimization plan. As part of the schedule, the permittee is required to submit two annual Reports on Effluent Discharge.

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

## **Attachments**

Water Flow Schematic created June 2014

Water Quality Based Effluent Limits memo dated October 17, 2025

## **Justification Of Any Waivers From Permit Application Requirements**

No waivers requested or granted as part of this permit reissuance

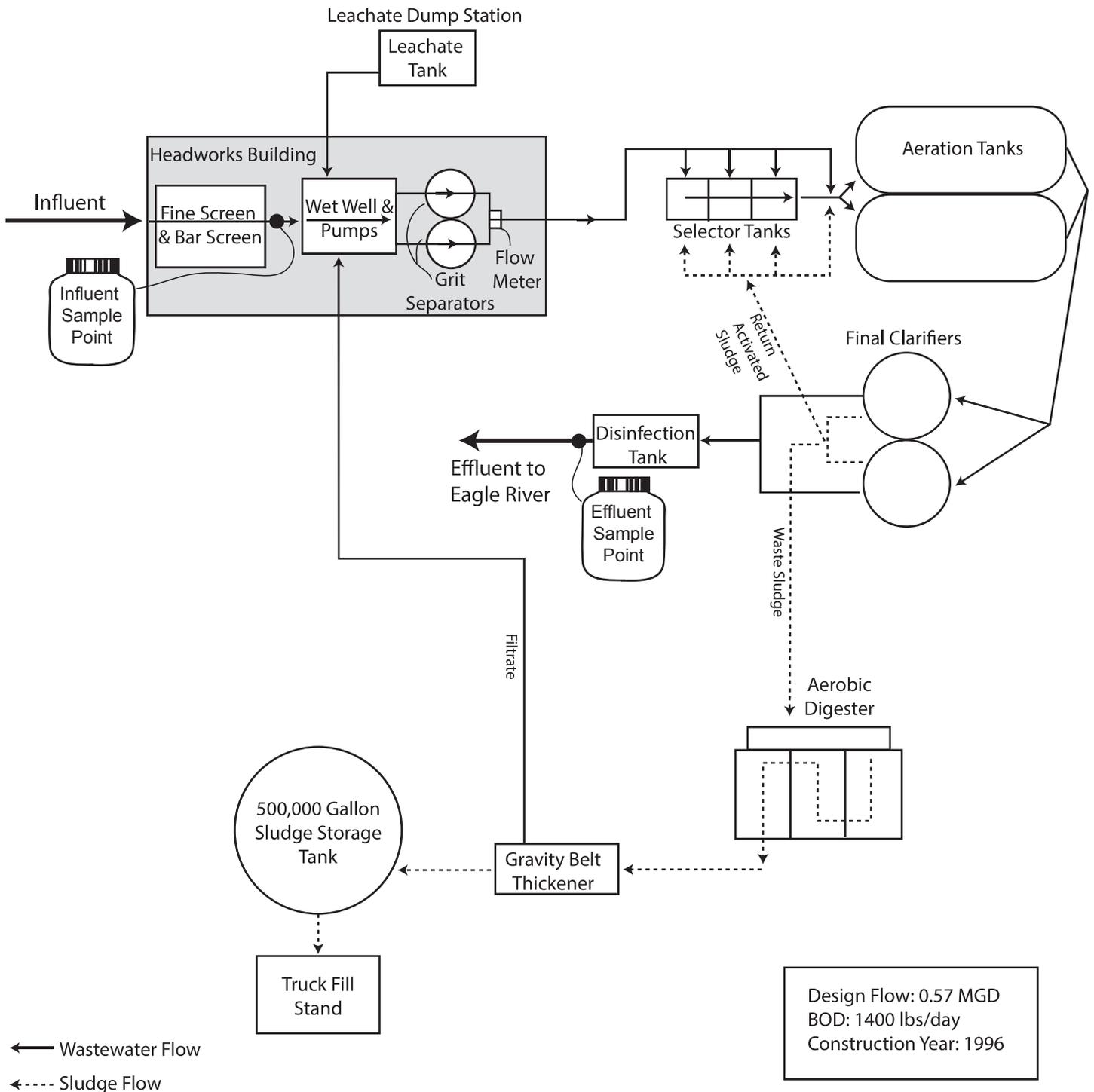
**Prepared By:** Sheri A. Snowbank

Wastewater Specialist

**Date:** November 25, 2025

# City of Eagle River Wastewater Treatment Facility

The Eagle River wastewater treatment facility consists of a headworks (fine screen and manual bar screen and grit separators), an oxidation ditch with biological phosphorus removal, two secondary clarifiers, and an ultraviolet disinfection unit before discharging to the Eagle River. Sludge is aerobically digested and run through a gravity belt thickener. Thickened sludge is pumped to a 180 day storage tank. The flow diagram below shows the treatment units and sampling locations.



**CORRESPONDENCE/MEMORANDUM**

DATE: October 17, 2025

TO: Sheri Snowbank – NOR/Spooner Service Center

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

SUBJECT: Water Quality-Based Effluent Limitations for the City of Eagle River  
 WPDES Permit No. WI-0022004-11-0

This is in response to your request for an evaluation of the need for water quality-based effluent limitations (WQBELs) using chapters NR 102, 104, 105, 106, 207, 210, 212, and 217 of the Wisconsin Administrative Code (where applicable) for the discharge from the City of Eagle River in Vilas County. This municipal wastewater treatment facility (WWTF) discharges to the Eagle River, located in the Eagle River Watershed in the Upper Wisconsin River Basin. This discharge is included in the Wisconsin River Basin (WRB) Total Maximum Daily Load (TMDL) as approved by EPA on 04/26/2019 with site-specific criteria approved by EPA on 07/09/2020. 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
BOD <sub>5</sub>			45 mg/L	30 mg/L	1, 2
TSS			45 mg/L	30 mg/L	1, 2
pH	9.0 s.u.	6.0 s.u.			1, 2
<i>E. coli</i> May – September				126 #/100 mL geometric mean	3
