## Permit Fact Sheet

## **General Information**

| Permit Number                               | WI-0020109-10-0  |
|---|--|
| Permittee Name                              | CITY OF RICHLAND CENTER  |
| and Address                                 | P O Box 312, Richland Center, WI 53581   |
| Permitted Facility                          | Richland Center Wastewater Treatment Facility  |
| Name and Address                            | 29847 Co Rd TB, Lone Rock  |
| Permit Term                                 | July 01, 2025 to June 30, 2030   |
| Discharge Location                          | West bank of the Pine River, 3,538 ft downstream of the Twin Bluffs Road bridge  |
| Receiving Water                             | Pine River in Willow Creek of Wisconsin River (lower) in Richland County   |
| Stream Flow (Q <sub>7,10</sub> )            | 66 cfs   |
| Stream<br>Classification                    | Warm Water Sport Fishery (WWSF)  |
| Discharge Type                              | Existing, Continuous   |
| Annual Average<br>Design Flow<br>(MGD)      | 1.006 MGD  |
| Industrial or<br>Commercial<br>Contributors | Yes, Allied Machinery, Alcam Creamery, and Rockwell Automation. In February 2017,<br>Rockwell Automation received a categorical Pretreatment Industrial Notification from the<br>department. |
| Plant Classification                        | A1 - Suspended Growth Processes; B - Solids Separation; C - Biological Solids/Sludges; P -<br>Total Phosphorus; D - Disinfection; L - Laboratory; SS - Sanitary Sewage Collection System     |
| Approved<br>Pretreatment<br>Program?        | N/A  |

## **Facility Description**

Richland Center built a new wastewater treatment facility, which went into operation in November 2015. Treatment units include raw wastewater screening and grit removal, primary clarification, activated sludge secondary treatment with biological phosphorus removal with chemical addition, final clarification, and seasonal disinfection using ultraviolet light. Solids produced during treatment are stabilized using anaerobic digestion followed by sludge dewatering through a rotary drum thickener and centrifuge, with final storage in the cake sludge storage building prior to land application to DNR-approved farmland.

## **Substantial Compliance Determination**

After a desk top review of all discharge monitoring reports, CMARs, land application reports, compliance schedule items, and a site visit on 9/19/2023, this facility has been found to be in substantial compliance with their current permit.

Compliance determination made by Tanner Connors on 10/6/2023 and updated desktop review dated 3/31/2025.

## Sample Point Descriptions

|                           | Sample Point Designation                       |  |  |  |  |  |
|---------------------------|--|--|--|--|--|--|
| Sample<br>Point<br>Number | Discharge Flow, Units, and<br>Averaging Period | Sample Point Location, Waste Type/Sample Contents and<br>Treatment Description (as applicable)   |  |  |  |  |
| 703                       | 0.50 MGD (July 2019 – December<br>2024)        | Influent: 24-Hr flow proportional composite sampler intake located<br>in the influent channel after the flow meter and prior to the<br>mechanical fine screen in the headworks building. Flow meter<br>located in the headworks building basement. |  |  |  |  |
| 001                       | N/A  | Effluent: 24-Hr flow proportional composite sampler intake located<br>before the UV channel, prior to discharge to the Pine River. Grab<br>samples for mercury collected at the sample port, all other grab<br>samples collected after UV.         |  |  |  |  |
| 002                       | 950 dry US ton (2024 permit application)       | Anaerobically digested, Cake, Class B. Representative sludge<br>samples shall be collected from the cake sludge storage building.  |  |  |  |  |
| 108                       | N/A  | In-Plant Monitoring - Collect the mercury field blank using standard sample handling procedures.   |  |  |  |  |

## **Permit Requirements**

### 1 Influent – Monitoring Requirements

### 1.1 Sample Point Number: 703- COMBINED INFLUENT

| Monitoring Requirements and Limitations |            |                    |                     |                         |                                 |  |
|---|------------|--------------------|---------------------|-------------------------|---------------------------------|--|
| Parameter                               | Limit Type | Limit and<br>Units | Sample<br>Frequency | Sample<br>Type          | Notes                           |  |
| Flow Rate                               |            | MGD                | Daily               | Continuous              |                                 |  |
| BOD5, Total                             |            | mg/L               | 5/Week              | 24-Hr Flow<br>Prop Comp |                                 |  |
| Suspended Solids,<br>Total              |            | mg/L               | 5/Week              | 24-Hr Flow<br>Prop Comp |                                 |  |
| Mercury, Total<br>Recoverable           |            | ng/L               | Monthly             | Grab                    | See Mercury Monitoring section. |  |

### **Changes from Previous Permit:**

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

- Flow- The sample frequency for flow has been changed from "continuous" to "daily" for eDMR reporting purposes.
- Mercury- Mercury sample type changed to grab which is the standard mercury sample type.

### **Explanation of Limits and Monitoring Requirements**

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

**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.

## 2 Inplant - Monitoring and Limitations

### 2.1 Sample Point Number: 108- GEN PLANT (Hg blank)

| Monitoring Requirements and Limitations |            |                    |                     |                |       |  |
|---|------------|--------------------|---------------------|----------------|-------|--|
| Parameter                               | Limit Type | Limit and<br>Units | Sample<br>Frequency | Sample<br>Type | Notes |  |
| Mercury, Total<br>Recoverable           |            | ng/L               | Monthly             | Blank          |       |  |

### **Changes from Previous Permit:**

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

### **Explanation of Limits and Monitoring Requirements**

Monitoring is included in the permit pursuant to s. NR 106.145, Wis. Adm. Code. Field blanks must meet the requirements under s. NR 106.145(9) and (10), Wis. Adm. Code. 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). Field blanks are required to verify a sample has not been contaminated during collection, transportation or analysis.

## **3** Surface Water - Monitoring and Limitations

### 3.1 Sample Point Number: 001- EFFLUENT

| Monitoring Requirements and Limitations |            |                    |                     |                         |       |  |
|---|------------|--------------------|---------------------|-------------------------|-------|--|
| Parameter                               | Limit Type | Limit and<br>Units | Sample<br>Frequency | Sample<br>Type          | Notes |  |
| BOD5, Total                             | Weekly Avg | 45 mg/L            | 5/Week              | 24-Hr Flow<br>Prop Comp |       |  |

| Monitoring Requirements and Limitations |                                |                    |                     |                         |   |  |  |
|---|--------------------------------|--------------------|---------------------|-------------------------|---|--|--|
| Parameter                               | Limit Type                     | Limit and<br>Units | Sample<br>Frequency | Sample<br>Type          | Notes   |  |  |
| BOD5, Total                             | Monthly Avg                    | 30 mg/L            | 5/Week              | 24-Hr Flow<br>Prop Comp |   |  |  |
| Suspended Solids,<br>Total              | Weekly Avg                     | 45 mg/L            | 5/Week              | 24-Hr Flow<br>Prop Comp |   |  |  |
| Suspended Solids,<br>Total              | Monthly Avg                    | 30 mg/L            | 5/Week              | 24-Hr Flow<br>Prop Comp |   |  |  |
| pH Field                                | Daily Max                      | 9.0 su             | 5/Week              | Grab                    |   |  |  |
| pH Field                                | Daily Min                      | 6.0 su             | 5/Week              | Grab                    |   |  |  |
| Nitrogen, Ammonia<br>(NH3-N) Total      | Daily Max                      | 17 mg/L            | 5/Week              | 24-Hr Flow<br>Prop Comp |   |  |  |
| Nitrogen, Ammonia<br>(NH3-N) Total      | Weekly Avg                     | 17 mg/L            | 5/Week              | 24-Hr Flow<br>Prop Comp |   |  |  |
| Nitrogen, Ammonia<br>(NH3-N) Total      | Monthly Avg                    | 17 mg/L            | 5/Week              | 24-Hr Flow<br>Prop Comp |   |  |  |
| E. coli                                 | Geometric<br>Mean -<br>Monthly | 126 #/100 ml       | Weekly              | Grab                    | Limit Effective May<br>through September<br>annually.   |  |  |
| E. coli                                 | % Exceedance                   | 10 Percent         | Monthly             | Calculated              | Limit Effective May<br>through September<br>annually. Enter the result in<br>the DMR on the last day of<br>the month. |  |  |
| Chloride                                |                                | mg/L               | Monthly             | 24-Hr Flow<br>Prop Comp | Monitoring in 2029 only.  |  |  |
| Mercury, Total<br>Recoverable           |                                | ng/L               | Monthly             | Grab                    | See permit for pollutant<br>minimization measures and<br>report submittal.  |  |  |
| PFOS                                    |                                | ng/L               | 1/2 Months          | Grab                    | Monitoring only. See<br>PFOS/PFOA Minimization<br>Plan Determination of Need<br>schedule.                             |  |  |
| PFOA                                    |                                | ng/L               | 1/2 Months          | Grab                    | Monitoring only. See<br>PFOS/PFOA Minimization<br>Plan Determination of Need<br>schedule.                             |  |  |
| Phosphorus, Total                       | Monthly Avg                    | 0.8 mg/L           | 5/Week              | 24-Hr Flow<br>Prop Comp | Limit effective throughout<br>the permit term, as it<br>represents a minimum<br>control level. See Water              |  |  |

