

# Permit Fact Sheet

## General Information

Permit Number:	WI-0025194-10-0	
Permittee Name:	Racine Wastewater Utility	
Address:	2101 Wisconsin Ave	
City/State/Zip:	Racine WI 53403-3372	
Discharge Location:	Approximately 500 feet east of Lake Michigan shoreline in Racine County.	
Receiving Water:	Lake Michigan	
StreamFlow (Q <sub>7,10</sub> ):	A lake discharge of dilution of 10:1 was used	
Stream Classification:	Cold Water Community; Public Water Supply	
Discharge Type:	Existing, Continuous	
Design Flow(s)	Daily Maximum	182 MGD (1998 facility plan)
	Weekly Maximum	123 MGD (1998 facility plan)
	Monthly Maximum	49 MGD (1998 facility plan)
	Annual Average	36 MGD (1998 facility plan)
Significant Industrial Loading?	Yes.	
Operator at Proper Grade?	Yes. Plant Subclass Required: Advanced - A1, B, C, P, D, L, Basic – SS	
Approved Pretreatment Program?	Yes. Racine’s pretreatment program was approved on August 1, 1984.	

## Facility Description

The Racine Wastewater Utility is designed to treat 36 MGD and treats on average 21 MGD. Preliminary and primary treatment are achieved by mechanical bar screens, grit chamber, and clarification for solids removal. Ferric chloride is added prior to and after primary treatment for chemical phosphorus removal. Secondary treatment is performed by conventional activated sludge via aeration basins where naturally occurring metabolizing microorganisms present in the wastewater break down organic matter and final clarification. Tertiary treatment is achieved through year-round UV disinfection. Two equalization basins are used during high flow conditions when influent flows exceed peak flow treatment capacity to prevent flood damage and process upsets. This wastewater is re-routed back to the head of the plant when influent flow decreases for full treatment or undergoes chlorinated disinfection/de-chlorination and blends with post-tertiary treatment wastewater. The option to discharge blended effluent during wet weather events will be continued in the reissued permit. Effluent is discharged year-round to Lake Michigan approximately 500 feet offshore. Sludge treatment occurs by anaerobic digestion, gravity belt thickening, belt filter press dewatering, and is either land applied on Department approved sites or landfilled. The Department has found the facility to be in substantial compliance with its current permit.

## Substantial Compliance Determination

**Enforcement During Last Permit:** There were two Notice of Noncompliance (NON) letters issued in response to SSO events during the previous term. All discharge monitoring reports & compliance schedule reports are submitted on time. There were three effluent violations, including a mercury daily max exceedance on 09/08/2021, a fecal coliform weekly average exceedance in April 2024, and a fecal coliform weekly average exceedance in August 2024.

The facility has completed all previously required actions as part of the enforcement process.

After a desk top review of all discharge monitoring reports, CMARs, land app reports, compliance schedule items, and a site visit on 10/11/2023, this facility has been found to be in substantial compliance with their current permit.

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	21.05 MGD (2023)	INFLUENT: Samples shall be collected from the headworks influent structure.
001	19.5 MGD (1/2020 – 5/2024)	EFFLUENT: 24-hour flow proportional composite samples shall be collected from the combined outfall structure where effluent mixes with the effluent from the equalization-hour basins before discharge to the lake. Discharge from the equalization basins shall receive primary treatment and disinfection before the combined outfall structure. Grab samples are taken from the effluent weir.
002	2400 dry U.S. tons (2024 WPDES application)	SLUDGE: Class B, anaerobically digested cake sludge. Representative samples shall be collected prior to land application at the discharge of the belt filter press.
010	N/A	Safety Site PLANT – Located in the City of Racine (21st Street & Roosevelt Avenue) at Manhole SS-U0904. During times of wet weather untreated flow could be discharged to Lake Michigan.
011	N/A	Safety Site S01 - Located in the City of Racine (Augusta Street & Michigan Boulevard) at Manhole SS-AC0003. During times of wet weather untreated flow could be discharged to Lake Michigan.
012	403,540 gallons (2/27/2023)	Safety Site S02 - Located in the City of Racine (3325 Michigan Boulevard) at Manhole SS-B0305. During times of wet weather untreated flow could be discharged to Lake Michigan.
013	N/A	Safety Site S03 - Located in the City of Racine (Carlton Drive & La Salle Street) at Manhole SS-B0133R. During times of wet weather untreated flow could be discharged to Lake Michigan.
014	N/A	Safety Site S04 - Located in the City of Racine (16th Street & College Avenue) at Manhole SS-T0005. During times of wet weather untreated flow could be discharged to Lake Michigan.
015	N/A	Safety Site S05 - Located in the City of Racine (21st Street & Grove Avenue) at Manhole SS-U0040. During times of wet weather untreated flow could be discharged to the Root River.

<b>Sample Point Designation</b>		
<b>Sample Point Number</b>	<b>Discharge Flow, Units, and Averaging Period</b>	<b>Sample Point Location, Waste Type/Sample Contents and Treatment Description (as applicable)</b>
016	398,582 gallons (2/27/2023)	Safety Site S06 – Located in the City of Racine (Washington Avenue & Grove Avenue) at Manhole SS-Z0010. During times of wet weather untreated flow could be discharged to the Root River.
018	N/A	Safety Site S08 – Located in the City of Racine (East 6th Street Siphon) at Manhole SS-QQ006. During times of wet weather untreated flow could be discharged to the Root River.
019	82,607 gallons (2/27/2023)	Safety Site S09 – Located in the City of Racine (Ontario Street & 4th Siphon) at Manhole EO-462. During times of wet weather untreated flow could be discharged to the Root River.
020	N/A	Safety Site S10 – Located in the City of Racine (Spruce Street & Brentwood Drive) at Manhole SS-U0430. During times of wet weather untreated flow could be discharged to Lake Michigan.
021	N/A	Safety Site S11 – Located in the City of Racine (Knoll Place & Norwood Drive) at Manhole SS-KK005. During times of wet weather untreated flow could be discharged to Lake Michigan.
022	N/A	Safety Site S12 – Located in the City of Racine (Golf Avenue & Conrad Drive) at Manhole SS-A0428. During times of wet weather untreated flow could be discharged to the Root River.
032	N/A	Safety Site L02 – Located in the City of Racine (Spring Street & Luedke Court) at LS #2 - Diversion Structure or East End of Storage Basin. During times of wet weather untreated flow could be discharged to the Root River.
036	N/A	Safety Site L06 – Located in the City of Racine (Drexel Avenue & Maryland Avenue) at LS #6 - Manhole SS-UO352. During times of wet weather untreated flow could be discharged to Lake Michigan.
037	N/A	Safety Site L07 – Located in the City of Racine (Steeple Chase Drive) at Manhole ST-NL02006. During times of wet weather untreated flow could be discharged to Lake Michigan.
038	N/A	Safety Site L08 – Located in the City of Racine (3625 Rapids Court) at LS #8 - Manhole SS-BB005. During times of wet weather untreated flow could be discharged to the Root River.
039	13,440 gallons (2/27/2023)	Safety Site L09 – Located in the City of Racine (Frances Drive & Harrington Drive) at LS #9 - Station. During times of wet weather untreated flow could be discharged to the Root River.
110	N/A	BLENDING (EQ Basin #1): Sample point for reporting diverted flow from EQ Basin #1 (east) to the outfall during high flow events. Wastewater flow bypasses the aeration basins, final clarifiers, and and then receives disinfection prior to discharge. The permittee shall notify the Department when blending occurs. See “Blending” requirements in the Standard Requirements section of the permit.

Sample Point Designation		
Sample Point Number	Discharge Flow, Units, and Averaging Period	Sample Point Location, Waste Type/Sample Contents and Treatment Description (as applicable)
		Flow monitoring and reporting is not required during normal operation of EQ basins where blending does not occur.
111	N/A	BLENDING (EQ Basin #2): Sample point for reporting diverted flow from EQ Basin #2 (west) to the outfall during high flow events. Wastewater flow bypasses the aeration basins, final clarifiers, and then receives disinfection prior to discharge. The permittee shall notify the Department when blending occurs. See "Blending" requirements in the Standard Requirements section of the permit. Flow monitoring and reporting is not required during normal operation of EQ basins where blending does not occur.
112	N/A	FIELD BLANK: Collect mercury field blank using standard sample handling procedures.
113	N/A	INTAKE: Grab samples of the City Water Intake (water supply from Lake Michigan) shall be taken from the Racine Water Utility intake.

## 1 Influent – Monitoring Requirements

### 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	
BOD5, Total		mg/L	Daily	24-Hr Flow Prop Comp	
Suspended Solids, Total		mg/L	Daily	24-Hr Flow Prop Comp	
Mercury, Total Recoverable		ng/L	Monthly	24-Hr Flow Prop Comp	See 'Mercury Monitoring' section.
Copper, Total Recoverable		ug/L	Monthly	24-Hr Flow Prop Comp	See 'Total Metals Analyses' and 'Sample Analysis' sections.
Cadmium, Total Recoverable		ug/L	Monthly	24-Hr Flow Prop Comp	See 'Total Metals Analyses' and 'Sample Analysis' sections.
Zinc, Total Recoverable		ug/L	Monthly	24-Hr Flow Prop Comp	See 'Total Metals Analyses' and 'Sample Analysis' sections.

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
					sections.
Lead, Total Recoverable		ug/L	Monthly	24-Hr Flow Prop Comp	See 'Total Metals Analyses' and 'Sample Analysis' sections.
Nickel, Total Recoverable		ug/L	Monthly	24-Hr Flow Prop Comp	See 'Total Metals Analyses' and 'Sample Analysis' sections.
Chromium, Total Recoverable		ug/L	Monthly	24-Hr Flow Prop Comp	See 'Total Metals Analyses' and 'Sample Analysis' sections.

### Changes from Previous Permit:

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

### Explanation of Monitoring Requirements

**BOD5 and Total Suspended Solids:** Tracking of BOD5 and Suspended Solids are required for percent removal requirements found in s. NR 210.05, Wis. Adm. Code.

**Mercury, Total Recoverable:** Mercury monitoring is included in the proposed permit pursuant to s. NR 106.145, Wis. Adm. Code. Required field blanks for Mercury monitoring per ss. NR 106.145 (9) and (10), Wis. Adm. Code requirements. The permittee shall collect a mercury field blank for each set of mercury samples (a set of samples may include a combination of influent, effluent or other samples all collected on the same day). The permittee shall report results of influent and effluent samples and field blanks to the Department on Discharge Monitoring Reports.

**Total Recoverable Copper, Cadmium, Zinc, Lead, Nickel, and Chromium:** Influent monitoring for metals is included in the proposed permit because the facility operates an industrial pretreatment program as required under ch. NR 211, Wis. Adm. Code.