Phosphorus				1.0 mg/L 2.3 lbs/day	1, 4
Ammonia Nitrogen					1, 5
Hardness (Total as CaCO <sub>3</sub> )					1, 5
Copper (Total Recoverable)					1, 5
Zinc (Total Recoverable)					1, 5
Chloride					1, 5
PFOS and PFOA					6
TKN, Nitrate+Nitrite, and Total Nitrogen					7
Acute WET					8

Footnotes:

1. No changes from the current permit.
2. These limits are based on the Warm Water Sport Fish (WWSF) community of the immediate receiving water as described in s. NR 210.05(1), Wis. Adm. Code.
3. Additional final limit: No more than 10 percent of *E. coli* bacteria samples collected in any calendar month may exceed 410 count/100 mL.

4. The concentration-based limit is a technology-based limit as described in subch. II of NR 217, Wis. Adm. Code. The mass-based limit is based on the Total Maximum Daily Load (TMDL) for the Wisconsin River Basin (WRB) to address phosphorus water quality impairments within the TMDL area.
5. Monthly monitoring for 1 year is recommended to continue during the reissued permit term.
6. PFOS and PFOA monitoring is recommended at a frequency of once every two months in accordance with s. NR 106.98(2), Wis. Adm. Code.
7. As recommended in the Department's October 1, 2019 Guidance for Total Nitrogen Monitoring in Wastewater Permits, annual total nitrogen monitoring is recommended for all minor municipal permittees. Sections 283.37(5) and 283.55(1)(e), Wis. Stats, and ss. NR 200.065(1)(g) and NR 200.065(1)(h), Wis. Adm. Codes, provide the authority to request this monitoring during the permit term. Total nitrogen is the sum of nitrate (NO<sub>3</sub>), nitrite (NO<sub>2</sub>), and total Kjeldahl nitrogen (TKN) (all expressed as N).
8. Three acute whole effluent toxicity (WET) tests are recommended during the reissued permit term. According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), a synthetic (standard) laboratory water may be used as the dilution water and primary control in acute WET tests. 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. If a satisfactory phosphorus chemical SOP is established and implemented at the facility prior to permit reissuance, then acute WET testing can be reduced to 2x in the reissued permit.