| Monitoring Requirements and Limitations |              |                    |                     |                |   |  |  |
|---|--------------|--------------------|---------------------|----------------|---|--|--|
| Parameter                               | Limit Type   | Limit and<br>Units | Sample<br>Frequency | Sample<br>Type | Notes   |  |  |
|   |              |                    |                     |                | Quality Trading (WQT)<br>sections for more<br>information.  |  |  |
| Phosphorus, Total                       |              | lbs/day            | 5/Week              | Calculated     | Report daily mass<br>discharged using Equation<br>1a. in the Water Quality<br>Trading (WQT) section.  |  |  |
| WQT Credits Used<br>(TP)                |              | lbs/month          | Monthly             | Calculated     | Report WQT TP Credits<br>used per month using<br>Equation 2c. in the Water<br>Quality Trading (WQT)<br>section. Available TP<br>Credits are specified in<br>Table 2 and in the approved<br>Water Quality Trading<br>Plan.                                 |  |  |
| WQT Computed<br>Compliance (TP)         | Monthly Avg  | 0.225 mg/L         | Monthly             | Calculated     | Report the WQT TP<br>Computed Compliance<br>value using Equation 3a. in<br>the Water Quality Trading<br>(WQT) section. Value<br>entered on the last day of<br>the month.  |  |  |
| WQT Computed<br>Compliance (TP)         | 6-Month Avg  | 0.075 mg/L         | Monthly             | Calculated     | Compliance with the six-<br>month average limit is<br>evaluated at the end of the<br>six-month period on June<br>30 and Dec 31.   |  |  |
| WQT Computed<br>Compliance (TP)         | 6-Month Avg  | 0.63 lbs/day       | Monthly             | Calculated     | Report the WQT TP<br>Computed Compliance<br>value using Equation 3b. in<br>the Water Quality Trading<br>(WQT) section.<br>Compliance with the six-<br>month average limit is<br>evaluated at the end of the<br>six-month period on June<br>30 and Dec 31. |  |  |
| WQT Credits Used<br>(TP)                | Annual Total | 738 lbs/yr         | Annual              | Calculated     | The sum of total monthly<br>credits used may not exceed<br>Table 2 values listed.   |  |  |
| Nitrogen, Total                         |              | mg/L               | See Listed          | 24-Hr Flow     | Annual in rotating quarters.<br>See Nitrogen Series   |  |  |

| Monitoring Requirements and Limitations |             |                    |                      |                         |   |  |  |
|---|-------------|--------------------|----------------------|-------------------------|---|--|--|
| Parameter                               | Limit Type  | Limit and<br>Units | Sample<br>Frequency  | Sample<br>Type          | Notes   |  |  |
| Kjeldahl                                |             |                    | Qtr(s)               | Prop Comp               | Monitoring section.   |  |  |
| Nitrogen, Nitrite +<br>Nitrate Total    |             | mg/L               | See Listed<br>Qtr(s) | 24-Hr Flow<br>Prop Comp | Annual in rotating quarters.<br>See Nitrogen Series<br>Monitoring section.  |  |  |
| Nitrogen, Total                         |             | mg/L               | See Listed<br>Qtr(s) | Calculated              | Annual in rotating quarters.<br>See Nitrogen Series<br>Monitoring section below.<br>Total Nitrogen shall be<br>calculated as the sum of<br>reported values for Total<br>Kjeldahl Nitrogen and<br>Total Nitrite + Nitrate<br>Nitrogen. |  |  |
| Temperature<br>Maximum                  |             | deg F              | Daily                | Continuous              | Monitoring in 2029 only.  |  |  |
| Acute WET                               |             | TUa                | See Listed<br>Qtr(s) | 24-Hr Flow<br>Prop Comp | See WET section.  |  |  |
| Chronic WET                             | Monthly Avg | 12 TUc             | See Listed<br>Qtr(s) | 24-Hr Flow<br>Prop Comp | See WET section.  |  |  |

### **Changes from Previous Permit**

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

- E. coli- Fecal coliform monitoring and limits have been replaced with Escherichia coli (E. coli) monitoring and limits.
- **TP-** MDV requirements removed and WQT requirements added. Reporting required for TMDL compliance updated sample frequency.
- **Mercury-** Mercury interim limit and variance requirements removed. Continued PMP implementation required. Sample frequency reduced to quarterly.
- Chloride- Chloride monitoring is now calendar year 2029.
- **PFOS/PFOA-** Monitoring once per two months for PFOS and PFOA is included in the permit in accordance with s. NR 106.98(2)(b), Wis. Adm. Code.
- Temperature- Monitoring in calendar year 2029 added.
- WET- Chronic WET limit updated to reflect the correct rounding to two significant figures.

### **Explanation of Limits and Monitoring Requirements**

Detailed discussions of limits and monitoring requirements can be found in the attached water quality-based effluent limits (WQBEL) memo dated March 7, 2025.

**Monitoring Frequencies-** The <u>Monitoring Frequencies for Individual Wastewater Permits</u> guidance (April 12, 2021) recommends that standard monitoring frequencies be included in individual wastewater permits based on the size and type of the facility, in order to characterize effluent quality and variability, to detect events of noncompliance, and to ensure consistency in permits issued across the state. Guidance and requirements in administrative code were considered when determining the appropriate monitoring frequencies for pollutants that have final effluent limits in effect during this permit term. No changes to monitoring frequency were required.</u>

**Phosphorus** – Phosphorus requirements are based on the Phosphorus Rules that became effective December 1, 2010 as detailed in NR 102 Water Quality Standards and NR 217 Effluent Standards and Limitations for Phosphorus. Chapter NR 217 of the Wis. Adm. Code addresses point source dischargers of phosphorus to surface waters. Currently in NR 217 Wis. Adm. Code there are two methods used to determine if a phosphorus limit is needed: a technology based effluent limit (TBEL) and a water quality based effluent limit (WQBEL). In this case, the WQBEL is 0.225 mg/L (monthly average), 0.075 mg/L & 0.063 lbs/day (6-month average). For the reasons explained in the April 30, 2012 paper entitled 'Justification for Use of Monthly, Growing Season and Annual Average Periods for Expression of WPDES Permit Limits for Phosphorus Discharges in Wisconsin', WDNR has determined that it is impracticable to express the phosphorus is expressed as a six-month average. It is also expressed as a monthly average equal to three times the derived WQBEL (which equates to 0.3 mg/L). This final effluent limit was derived from and complies with the applicable water quality criterion. A phosphorus concentration limit is necessary to prevent backsliding during the term of the permit. The current limit of 0.8 mg/L monthly average is retained.

The wastewater treatment facility is not able to meet the WQBEL. This permit authorizes the use of trading as a tool to demonstrate compliance with the phosphorus WQBELs. This permit includes terms and conditions related to the Water Quality Trading Plan (WQT-2024-0027) or approved amendments thereof. The total 'WQT TP Credits' available are designated in the approved WQT Plan. Richland Center is implementing a variety of management practices including streambank stabilization, crop land improvements, and barnyard practices. The WQT Plan proposes the generation of 738 lbs/yr of phosphorus credits for the next five years.

Additional WQT subsections in the permit provide information on compliance determinations, annual reporting and reopening of the permit.

**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 municipal dischargers with an average flow rate less than 1 MGD, to be evaluated on a case-by-case basis to determine if monitoring is required pursuant to s. NR 106.98(2)(c), Wis. Adm. Code. The department evaluated the need for PFOS and PFOA monitoring taking into consideration the presence of potential PFOS or PFOA industrial wastes, remediation sites and other potential sources of PFOS or PFOA. Based on information available when the permit was drafted, monitoring once every two months is required due to the effluent flow rate.

A sample frequency of 1/2 months means one sample is taken during any two-month period. Examples of 1/2 month sample would be every other month (Jan, March, May, etc.) or back-to-back months with a break in between (February & March, May & June, Aug & Sept, etc.). DMR Short Forms will be generated for the following time periods: January-February, March-April, May-June, July-August, September-October, and November-December. At a minimum one sample result will be present on each form.

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.