## 2 Inplant - Monitoring and Limitations

### Sampling Point 110 - BLENDING (EQ Basin #1)

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow Rate		MGD	Per Occurrence	Calculated	See "Blending Flow" permit section.
Time		hours	Per Occurrence	Calculated	Report the total duration of blending within a given day

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
					(12:00am - 11:59pm) in which blending occurs. See "Blending Flow" permit section.

### Changes from Previous Permit:

Changes highlighted in table above.

**Flow Rate-** Sample Type changed from Measured to Calculated.

**Time-** Parameter Type changed from Flow Rate to Time for hours of reported blending.

### Explanation of Monitoring Requirements

Equalization basins are used during high flow conditions when influent flows exceed peak flow treatment capacity, to prevent flood damage and process upsets. Wastewater is re-routed back to the head of the plant when influent flow decreases for full treatment or undergoes chlorinated disinfection/dichlorination and blends with post-tertiary treatment wastewater. The option to discharge blended effluent during wet weather events is continued in the proposed permit. All waters diverted during high flow events will be monitored for flow rate and time. Blending is approved for this facility and will be reported to the Department as specified in permit section 6.2.9. The volume of blended flow along with the total time of each day's blending event will be reported on the monthly eDMR. The facility's request for blending was approved by the Department on October 4, 2024.

### Sample Point Number 111- BLENDING (EQ Basin #2)

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow Rate		MGD	Per Occurrence	Continuous	See "Blending Flow" permit section.
Time		hours	Per Occurrence	Calculated	Report the total duration of blending within a given day (12:00am - 11:59pm) in which blending occurs. See "Blending Flow" permit section.

### Changes from Previous Permit:

Changes highlighted in table above.

**Flow Rate-** Sample Type changed from Measured to Continuous.

**Time-** Parameter Type changed from Flow Rate to Time for hours of reported blending.

### Explanation of Monitoring Requirements

Equalization basins are used during high flow conditions when influent flows exceed peak flow treatment capacity, to prevent flood damage and process upsets. Wastewater is re-routed back to the head of the plant when influent flow decreases for full treatment or undergoes chlorinated disinfection/dichlorination and blends with post-tertiary treatment wastewater. The option to discharge blended effluent during wet weather events is continued in the proposed permit. All waters diverted during high flow events will be monitored for flow rate and time. Blending is approved for this facility and will be reported to the Department as specified in permit section 6.2.9. The volume of blended flow along with the total time of each day's blending event will be reported on the monthly eDMR. The facility's request for blending was approved by the Department on October 4, 2024.

### Sample Point Number: 112- Mercury Field Blanks

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Mercury, Total Recoverable		ng/L	Monthly	Blank	See "Mercury Monitoring" section.

#### Changes from Previous Permit:

No changes from previous permit.

### Explanation of Monitoring Requirements

**Mercury, Total Recoverable:** Required field blanks for Mercury monitoring per ss. NR 106.145(9) and (10), Wis. Adm. Code, requirements. The permittee shall collect a mercury field blank for each set of mercury samples (a set of samples may include a combination of influent, effluent or other samples all collected on the same day). The permittee shall report results of influent and effluent samples and field blanks to the Department on Discharge Monitoring Reports.

### Sample Point Number: 113- City Water Intake

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Arsenic, Total Recoverable		ug/L	Quarterly	Grab	See 'Sample Monitoring and Analysis' section.

#### Changes from Previous Permit:

No changes from previous permit.

### Explanation of Monitoring Requirements

**Arsenic, Total Recoverable:** A strong correlation between background data and facility effluent data suggests that effluent discharge concentrations of arsenic are due to the presence of arsenic in source water. Due to a limited amount of data, untreated drinking water intake and effluent monitoring for total recoverable arsenic is included. A separate sample point for drinking water intake is included to allow for data reporting and retrieval. Pursuant to s. NR 106.07(6)(a), Wis. Adm. Code, the permittee shall perform effluent monitoring required in the permit using an acceptable analytical

methodology for total recoverable arsenic in ch. NR 219, Wis. Adm. Code, which produces the lowest limit of detection and limit of quantification possible.

Data will be used to illustrate the local arsenic cycle and determine if condition of s. NR 106.06(6) (b) 1-58, Wis. Adm. Code, are met. Monitoring will occur quarterly to provide enough information by the next permit reissuance to determine if continued monitoring and/or a water quality-based effluent limit is necessary for total recoverable arsenic. Arsenic samples shall be analyzed using a highly sensitive but acceptable method unless not possible, using the most sensitive approved method.

### 3 Surface Water - Monitoring and Limitations

#### Sample Point Number: 001- EFFLUENT

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow Rate		MGD	Daily	Continuous	
BOD5, Total	Weekly Avg	45 mg/L	Daily	24-Hr Flow Prop Comp	
BOD5, Total	Monthly Avg	30 mg/L	Daily	24-Hr Flow Prop Comp	
Suspended Solids, Total	Weekly Avg	45 mg/L	Daily	24-Hr Flow Prop Comp	
Suspended Solids, Total	Monthly Avg	30 mg/L	Daily	24-Hr Flow Prop Comp	
pH Field	Daily Max	9.0 su	Daily	Continuous	
pH Field	Daily Min	6.0 su	Daily	Continuous	
Fecal Coliform	Geometric Mean - Monthly	400 #/100 ml	Daily	Grab	Limit effective October through April annually and retained the entire permit term. Effective as interim limit May through September 2025 until the E. coli limit goes into effect (2026) per the Effluent Limitations for E. coli Schedule.
E. coli		#/100 ml	Daily	Grab	Monitoring only May through September 2025 until the final limit goes into effect per the Effluent Limitations for E. coli Schedule.



Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
E. coli	Geometric Mean - Monthly	126 #/100 ml	Daily	Grab	Limit Effective May through September 2026 and May through September annually for permit term.
E. coli	% Exceedance	10 Percent	Monthly	Calculated	Limit effective May through September 2026 and May through September annually for permit term. See the 'E. coli Percent Limit subsection. Enter the result in the DMR on the last day of the month.
Chlorine, Total Residual	Daily Max	38 ug/L	Per Occurrence	Grab	Limits apply only when chlorine is added.
Chlorine, Total Residual	Weekly Avg	38 ug/L	Per Occurrence	Grab	Limits apply only when chlorine is added.
Chlorine, Total Residual	Monthly Avg	38 ug/L	Per Occurrence	Grab	Limits apply only when chlorine is added.
Nitrogen, Ammonia Variable Limit		mg/L	Daily	See Table	Look up the variable ammonia limit from the 'Variable Ammonia Limitation' table and report the variable limit in the Ammonia Variable Limit column on the eDMR.
Nitrogen, Ammonia (NH3-N) Total	Daily Max - Variable	mg/L	Daily	24-Hr Flow Prop Comp	Report the daily maximum Ammonia result in the Nitrogen, Ammonia (NH3-N) Total column of the eDMR. See Ammonia Limitation Section.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	62 mg/L	Daily	24-Hr Flow Prop Comp	Monitoring year-round. Limit effective November through April.
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	25 mg/L	Daily	24-Hr Flow Prop Comp	Monitoring year-round. Limit effective November through April.
Nitrogen, Total Kjeldahl		mg/L	Quarterly	24-Hr Flow Prop Comp	

<b>Monitoring Requirements and Limitations</b>					
<b>Parameter</b>	<b>Limit Type</b>	<b>Limit and Units</b>	<b>Sample Frequency</b>	<b>Sample Type</b>	<b>Notes</b>
Nitrogen, Nitrite + Nitrate Total		mg/L	Quarterly	24-Hr Flow Prop Comp	
Nitrogen, Total		mg/L	Quarterly	Calculated	Total Nitrogen shall be calculated as the sum of reported values for Total Kjeldahl Nitrogen and Total Nitrite + Nitrate Nitrogen.
Phosphorus, Total	Monthly Avg	0.82 mg/L	Daily	24-Hr Flow Prop Comp	
Mercury, Total Recoverable	Daily Max	2.5 ng/L	Monthly	Grab	See "Mercury Monitoring" section.
Hardness, Total as CaCO <sub>3</sub>		mg/L	Quarterly	24-Hr Flow Prop Comp	See 'Total Metals Analyses' and 'Sample Analysis' sections.
Arsenic, Total Recoverable		ug/L	Quarterly	24-Hr Flow Prop Comp	See 'Total Metals Analyses' and 'Sample Analysis' sections.
Cadmium, Total Recoverable		ug/L	Monthly	24-Hr Flow Prop Comp	See 'Total Metals Analyses' and 'Sample Analysis' sections.
Chromium, Total Recoverable		ug/L	Monthly	24-Hr Flow Prop Comp	See 'Total Metals Analyses' and 'Sample Analysis' sections.
Copper, Total Recoverable		ug/L	Monthly	24-Hr Flow Prop Comp	See 'Total Metals Analyses' and 'Sample Analysis' sections.
Lead, Total Recoverable		ug/L	Monthly	24-Hr Flow Prop Comp	See 'Total Metals Analyses' and 'Sample Analysis' sections.
Nickel, Total Recoverable		ug/L	Monthly	24-Hr Flow Prop Comp	See 'Total Metals Analyses' and 'Sample Analysis' sections.
Zinc, Total Recoverable		ug/L	Monthly	24-Hr Flow Prop Comp	See 'Total Metals Analyses' and 'Sample Analysis' sections.
Temperature Maximum		deg F	3/Week	Continuous	Monitoring in year 2028.
Chloride		mg/L	Monthly	24-Hr Flow	Monitoring in year 2028.

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
				Prop Comp	
PFOS		ng/L	Monthly	Grab	Monitoring only. See PFOS/PFOA Minimization Plan Determination of Need schedule.
PFOA		ng/L	Monthly	Grab	Monitoring only. See PFOS/PFOA Minimization Plan Determination of Need schedule.
Acute WET		TUa	See Listed Qtr(s)	24-Hr Flow Prop Comp	Annual in rotating quarters. See 'WET Testing' section.
Chronic WET		TUc	See Listed Qtr(s)	24-Hr Flow Prop Comp	Annual in rotating quarters. See 'WET Testing' section.

### Changes from Previous Permit

**Fecal Coliform and E. coli:** Fecal coliform monitoring and limits have been replaced with Escherichia coli (E. coli) monitoring and limits. E. coli monitoring is required at the permit effective date. An interim fecal coliform limit of 400 #/100 ml as a monthly geometric mean will apply from the permit effective date through the end of a compliance schedule. At the end of the schedule, E. coli limits of 126 #/100 ml as a monthly geometric mean that may never be exceeded and 410 #/100ml as a daily maximum that may not be exceeded more than 10 percent of the time in any calendar month will apply.