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

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

Attachments (2) – Narrative & discharge area map.

PREPARED BY: Michael A. Polkinghorn – Water Resources Engineer

E-cc: Brooke Klingbeil, Regional Wastewater Engineer – NOR/Wausau Service Center  
Michelle BalkLudwig, Regional Wastewater Supervisor – NOR/Spooner Service Center  
Diane Figiel, Water Resources Engineer – WY/3  
Nate Willis, Wastewater Engineer – WY/3

**Water Quality-Based Effluent Limitations for  
City of Eagle River**

**WPDES Permit No. WI-0022004-11-0**

Prepared by: Michael A. Polkinghorn

**PART 1 – BACKGROUND INFORMATION**

**Facility Description**

The City of Eagle River owns and operates a domestic wastewater treatment system. The facility is an activated sludge plant which consists of headworks (fine and manual bar screens and grit separators) that remove debris, aeration which provides secondary treatment, final settling and disinfection. More specifically, the activated sludge process is composed of settled solids containing naturally occurring microorganisms recycled from the treatment system. The mixture following the headworks enters selector tanks followed by oxidation ditch aeration tanks (air added) where the microorganisms breaks down the organic matter. Biological phosphorus removal is practiced utilizing anoxic and anaerobic selector tanks along with ferric chloride addition capability added to either the influent or effluent channels of the oxidation ditch in addition to further precipitate phosphorus. The water is then pumped into final clarifiers where the remaining solids including phosphorus is settled out. Disinfection occurs seasonally during the months of May – October via ultraviolet light. Effluent is discharged year round to the south bank of the Eagle River approx. 960 ft downstream of the Highway 45 North Bridge.

Attachment #2 is a discharge area map of Outfall 001.

**Existing Permit Limitations**

The current permit, which expired on 12/31/2024, includes the following effluent limitations and monitoring requirements.

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Footnotes
Flow Rate					1
BOD <sub>5</sub>			45 mg/L	30 mg/L	2, 3
TSS			45 mg/L	30 mg/L	2, 3
pH	9.0 s.u.	6.0 s.u.			2, 3
Fecal Coliform May – September			<b>656#/100 mL geometric mean</b>	400#/100 mL geometric mean	4
Phosphorus					
Interim				1.0 mg/L	5
Final				2.3 lbs/day	
Ammonia Nitrogen					1
Hardness (Total as CaCO <sub>3</sub> )					1

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Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Footnotes
Copper (Total Recoverable)					1
Zinc (Total Recoverable)					1
Chloride					1

Footnotes:

1. Monitoring only.
2. These limits are based on the Warm Water Sport Fish (WWSF) community of the immediate receiving water as described in s. NR 210.05(1), Wis. Adm. Code.
3. **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.
4. Additional limits to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Codes, are included in bold.
5. The concentration-based limit is a technology-based limit as described in subch. II of NR 217, Wis. Adm. Code. The mass-based limit is based on the Total Maximum Daily Load (TMDL) for the Wisconsin River Basin (WRB) to address phosphorus water quality impairments within the TMDL area and became effective in the permit on 10/01/2020.

**Receiving Water Information**

- Name: Eagle River
- Waterbody Identification Code (WBIC): 1599500
- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code: Warm Water Sport Fish (WWSF) community, non-public water supply and recreational use.
- Low flows used in accordance with chs. NR 106 and 217, Wis. Adm. Code: There is little information for low-flow data for this stream. The following 7-Q<sub>10</sub> flow value is from USGS for Station SW 1/4, Sec. 28, T40N, R11E, where Outfall 001 is located. This flow value is approximately equal to the annual 90% exceedance flow (baseflow) calculated in the WPDES Viewer. The 7-Q<sub>2</sub> and 90-Q<sub>10</sub> flow values are not available and will both be set equal to the 7-Q<sub>10</sub> flow value. Limit calculations utilizing the prior stated flows will be conservative or more stringent than necessary. The City of Eagle River can contact USGS for stream low-flow estimates at or nearby the location of Outfall 001 if more accurate flow information is desired. The Harmonic Mean has been estimated as recommended in *State of Wisconsin Water Quality Rules Implementation Plan* (Publ. WT-511-98) using a drainage area of 237.53 mi<sup>2</sup>.  
     7-Q<sub>10</sub> = 97 cubic feet per second (cfs)  
     Harmonic Mean Flow = 152 cfs  
     A value of 97 cfs is also used as a conservative estimate for the 7-Q<sub>2</sub> and 90-Q<sub>10</sub> low flows.
- Hardness = 47 mg/L as CaCO<sub>3</sub>. This value represents the geometric mean of data (n = 3, October 1997 – June 2001) of historic whole effluent toxicity testing at the facility.
- % 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 from Eagle River is used for this evaluation. The numerical values are shown in the tables below. If no data is available, the background