## 4 Land Application - Monitoring and Limitations

| Municipal Sludge Description  |                             |                                       |                                 |                                 |                     |  |  |  |
|---|-----------------------------|---------------------------------------|---------------------------------|---------------------------------|---------------------|--|--|--|
| Sample<br>Point   | Sludge<br>Class (A or<br>B) | Sludge<br>Type<br>(Liquid or<br>Cake) | Pathogen<br>Reduction<br>Method | Vector<br>Attraction<br>Method  | Reuse<br>Option     | Amount<br>Reused/Dis<br>posed (Dry<br>Tons/Year) |  |  |
| 002   | В                           | Liquid                                | Anaerobic<br>Digestion          | Volatile<br>Solids<br>Reduction | Land<br>Application | 950  |  |  |
| Does sludge n   | nanagement der              | nonstrate comp                        | liance? Yes                     | ·                               | ·                   | ·  |  |  |
| Is additional s   | ludge storage re            | equired? No                           |                                 |                                 |                     |  |  |  |
| Is Radium-22  | 6 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 problems in landapplying sludge from this facility                      |                             |                                       |                                 |                                 |                     |  |  |  |
| Is a priority pollutant scan required? No   |                             |                                       |                                 |                                 |                     |  |  |  |
| Priority pollutant scans are required once every 10 years at facilities with design flows between 5 MGD and 40 MGD, and once every 5 years if design flow is greater than 40 MGD. |                             |                                       |                                 |                                 |                     |  |  |  |

## 4.1 Sample Point Number: 002- SLUDGE

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

|                                     | Mo           | nitoring Requir    | ements and Lin      | nitations      |   |
|-------------------------------------|--------------|--------------------|---------------------|----------------|---|
| Parameter                           | Limit Type   | Limit and<br>Units | Sample<br>Frequency | Sample<br>Type | Notes   |
| Selenium Dry Wt                     | Ceiling      | 100 mg/kg          | Quarterly           | Composite      |   |
| Selenium Dry Wt                     | High Quality | 100 mg/kg          | Quarterly           | Composite      |   |
| Zinc Dry Wt                         | Ceiling      | 7,500 mg/kg        | Quarterly           | Composite      |   |
| Zinc Dry Wt                         | High Quality | 2,800 mg/kg        | Quarterly           | Composite      |   |
| Nitrogen, Total<br>Kjeldahl         |              | Percent            | Quarterly           | Composite      |   |
| Nitrogen, Ammonium<br>(NH4-N) Total |              | Percent            | Quarterly           | Composite      |   |
| Phosphorus, Total                   |              | Percent            | Quarterly           | Composite      |   |
| Phosphorus, Water<br>Extractable    |              | % of Tot P         | Quarterly           | Composite      |   |
| Potassium, Total<br>Recoverable     |              | Percent            | Quarterly           | Composite      |   |
| PCB Total Dry Wt                    | Ceiling      | 50 mg/kg           | Once                | Composite      | Once in 2026.   |
| PCB Total Dry Wt                    | High Quality | 10 mg/kg           | Once                | Composite      | Once in 2026.   |
| PFOA + PFOS                         |              | ug/kg              | Annual              | Calculated     | Report the sum of PFOA<br>and PFOS. See PFAS<br>Permit Sections for more<br>information.  |
| PFAS Dry Wt                         |              |                    | Annual              | Grab           | Perfluoroalkyl and<br>Polyfluoroalkyl Substances<br>based on updated DNR<br>PFAS List. See PFAS<br>Permit Sections for more<br>information. |

### 4.1.1 Changes from Previous Permit:

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

List 1 & 2 – List 1 and 2 sampling frequencies changed to quarterly based on the reported sludge generated volume in accordance with s. NR 204.06(2) Table A, Wis. Adm. Code.

**PCB** – Sampling year updated.

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

### 4.1.2 Explanation of Limits and Monitoring Requirements

Requirements for disposal, including land application of municipal sludge, are determined in accordance with ch. NR 204, Wis. Adm. Code. Ceiling and high-quality limits for metals in sludge are specified in s. NR 204.07(5), 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. Radium requirements are addressed in s. NR 204.07(3)(n), 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 this WPDES permit pursuant to ss. NR 214.18(5)(b) and NR 204.06(2)(b)9, Wis. Adm. Code.

## 5 Schedules

## 5.1 Annual Water Quality Trading (WQT) Report

| Required Action   | Due Date   |
|---|------------|
| Annual WQT Report: Submit an annual WQT report that shall cover the first year of the permit term. The WQT Report shall include:  | 01/31/2026 |
| The number of pollutant reduction credits (lbs/month) used each month of the previous year to demonstrate compliance;   |            |
| The source of each month's pollutant reduction credits by identifying the approved water quality trading plan that details the source;  |            |
| A summary of the annual inspection of each nonpoint source management practice that generated any of the pollutant reduction credits used during the previous year; and   |            |
| Identification of noncompliance or failure to implement any terms or conditions of this permit with respect to water quality trading that have not been reported in discharge monitoring reports.   |            |
| Annual WQT Report #2: Submit an annual WQT report that shall cover the previous year.   | 01/31/2027 |
| Annual WQT Report #3: Submit an annual WQT report that shall cover the previous year.   | 01/31/2028 |
| Annual WQT Report #4: Submit an annual WQT report that shall cover the previous year.   | 01/31/2029 |
| Annual WQT Report #5: Submit the annual WQT report. If the permittee wishes to continue to comply with phosphorus limits through WQT in subsequent permit terms, the permittee shall submit a revised WQT plan including a demonstration of credit need, compliance record of the existing WQT, and any additional practices needed to maintain compliance over time. | 01/31/2030 |

| Annual WQT Report Required After Permit Expiration: In the event that this permit is not              |   |
|---|---|
| reissued by the expiration date, the permittee shall continue to submit annual WQT reports by         |   |
| January 31 each year covering the total number of pollutant credits used, the source of the pollution |   |
| reduction credits, a summary of annual inspection reports performed, and identification of            |   |
| noncompliance or failure to implement any terms or conditions of the approved water quality trading   |   |
| plan for the previous calendar year.  |   |
|   | 1 |

### **Explanation of Schedule**

Reports are required that include the following information:

- Verification that site inspections occurred;
- Brief summary of site inspection findings;
- Identification of noncompliance or failure to implement any terms or conditions of the permit or trading plan that have not been reported in discharge monitoring reports;
- Any applicable notices of termination or management practice registration; and
- A summary of credits used each month over the calendar year

### 5.2 Mercury Pollutant Minimization Program

| Required Action  | Due Date   |
|--|------------|
| Mercury Report: Submit a final report documenting the success in maintaining mercury                   | 12/31/2029 |
| concentrations in the effluent. The report shall summarize mercury pollutant minimization activities   |            |
| that have been implemented during the current permit term and state which, if any, pollutant           |            |
| minimization activities from the approved pollutant minimization plan were not pursued and why.        |            |
| The report shall include an analysis of trends in monthly and annual total effluent mercury            |            |
| concentrations based on mercury 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.                                   |            |

### **Explanation of Schedule**

Richland Center has previous had a variance from the mercury water quality criterion for the protection of wildlife (1.3 ng/L). As a condition of this permit the permittee shall continue to implement a Mercury Pollutant Minimization Program (PMP).

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

| Required Action  | Due Date   |
|--|------------|
| <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. | 07/01/2026 |
| 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.  |            |
| <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                     | 07/01/2027 |

| comparison on the likelihood of the facility needing to develop a PFOS/PFOA minimization plan.  |  |
|---|--|
| 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.   |  |
| The permittee shall also submit a request to the department to evaluate the need for a PFOS/PFOA minimization plan.   |  |
| 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. |  |
| 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.  |  |

### **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.

### 5.4 Land Application Management Plan

A management plan is required for the land application system.

| Required Action   | Due Date   |
|---|------------|
| Land Application Management Plan Submittal: Submit an update to the management plan to optimize the land application system performance and demonstrate compliance with ch. NR 204, Wis. Adm. Code, by the Due Date. This management plan shall 1) specify information on pretreatment processes (if any); 2) identify land application sites; 3) describe site limitations; 4) address vegetative cover management and removal; 5) specify availability of storage; 6) describe the type of transporting and spreading vehicle(s); 7) specify monitoring procedures; 8) track site loading; 9) address contingency plans for adverse weather and odor/nuisance abatement; and 10) include any other pertinent information. Once approved, all landspreading activities shall be conducted in accordance with the plan. Any changes to the plan must be approved by the Department prior to implementing the changes. | 07/01/2026 |

### 5.4.1 Explanation of Schedule

An up-to-date Land Application Management Plan is required that documents how the permittee will manage the land application of biosolids consistent with ch. NR 204, Wis. Adm. Code.

## **Special Reporting Requirements**

None.