**Nitrogen, Ammonia:** Sample Type changed from Calculated to See Table.

**Total Phosphorus:** The monthly average interim limit of 0.86 mg/L was decreased to 0.82 mg/L.

**Mercury, Total Recoverable:** The daily maximum limit of 4.0 ng/L was decreased to 2.5 ng/L.

**Chloride:** One year of monitoring has been added to the permit in 2028.

**PFOS and PFOA:** Monthly monitoring is included in the permit in accordance with s. NR 106.98(2)(a), Wis. Adm. Code.

### Explanation of Limits and Monitoring Requirements

Refer to the “Water Quality-Based Effluent Limitations for the Racine Wastewater Utility”, prepared by Nicole Krueger, dated September 27, 2024 and used for this reissuance.

**BOD5, Total Suspended Solids and pH-** Categorical limits and WQBELs are included in the permit as outlined in ch. NR 210, Wis. Adm. Code. The effluent limitations for BOD5, Total Suspended Solids, and pH are carried over from the previous permit and are not subject to change at this time because the receiving water characteristics have not changed.

**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.

**PFOS and PFOA** – NR 106 Subchapter VIII – Permit Requirements for PFOS and PFOA Dischargers became effective on August 1, 2022. At the first reissuance of a WPDES permit after August 1, 2022, the new rule requires WPDES permits for major municipal dischargers, with an average flow rate greater than or equal to 5 MGD, at a minimum sample effluent on a monthly basis for PFOS and PFOA pursuant s. NR 106.98(2)(a), Wis. Adm. Code. The initial determination of the need for sampling shall be conducted for up to two years in order to determine if the permitted discharge has the reasonable potential to cause or contribute to an exceedance of the PFOS or PFOA standards under s. NR 102.04(8)(d)1, Wis. Adm. Code.

**Acute and Chronic WET-** Whole effluent toxicity (WET) testing requirements are determined in accordance with ss. NR 106.08 and NR 106.09, Wis. Adm. Code, as revised in August 2016. Testing is required during the following quarters: **July – Sept 2025, Jan – March 2026, April – June 2027, Oct – Dec 2028, July – Sept 2029.**

**Sample Point Number: 010- SS PLANT; 011- S01; 012- S02; 013- S03; 014- S04; 015- S05; 016- S06; 018- S08; 019- S09; 020- S10; 021- S11; 022- S12; 032- L02; 036- L06; 038- L08, and 039- L09**

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Volume		MGD	Per Occurrence	Measure	
E.coli		#/100 ml	Per Occurrence	Grab	

**Changes from Previous Permit**

**Volume-** Parameter changed from Flow Bypass to Volume.

**E.coli-** Parameter changed from Flow Bypass to E.coli.

**Explanation of Monitoring Requirements**

The sample points in this section are points throughout the collection system that the facility may use in the event of an SSO. The addition of monitoring at these points on the DMR allows for future data analysis. SSO rules and required forms continue to be in effect as described in the permit. Safety sites are built into the collection system to prevent basement back-ups. In the event of a surcharge, a high level is detected in the manhole and a message is sent through FM telemetry to the SCADA system at the wastewater treatment facility. When flow reaches a level of elevation higher than the manhole it is redirected automatically to the storm sewer system and flow monitoring begins. Lift stations noted above with an “L” are lift stations that have the capability to direct high flows to a storm sewer or directly from the lift station. Safety sites and lift stations are continuously monitored through SCADA using radio telemetry to the wastewater treatment plant and are tested monthly. Additionally, Racine Wastewater Utility monitors sites throughout the city that collect flow and rainfall data.

### 3.1.1 Sampling Point (Outfall) 037- L07

Monitoring Requirements and Effluent Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Volume		MGD	Per Occurrence	Estimated	
E. coli		#/100 ml	Per Occurrence	Grab	

### Changes from Previous Permit

**Volume-** Parameter changed from Flow Bypass to Volume.

**E.coli-** Parameter changed from Flow Bypass to E.coli.

### Explanation of Monitoring Requirements

The sample points in this section are points throughout the collection system that the facility may use in the event of an SSO. The addition of monitoring at these points on the DMR allows for future data analysis. SSO rules and required forms continue to be in effect as described in the permit. Safety sites are built into the collection system to prevent basement back-ups. In the event of a surcharge, a high level is detected in the manhole and a message is sent through FM telemetry to the SCADA system at the wastewater treatment facility. When flow reaches a level of elevation higher than the manhole it is redirected automatically to the storm sewer system and flow monitoring begins. Lift stations noted above with an "L" are lift stations that have the capability to direct high flows to a storm sewer or directly from the lift station. Safety sites and lift stations are continuously monitored through SCADA using radio telemetry to the wastewater treatment plant and are tested monthly. Additionally, Racine Wastewater Utility monitors sites throughout the city that collect flow and rainfall data.

## 4 Land Application - Monitoring and Limitations

Municipal Sludge Description						
Sample Point	Sludge Class (A or B)	Sludge Type (Liquid or Cake)	Pathogen Reduction Method	Vector Attraction Method	Reuse Option	Amount Reused/Disposed (Dry Tons/Year)
002	B	Cake	Anaerobic Digestion	Incorporation	Land Apply and Landfill	2,400 dry US tons
Does sludge management demonstrate compliance? <b>Yes.</b>						
Is additional sludge storage required? <b>No.</b>						
Is Radium-226 present in the water supply at a level greater than 2 pCi/liter? <b>No.</b>						
If yes, special monitoring and recycling conditions will be included in the permit to track any potential						

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)
problems in landapplying sludge from this facility						
Is a priority pollutant scan required? <b>Yes, the scan is required in 2028.</b>						
Priority pollutant scans are required once every 10 years at facilities with design flows between 5 MGD and 40 MGD, and once every 5 years if design flow is greater than 40 MGD.						

### Sample Point Number: 002- ANAEROBIC CAKE SLUDGE

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Solids, Total		Percent	1/ 2 Months	Grab Comp	
Arsenic Dry Wt	Ceiling	75 mg/kg	1/ 2 Months	Grab Comp	
Arsenic Dry Wt	High Quality	41 mg/kg	1/ 2 Months	Grab Comp	
Cadmium Dry Wt	Ceiling	85 mg/kg	1/ 2 Months	Grab Comp	
Cadmium Dry Wt	High Quality	39 mg/kg	1/ 2 Months	Grab Comp	
Copper Dry Wt	Ceiling	4,300 mg/kg	1/ 2 Months	Grab Comp	
Copper Dry Wt	High Quality	1,500 mg/kg	1/ 2 Months	Grab Comp	
Lead Dry Wt	Ceiling	840 mg/kg	1/ 2 Months	Grab Comp	
Lead Dry Wt	High Quality	300 mg/kg	1/ 2 Months	Grab Comp	
Mercury Dry Wt	Ceiling	57 mg/kg	1/ 2 Months	Grab Comp	
Mercury Dry Wt	High Quality	17 mg/kg	1/ 2 Months	Grab Comp	
Molybdenum Dry Wt	Ceiling	75 mg/kg	1/ 2 Months	Grab Comp	
Nickel Dry Wt	Ceiling	420 mg/kg	1/ 2 Months	Grab Comp	
Nickel Dry Wt	High Quality	420 mg/kg	1/ 2 Months	Grab Comp	
Selenium Dry Wt	Ceiling	100 mg/kg	1/ 2 Months	Grab Comp	
Selenium Dry Wt	High Quality	100 mg/kg	1/ 2 Months	Grab Comp	
Zinc Dry Wt	Ceiling	7,500 mg/kg	1/ 2 Months	Grab Comp	
Zinc Dry Wt	High Quality	2,800 mg/kg	1/ 2 Months	Grab Comp	
Nitrogen, Total Kjeldahl		Percent	1/ 2 Months	Grab Comp	

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Nitrogen, Ammonium (NH4-N) Total		Percent	1/ 2 Months	Grab Comp	
Phosphorus, Total		Percent	1/ 2 Months	Grab Comp	
Phosphorus, Water Extractable		% of Tot P	1/ 2 Months	Grab Comp	
Potassium, Total Recoverable		Percent	1/ 2 Months	Grab Comp	
PCB Total Dry Wt	Ceiling	50 mg/kg	Once	Grab Comp	Once in 2026.
PCB Total Dry Wt	High Quality	10 mg/kg	Once	Grab Comp	Once in 2026.
PFAS Dry Wt			Annual	Grab Comp	Perfluoroalkyl and Polyfluoroalkyl Substances based on updated DNR PFAS List. See PFAS Permit Sections for more information.
PFOA + PFOS		ug/kg	Annual	Calculated	Report the sum of PFOA and PFOS. See PFAS Permit Sections for more information.
Municipal Sludge Priority Pollutant Scan			Once	Grab Comp	Once in 2028 as specified in s. NR 215.03 (1-4), Wis. Adm. Code.

## Changes from Previous Permit:

**PFAS** - Annual monitoring is included in the permit.

**Municipal Sludge Priority Pollutant Scan** - Monitoring once in 2028 is included in the permit.

## Explanation of Limits and Monitoring Requirements

Requirements for land application of municipal sludge are determined in accordance with ch. NR 204, Wis. Adm. Code. Ceiling and high-quality limits for metals in sludge are specified in s. NR 204.07(5), Wis. Adm. Code. Requirements for pathogens are specified in s. NR 204.07(6) and in s. NR 204.07 (7), Wis. Adm Code, for vector attraction requirements. Limitations for PCBs are addressed in s. NR 204.07(3)(k), Wis. Adm. Code. Municipal Sludge Priority Pollutant Scan is required per s. NR 215.03 (1-4), Wis. Adm. Code.

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

Collecting sludge data on PFAS concentrations from a wide range of wastewater treatment facilities will help protect public health from exposure to elevated levels of PFAS and determine the department’s implementation of EPA’s

recommendations. To quantitate this risk, PFAS sampling has been included in the proposed WPDES permit pursuant to ss. NR 214.18(5)(b) and NR 204.06(2)(b)9, Wis. Adm. Code.

## 5 Schedules

### 5.1 Effluent Limitations for E. coli

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

Required Action	Due Date
<b>Construction Upgrade Progress Report:</b> The permittee shall submit a progress report on construction upgrades.	06/30/2025
<b>Complete Construction:</b> The permittee shall complete construction of wastewater treatment system upgrades.	12/31/2025
<b>Achieve Compliance:</b> The permittee shall achieve compliance with final E. coli limitations.	04/30/2026

### Explanation of Schedule

A compliance schedule is included in the permit to provide time for the permittee to investigate options for meeting new effluent E. coli water quality-based effluent limits while coming into compliance with the limits as soon as reasonably possible.