Attachment #1

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: There are no known impairments to the Eagle River. Outfall 001 is included in the WRB TMDL to address phosphorus water quality impairments within the TMDL area.

**Effluent Information**

- Design flow rate(s):  
Annual average = 0.517 million gallons per day (MGD)  
For reference, the actual average flow from September 2020 – August 2025 was 0.215 MGD.
- Hardness = 164 mg/L as CaCO<sub>3</sub>. This value represents the geometric mean of data (n = 16, January 2022 – December 2022) from both permit required monitoring and the permit application.
- Acute dilution factor used in accordance with s. NR 106.06(3)(c), Wis. Adm. Code: Not applicable – this facility does not have an approved Zone of Initial Dilution (ZID).
- Wastewater source: Domestic wastewater with no industrial contributors. Accepts landfill leachate from Vilas County Landfill Venture Group.
- Water supply: Municipality waterworks.
- Additives: The City of Eagle River has included 2 additives in the permit application that have the potential to be present in Outfall 001. These additives are listed below:
  - Hawkins Chemical Ferric chloride – Phosphorus removal
  - Hawkins Chemical Polymer – Sludge conditioning
  - An additive review is not necessary for any additives where either the toxicity is well documented and understood, can be controlled by a WQBEL, or are not believed to be present in the discharge. This is the case upon initial review of the listed additives; therefore, an additive review is not needed at this time.
- Effluent characterization: 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, and hardness and phosphorus. The permit required monitoring for hardness, copper, zinc, chloride, and ammonia nitrogen.
- Effluent data for substances for which a single sample was analyzed is shown in the tables in Part 2, in the column titled “MEAN EFFL. CONC.”. Otherwise, substances with multiple effluent data are shown in the tables below or in their respective parts in this evaluation.

**Toxic Substance Multiple Effluent Data**

Sample Date	Copper (µg/L)	Chloride (mg/L)	Zinc (µg/L)
01/11/2022	14	220	67
01/12/2022	14		
02/22/2022	12	220	57
02/23/2022	12		
03/24/2022	8	220	59
03/25/2022	8	220	59
04/19/2022	14	150	61
04/20/2022	14		
05/26/2022	14	160	51
05/27/2022	14	160	

Attachment #1

Sample Date	Copper (µg/L)	Chloride (mg/L)	Zinc (µg/L)
06/15/2022	17	170	46
06/16/2022	17		
07/26/2022	17	170	61
07/27/2022	17		
08/09/2022	15	140	57
08/10/2022	15	140	
09/25/2022	15	160	100
09/26/2022	15		
10/04/2022	18	170	170
10/05/2022	18	170	
11/02/2022	18	170	80
11/22/2022	18		
12/13/2022	11	820	120
1-day P <sub>99</sub>	23	824	192
4-day P <sub>99</sub>	18	473	126

The following table presents the average concentrations and loadings at Outfall 001 from September 2020 – August 2025 for all parameters with limits in the current permit to meet the requirements of s. NR 201.03(6), Wis. Adm. Code:

**Parameters with Effluent Limits**

	Average Measurement*	Average Mass Discharged
BOD <sub>5</sub>	9.2 mg/L	
TSS	12 mg/L	
pH field	6.9 s.u.	
Fecal Coliform	25 #/100 mL**	
Phosphorus	0.51 mg/L	0.88 lbs/day

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

\*\* The average measurement for bacteria is calculated as a geometric mean. Values reported below the LOD are replaced with a value of 1 for the calculation of the geometric mean.