## Attachments:

Water Quality Based Effluent Limits with Map(s) dated March 7, 2025 WQT Trade Plan dated January 2024 WQT Approval Letter dated 11/15/2024

## **Proposed Expiration Date:**

06/30/2030

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

None

Prepared By: Jennifer Jerich, Wastewater Specialist

Date: 4/18/2025 Revision date after Fact Sheet: 5/2/2025 Revision date after Public Notice:

| DATE:  | March 7. | 2025 |
|--------|----------|------|
| 2.112. |          |      |

TO: Jennifer Jerich – SCR/Horicon

FROM: Sarah Luck – SCR/Fitchburg

SUBJECT: Water Quality-Based Effluent Limitations for Richland Center Wastewater Treatment Facility WPDES Permit No. WI-0020109-10-0

This is in response to your request for an evaluation of the need for water quality-based effluent limitations (WQBELs) using chapters NR 102, 104, 105, 106, 207, 210, 212, and 217 of the Wisconsin Administrative Code (where applicable), for the discharge from the Richland Center Wastewater Treatment Facility in Richland County. This municipal wastewater treatment facility (WWTF) discharges to the Pine River, located in the Willow Creek Watershed in the Lower Wisconsin River Basin. This discharge is located downstream of the Wisconsin River TMDL and therefore is not included in the TMDL. 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<br>Maximum | Daily<br>Minimum | Weekly<br>Average | Monthly<br>Average             | Six-Month<br>Average       | Footnotes |
|--|------------------|------------------|-------------------|--------------------------------|----------------------------|-----------|
| BOD <sub>5</sub>                               |                  |                  | 45 mg/L           | 30 mg/L                        |                            | 1         |
| TSS  |                  |                  | 45 mg/L           | 30 mg/L                        |                            | 1         |
| рН   | 9.0 s.u.         | 6.0 s.u.         |                   |                                |                            | 1         |
| Ammonia Nitrogen                               | 17 mg/L          |                  | 17 mg/L           | 17 mg/L                        |                            | 1,2       |
| E. coli  |                  |                  |                   | 126 #/100 mL<br>geometric mean |                            | 3         |
| Chloride                                       |                  |                  |                   |                                |                            | 4         |
| Mercury  |                  |                  |                   |                                | 5                          |           |
| PFOS and PFOA                                  |                  |                  |                   |                                |                            | 6         |
| Phosphorus<br>WQT MCL<br>Final WQBEL           |                  |                  |                   | 0.80 mg/L<br>0.225 mg/L        | 0.075 mg/L<br>0.63 lbs/day | 7         |
| TKN,<br>Nitrate+Nitrite, and<br>Total Nitrogen |                  |                  |                   |                                | ¥                          | 1,8       |
| Temperature, Daily<br>Maximum                  |                  |                  |                   |                                |                            | 9         |
| Acute WET                                      |                  |                  |                   |                                |                            | 10,12     |
| Chronic WET                                    |                  |                  |                   | 12 TU <sub>c</sub>             |                            | 11,12     |

Footnotes:

- 1. No changes from the current permit.
- 2. 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.
- 3. <u>Additional final limit</u>: No more than 10 percent of *E. coli* bacteria samples collected in any calendar month may exceed 410 count/100 mL.



- 4. Monitoring at a frequency to ensure that a minimum of 11 samples are available at the next permit issuance.
- 5. Monthly monitoring throughout the permit term. Pollutant minimization efforts are recommended to continue during the reissued permit term in order to maintain effluent quality at or below current levels.
- 6. PFOS and PFOA monitoring is recommended at a frequency of once every two months in accordance with s. NR 106.98(2), Wis. Adm. Code.
- 7. A minimum control level (MCL) is required for water quality trading (WQT). This value is 0.80 mg/L as a monthly average and should not be exceeded during the permit term.
- 8. 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. Sections 283.37(5) and 283.55(1)(e), Wis. Stats, and ss. NR 200.065(1)(g) and NR 200.065(1)(h), Wis. Adm. Code, provide the authority to request this monitoring during the permit term. Total Nitrogen is the sum of nitrate (NO<sub>3</sub>), nitrite (NO<sub>2</sub>), and total Kjeldahl nitrogen (TKN) (all expressed as N).
- 9. One year of thermal monitoring is recommended.
- 10. Annual acute WET monitoring is required. 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.
- 11. Annual chronic WET monitoring is required. 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 the Pine River.
- 12. Sampling WET concurrently with any chemical-specific toxic substances is recommended. Tests should be done in rotating quarters, to collect seasonal information about this discharge and should continue after the permit expiration date (until the permit is reissued).

Please consult the attached report for details regarding the above recommendations. If there are any questions or comments, please contact Sarah Luck (Sarah.Luck@wisconsin.gov) or Diane Figiel (Diane.Figiel@wisconsin.gov).

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

PREPARED BY:

Sarah Luck

Date: March 7, 2025

Sarah Luck Water Resources Engineer

E-cc: Tanner Connors, Wastewater Engineer – SCR/Fitchburg Diane Figiel, Water Resources Engineer – WY/3 Kari Fleming, Environmental Toxicologist – WY/3 Nate Willis, Wastewater Engineer – WY/3

#### Water Quality-Based Effluent Limitations for Richland Center Wastewater Treatment Facility

#### WPDES Permit No. WI-0020109-10-0

#### PART 1 – BACKGROUND INFORMATION

#### **Facility Description**

Richland Center built a new wastewater treatment facility, which went into operation in November 2015. Treatment units include raw wastewater screening and grit removal, primary clarification, activated sludge secondary treatment with biological phosphorus removal with chemical addition, final clarification, and seasonal disinfection using ultraviolet light. Solids produced during treatment are stabilized using anaerobic digestion followed by sludge dewatering through a rotary drum thickener and centrifuge, with final storage in the cake sludge storage building prior to land application to DNR-approved farmland.

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

#### **Existing Permit Limitations**

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

| Parameter                                      | Daily<br>Maximum | Daily<br>Minimum | Weekly<br>Average             | Monthly<br>Average         | Six-Month<br>Average       | Footnotes |
|--|------------------|------------------|-------------------------------|----------------------------|----------------------------|-----------|
| BOD <sub>5</sub>                               |                  |                  | 45 mg/L                       | 30 mg/L                    |                            | 1         |
| TSS  |                  |                  | 45 mg/L                       | 30 mg/L                    |                            | 1         |
| рН   | 9.0 s.u.         | 6.0 s.u.         |                               |                            |                            | 1         |
| Ammonia Nitrogen                               | 17 mg/L          |                  | 17 mg/L                       | 17 mg/L                    |                            | 2         |
| Fecal Coliform<br>May – September              |                  |                  | 656#/100 mL<br>geometric mean | 400#/100 mL geometric mean |                            | 2         |
| Mercury  | 4.3 ng/L         |                  |                               |                            |                            | 3         |
| Chloride                                       |                  |                  |                               |                            |                            | 4         |
| Phosphorus<br>MDV Interim<br>Final             |                  |                  |                               | 0.8 mg/L<br>0.225 mg/L     | 0.075 mg/L<br>0.63 lbs/day | 5         |
| TKN,<br>Nitrate+Nitrite, and<br>Total Nitrogen |                  |                  |                               |                            |                            | 4         |
| Acute WET                                      |                  |                  |                               |                            |                            | 6         |
| Chronic WET                                    |                  |                  |                               | 11.6 TU <sub>c</sub>       |                            | 6         |

Footnotes:

- 1. These limitations are not being evaluated as part of this review. Since the water quality criteria (WQC), reference effluent flow rates, and receiving water characteristics have not changed, limitations for these water quality characteristics do not need to be re-evaluated at this time.
- 2. 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.
- 3. This is an alternative effluent limit based on the 1-day upper 99th percentile of effluent data collected from June 2013 to August 2017.
- 4. Monitoring only.
- 5. The facility was covered under the multi-discharger variance.
- 6. Annual acute and chronic WET testing. The IWC for chronic WET was 8.6%.

#### **Receiving Water Information**

- Name: Pine River
- Waterbody Identification Code (WBIC): 1220600
- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code: Warm Water Sport Fish (WWSF) community, non-public water supply.
- Low flows used in accordance with chs. NR 106 and 217, Wis. Adm. Code: The following 7-Q<sub>10</sub> and 7-Q<sub>2</sub> values are from the USGS Station located at Highway Q, 2.5 miles southeast of Richland Center.

 $7-Q_{10} = 66$  cubic feet per second (cfs)

 $7-Q_2 = 82 \text{ cfs}$ 

 $90-Q_{10} = 70 \text{ cfs}$ 

Harmonic Mean Flow = 112 cfs using a drainage area of  $190 \text{ mi}^2$ 

The Harmonic Mean has been estimated based on average flow and the  $7-Q_{10}$  using an equation from U.S. EPA's *Technical Support Document for Water Quality-Based Toxics Control* (March 1991, EPA/505/2-90-001, pgs. 88-89).