### 5.2 Mercury Pollutant Minimization Program

As a condition of the mixing zone phase out exception for mercury granted in accordance with s. NR 106.06 (2) (br), Wis. Adm. Code, and 40 CFR 132, Appendix F, the permittee shall perform the following actions in accordance with s. NR 106.145, Wis. Adm. Code.

Required Action	Due Date
<b>Submit Annual Status Report:</b> The permittee shall submit to the Department an annual status report to summarize and evaluate mercury monitoring data and other relevant information collected to document background and effluent levels of mercury. The report shall also document any continuing reasonable cost-effective efforts to identify and reduce potential sources of mercury in the effluent. The first annual report shall be due on the date specified and annually thereafter.	01/31/2025
<b>Annual Mercury Progress Report #2:</b> Submit a mercury progress report, related to the pollutant minimization activities for the previous year, as defined above.	01/31/2026
<b>Annual Mercury Progress Report #3:</b> Submit a mercury progress report, related to the pollutant minimization activities for the previous year, as defined above.	01/31/2027
<b>Annual Mercury Progress Report #4:</b> Submit a mercury progress report, related to the pollutant minimization activities for the previous year, as defined above.	01/31/2028
<b>Final Mercury Report:</b> Submit a final report documenting the success in reducing or maintaining mercury concentrations in the effluent. The report shall summarize mercury pollutant minimization activities that have been implemented during the current permit term. The report shall include an analysis of trends in monthly and annual total effluent mercury concentrations based on mercury	01/31/2029



sampling during the current permit term. The report shall also include an analysis of how influent and effluent mercury varies with time and with significant loading of mercury such as loads from industries into the collection system.	
<b>Annual Mercury Reports After Permit Expiration:</b> In the event that this permit is not reissued on time, the permittee shall continue to submit annual mercury status reports.	

## Explanation of Schedule

The Racine Wastewater Utility has requested an exemption to the proposed mixing zone phase out when calculating effluent limitations for mercury beyond the November 15, 2010 phase out date under the exception for technical and economic considerations to the mixing zone phase-out for bio-accumulating chemicals of concern (BCC's) at 40 CFR, Part 132, Appendix F, Procedure 3.C.6. Therefore, Racine will accept a permit requirement for a continued mercury pollutant minimization program (PMP) that meets the requirements of s. 106.145 (7), Wis. Adm. Code. The Department believes that the finding at s.106.145 (1) (a), Wis. Adm. Code, sufficiently demonstrates that controls beyond a PMP would result in unreasonable economic effects because controls to remove mercury using wastewater treatment technology are not feasible or cost-effective.

### 5.3 PFOS/PFOA Minimization Plan Determination of Need

Required Action	Due Date
<p><b>Report on Effluent Discharge:</b> 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>	12/31/2025
<p><b>Report on Effluent Discharge and Evaluation of Need:</b> 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>	12/31/2026

## **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:**

None.

## **Attachments:**

Water Quality Based Effluent Limitations Memo, dated September 27, 2024.

Blending Approval Memo to Add Blending to WPDES Permit No. WI-0025194-10, dated October 4, 2024

## **Expiration Date:**

December 31, 2029

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

No waivers were requested or granted from permit application requirements.

**Prepared By:** Melanie Burns, Wastewater Specialist

**Date:** October 3, 2024

**Date Post Fact Check:** November 12, 2024 (Typographical errors corrected in fact sheet.)

**Date Post Public Notice:**

# CORRESPONDENCE/MEMORANDUM

DATE: 09/27/2024

TO: Melanie Burns – SER

FROM: Nicole Krueger – SER *Nicole Krueger*

SUBJECT: Water Quality-Based Effluent Limitations for Racine Wastewater Utility  
 WPDES Permit No. WI-0025194-10

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 Racine Wastewater Utility in Racine County. This municipal wastewater treatment facility (WWTF) discharges to Lake Michigan. 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 <sub>5</sub>			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
Bacteria					3
Interim Limit Fecal Coliform				400 #/100 mL geometric mean	
Final Limit <i>E. coli</i>				126 #/100 mL geometric mean	
Residual Chlorine	38 µg/L		<b>38 µg/L</b>	<b>38 µg/L</b>	4
Ammonia Nitrogen November – April	Variable		62 mg/L	25 mg/L	5
TKN, Nitrate+Nitrite, and Total Nitrogen					6
PFOS and PFOA					7
Phosphorus				0.82 mg/L	
Mercury	2.5 ng/L				8
Hardness					2,9
Arsenic					1,2
Chloride					10
Temperature					1,2
Acute WET					11
Chronic WET					11

Footnotes:

1. No changes from the current permit.
2. Monitoring only.
3. Bacteria limits apply year-round. The fecal coliform interim limit will apply until the end of the compliance schedule when *E. coli* limit takes effect. The *E. coli* limit applies May – September. The *E. coli* limit may apply October – April, or the current fecal coliform limit may apply

October – April instead. Additional final limit: No more than 10 percent of E. coli bacteria samples collected in any calendar month may exceed 410 count/100 mL.

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

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

6. As recommended in the Department's October 1, 2019 Guidance for Total Nitrogen Monitoring in Wastewater Permits, quarterly total nitrogen monitoring is recommended for all municipal major permittees. 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).
7. Monthly monitoring is required in accordance with s. NR 106.98(2), Wis. Adm. Code.
8. This is a mixing zone phase-out exception limit. Continued implementation of a pollutant minimization program is recommended as well.
9. Hardness monitoring is recommended because of the relationship between hardness and daily maximum limits based on acute toxicity criteria.
10. Monitoring at a frequency to ensure that 11 samples are available at the next permit issuance.
11. Annual acute and chronic WET tests are recommended. The Instream Waste Concentration (IWC) to assess chronic test results is 9%. According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), chronic testing shall be performed using a dilution series of 100%, 30%, 10%, 3% & 1% and the dilution water used in WET tests conducted on Outfall 001 shall be a grab sample collected from Lake Michigan. 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).

**Continued monitoring for total recoverable cadmium, chromium, copper, lead, nickel and zinc is also required because Racine operates a local pretreatment program for the many industries that discharge to the treatment facility.**

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

Attachments (4) – Narrative, Mixing Zone Phase-Out Exception for Mercury, Outfall Map, & Thermal Table

PREPARED BY: Nicole Krueger, Water Resources Engineer – SER

E-cc: Jacob Wedesky, Wastewater Engineer – SER  
Bryan Hartsook, Regional Wastewater Supervisor – SER  
Diane Figiel, Water Resources Engineer – WY/3  
Nate Willis, Wastewater Engineer – WY/3

Attachment #1  
**Water Quality-Based Effluent Limitations for  
 Racine Wastewater Utility**

**WPDES Permit No. WI-0025194-10**

Prepared by: Nicole Krueger

**PART 1 – BACKGROUND INFORMATION**

**Facility Description**

The Racine Wastewater Utility is designed to treat 36 MGD. Preliminary and primary treatment are achieved by mechanically cleaned bar screens, grit chamber, and clarification for solids removal. Ferric chloride is added prior to primary treatment for chemical phosphorus removal. Secondary treatment is performed by conventional activated sludge via aeration basins where naturally occurring metabolizing microorganisms present in the wastewater break down organic matter until effluent limits are met. Tertiary treatment is achieved by additional clarification with UV disinfection occurring year – round. Two equalization basins are used during high flow conditions when influent flows exceed peak flow treatment capacity, to prevent flood damage and process upsets. This wastewater is rerouted back to the head of the plant when influent flow decreases for full treatment or undergoes chlorinated disinfection/dechlorination and bypasses/blends with post – tertiary treatment wastewater. The option to discharge blended effluent during wet weather events will be continued in the reissued permit. Effluent is discharged year – round to Lake Michigan approximately 500 feet offshore. Sludge treatment occurs by anaerobic digestion, gravity belt thickening, belt filter press dewatering, and is either land applied on Department approved sites or landfilled.

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

**Existing Permit Limitations**

The current permit, expiring 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
TSS			45 mg/L	30 mg/L	2
pH	9.0 s.u.	6.0 s.u.			2
Fecal Coliform May – September			<b>970#/100 mL geometric mean</b>	400#/100 mL geometric mean	3
E. coli					1
Residual Chlorine	38 µg/L		<b>38 µg/L</b>	<b>38 µg/L</b>	3
Ammonia Nitrogen November – April	Variable		62 mg/L	25 mg/L	4,5
TKN, Nitrate+Nitrite, and Total Nitrogen					1
Phosphorus				0.86 mg/L	

Attachment #1

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Footnotes
Mercury	4.0 ng/L				6
Hardness					1
Arsenic					1
Temperature					1
Acute WET					7
Chronic WET					7

Footnotes:

1. Monitoring only.
2. These limitations are not being evaluated as part of this review. Because the water quality criteria (WQC), reference effluent flow rates, and receiving water characteristics have not changed, limitations for these water quality characteristics do not need to be re-evaluated at this time.
3. 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.
4. Daily maximum ammonia limits shown below apply November – April.

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

5. Ammonia monitoring only for May – October.
6. This is a mixing zone phase-out exception limit.
7. Annual acute and chronic WET testing is required. The IWC for chronic WET was 9.1%.

**Monitoring for total recoverable cadmium, chromium, copper, lead, nickel and zinc is also required because Racine operates a local pretreatment program for the many industries that discharge to the treatment facility.**

**Receiving Water Information**

- Name: Lake Michigan
- Waterbody Identification Code (WBIC): 20
- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code: Cold water community and public water supply.
- Flow: A ten-to-one dilution ratio will be used for calculating effluent limitations based on chronic or long-term impacts, in accordance with s. NR 106.06(4)(b)2, Wis. Adm. Code, because the receiving water does not exhibit a unidirectional flow at the point of discharge.
- Hardness = 145 mg/L as CaCO<sub>3</sub>. This value represents the geometric mean of data from chronic WET

testing from 10/16/2018 – 08/05/2021.

- Source of background concentration data: Metals data from Lake Michigan is used for this evaluation from DNR Water Quality Rules Implementation Plan, Chapter 4 (1998). Background data for mercury and arsenic are from Racine’s water intake data. 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: There are several other dischargers to Lake Michigan, however they are not in the immediate vicinity and the mixing zones do not overlap. Therefore, the other dischargers do not impact this evaluation.
- Impaired water status: Lake Michigan is 303(d) listed as impaired for mercury and PCBs.

**Effluent Information**

- Design flow rate(s):
  - Annual average = 36 MGD (Million Gallons per Day)
  - Peak daily = 182 MGD
  - Peak weekly = 123 MGD
  - Peak monthly = 49 MGD
  - The peak design flows are from the 1998 facility plan.

For reference, the actual average flow from 01/01/2020 – 05/31/2024 was 19.5 MGD.