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

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

1. The maximum effluent concentration exceeds the calculated limit (s. NR 106.05(3), Wis. Adm. Code)
2. If 11 or more detected results are available in the effluent, the upper 99<sup>th</sup> percentile (or P<sub>99</sub>) 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-Q<sub>10</sub>**

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-Q<sub>10</sub> 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<sub>s</sub> = average minimum 1-day flow which occurs once in 10 years (1-day Q<sub>10</sub>)  
 if the 1-day Q<sub>10</sub> flow data is not available = 80% of the average minimum 7-day flow which occurs once in 10 years (7-day Q<sub>10</sub>).

Q<sub>e</sub> = 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<sub>s</sub> = 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-Q<sub>10</sub> 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 City of Eagle River, and the limits are set based on two times the ATC.

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 = 78 cfs, (1-Q<sub>10</sub> (estimated as 80% of 7-Q<sub>10</sub>)), 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 <sub>99</sub>	1-day MAX. CONC.
Arsenic		340	680	135.9	<1.1		<1.1
Cadmium	164	18.2	36.3	7.3	<0.19		<0.19
Chromium	164	2,703	5,407	1,081	2.0		2.0
Copper	164	24.7	49.5			23	18
Lead	164	172	345	69	<4.3		<4.3
Nickel	164	713	1,426	285	5.3		5.3
Zinc	164	186	371			192	170
Chloride (mg/L)		757	1,514			824	820

\* The 2 × ATC method of limit calculation yields a more restrictive limit than consideration of ambient concentrations and 1-Q<sub>10</sub> 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 = 24 cfs (¼ of the 7-Q<sub>10</sub>), 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 <sub>99</sub>
Arsenic		152.2		4,766	953	<1.1	
Cadmium	47	1.36		42.59	8.5	<0.19	
Chromium	47	71.18		2,229	446	2.0	
Copper	47	5.42		169.7			18
Lead	47	13.50		422.8	85	<4.3	
Nickel	47	27.56		863	173	5.3	
Zinc	47	62.2		1,948			126
Chloride (mg/L)		395	3.47	12,264			473

**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 = 38 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		17,996	3,599	<0.19
Chromium	3,818,000		185,698,573	37,139,715	2.0
Lead	140		6,809	1,362	<4.3
Nickel	43,000		2,091,419	418,284	5.3

**Monthly Average Limits based on Human Cancer Criteria (HCC)**

RECEIVING WATER FLOW = 38 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		647	129	<1.1

In addition to evaluating the need for limits for each individual substance for which HCC exist, s. NR 106.06(8), Wis. Adm. Code, requires the evaluation of the cumulative cancer risk. Because no effluent limits are needed based on HCC, determination of the cumulative cancer risk is not needed per s. NR 106.06(8), Wis. Adm. Code.

**Conclusions and Recommendations**

Based on a comparison of the effluent data and calculated effluent limitations, **effluent limitations are not recommended for any toxic substances.** Limits and/or monitoring recommendations are made in the paragraphs below:

Copper – Considering available effluent data from the current permit term (January 2022 – December 2022), the 1-day and 4-day P<sub>99</sub> concentrations are 28 and 18 µg/L respectively. These concentrations are below the calculated copper WQBELs; **therefore, copper limits are not recommended during the reissued permit term. Monthly copper monitoring for 1 year is recommended to continue during the reissued permit term due to the likelihood of the mean effluent concentration being above 1/5<sup>th</sup> of the daily maximum limit.**

**Monthly hardness monitoring for 1 year is also recommended to continue because of the relationship between hardness and daily maximum limits based on ATC.**

Zinc – Considering available effluent data from the current permit term (January 2022 – December 2022), the 1-day and 4-day P<sub>99</sub> concentrations are 192 and 126 µg/L respectively. These concentrations are below the calculated zinc WQBELs; **therefore, zinc limits are not recommended during the reissued permit term. Monthly zinc monitoring for 1 year is recommended to continue during the reissued permit term due to the likelihood of the mean effluent concentration being above 1/5<sup>th</sup> of the daily maximum limit.**