- Hardness = 242 mg/L as CaCO<sub>3</sub>. This value represents the geometric mean of WET data conducted by Richland Center Wastewater Treatment Facility from November 2019 through October 2024.
- % of low flow used to calculate limits in accordance with s. NR 106.06(4)(c)5., Wis. Adm. Code: 25%
- Source of background concentration data: Metals data from the Pine River at STH 14 (SWIMS Station 533029) is used for this evaluation. 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: Richland Center Renewable Energy discharges approximately 6.5 stream miles upstream of Outfall 001. However, given the flow rate of the receiving water and that the mixing zones do not overlap, combined impacts do not need to be considered.
- Impaired water status: The Pine River is listed as impaired for total phosphorus at the discharge location.

#### **Effluent Information**

- Flow rates:
  - Design annual average = 1.006 Million Gallons per Day (MGD) Peak daily = 2.746 MGD Peak weekly = 2.104 MGD Peak monthly = 1.462 MGD

*The flow rates above are from the May 6, 2014 facility plan approval letter from the Department.* For reference, the actual average flow from July 2019 through December 2024 was 0.50 MGD.

- Hardness = 225 mg/L as CaCO<sub>3</sub>. This value represents the geometric mean of four samples collected in September and October 2023 which were reported on the permit application.
- Acute dilution factor used in accordance with s. NR 106.06(3)(c), Wis. Adm. Code: Not applicable this facility does not have an approved Zone of Initial Dilution (ZID).
- Wastewater sources: Domestic and commercial wastewater with industrial sources from Allied Machinery Richland LLC and Alcam Creamery, Co.
- Water supply: City of Richland Center wells and Pine Valley Healthcare and Rehabilitation Center.
- Additives: Ferric chloride (phosphorus removal)
- 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, plus chloride and copper. The permit-required monitoring for 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.

| Copper Effluent Data          |               |             |               |             |               |
|-------------------------------|---------------|-------------|---------------|-------------|---------------|
| Sample Date                   | Copper (µg/L) | Sample Date | Copper (µg/L) | Sample Date | Copper (µg/L) |
| 09/05/23                      | 9.7           | 09/18/23    | 4.5           | 10/03/23    | 20            |
| 09/08/23                      | 9.1           | 09/21/23    | 3.7           | 10/06/23    | 8.4           |
| 09/12/23                      | 7.7           | 09/25/23    | 4.6           | 10/11/23    | 2.4           |
| 09/15/23                      | 5.4           | 09/28/23    | 6.5           |             |               |
| 1-day P <sub>99</sub> 25 µg/L |               |             |               |             |               |
| 4-day P <sub>99</sub> 15 μg/L |               |             |               |             |               |

| Sample Date                               | Chloride (mg/L)                        | Sample Date | Chloride (mg/L) | Sample Date | Chloride (mg/L) |  |  |
|---|--|-------------|-----------------|-------------|-----------------|--|--|
| 02/22/22                                  | 340                                    | 05/25/22    | 290             | 09/27/22    | 350             |  |  |
| 02/27/22                                  | 02/27/22 400 06/16/22 310 10/31/22 310 |             |                 |             |                 |  |  |
| 03/29/22                                  | 420                                    | 07/07/22    | 300             | 11/29/22    | 380             |  |  |
| 04/14/22                                  | 04/14/22 350 08/26/22 340 12/15/22 340 |             |                 |             |                 |  |  |
| $1 \text{-day P}_{99} = 447 \text{ mg/L}$ |  |             |                 |             |                 |  |  |
| 4-day P <sub>99</sub> = 393 mg/L          |  |             |                 |             |                 |  |  |

#### **Chloride Effluent Data**

#### **Mercury Effluent Data**

|                        | Mercury (ng/L) |
|------------------------|----------------|
| 1-day P <sub>99</sub>  | 3.3            |
| 4-day P <sub>99</sub>  | 1.8            |
| 30-day P <sub>99</sub> | 1.1            |
| Mean                   | 0.81           |
| Std                    | 0.65           |
| Sample size            | 66             |
| Range                  | 0.25 - 3.3     |

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| Attachment #1 |                     |  |
|---------------|---------------------|--|
|               | Mercury (ng/L)      |  |
| Sample dates  | 08/26/19 - 12/17/24 |  |

The following table presents the average concentrations and loadings at Outfall 001 from July 2019 through December 2024 for all parameters with limits in the current permit to meet the requirements of s. NR 201.03(6), Wis. Adm. Code:

| 0                |                        |
|------------------|------------------------|
|                  | Average<br>Measurement |
| BOD <sub>5</sub> | 3.8 mg/L*              |
| TSS              | 3 mg/L*                |
| pH field         | 7.0 s.u.               |
| Phosphorus       | 0.59 mg/L              |
| Ammonia Nitrogen | 0.16 mg/L*             |
| Fecal coliform   | 41#/100 mL             |
| Mercury          | 0.81 ng/L              |

| Averages of Parameters with Limit | S |
|-----------------------------------|---|
|-----------------------------------|---|

\*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)

#### Acute Limits based on 1-Q<sub>10</sub>

Daily maximum effluent limitations for toxic substances are based on the acute toxicity criteria (ATC), listed in ch. NR 105, Wis. Adm. Code. Previously daily maximum limits for toxic substances were calculated as two times the ATC. However, changes to ch. NR 106, Wis. Code, (September 1, 2016) require the Department to calculate acute limitations using the same mass balance equation as used for other limits along with the 1-Q<sub>10</sub> receiving water low flow to determine if more restrictive effluent limitations are needed to protect the receiving stream from discharges which may cause or contribute to an exceedance of the acute water quality standards. The mass balance equation is provided below.

Limitation = 
$$(WQC) (Qs + 1 - f Qe) - (Qs - f Qe) (Cs)$$
  
Oe

Where:

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

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

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

- f = Fraction of the effluent flow that is withdrawn from the receiving water, and
- Cs = Background concentration of the substance (in units of mass per unit volume) as specified in s. NR 106.06(4)(e), Wis. Adm. Code.

If the receiving water is effluent dominated under low stream flow conditions, the  $1-Q_{10}$  method of limit calculation produces the most stringent daily maximum limitations and should be used while making reasonable potential determinations. This is not the case for Richland Center Wastewater Treatment Facility, and the limits are set based on two times the acute toxicity criteria.

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

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

RECEIVING WATER FLOW = 53 cfs,  $(1-Q_{10} \text{ (estimated as 80\% of } 7-Q_{10}))$ , as specified in s. NR 106.06(3)(bm), Wis. Adm. Code.

|                 | REF.  |      | MAX.   | 1/5 OF | MEAN  |                 | 1-day |
|-----------------|-------|------|--------|--------|-------|-----------------|-------|
|                 | HARD. | ATC  | EFFL.  | EFFL.  | EFFL. | 1-day           | MAX.  |
| SUBSTANCE       | mg/L  |      | LIMIT* | LIMIT  | CONC. | P <sub>99</sub> | CONC. |
| Arsenic         |       | 340  | 679.6  | 135.9  | <1.1  |                 |       |
| Cadmium         | 225   | 26.1 | 52.2   | 10.4   | <0.19 |                 |       |
| Chromium        | 225   | 3499 | 6999.0 | 1400   | 1.3   |                 |       |
| Copper          | 225   | 33.3 | 66.6   |        |       | 25              | 20    |
| Lead            | 225   | 234  | 467.6  | 93.5   | <4.3  |                 |       |
| Mercury (ng/L)  |       | 830  | 1660.0 |        |       | 3.3             | 3.3   |
| Nickel          | 225   | 931  | 1861.5 | 372    | 10    |                 |       |
| Zinc            | 225   | 244  | 488.7  | 97.7   | 25    |                 |       |
| Chloride (mg/L) |       | 757  | 1514.0 |        |       | 447             | 420   |

\* The  $2 \times ATC$  method of limit calculation yields a more restrictive limit than consideration of ambient concentrations and 1-Q<sub>10</sub> flow rates per the changes to s. NR 106.07(3), Wis. Adm. Code, effective 09/01/2016.