- Hardness = 295 mg/L as CaCO<sub>3</sub>. This value represents the geometric mean of data from permit-required monitoring from 01/08/2020 – 04/09/2024.
- 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 Lake Michigan and 17 categorical industrial users.
- Additives: Ferric chloride is used for phosphorus removal, sodium hypochlorite is used for disinfection, sodium bisulfite is used for dechlorination, and two polymers are used for dewatering.
- Effluent characterization: This facility is categorized as a major municipal, so the permit application required effluent sample analyses for all the “priority pollutants” except for the Dioxins and Furans as specified in s. NR 200.065, Table 1, Wis. Adm. Code. The permit-required monitoring for arsenic, cadmium, chromium, copper, lead, nickel, zinc, and mercury is used in this evaluation.
- Effluent data for substances for which a single sample was analyzed is shown in the tables in Part 2 below, in the column titled “MEAN EFFL. CONC.”. Otherwise, substances with multiple effluent data are shown in the tables below or in their respective parts in this evaluation.

**Effluent Data**

	Mercury ng/L		Nickel µg/L
1-day P <sub>99</sub>	4.87	1-day P <sub>99</sub>	16.4
4-day P <sub>99</sub>	2.73	4-day P <sub>99</sub>	12.2
30-day P <sub>99</sub>	1.62	30-day P <sub>99</sub>	7.23
Mean	1.15	Mean*	4.94
Std	0.98	Std	3.00
Sample size	55	Sample size	53
Range	0.44 – 7.7	Range	<2.6 – 18.8



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	Cadmium µg/L		Chromium µg/L
1-day P <sub>99</sub>		1-day P <sub>99</sub>	
4-day P <sub>99</sub>		4-day P <sub>99</sub>	
30-day P <sub>99</sub>		30-day P <sub>99</sub>	
Mean**	<2	Mean*	0.44
Std		Std	
Sample size		Sample size	53
Range		Range	<2 – 9.8
	Copper µg/L		Lead µg/L
1-day P <sub>99</sub>	19.7	1-day P <sub>99</sub>	
4-day P <sub>99</sub>	14.7	4-day P <sub>99</sub>	
30-day P <sub>99</sub>	9.19	30-day P <sub>99</sub>	
Mean*	6.69	Mean**	<10
Std	3.60	Std	
Sample size	53	Sample size	
Range	<10 - 20	Range	
	Zinc µg/L		Arsenic µg/L
1-day P <sub>99</sub>	76.3	1-day P <sub>99</sub>	0.90
4-day P <sub>99</sub>	47.4	4-day P <sub>99</sub>	0.67
30-day P <sub>99</sub>	26.2	30-day P <sub>99</sub>	0.55
Mean*	17.1	Mean	0.49
Std	16.2	Std	0.14
Sample size	53	Sample size	18
Range	<11.6 – 70	Range	0.32 - 0.92

\*The mean concentration was calculated using zero in place of the non-detected results.

\*\*There were no detects during the permit term.

**Effluent Chloride Data**

Sample Date	Chloride mg/L
02/06/2024	212
03/06/2024	160
04/09/2024	166
05/01/2024	169
Average	177

The following table presents the average concentrations and loadings at Outfall 001 from 01/01/2020 – 05/31/2024 for all parameters with limits in the current permit to meet the requirements of s. NR 201.03(6), Wis. Adm. Code:

**Parameter Averages with Limits**

	Average Measurement
BOD <sub>5</sub>	9.73 mg/L*
TSS	5.94 mg/L
pH field	7.03 s.u.

Attachment #1

	Average Measurement
Phosphorus	0.71 mg/L
Ammonia Nitrogen	2.09 mg/L*
Mercury	1.15 ng/L
Fecal Coliform	219 #/100 mL
Chlorine	<100 µg/L

\*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 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)

The following tables list the calculated WQBELs for this discharge along with the results of effluent sampling for all the detected substances. All concentrations are expressed in terms of micrograms per Liter (µg/L), except for hardness and chloride (mg/L) and mercury (ng/L).

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

10:1 dilution

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.
Chlorine		19.0	38.1	7.61	<100		
Arsenic		340	680			0.90	0.92
Cadmium	295	15.1	30.1	6.03	<2		
Chromium	295	4373	8746	1749	0.44		
Copper	295	43.1	86.1			19.7	20
Lead	295	304	608	122	<10		
Mercury (ng/L)		830	830			4.87	7.7
Nickel	268	1080	2161			16.4	18.8
Zinc	295	310	620			76.3	70
Chloride (mg/L)		757	1514	303	177		

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

\*\* The acute limits are based on 2 × ATC.

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

10:1 dilution

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>
Chlorine		7.28		80.1	16.0	<100	
Arsenic		148	0.97	1618			0.67
Cadmium	145	3.30	0.0085	36.2	7.24	<2	
Chromium	145	117	0.49	1281	256	0.44	
Copper	145	14.2	0.44	152			14.7
Lead	145	40.1	0.052	441	88.1	<10	
Mercury (ng/L)		440	0.6	440			2.73
Nickel	145	71.5		786			12.2
Zinc	145	167	0.39	1829			47.4
Chloride (mg/L)		395		4345	869	177	

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

**Monthly Average Limits based on Wildlife Criteria (WC)**

10:1 dilution

SUBSTANCE	WC	MEAN BACK-GRD.	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	30-day P <sub>99</sub>
Mercury (ng/L)	1.3	0.6	1.3			<b>1.62</b>

**Monthly Average Limits based on Human Threshold Criteria (HTC)**

10:1 dilution

SUBSTANCE	HTC	MEAN BACK-GRD.	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	30-day P <sub>99</sub>
Cadmium	4.4	0.0085	48	9.7	<2	
Chromium (+3)	100	0.49	1095	219	0.44	
Lead	10	0.052	109	21.9	<10	
Mercury (ng/L)	1.5	0.6	1.5			<b>1.62</b>
Nickel	100		1100	220		7.23

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

10:1 dilution

SUBSTANCE	HCC	MEAN BACK-GRD.	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	30-day P <sub>99</sub>
Arsenic	0.2	0.97	0.2			<b>0.55</b>

In addition to evaluating the need for limits for each individual substance for which HCC exist, s. NR 106.06(8), Wis. Adm. Code, requires the evaluation of the cumulative cancer risk. Because no effluent

limits are needed based on HCC, determination of the cumulative cancer risk is not needed per s. NR 106.06(8), Wis. Adm. Code.

**Conclusions and Recommendations**

Based on a comparison of the effluent data and calculated effluent limitations, effluent limitations are required for chlorine, arsenic, and mercury.

Total Residual Chlorine – Because chlorine is added as a disinfectant during blending, effluent limitations are recommended to assure proper operation of the de-chlorination system. Section NR 210.06(2)(b), Wis. Adm. Code, states, “When chlorine is used for disinfection, the daily maximum total residual chlorine concentration of the discharge may not exceed 0.10 mg/L.” Because the WQBELs are more restrictive, they are recommended instead. Specifically, **a daily maximum limit of 38 µg/L is required. The weekly and monthly average effluent limitations of 38 µg/L shall be continued in the reissued permit to meet expression of limits requirements.**

Chloride – Considering available effluent data from the permit reissuance application, the average chloride was 177 mg/L.

The average is below 1/5<sup>th</sup> of the most stringent calculated WQBEL for chloride, therefore no effluent limits are needed. **Chloride monitoring is recommended to ensure that 11 sample results are available at the next permit issuance to meet the data requirements of s. NR 106.85, Wis. Adm. Code.**

Arsenic – The 30-day P<sub>99</sub> is 0.55 µg/L, which is above the human cancer criteria of 0.2 µg/L. The current permit requires city water intake and effluent monitoring of arsenic, shown in the table below.

**Arsenic Data**

	City Water Intake µg/L	Effluent Arsenic µg/L
1-day P <sub>99</sub>	2.31	0.90
4-day P <sub>99</sub>	1.59	0.67
30-day P <sub>99</sub>	1.22	0.55
Mean	1.04	0.49
Std	0.40	0.14
Sample size	18	18
Range	0.41 - 1.9	0.32 - 0.92

Section NR 106.06(6), Wis. Adm. Code, allows a facility to demonstrate that a pollutant present in intake water, which is passed through the facility and discharged does not cause, have the reasonable potential to cause, or contribute to the excursion of water quality criteria in the receiving water. The demonstration has five conditions, all of which must be met:

1. The permittee withdraws 100 percent of its intake water containing the substance from the same body of water into which the discharge is made;
2. The permittee does not contribute any additional mass of the substance to the wastewater;
3. The permittee does not alter the substance chemically or physically in a manner that would cause adverse water quality impacts to occur that would not occur if the pollutants were left in-stream;

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4. The permittee does not increase the concentration at the edge of the mixing zone, or at the point of discharge if a mixing zone is not allowed, as compared to the concentration in the intake water, unless the increased concentration does not cause or contribute to an excursion above an applicable water quality standard; and
5. The timing and location of the discharge would not cause adverse water quality impacts to occur that would not occur if the identified intake pollutant were left instream.

All conditions are demonstrated for Racine, so arsenic limits are not recommended in the reissued permit. 100% of the source water is from Lake Michigan (from the City of Racine and the Villages of Caledonia, Mount Pleasant, Sturtevant, Wind Point, North Bay, Elmwood Park, and Somers) and the data shows that Racine does not add mass to the wastewater as the city intake is higher than the effluent. **Monitoring of the untreated drinking water intake (water supply from Lake Michigan) and effluent should be continued in the reissued permit** so the conditions described in s. NR 106.06(6), Wis. Adm. Code can be supported in the next issuance. Samples should be evaluated using a highly sensitive method so that reasonable potential can be determined at the next issuance.

Mercury – The current permit requires quarterly monitoring of the influent and effluent for total recoverable mercury and has a daily maximum limit of 4.0 ng/L. A total of 55 effluent sampling results are available from 01/08/2020 – 05/01/2024 for total recoverable mercury. The 30-day P<sub>99</sub> of representative data is 1.62 ng/L, which is greater than the most stringent limit (wildlife criterion of 1.3 ng/L); therefore, **a limit is required for mercury**. Please see Attachment #2 for information for the Mixing Zone Phase-Out Exception for Mercury which Racine has submitted a request for.

PFOS and PFOA – The need for PFOS and PFOA monitoring is evaluated in accordance with s. NR 106.98(2), Wis. Adm. Code. Previous monitoring produced a PFOS result of 1.69 ng/L and a PFOA result of 4.49 ng/L. These results are greater than one fifth of the respective criteria for each substance. Based on the effluent flow rate, the types of indirect dischargers contributing to the collection system, the available PFOS/PFOA monitoring data, **PFOS and PFOA monitoring is recommended at a monthly 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. The current permit has daily maximum, weekly average and monthly average limits for November – April. These limits are re-evaluated at this time due to the following changes:

- Subchapter IV of ch. NR 106, Wis. Adm. Code allows limits based on available dilution instead of limits set to twice the acute criteria.
- Section NR 106.07(3), Wis. Adm. Code requires weekly and monthly average limits for municipal treatment plants.