Chloride – Considering available effluent data from the current permit term (January 2022 – December 2022), the 1-day and 4-day P<sub>99</sub> concentrations are 824 and 473 mg/L respectively. These concentrations are below the calculated chloride WQBELs; **therefore, chloride limits are not recommended during the reissued permit term. Chloride monitoring is recommended to ensure that 11 sample results are available at the next permit issuance to meet the data requirements of s. NR 106.85, Wis. Adm. Code.**

Mercury – The permit application did not require monitoring for mercury because the City of Eagle River 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.” 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 December 2020 – April 2024 was 0.8 mg/kg, with a maximum reported concentration of 2 mg/kg. **Therefore, mercury monitoring is not recommended at Outfall 001.**

PFOS and PFOA – The need for PFOS and PFOA monitoring is evaluated in accordance with s. NR 106.98(2), Wis. Adm. Code. Based on the type of discharge and the types of indirect dischargers contributing to the collection system, **PFOS and PFOA monitoring is recommended at a once every two months frequency.**

### **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 City of Eagle River 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 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 722 sample results were reported from September 2020 – August 2025. The maximum reported value was 7.7 s.u. (Standard pH Units). The effluent pH was 7.5 s.u. or less 99% of the time. The 1-day P<sub>99</sub>, calculated in accordance with s. NR 106.05(5), Wis. Adm. Code, is 7.6 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 7.6 s.u. Therefore, a value of 7.6 s.u. is believed to represent the maximum reasonably expected pH, and therefore most appropriate for determining daily maximum limitations for ammonia nitrogen. Substituting a value of 7.6 s.u. into the equation above yields an ATC = 17 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-Q<sub>10</sub> receiving water low flow if it is determined that the previous method of acute ammonia limit calculation (2×ATC) is not sufficiently protective of the fish and aquatic life. The more restrictive calculated limits shall apply.

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

**Daily Maximum Ammonia Nitrogen Determination**

Method	Limit (mg/L)
2×ATC	34
1-Q <sub>10</sub>	1,700

The 2×ATC method yields the most stringent limits for the City of Eagle River.

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

The weekly and monthly average ammonia nitrogen limits calculation from the previous limit evaluation do not change because there have been no changes in the effluent and receiving water flow rates. The calculations from the previous limit evaluation (August 2019) are shown in the table below:

**Weekly & Monthly Ammonia Nitrogen Limits – August 2019 Limit Evaluation**

		Spring	Summer	Winter
		April & May	June – Sept.	Oct. - March
<b>Effluent Flow</b>	Q <sub>e</sub> (MGD)	0.517	0.517	0.517
	7-Q (cfs)	97	97	97
	7-Q (cfs)	97	97	97

Attachment #1

<b>Background Information</b>	Ammonia (mg/L)	0.07	0.04	0.14
	Temperature (°C)	14	21	10
	pH (s.u.)	7.3	7.4	7.2
	% of Flow used	50	100	25
	Reference Weekly Flow (cfs)	49	97	24
	Reference Monthly Flow (cfs)	41	82	21
<b>Criteria mg/L</b>	4-day Chronic			
	Early Life Stages Present	13.0	7.90	
	Early Life Stages Absent			18.2
	30-day Chronic			
	Early Life Stages Present	5.21	3.16	
	Early Life Stages Absent			7.27
<b>Effluent Limitations mg/L</b>	Weekly Average			
	Early Life Stages Present	800	960	
	Early Life Stages Absent			570
	Monthly Average			
	Early Life Stages Present	270	330	
	Early Life Stages Absent			190

**Effluent Data**

The following table evaluates the statistics based upon ammonia data reported from January 2022 – December 2022.