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

RECEIVING WATER FLOW = 17 cfs ( $\frac{1}{4}$  of the 7-Q<sub>10</sub>), as specified in s. NR 106.06(4)(c), Wis. Adm. Code

|                | REF.   |        | MEAN  | WEEKLY | 1/5 OF | MEAN   |                 |
|----------------|--------|--------|-------|--------|--------|--------|-----------------|
|                | HARD.* | CTC    | BACK- | AVE.   | EFFL.  | EFFL.  | 4-day           |
| SUBSTANCE      | mg/L   |        | GRD.  | LIMIT  | LIMIT  | CONC.  | P <sub>99</sub> |
| Arsenic        |        | 152.2  |       | 1766   | 353.1  | <1.1   |                 |
| Cadmium        | 175    | 3.82   | 0.08  | 43.47  | 8.7    | < 0.19 |                 |
| Chromium       | 242    | 272.13 | 3     | 3125   | 625.0  | 1.3    |                 |
| Copper         | 242    | 22.02  | 3     | 218.7  |        |        | 15              |
| Lead           | 242    | 65.69  |       | 762.0  | 152.4  | <4.3   |                 |
| Mercury (ng/L) |        | 440    |       | 5104   |        |        | 1.8             |
| Nickel         | 242    | 110.11 |       | 1277   | 255.5  | 10     |                 |
| Zinc           | 242    | 260.4  |       | 3021   | 604.1  | 25     |                 |

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|---|--|
| Richland Center Wastewater Treatment Facility |  |

| Attachment #1   |        |     |       |        |        |       |       |
|-----------------|--------|-----|-------|--------|--------|-------|-------|
|                 | REF.   |     | MEAN  | WEEKLY | 1/5 OF | MEAN  |       |
|                 | HARD.* | CTC | BACK- | AVE.   | EFFL.  | EFFL. | 4-day |
| SUBSTANCE       | mg/L   |     | GRD.  | LIMIT  | LIMIT  | CONC. | P99   |
| Chloride (mg/L) |        | 395 | 4.9   | 4530   |        |       | 393   |

\* 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)

RECEIVING WATER FLOW = 17 cfs ( $\frac{1}{4}$  of the 90-Q<sub>10</sub>), as specified in s. NR 106.06(4), Wis. Adm. Code

|                |     | MO'LY |        |
|----------------|-----|-------|--------|
|                | WC  | AVE.  | 30-day |
| SUBSTANCE      |     | LIMIT | P99    |
| Mercury (ng/L) | 1.3 | 1.3   | 1.1    |

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

RECEIVING WATER FLOW = 28 cfs (1/4 of Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

|                |         | MEAN  | MO'LY    | 1/5 OF   | MEAN   |        |
|----------------|---------|-------|----------|----------|--------|--------|
|                | HTC     | BACK- | AVE.     | EFFL.    | EFFL.  | 30-day |
| SUBSTANCE      |         | GRD.  | LIMIT    | LIMIT    | CONC.  | P99    |
| Antimony       | 373     |       | 7108     | 1421.7   | 0.52   |        |
| Cadmium        | 370     | 0.08  | 7050     | 1410.0   | < 0.19 |        |
| Chromium (+3)  | 3818000 | 3     | 72761099 | 14552220 | 1.3    |        |
| Lead           | 140     |       | 2668     | 533.6    | <4.3   |        |
| Mercury (ng/L) | 1.5     |       | 28.6     | 5.72     |        | 1.1    |
| Nickel         | 43000   |       | 819468   | 163894   | 10     |        |

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

RECEIVING WATER FLOW = 28 cfs (<sup>1</sup>/<sub>4</sub> of Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

|           |      | MO'LY | 1/5 OF | MEAN  |
|-----------|------|-------|--------|-------|
|           | HCC  | AVE.  | EFFL.  | EFFL. |
| SUBSTANCE |      | LIMIT | LIMIT  | CONC. |
| Arsenic   | 13.3 | 253.5 | 50.69  | <1.1  |

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

#### **Conclusions and Recommendations**

Based on a comparison of the effluent data and calculated effluent limitations, **no effluent limitations are required.** 

<u>Chloride</u> – Considering available effluent data from the current permit term (sampled monthly in 2022), the 1-day P<sub>99</sub> chloride concentration is 447 mg/L, and the 4-day P<sub>99</sub> of effluent data is 393 mg/L. These effluent concentrations are below the calculated WQBELs for chloride; therefore, **no effluent limits are** 

**needed.** Chloride monitoring is required 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.

<u>Mercury</u> – The WQBEL for total recoverable mercury is set equal to the most stringent criterion of 1.3 ng/L, according to s. NR 106.06(6), Wis. Adm. Code, because the background concentration in the receiving water and similar inland streams is known to exceed 1.3 ng/L. The current permit is covered under an EPA-approved mercury variance with an alternative effluent limit of 4.3 ng/L as a daily maximum along with monthly monitoring of the influent and effluent. A total of 66 effluent sampling results are available from August 2019 through December 2024. The average concentration was 0.81 ng/L, and the maximum was 3.3 ng/L. Since the 30-day P<sub>99</sub> of available data (1.1 ng/L) is less than the most stringent WQBEL of 1.3 ng/L, no limit for mercury is required for permit reissuance. Monthly total recoverable mercury monitoring is recommended to continue, as well as continuation of pollutant minimization efforts in order to maintain effluent quality at or below current levels.

#### **Antidegradation and Antibacksliding**

Since current treatment capability and pollutant minimization measures are expected to remain in place, the removal of the daily maximum mercury variance limit will not increase the concentration, level, or loading of mercury to the Pine River. Therefore, antidegradation would not be applicable. To be consistent with antibacksliding requirements, the current limit may be removed in accordance with s. NR 207.12(4)(b), Wis. Adm. Code.

<u>PFOS and PFOA</u> – The need for PFOS and PFOA monitoring is evaluated in accordance with s. NR 106.98(2), Wis. Adm. Code. Based on the effluent flow rate, **PFOS and PFOA monitoring is recommended at a once every two months frequency.** 

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

The State of Wisconsin promulgated revised water quality standards for ammonia nitrogen in ch. NR 105, Wis. Adm. Code, effective March 1, 2004 which includes criteria based on both acute and chronic toxicity to aquatic life. The current permit has daily maximum, weekly average, and monthly average limits. These limits are re-evaluated at this time due to the following change:

- The maximum expected effluent pH has changed.

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

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

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

Where:

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

The effluent pH data was examined as part of this evaluation. A total of 1436 sample results were reported from July 2019 through December 2024. The maximum reported value was 8.2 s.u. (Standard pH Units). The effluent pH was 7.6 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

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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 7.6 s.u. is believed to represent the maximum reasonably expected pH, and therefore most appropriate for determining daily maximum limitations for ammonia nitrogen. Substituting a value of 7.6 s.u. into the equation above yields an ATC = 17.03 mg/L.

#### Daily Maximum Ammonia Nitrogen Effluent Limitations Calculation Method

In accordance with s. NR 106.32(2), Wis. Adm. Code, daily maximum ammonia limitations are calculated using the 1- $Q_{10}$  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.

|                   | Ammonia Nitrogen Limit<br>(mg/L) |
|-------------------|----------------------------------|
| 2×ATC             | 34                               |
| 1-Q <sub>10</sub> | 593                              |

#### **Daily Maximum Ammonia Nitrogen Determination**

The 2×ATC method yields the most stringent limit for Richland Center Wastewater Treatment Facility.

The limit of 34 mg/L, calculated above, is greater than the current daily maximum limit of 17 mg/L. If Richland Center Wastewater Treatment Facility would like to request an increase to the existing permit limits an assessment of their effluent data consistent with the requirements of ss. NR 207.04(1)(a) and (c), Wis. Adm. Code, must be provided. This evaluation is on a parameter-by-parameter basis and includes consideration of operations, maintenance, and temporary upsets. **Without a demonstration of need for a higher limit in accordance with s. NR 207.04, Wis. Adm. Code, the current daily maximum limit of 17 mg/L must be continued in the reissued permit.** 

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

| Duny Mit              |               |                     |               |                     |               |  |  |  |  |
|-----------------------|---------------|---------------------|---------------|---------------------|---------------|--|--|--|--|
| Effluent pH<br>s.u.   | Limit<br>mg/L | Effluent pH<br>s.u. | Limit<br>mg/L | Effluent pH<br>s.u. | Limit<br>mg/L |  |  |  |  |
| $6.0 \le p H \le 6.1$ | 108           | $7.0 < pH \leq 7.1$ | 66            | $8.0 < pH \leq 8.1$ | 14            |  |  |  |  |
| $6.1 < pH \le 6.2$    | 106           | $7.1 < pH \le 7.2$  | 59            | $8.1 < pH \le 8.2$  | 11            |  |  |  |  |
| $6.2 < pH \le 6.3$    | 104           | $7.2 < pH \le 7.3$  | 52            | $8.2 < pH \le 8.3$  | 9.4           |  |  |  |  |
| $6.3 < pH \le 6.4$    | 101           | $7.3 < pH \leq 7.4$ | 46            | $8.3 < pH \leq 8.4$ | 7.8           |  |  |  |  |
| $6.4 < pH \le 6.5$    | 98            | $7.4 < pH \leq 7.5$ | 40            | $8.4 < pH \le 8.5$  | 6.4           |  |  |  |  |
| $6.5 < pH \le 6.6$    | 94            | $7.5 < pH \le 7.6$  | 34            | $8.5 < pH \le 8.6$  | 5.3           |  |  |  |  |
| $6.6 < pH \leq 6.7$   | 89            | $7.6 < pH \leq 7.7$ | 29            | $8.6 < pH \leq 8.7$ | 4.4           |  |  |  |  |
| $6.7 < pH \le 6.8$    | 84            | $7.7 < pH \le 7.8$  | 24            | $8.7 < pH \le 8.8$  | 3.7           |  |  |  |  |
| $6.8 < pH \le 6.9$    | 78            | $7.8 < pH \le 7.9$  | 20            | $8.8 < pH \le 8.9$  | 3.1           |  |  |  |  |

Daily Maximum Ammonia Nitrogen Limits – WWSF, WWFF & LFF

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| Effluent pH         | Limit | Effluent pH         | Limit | Effluent pH         | Limit |
|---------------------|-------|---------------------|-------|---------------------|-------|
| s.u.                | mg/L  | s.u.                | mg/L  | s.u.                | mg/L  |
| $6.9 < pH \leq 7.0$ | 72    | $7.9 < pH \leq 8.0$ | 17    | $8.9 < pH \leq 9.0$ | 2.6   |

Weekly and Monthly Average Limits based on Chronic Toxicity Criteria (CTC) The weekly and monthly average ammonia nitrogen limits calculation from the previous memo do not change because there have been no changes in the effluent and receiving water flow rates. The calculations from the previous WQBEL memo are shown in Attachment #3.