#### **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:

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

Where:

A = 0.275 and B = 39.0 for a Cold-Water Category 1 fishery, and  
 pH (s.u.) = that characteristic of the effluent.

The effluent pH data was examined as part of this evaluation. A total of 1613 sample results were reported from 01/02/2020 – 05/31/2024. The maximum reported value was 7.5 s.u. (Standard pH Units). The effluent pH was 7.4 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 7.5 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 7.4 s.u. Therefore, a value of 7.5 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 7.5 s.u. into the equation above yields an ATC = 13 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 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**

	Ammonia Nitrogen Limit mg/L
2×ATC	27
1-Q <sub>10</sub>	146

The 2×ATC method yields the most stringent limits for Racine.

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

**Daily Maximum Ammonia Nitrogen Limits – Cold water**

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

6.9 < pH ≤ 7.0	48	7.9 < pH ≤ 8.0	11	8.9 < pH ≤ 9.0	1.8
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**Weekly and Monthly Average Limits based on Chronic Toxicity Criteria (CTC)**

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

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 for a Cold-Water 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  $1.45 \times 10^{(0.028 \times (25 - T))}$ ,
- T = the temperature (°C) of the receiving water

The 4-day criterion is equal to the 30-day criterion multiplied by 2.5. The 4-day criteria are used to derive weekly average limitations, and the 30-day criteria are used to derive monthly average limitations, both by a mass-balance using a ten-to-one dilution ratio.

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

**Weekly and Monthly Ammonia Nitrogen Limits – CW**

		November – April	May – October
<b>Effluent Flow</b>	Qe (MGD)	36	36
<b>Background Information</b>	Ammonia (mg/L)	0.042	0.042
	Average Temperature (°C)	4	15
	Maximum Temperature (°C)	8	18
	pH (s.u.)	8.05	8.24
<b>Criteria mg/L</b>	4-day Chronic	5.65	3.82
	30-day Chronic	2.26	1.53
<b>Effluent Limits mg/L</b>	Weekly Average	62	42
	Monthly Average	24	16

**Effluent Data**

The following table evaluates the statistics based upon ammonia data reported from 01/01/2020 – 05/31/2024, with those results being compared to the calculated limits to determine the need to include ammonia limits in Racine’s permit for the respective month ranges. That need is determined by calculating 99<sup>th</sup> upper percentile (or P<sub>99</sub>) values for ammonia during each of the month ranges and comparing the daily maximum values to the daily maximum limit.

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**Ammonia Nitrogen Effluent Data**

Ammonia Nitrogen mg/L	November – April	May – October
1-day P <sub>99</sub>	9.81	11.2
4-day P <sub>99</sub>	5.41	6.24
30-day P <sub>99</sub>	2.97	3.42
Mean *	1.95	2.24
Std	2.03	2.34
Sample size	846	767
Range	<0.04 – 13.8	<0.04 – 14

\*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.

The permit currently has daily maximum, weekly average, and monthly average limits for November – April. **Where there are existing ammonia nitrogen limits in the permit, the limits must be retained regardless of reasonable potential**, consistent with s. NR 106.33(1)(b), Wis. Adm. Code:

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

Therefore, **the current weekly and monthly average limits for November – April are recommended to continue in the reissued permit.**

**Conclusions and Recommendations**

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

**Final Ammonia Nitrogen Limits**

	Daily Maximum mg/L	Weekly Average mg/L	Monthly Average mg/L
November – April	Variable	62	25

**Monitoring only for May – October is recommended to continue in the reissued permit.**

**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. 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 year-round.** No changes are recommended to the current recreational period and the required disinfection season.

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

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

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

### **Effluent Data**

Racine has monitored effluent *E. coli* from 01/01/2020 – 05/31/2024 and a total of 1601 results are available. A geometric mean of 126 counts/100 mL was exceeded in 38 out of 53 months, with a maximum monthly geometric mean of 565 counts/100 mL. Effluent data has exceeded 410 counts/100 mL 195 times (which is 12% of the total sample results). The maximum reported value was 2420 counts/100 mL. Based on this effluent data it appears that the facility can't meet new *E. coli* limits and a compliance schedule is needed in the reissued permit.

### **Interim Limit**

At this time, there is no effluent *E. coli* data available to determine if these limits are currently met. The permit will include a compliance schedule to meet these limits. During the compliance schedule, an interim limit applies to prevent back-sliding from the current level of disinfection during the compliance schedule period. Therefore, the current **fecal coliform limit shall be included in the reissued permit as an interim limit of 400 counts/100 mL as a monthly geometric mean.** Any weekly geometric mean limit which was included in the current permit for expression of limits purposes does not need to be included in the permit as an interim limit.

## **PART 5 – PHOSPHORUS**

### **Technology-Based Effluent Limit**

Subchapter II of Chapter NR 217, Wis. Adm. Code, requires municipal wastewater treatment facilities that discharge greater than 150 pounds of Total Phosphorus per month to comply with a monthly average

limit of 1.0 mg/L, or an approved alternative concentration limit.

Because Racine currently has a limit of 0.86 mg/L, which is more stringent than a TBEL 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.

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

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

Section NR 102.06(5)(b) specifies that a total phosphorus criterion of 7 µg/L (0.007 mg/L) applies for the open and nearshore water of Lake Michigan. For direct discharges to Lake Michigan such as Racine, s. NR 217.13(4), Wis. Adm. Code, states that the Department shall set effluent limits consistent with nearshore or whole lake models approved by the Department. In the absence of an approved model, a limit should be set at a level that is achievable and that makes progress toward phosphorus reductions without investing in temporary treatment. Typically a six-month average limit of 0.6 mg/L is recommended based on the best readily available phosphorus removal technology.

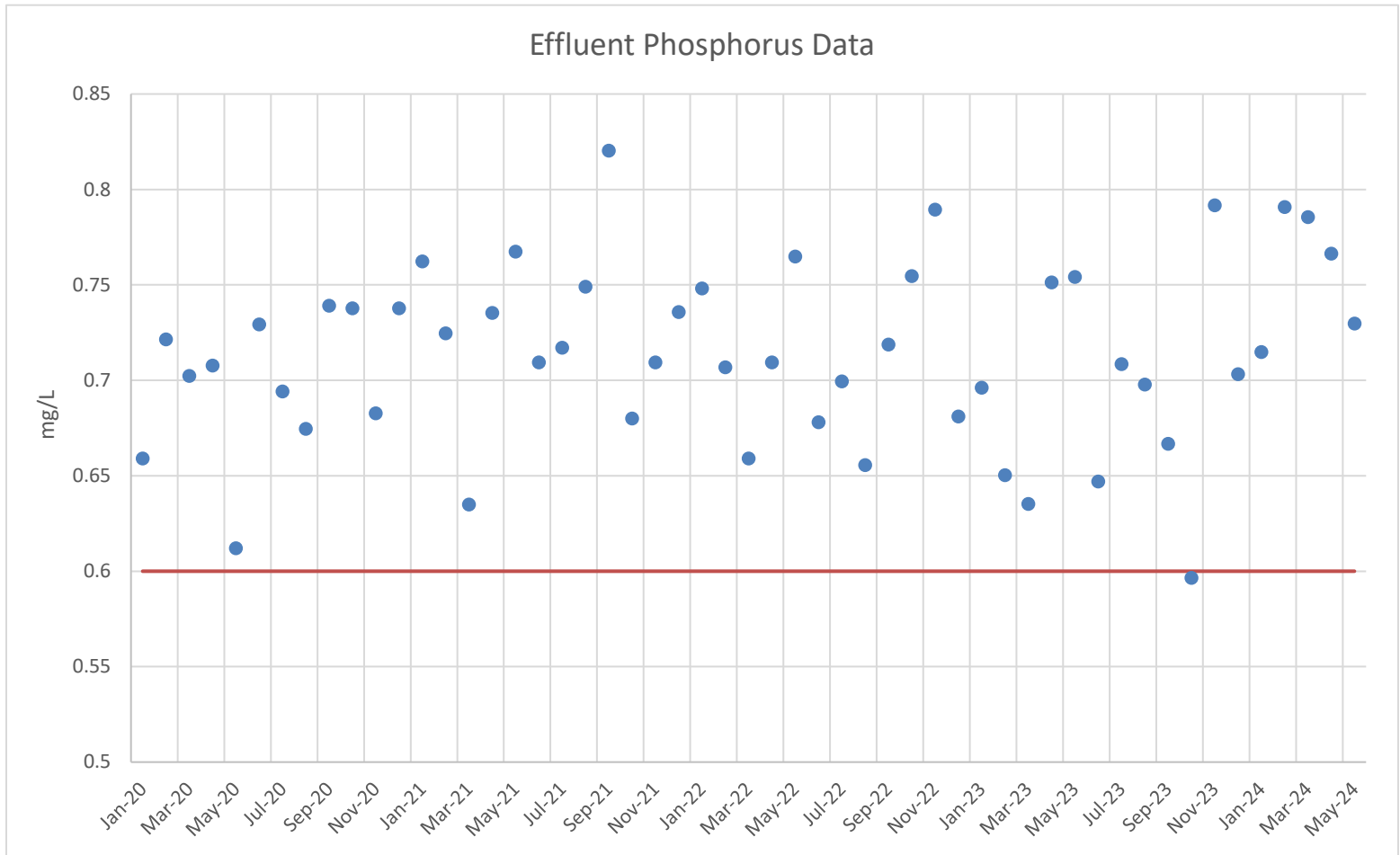
**Effluent Data**

The following table summarizes effluent total phosphorus monitoring data from 01/01/2020 – 05/31/2024.

**Total Phosphorus Effluent Data**

	<b>Phosphorus mg/L</b>
1-day P <sub>99</sub>	1.03
4-day P <sub>99</sub>	0.86
30-day P <sub>99</sub>	0.76
Mean	0.71
Std	0.12
Sample size	1613
Range	0.24 - 1.66

The following graph shows the monthly average effluent concentrations from 01/01/2020 – 05/31/2024 compared to 0.6 mg/L.



Racine's effluent data demonstrates that the facility is not able to meet 0.6 mg/L as a six-month average on a consistent basis without investing in additional treatment. Therefore, the WQBEL of 0.6 as a six-month average is not recommended to be included in the reissued permit. **The monthly average limit of 0.82 mg/L is recommended in the reissued permit, equal to the highest monthly average during the current 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.