**Ammonia Nitrogen Effluent Data**

Sample Date	Conc. (mg/L)
01/11/2022	2.2
02/22/2022	7
03/24/2022	0.98
03/25/2022	0.98
04/19/2022	0.9
05/26/2022	0.62
05/27/2022	0.62
06/15/2022	0.54
07/26/2022	4.1
08/09/2022	0.49
08/10/2022	0.49
09/25/2022	0.071
10/04/2022	0.8
10/05/2022	0.8
11/02/2022	1.3
12/13/2022	0.69
1-day P <sub>99</sub>	8.4
4-day P <sub>99</sub>	4.5
30-day P <sub>99</sub>	2.3

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

### Reasonable Potential

The need to include ammonia limits in the City of Eagle River permit is determined by calculating 99<sup>th</sup> upper percentile (or P<sub>99</sub>) values for ammonia and comparing those to the calculated limits. Based on this comparison, there is no reasonable potential for the discharge to exceed any of the calculated ammonia nitrogen limits. **Therefore, ammonia nitrogen limits are not recommended during the reissued permit term. Monthly monitoring for 1 year is recommended to continue during the reissued permit term to determine the need for ammonia nitrogen limits at the next permit issuance.**

## 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 City of Eagle River'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

The City of Eagle River has monitored effluent *E. coli* from August 2023 – August 2024 and a total of 21 results are available. A geometric mean of 126 counts/100 mL was exceeded once out of the last 6 months, with a maximum monthly geometric mean of 340 counts/100 mL (July 2024). Effluent data has exceeded 410 counts/100 mL 2 times (which is 10% of the total sample results). The maximum reported value was 750 counts/100 mL (07/02/2024). Based on this effluent data and given this facility uses UV light for disinfection, **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 City of Eagle River currently has a limit of 1.0 mg/L, this limit should be included in the reissued permit.** This limit remains applicable unless a more stringent WQBEL is given. In addition, the need for a WQBEL for

phosphorus must be considered.

**Water Quality-Based Effluent Limits (WQBEL)**

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

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.

**Effluent Data**

The following table summarizes effluent total phosphorus monitoring data from October 2020 – August 2025 for informational purposes only since the TMDL limit became effective in the current permit on 10/01/2020.

**Total Phosphorus Effluent Data**

Statistics	Conc. (mg/L)	Mass (lbs/day)
1-day P <sub>99</sub>	1.6	2.8
4-day P <sub>99</sub>	1.0	1.7
30-day P <sub>99</sub>	0.66	1.1
Mean	0.51	0.88
Std	0.32	0.55
Sample size	710	709
Range	0.11 - 3.21	0.17 - 4.76

**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 lbs/yr. This WLA is found in Table K-3 of Appendix J of the *Total Maximum Daily Loads for Total Phosphorus in the Wisconsin River Basin (WRB TMDL)* report dated December 21, 2018 are expressed as maximum annual loads (lbs/year) and maximum daily loads (lbs/day). For the City of Eagle River, this WLA is 577 lbs/yr and 1.58 lbs/day.

The monthly average limit of 2.3 lbs/day was determined in the previous limit evaluation (August 2019). The monthly average multiplier of 1.47 was chosen as described in the Department TMDL Implementation guidance using a coefficient of variation (CV) of 0.6 and a 3x/wk effluent monitoring frequency. The TMDL-based phosphorus WQBEL(s) will be re-evaluated if the annual phosphorus WLA is not being met as described in the prior stated guidance. This is done by comparing each rolling sum of 12 consecutive months of total monthly mass phosphorus discharges over the current permit term directly against the annual WLA. In this case, City of Eagle River has been 100% compliant in meeting the annual WLA of 577 lbs/yr, or all 48 available rolling sums have been below the annual WLA during October 2020 – August 2025 since the TMDL limit became effective in the current permit in October 2020. The

City of Eagle River is considered to be meeting their annual WLA. **Therefore, the monthly average limit of 2.3 lbs/day will remain unchanged during the reissued permit term.**

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

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

Due to the amount of upstream flow available for dilution in the limit calculation ( $Q_s:Q_e > 20:1$ ), the lowest calculated limitation is 120° F as a daily maximum as described in s. NR 106.55(6)(a), Wis. Adm. Code. At temperatures above approximately 103° F, conventional biological treatment systems do not function properly and experience upsets. There is no indication that this has ever occurred in this treatment system, so there is no reasonable potential for the discharge to exceed this limit. **Therefore, temperature limits or monitoring are not recommended during the reissued permit term.**