#### **Effluent Data**

The following table evaluates the statistics based upon ammonia data reported from July 2019 through December 2024.

| Ammonia Nitrogen Emuent Data |                          |  |  |  |
|------------------------------|--------------------------|--|--|--|
|                              | Ammonia Nitrogen<br>mg/L |  |  |  |
| 1-day P <sub>99</sub>        | 1.69                     |  |  |  |
| 4-day P <sub>99</sub>        | 1.05                     |  |  |  |
| 30-day P <sub>99</sub>       | 0.44                     |  |  |  |
| Mean*                        | 0.16                     |  |  |  |
| Std                          | 0.46                     |  |  |  |
| Sample size                  | 1437 (84 ND)             |  |  |  |
| Range                        | <0.04 - 7.89             |  |  |  |

### Ammonia Nitus con Effluent Data

\*"<" means that the pollutant was not detected at the indicated level of detection. The mean concentration was calculated using zero in place of the non-detected (ND) result.

#### **Reasonable Potential**

The need to include ammonia limits in the Richland Center Wastewater Treatment Facility permit is determined by calculating  $99^{th}$  upper percentile (or  $P_{99}$ ) values for ammonia and comparing those to the calculated limits. Based on this comparison, there is no reasonable potential for the discharge to exceed any of the calculated ammonia nitrogen limits. However, since the permit currently has weekly and monthly average limits year-round, the limits must be retained regardless of reasonable potential, consistent with s. NR 106.33(1)(b), Wis. Adm. Code:

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

#### **Conclusions and Recommendations**

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

| I mai Ammonia Tuti ogen Emitis |         |         |         |  |  |
|--------------------------------|---------|---------|---------|--|--|
|                                | Daily   | Weekly  | Monthly |  |  |
|                                | Maximum | Average | Average |  |  |
| Year-round                     | 17 mg/L | 17 mg/L | 17 mg/L |  |  |

| Final Ar | nmonia | Nitrogen | Limits |
|----------|--------|----------|--------|
|----------|--------|----------|--------|

Additional limits to meet the requirements in s. NR 106.07, Wis. Adm Code, are denoted in bold text.

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# Attachment #1 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. Since Richland Center Wastewater Treatment Facility's permit requires twice weekly monitoring, the 410 counts/100 mL limit will effectively function as a daily maximum limit unless the facility performs additional monitoring. Any additional monitoring beyond what is required by the permit must also be reported on the DMR as required in the standard requirements section of the permit.

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

#### **Effluent Data**

Richland Center Wastewater Treatment Facility has monitored effluent *E. coli* from May 2023 through September 2024, and a total of 73 results are available. A geometric mean of 126 counts/100 mL was not exceeded in any of the months, and the maximum monthly geometric mean was 30 counts/100 mL. Effluent data did not show any exceedance of 410 counts/100 mL; the maximum reported value was 200 counts/100 mL. Based on the effluent data it appears that **the facility can meet new** *E. coli* **limits, and a compliance schedule is not needed in the reissued permit.** 

#### PART 5 – PHOSPHORUS

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

Subchapter II of Chapter NR 217, Wis. Adm. Code, requires municipal wastewater treatment facilities that discharge greater than 150 pounds of total phosphorus per month to comply with a monthly average limit of 1.0 mg/L, or an approved alternative concentration limit.

## Since Richland Center Wastewater Treatment Facility has phosphorus limits in effect that are more stringent than 1.0 mg/L, the need for a TBEL will not be considered further.

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

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

The current permit has the phosphorus WQBELs of 0.225 mg/L as a monthly average and 0.075 mg/L as a six-month average, respectively. These are the most stringent limits the Department can implement to a discharge based on a unidirectional flow surface waterbody. Since there is no new instream monitoring data for the receiving water and since the Pine River is still listed as impaired for total phosphorus at the point of discharge, the limits do not need to be reevaluated at this time and are recommended to continue during the reissued permit term.

#### **Effluent Data**

The following table summarizes effluent total phosphorus monitoring data from July 2019 through December 2024.

| Total I nosphorus Ennuent Data |             |  |  |
|--------------------------------|-------------|--|--|
|                                | mg/L        |  |  |
| 1-day P <sub>99</sub>          | 4.53        |  |  |
| 4-day P <sub>99</sub>          | 2.52        |  |  |
| 30-day P <sub>99</sub>         | 1.14        |  |  |
| Mean                           | 0.59        |  |  |
| Std                            | 1.01        |  |  |
| Sample size                    | 1413        |  |  |
| Range                          | 0.04 - 6.07 |  |  |
|                                |             |  |  |

### **Total Phosphorus Effluent Data**

#### **Reasonable Potential Determination**

The discharge has reasonable potential to cause or contribute to an exceedance of the water quality criterion because the 30-day P<sub>99</sub> of reported effluent total phosphorus data is greater than the calculated WQBEL. Therefore, a WQBEL is required.

#### **Mass Limits**

A mass limit is also required, pursuant to s. NR 217.14(1)(a), Wis. Adm. Code, because the discharge is to a surface water that is to a phosphorus impaired waterbody. This final mass limit shall be 0.075 mg/L  $\times$  8.34  $\times$  1.006 MGD = 0.63 lbs/day expressed as a six-month average.

#### Water Quality Trading

A water quality trading plan has been conditionally approved as an alternative compliance option to offset any total phosphorus discharged from Outfall 001 that exceeds the WQBELs. The phosphorus WQBELs may be expressed as computed compliance limits, but a Minimum Control Level (MCL) must be set as a limit not to be exceeded at the outfall location. Richland Center Wastewater Treatment Facility has been approved for up to 738 lbs/year of water quality trading credits through 2030. **The existing MDV interim limit of 0.80 mg/L is recommended as the MCL.** 

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

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

Due to the amount of upstream flow available for dilution in the limit calculation (Qs:Qe >20:1), the lowest calculated limitation is  $120^{\circ}$ F (s. NR 106.55(6)(a), Wis. Adm. Code).

The table below summarizes the maximum temperatures reported during monitoring from February 2016-January 2017 (temperature monitoring was not required during the current permit term).

| Monthly Temperature Enluent Data & Limits |                                 |                                     |   |  |  |  |
|---|---------------------------------|-------------------------------------|---|--|--|--|
|   | Representat<br>Monthly<br>Tempe | tive Highest<br>Effluent<br>erature | Calculated Effluent<br>Limit                |  |  |  |
| Month                                     | Weekly<br>Maximum               | Daily<br>Maximum                    | Weekly<br>Average<br>Effluent<br>Limitation | Daily<br>Maximum<br>Effluent<br>Limitation |  |  |
|   | (°F)                            | (°F)                                | (°F)  | (°F)                                       |  |  |
| JAN                                       | 53                              | 53                                  | -   | 120  |  |  |
| FEB                                       | 49                              | 50                                  | -   | 120  |  |  |
| MAR                                       | 51                              | 51                                  | -   | 120  |  |  |
| APR                                       | 55                              | 55                                  | -   | 120  |  |  |
| MAY                                       | 61                              | 61                                  | -   | 120  |  |  |
| JUN                                       | 68                              | 70                                  | -   | 120  |  |  |
| JUL                                       | 73                              | 73                                  | -   | 120  |  |  |
| AUG                                       | 73                              | 73                                  | -   | 120  |  |  |
| SEP                                       | 73                              | 73                                  | -   | 120  |  |  |
| OCT                                       | 70                              | 70                                  | -   | 120  |  |  |
| NOV                                       | 64                              | 64                                  | -   | 120  |  |  |
| DEC                                       | 57                              | 57                                  | -   | 120  |  |  |

Attachment #1 Monthly Temperature Effluent Data & Limits

#### **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

Based on the available effluent data, no effluent limits are recommended for temperature. **Thermal monitoring for one year is recommended to be used at the next permit reissuance** since existing data will be at least 13-14 years old at the next reissuance and since there are industrial contributors.