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 01/01/2020 – 05/31/2024.

The table below summarizes the maximum temperatures reported during monitoring from 01/01/2023 – 12/31/2023.

**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	56	68	60	120
FEB	52	53	62	96
MAR	53	73	79	95
APR	57	68	85	86
MAY	61	64	81	87
JUN	67	68	NA	120
JUL	72	79	99	85
AUG	74	79	96	93
SEP	74	76	74	86
OCT	72	73	<b>70</b>	97
NOV	66	67	78	120
DEC	61	69	65	112

**Reasonable Potential**

Permit limits for temperature are recommended based on the procedures in s. NR 106.56, Wis. Adm. Code.

- An acute limit for temperature is recommended for each month in which the representative daily maximum effluent temperature for that month exceeds the acute WQBEL. The representative daily maximum effluent temperature is the greater of the following:
  - (a) The highest recorded representative daily maximum effluent temperature
  - (b) The projected 99th percentile of all representative daily maximum effluent temperatures
- A sub-lethal limitation for temperature is recommended for each month in which the representative weekly average effluent temperature for that month exceeds the weekly average WQBEL. The representative weekly average effluent temperature is the greater of the following:
  - (a) The highest weekly average effluent temperature for the month.
  - (b) The projected 99th percentile of all representative weekly average effluent temperatures for the month

Comparing the representative highest effluent temperature to the calculated effluent limits determines the reasonable potential of exceeding the effluent limits. The months in which limitations are recommended are shown in bold. Based on this analysis, **a weekly average temperature maximum limit is necessary for the month of October.**

Racine has submitted a request for consideration of dissipative cooling, referencing a previous dissipative cooling (DC) study and a statement that there have not been substantial changes to the facility. The DC study demonstrated that there is very little variability of temperature in Lake Michigan from the outfall diffusers. Based on this information, the department has found that it is not necessary to include temperature limits in the reissued permit. **Temperature monitoring is recommended per the requirements of s. NR 106.59(7), Wis. Adm. Code.**

#### **Future WPDES Permit Reissuance**

Dissipative cooling requests must be re-evaluated every permit reissuance. The permittee is responsible for submitting an updated DC request prior to permit reissuance. Such a request must either include:

- a) A statement by the permittee that there have been no substantial changes in operation of, or thermal loadings to, the treatment facility and the receiving water; or
- b) New information demonstrating DC to supplement the information used in the previous DC determination. If significant changes in operation or thermal loads have occurred, additional DC data must be submitted to the Department.

### **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 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 IC<sub>25</sub> (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 **9.1%** 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:

The IWC is 9.1% based on dilution of 10 parts lake water to 1-part effluent, as specified in s. NR 106.06(4)(b)2, Wis. Adm. Code, or a factor of 1 in 11 to calculate the IWC.

- According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), a synthetic (standard) laboratory water may be used as the dilution water and primary control in acute WET tests, unless the use of different dilution water is approved by the Department prior to use. The primary control water must be specified in the WPDES permit.
- According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), receiving water must be used as the dilution water and primary control in chronic WET tests, unless the use of different dilution water is approved by the Department prior to use.

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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. 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. Data collected prior to July 1, 2005 is excluded in this evaluation.

**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?	
08/15/2006	>100	>100	Pass	Yes	20.81	>100	Pass	Yes	
11/08/2007	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
10/30/2008	>100	>100	Pass	No	>100	>100	Pass	No	1
02/05/2009	>100	>100	Pass	No	>100	>100	Pass	No	
05/06/2010	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
08/30/2011	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
07/24/2012	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
10/16/2012	>100	>100	Pass	Yes	62	>100	Pass	Yes	
09/24/2013	>100	>100	Pass	Yes	49	>100	Pass	Yes	
10/21/2014	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
02/03/2015	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
08/09/2016	>100	>100	Pass	Yes	59.6	>100	Pass	Yes	
05/09/2017		>100	Pass	Yes	>100	>100	Pass	Yes	
05/31/2017	>100		Pass	Yes					
10/16/2018	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
01/15/2019	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
04/21/2020	>100	>100	Pass	Yes	75.4	>100	Pass	Yes	
08/05/2021	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
10/25/2022	>100	>100	Pass	Yes	71	>100	Pass	Yes	
02/07/2023	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
04/09/2024	>100	>100	Pass	Yes	>100	>100	Pass	Yes	

Footnotes:

1. *Tests done by S-F Analytical, July 2008 – March 2011.* The DNR has reason to believe that WET tests completed by SF Analytical Labs from July 2008 through March 31, 2011 were not performed using proper test methods. Therefore, WET data from this lab during this period has been disqualified and was not included in the analysis.
- According to s. NR 106.08, Wis. Adm. Code, WET reasonable potential is determined by multiplying the highest toxicity value that has been measured in the effluent by a safety factor, to predict the likelihood (95% probability) of toxicity occurring in the effluent above the applicable WET limit. The safety factor used in the equation changes based on the number of toxicity detects in the dataset. The fewer detects present, the higher the safety factor, because there is more uncertainty surrounding the

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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.**

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

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

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

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

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

**Chronic WET Limit Parameters**

TU <sub>c</sub> (maximum) 100/IC <sub>25</sub>	B (multiplication factor from s. NR 106.08(6)(c), Wis. Adm. Code, Table 4)	IWC
100/20.81 = 4.8	2.1 Based on 6 detects	9.1%

$$[(TU_c \text{ effluent}) (B)(IWC)] = 0.92 < 1.0$$

Therefore, no reasonable potential is shown chronic WET limits using the procedures in s. NR 106.08(6) and representative data from 08/15/2006 – 04/09/2024.

The WET checklist was developed to help DNR staff make recommendations regarding WET limits, monitoring, and other related permit conditions. The checklist indicates whether acute and chronic WET limits are needed, based on requirements specified in s. NR 106.08, Wis. Adm. Code. The checklist steps the user through a series of questions, assesses points based on the potential for effluent toxicity, and suggests monitoring frequencies based on points accumulated during the checklist analysis. As toxicity potential increases, more points accumulate, and more monitoring is recommended to ensure that toxicity is not occurring. A summary of the WET checklist analysis completed for this permittee is shown in the table below. Staff recommendations based on best professional judgment are provided below the summary table. For guidance related to reasonable potential and the WET checklist, see Chapter 1.3 of the WET Guidance Document: <https://dnr.wisconsin.gov/topic/Wastewater/WET.html>.

**WET Checklist Summary**

	Acute	Chronic
<b>AMZ/IWC</b>	Not Applicable. <b>0 Points</b>	IWC = 9.1%. <b>0 Points</b>
<b>Historical Data</b>	19 tests used to calculate RP. No tests failed. <b>0 Points</b>	18 tests used to calculate RP. No tests failed. <b>0 Points</b>
<b>Effluent Variability</b>	Little variability, no violations or upsets, consistent WWTF operations. <b>0 Points</b>	Same as Acute. <b>0 Points</b>

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	<b>Acute</b>	<b>Chronic</b>
<b>Receiving Water Classification</b>	Coldwater community. <b>5 Points</b>	Same as Acute. <b>5 Points</b>
<b>Chemical-Specific Data</b>	No reasonable potential for limits based on ATC; Ammonia nitrogen limit carried over from the current permit. Arsenic, chromium, copper, mercury, nickel, zinc, chloride, and ammonia detected. Additional Compounds of Concern: Dichlorobromomethane and chloroform. <b>5 Points</b>	No reasonable potential for limits based on CTC; Ammonia nitrogen limit carried over from the current permit. Arsenic, chromium, copper, mercury, nickel, zinc, chloride, and ammonia detected. Additional Compounds of Concern: Dichlorobromomethane and chloroform. <b>5 Points</b>
<b>Additives</b>	1 Biocide (sodium hypochlorite) and 4 Water Quality Conditioners (ferric chloride, sodium bisulfite, polymer EM 1895, polymer EM 1479) added. Permittee has proper P chemical SOPs in place <b>7 Points</b>	Two additives used more than once per 4 days. <b>7 Points</b>
<b>Discharge Category</b>	17 categorical and 17 other significant industrial contributors. <b>15 Points</b>	Same as Acute. <b>15 Points</b>
<b>Wastewater Treatment</b>	Secondary or better. <b>0 Points</b>	Same as Acute. <b>0 Points</b>
<b>Downstream Impacts</b>	No impacts known <b>0 Points</b>	Same as Acute. <b>0 Points</b>
<b>Total Checklist Points:</b>	<b>32 Points</b>	<b>32 Points</b>
<b>Recommended Monitoring Frequency (from Checklist):</b>	1x yearly	1x yearly
<b>Limit Required?</b>	No	No
<b>TRE Recommended? (from Checklist)</b>	No	No

- After consideration of the guidance provided in the Department's WET Program Guidance Document (2022) and other information described above, annual acute and chronic 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).
- A minimum of annual acute and chronic monitoring is recommended because Racine is a major municipal discharger with a design flow greater than 1.0 MGD. Federal regulations at 40 CFR Part 122.21(j) require at least 4 acute and chronic WET tests with each permit application on samples collected since the previous reissuance. Therefore, annual monitoring is recommended in the permit term, so that data will be available for the next permit application.



**Mixing Zone Phase-Out Exception for Mercury  
For Racine**

Racine has requested a continued exception to the mixing zone phase out when calculating effluent limitations for mercury beyond November 15, 2010 under the exception for technical and economic considerations to the mixing zone phase-out for bioaccumulating chemicals of concern (BCC's) at 40 CFR, Part 132, Appendix F, Procedure 3 C. 6. In consideration of the requirements contained at the above reference, the Wisconsin Department of Natural Resources (WDNR) determines that:

- Racine is in compliance with and shall continue to comply with all applicable requirements of Clean Water Act sections 118, 301, 302, 303, 304, 306, 307, 401, and 402, including existing categorical effluent limits and WQBELs.
- Racine will accept a permit compliance schedule requiring the development and implementation of a Mercury Pollution Minimization Plan (PMP) meeting the requirements of s. 106.145(7), Wis. Adm. Code. WDNR believes the finding at s. 106.145(1)(a), Wis. Adm. Code, sufficiently demonstrates that controls beyond a PMP would result in unreasonable economic effects because controls to remove mercury using wastewater treatment technology are not feasible or cost-effective.
- Racine discharges directly to Lake Michigan.
- There have not previously been effluent mercury limitations included in Racine's permits (WI-0025194-10).
- The discharger has reduced and will continue to reduce, to the maximum extent possible, its discharge of the BCC for which the mixing zone is requested. The mixing zone shall be no larger than necessary to account for the technical constraints and economic effects identified pursuant to this exception. Therefore, the mixing zone shall be set at 0.45:1 based on the 30-day P<sub>99</sub> of discharge 1.62 ng/L, the criterion of 1.3 ng/L, and a background concentration of 0.6 at the facility design flow of 36 MGD.
- The limit shall be set at 2.5 ng/L as a daily maximum. This is equal to the maximum monthly sample from 06/08/2021 after the sample from 09/08/2021 of 7.7 ng/L was removed since this may have been due to rising sludge.
- The water quality criteria are met at the edge of the mixing zone.
- There is currently no applicable TMDL for mercury in Lake Michigan and available data indicate the concentration of mercury in Lake Michigan meets all applicable water quality criteria.
- Other actions in Wisconsin to reduce releases of mercury include rules to control emissions from utility boilers and proposed mercury product legislation.
- This mixing zone and resulting WQBELs meet the requirements at 40 CFR, Part 132, Appendix F, Procedure 3 D., including that the actions will not jeopardize the continued existence of endangered or threatened species. The requirements for authorizing the exception and the circumstances under which it is being granted are essentially the same as those for granting a variance to water quality standards. WDNR has analyzed the potential impacts to endangered and threatened species as part of its variance process. The analysis concluded that approval of mercury variances, with more stringent permit requirements for PMPs, is unlikely to adversely affect bald eagles or other listed species that occur within the State of Wisconsin.