## **PART 7 – WHOLE EFFLUENT TOXICITY (WET)**

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

- Acute tests predict the concentration that causes lethality of aquatic organisms during a 48 to 96-hour exposure. To assure that a discharge is not acutely toxic to organisms in the receiving water, WET tests must produce a statistically valid LC<sub>50</sub> (Lethal Concentration to 50% of the test organisms) greater than 100% effluent, according to s. NR 106.09(2)(b), Wis. Adm Code.
- Chronic testing is usually not recommended where the ratio of the 7-Q<sub>10</sub> to the effluent flow exceeds 100:1. For the City of Eagle River, that ratio is approximately 121:1. With this amount of dilution, there is believed to be little potential for chronic toxicity effects in the Eagle River associated with the discharge from the City of Eagle River, **so the need for chronic WET testing will not be considered further.**
- According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), a synthetic (standard) laboratory water may be used as the dilution water and primary control in acute WET tests, unless the use of different dilution water is approved by the Department prior to use. The primary control water must be specified in the WPDES permit.
- Shown below is a tabulation of all available WET data for Outfall 001. Efforts are made to ensure that

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

**WET Data History**

Date Test Initiated	Acute Results LC <sub>50</sub> %				Chronic Results IC <sub>25</sub> %				Footnotes or Comments
	<i>C. dubia</i>	Fathead minnow	Pass or Fail?	Used in RP?	<i>C. dubia</i>	Fathead Minnow	Pass or Fail?	Use in RP?	
06/16/1992	>100	40	Fail	No					1
12/08/1992	>100	>100	Pass	No					1
10/07/1997	>100	>100	Pass	Yes	>80	>80	Pass	No	2
09/15/1998	>100	>100	Pass	Yes					
06/06/2001	>100	>100	Pass	Yes					

Footnotes:

1. The WWTF received many significant upgrades in 1996 where WET testing performed prior is no longer representative of the current discharge.
  2. The 7-Q<sub>10</sub>:Q<sub>e</sub> ratio is greater than 100:1; therefore, chronic testing will not be considered for the reissued permit term.
- 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.

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

According to s. NR 106.08(6)(d), Wis. Adm. Code, TUa and TUC effluent values are equal to zero whenever toxicity is not detected (i.e. when the LC<sub>50</sub>, IC<sub>25</sub> or IC<sub>50</sub> ≥ 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>.

**WET Checklist Summary**

	<b>Acute</b>
<b>AMZ/IWC</b>	Not applicable. <b>0 Points</b>
<b>Historical Data</b>	Three tests used to calculate RP. No tests failed. No tests within last 5 years. <b>5 Points</b>
<b>Effluent Variability</b>	Little variability, no violations or upsets, consistent WWTF operations. <b>0 Points</b>
<b>Receiving Water Classification</b>	WWSF community. <b>5 Points</b>
<b>Chemical-Specific Data</b>	No reasonable potential for limits based on ATC. Multiple substances detected. No additional compounds of concern. <b>3 Points</b>
<b>Additives</b>	No biocides and 2 water quality conditioners added. Permittee has proper P chemical SOPs in place: No. <b>17 Points</b>
<b>Discharge Category</b>	No industrial contributors. <b>0 Points</b>
<b>Wastewater Treatment</b>	Secondary or better. <b>0 Points</b>
<b>Downstream Impacts</b>	No impacts known. <b>0 Points</b>
<b>Total Checklist Points:</b>	<b>30 Points</b>
<b>Recommended Monitoring Frequency (from Checklist):</b>	Three acute tests recommended.
<b>Limit Required?</b>	No.
<b>TRE Recommended? (from Checklist)</b>	No.

- After consideration of the guidance provided in the Department's *WET Program Guidance Document* (2022) and other information described above, **3x 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.
- **If a satisfactory phosphorus chemical SOP is established and implemented at the facility prior to permit reissuance, then acute WET testing can be reduced to 2x in the reissued permit.**