## Attachment #1 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% (8.6 rounded to the nearest whole number), 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:

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

Where:

 $Q_e$  = annual average flow = 1.006 MGD = 1.557 cfs f = fraction of the  $Q_e$  withdrawn from the receiving water = 0  $Q_s = \frac{1}{4}$  of the 7- $Q_{10} = 66$  cfs  $\div 4 = 16.5$  cfs

- 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. 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.

Tests conducted prior to July 1, 2005 are not presented in the table below due to significant changes that were made to WET test methods in 2004. These changes were assumed to be fully implemented by certified labs by no later than June 2005. Data collected before July 1, 2005 do not show repeated toxicity that was never resolved and is not the only data that is available.

| Date              |          | Acute LC:      | Results<br>50 %  |             |          | Chronic<br>IC <sub>2</sub> | Results<br>5 %   |            | Footnotes      |
|-------------------|----------|----------------|------------------|-------------|----------|----------------------------|------------------|------------|----------------|
| Test<br>Initiated | C. dubia | Fathead minnow | Pass or<br>Fail? | Used in RP? | C. dubia | Fathead<br>Minnow          | Pass or<br>Fail? | Use in RP? | or<br>Comments |
| 06/06/2006        | >100     | >100           | Pass             | No          | >100     | >100                       | Pass             | No         | 1              |
| 03/22/2007        | >100     | >100           | Pass             | No          | >100     | >100                       | Pass             | No         | 1              |
| 08/04/2015        | >100     | >100           | Pass             | No          | >100     | >100                       | Pass             | No         | 1              |
| 09/20/2016        | >100     | >100           | Pass             | Yes         | >100     | 17.2                       | Pass             | Yes        |                |
| 10/03/2017        | >100     | >100           | Pass             | Yes         | >100     | >100                       | Pass             | Yes        |                |
| 11/05/2019        | >100     | >100           | Pass             | Yes         | >100     | >100                       | Pass             | Yes        |                |
| 04/14/2020        | >100     | >100           | Pass             | Yes         | >100     | >100                       | Pass             | Yes        |                |
| 09/14/2021        | >100     | >100           | Pass             | Yes         | >100     | >100                       | Pass             | Yes        |                |
| 11/15/2022        | >100     | >100           | Pass             | Yes         | >100     | >100                       | Pass             | Yes        |                |
| 01/24/2023        | >100     | >100           | Pass             | Yes         | >100     | >100                       | Pass             | Yes        |                |
| 10/22/2024        | >100     | >100           | Pass             | Yes         | >100     | >100                       | Pass             | Yes        |                |

#### WET Data History

Footnote:

1. *Data Not Representative*. The facility completed an upgrade in November 2015 which renders all previous WET data unrepresentative.

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

According to s. NR 106.08(6)(d), Wis. Adm. Code, TUa and TUc effluent values are equal to zero whenever toxicity is not detected (i.e. when the LC<sub>50</sub>, IC<sub>25</sub> or IC<sub>50</sub>  $\geq$  100%).

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

Attachment #1 Chronic Reasonable Potential =  $[(TU_c \text{ effluent}) (B)(IWC)]$ 

| <b>TUc</b> (maximum)<br>100/IC <sub>25</sub> | <b>B</b><br>(multiplication factor from s. NR<br>106.08(6)(c), Wis. Adm. Code, Table 4) | IWC |  |  |  |
|--|---|-----|--|--|--|
| 100/17.2 =<br>5.8                            | 6.2<br>Based on 1 detect  | 9%  |  |  |  |

#### **Chronic WET Limit Parameters**

[(TUc effluent) (B)(IWC)] = 3.1 > 1.0

Therefore, reasonable potential is shown for a **chronic WET limit** using the procedures in s. NR 106.08(6), Wis. Adm. Code, and representative data from August 2015 through October 2024.

<u>Expression of WET limits</u> Chronic WET limit = [100/IWC] TU<sub>c</sub> = 100/8.6 = 11.6 = 12 TU<sub>c</sub> (rounded to two significant figures) expressed as a monthly average

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.

|                         | Acute  | Chronic  |
|-------------------------|--|--|
| AMZ/IWC                 | Not Applicable.                                  | IWC = 9%   |
|                         | 0 Points   | 0 Points   |
| Historical              | 8 tests used to calculate RP.                    | 8 tests used to calculate RP.                    |
| Data                    | No tests failed.                                 | No tests failed.                                 |
| Data                    | 0 Points   | 0 Points   |
| Ffluont                 | Little variability, few violations, no upsets,   | Same as Acute.                                   |
| Elliuent<br>Voriobility | consistent WWTF operations.                      |  |
| variability             | 0 Points   | 0 Points   |
| Receiving Water         | WWSF   | Same as Acute.                                   |
| Classification          | 5 Points   | 5 Points   |
|                         | No reasonable potential for limits based on ATC. | No reasonable potential for limits based on CTC. |
|                         | Ammonia nitrogen limit carried over from the     | Ammonia nitrogen limit carried over from the     |
| Chemical-Specific       | current permit. Chloride, chromium, copper,      | current permit. Chloride, chromium, copper,      |
| Data                    | mercury, nickel, and zinc detected.              | mercury, nickel, and zinc detected.              |
|                         | Additional Compounds of Concern: Antimony.       | Additional Compounds of Concern: Antimony.       |
|                         | 5 Points   | 5 Points   |
| Additives               | No biocides and one water quality conditioner    | All additives used more than once per 4 days.    |
| Auditives               | (ferric chloride) added.                         |  |

#### WET Checklist Summary

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| Attachment #1                        |  |                            |  |  |  |
|--------------------------------------|--|----------------------------|--|--|--|
|                                      | Acute  | Chronic                    |  |  |  |
|                                      | Permittee will have proper P chemical SOP in |                            |  |  |  |
|                                      | place prior to permit reissuance.            | 1 Point                    |  |  |  |
|                                      | 1 Point                                      |                            |  |  |  |
| Discharge                            | 2 Industrial Contributors.                   | Same as Acute.             |  |  |  |
| Category                             | 6 Points                                     | 6 Points                   |  |  |  |
| Wastewater                           | Secondary or better.                         | Same as Acute.             |  |  |  |
| Treatment                            | 0 Points                                     | 0 Points                   |  |  |  |
| Downstream                           | No impacts known.                            | Same as Acute.             |  |  |  |
| Impacts                              | 0 Points                                     | 0 Points                   |  |  |  |
| Total Checklist                      | 17 Points                                    | 17 Points                  |  |  |  |
| Points:                              |  | 17 1 01113                 |  |  |  |
| Recommended                          |  |                            |  |  |  |
| Monitoring Frequency                 | 1x yearly                                    | 1x yearly                  |  |  |  |
| (from Checklist):                    |  |                            |  |  |  |
| Limit Required?                      | No   | Limit = 12 TU <sub>c</sub> |  |  |  |
| TRE Recommended?<br>(from Checklist) | 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.** A minimum of annual acute and chronic monitoring is required because Fort Atkinson Wastewater Treatment Facility 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 four 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. 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).
- According to the requirements specified in s. NR 106.08, Wis. Adm. Code, a chronic WET limit is required. The chronic WET limit shall be expressed as 12 TU<sub>c</sub> as a monthly average in the effluent limits table of the permit. A minimum of annual chronic monitoring is required since a chronic WET limit is required. Federal regulations in 40 CFR Part 122.44(i) require that monitoring occur at least once per year when a limit is present.



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Attachment #3 Ammonia Nitrogen Calculations from the WQBEL Memo Dated February 12, 2018

|                 |                              | Spring      | Summer       | Winter    |
|-----------------|------------------------------|-------------|--------------|-----------|
|                 |                              | April & May | June – Sept. | Oct March |
|                 | $7-Q_{10}$ (cfs)             | 66          | 66           | 66        |
|                 | $7-Q_2$ (cfs)                | 82          | 82           | 82        |
|                 | Ammonia (mg/L)               | 0.06        | 0.06         | 0.085     |
| Background      | Temperature (°C)             | 6           | 18.6         | 4         |
| Information     | pH (s.u.)                    | 8.03        | 8.11         | 8.05      |
|                 | % of Flow used               | 25          | 100          | 25        |
|                 | Reference Weekly Flow (cfs)  | 16.5        | 66           | 16.5      |
|                 | Reference Monthly Flow (cfs) | 17.4        | 69.7         | 17.4      |
| Criteria        | 4-day Chronic                | 5.82        | 3.97         | 5.70      |
| mg/L            | 30-day Chronic               | 2.33        | 1.59         | 2.28      |
| Effluent Limits | Weekly Average               | 66.92       | 169.57       | 65.17     |
| mg/L            | Monthly Average              | 27.74       | 69.93        | 26.83     |