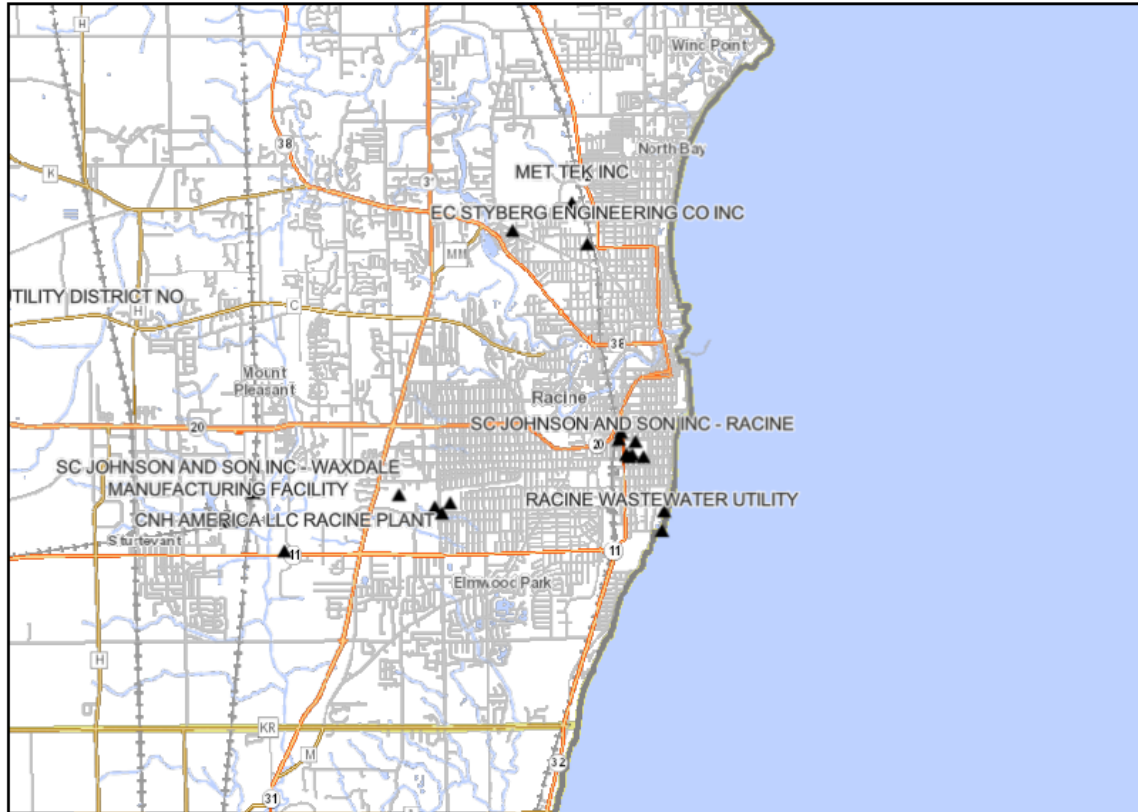
Therefore, WDNR grants a mixing zone extension for effluent discharges from the wastewater treatment facility operated by Racine due to technical and economic considerations.

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The granting of this exception to Racine shall apply only to the 5-year permit term of the proposed WPDES permit. The permittee will need to make a similar request and DNR will need to make a similar determination for a further continuation of a mixing zone, if those actions become appropriate for the next permit term.



# Racine Wastewater Utility Outfall Location



### Legend

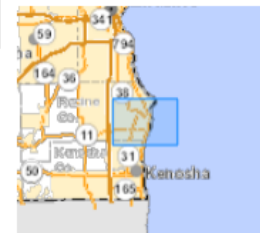
- Permits
- Surface Water Outfalls
- ▲
- Basemaps
- Hydro
- 24K Hydro (Cached) Inland
- Water Resources
- Rivers and Streams
- Intermittent Streams
- Open Water
- Great Lakes water

### Notes

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Date Printed: 09/10/2024



**Temperature limits for receiving waters without unidirectional flow**  
(calculation using default ambient temperature data)

**Facility:** Racine Wastewater Utility

**Outfall(s):** 001

**Date Prepared:** 9/10/2024

**Design Flow (Qe):** 36 MGD

**Lake Type:** Lake Michigan waters - Sout

**Discharge Type:** Great Lakes off-shore discharge

**Temp Dates**      **Flow Dates**

**Start:** 01/01/23    01/01/20

**End:** 12/31/23    05/31/24

**Maximum area of mixing zone allowed**  
(coefficient "A"): 3,141,593 ft<sup>2</sup>

Month	Water Quality Criteria			Representative Highest Effluent Flow Rate (Qe)		Representative Highest Monthly Effluent Temperature			Calculated Effluent Limit			
	Ta (default) (°F)	Sub-Lethal WQC (°F)	Acute WQC (°F)	7-day Rolling Average (Qesl) (MGD)	Daily Maximum Flow Rate (Qea) (MGD)	B	e <sup>-a</sup> (for SL-WQBEL)	e <sup>-a</sup> (for A-WQBEL)	Weekly Average (°F)	Daily Maximum (°F)	Weekly Average Effluent Limitation (°F)	Daily Maximum Effluent Limitation (°F)
JAN	35	43	69	37.78	47.50	0.405	0.317	0.401	56	68	60	120
FEB	34	46	69	51.10	75.28	0.405	0.427	0.561	52	53	62	96
MAR	37	52	70	42.70	76.79	0.405	0.361	0.568	53	73	79	95
APR	43	59	70	45.07	92.76	0.405	0.381	0.626	57	68	85	86
MAY	48	65	72	64.71	88.99	0.405	0.511	0.614	61	64	81	87
JUN	54	70	73	20.93	25.84	0.405	0.125	0.186	67	68	NA	120
JUL	59	71	74	36.26	80.85	0.405	0.302	0.584	72	79	99	85
AUG	63	70	76	33.37	61.04	0.555	0.211	0.427	74	79	96	93
SEP	60	64	74	40.61	85.63	0.555	0.278	0.545	74	76	74	86
OCT	53	57	73	30.50	54.88	0.405	0.241	0.453	72	73	70	97
NOV	45	49	71	20.72	31.40	0.405	0.123	0.251	66	67	78	120
DEC	38	44	70	29.19	51.90	0.405	0.226	0.433	61	69	65	112



October 4, 2024

Memo to Racine Wastewater Utility's WWTF File

Operational Contacts – Mary-Frances Klimek, OIC

From: Jacob Van Susteren-Wedesky, WDNR Wastewater Engineer

Subject: Blending Approval Memo to Add Blending to WPDES Permit No. WI-0025194-10

### **Approval**

Blending is hereby approved, and conditions will be included in the Racine Wastewater Utility's (RWU) WPDES Permit WI-0025194-10, per Wis. Administrative Code s. NR 210.12 (2). The Department has determined that blending may be necessary during wet weather and other high flow conditions.

A condition for blending states that: Untreated or partially treated wastewater that is routed around a biological treatment process or a portion of a biological treatment process shall be recombined with the biologically treated wastewater, and the combined flow shall be disinfected, if required by the WPDES permit, prior to discharge. Additionally, wastewaters shall meet the effluent limitations established in the permit. These criteria shall be followed.

### **Blending Plant Settings**

The RWU wastewater treatment plant diverts flow from the influent channel and stored in two 2.7 MG flow optimization equalization basins during high flow events until inflow decreases. The equalization basins are pumped back to the headworks. In the event the equalization basins reach capacity, overflow bypasses preliminary & secondary treatment and receives disinfection prior to discharge. Influent flow entering the basins passes through ½" mechanically cleaned bar screens and is chlorinated using flow paced pumps. The effluent from the basins is dechlorinated before blending with plant effluent. RWU utilizes 7.5% sodium hypochlorite and 38% sodium bisulfate for disinfection & dechlorination.

The WWTF is designed to fully treat 108 MGD through the plant. Each of the equalization basins are able to treat 100 MGD for a total treated volume of 308 MGD. Blending at flows above 108 MGD may be necessary to maintain process stability, maintain treatment efficiency and prevent hydraulic overloading of the treatment facilities, which include preliminary screening & grit removal, 12 primary clarifiers, 5 aeration basins, 9 final clarifiers and UV disinfection.

### **Efforts to Reduce I/I**

The RWUs Capacity, Management, Operation and Maintenance Plan goals include continuous inspection and testing of the collection system to identify areas of wet weather inflow in the system. The CMOM was reviewed as part of the compliance inspection on 10/11/2023 and is meeting the conditions of the CMOM program. These efforts support s. NR 210.12(2)(b), Wis. Adm. Code.

### **Approval of Blending Design**

The department approved the RWU's blending approval request on September 13, 2019 (Project Number: S-2019-0481). This letter was provided after the Department reviewed the documentation titled "WPDES Permit 0025194-08-0 Renewal; Blending Request" as submitted by Mary-Frances Klimek and received for approval on

June 13, 2019. As stated in the approval letter, the submitted documentation satisfactorily demonstrates that the RWU Wastewater Treatment Plant complies with the general provisions to justify blending under s. NR 210.12(1) and (2), Wis. Adm. Code, and has the physical capability and necessary equipment in place to practice blending. The department also acknowledged the blending determination in the July 29, 2022 letter for the approval of the 2020 Racine RWU Facilities Plan (project number S-2020-0649).

**Additional Information:**

Additional information can be referenced from the June 13, 2019 blending request submittal as well as the 2020 Racine RWU Facilities Plan.