

# Permit Fact Sheet

## General Information

|                                  |   |
|----------------------------------|---|
| Permit Number:                   | WI-0061921-04-0   |
| Permittee Name:                  | Wisconsin Power and Light Company   |
| Address:                         | 1401 West B-R Townline Road   |
| City/State/Zip:                  | Beloit WI 53511   |
| Discharge Location:              | Rock River, North bank of the river South of the plant. The replacement outfall is located adjacent to and west of WPL's existing Riverside Energy Center. The site is located in Township 1N, Range 12E, Section 1; Town of Beloit; Lat/long of Appx. Centroid of Project 42.5766, -89.0357. |
| Receiving Water:                 | Rock River  |
| StreamFlow (Q <sub>7,10</sub> ): | 219 cfs   |
| Stream Classification:           | Warm Water Sport Fish (WWSF) community and non-public water supply  |
| Discharge Type:                  | Existing  |

## Facility Description

Wisconsin Power and Light (WPL) – Riverside Energy Center (an Alliant Company) is a campus containing two natural gas-fired combined-cycle electric power generation facilities. The original Riverside Energy Center facility has approximately 460 MW under standard conditions and approximately 140-MW of additional peaking capacity using steam augmentation and duct firing for a total generation capacity of 674.9 MW. Heat recovery from the exhaust of the combustion turbines is used to create the steam to generate electricity for steam turbines. A wet recirculating cooling tower is used to cool steam from the steam cycle. The Riverside facility has a discharge of combined cooling tower blowdown and non-cooling tower blowdown low volume wastewater streams. The effluent discharge from Riverside combines with West Riverside's effluent discharge under Outfall 001 to discharge to the Rock River.

The West-Riverside Energy Center (WREC) facility was constructed in 2020 and is a natural gas combined cycle (NGCC) project next to the existing Riverside facility. The WREC facility is a nominal 700 MW NGCC electrical generating facility consisting of two natural gas-fired combustion turbines and a heat recovery steam generator. The effluent discharge from WREC combines with Riverside's effluent discharge under Outfall 001 to discharge to the Rock River.

At Riverside, wastewater from equipment and wash-down areas is treated in an oil water separator (OWS). Dechlorination of cooling tower blowdown is done using sodium bisulfite before mixing with West Riverside effluent. At West Riverside, wastewater from equipment and washdown areas is routed to a wastewater treatment system that consists of an inclined plate clarifier followed by three sand filters in series. Dechlorination of treated wastewater is done using sodium bisulfite before mixing with Riverside effluent. West Riverside has a sludge handling process consisting of a sludge thickening tank and plate and frame filter press. Cake sludge is disposed in offsite landfill.

Tertiary sand filters were installed for zinc and phosphorus removal during the last permit term.

Changes from the previous permit have been highlighted in grey.

## Substantial Compliance Determination

### Enforcement During Last Permit:

After a desk top review of all discharge monitoring reports, compliance schedule items, and a site visit on 2/2/2023, this facility has been found to be in substantial compliance with their current permit.

**Compliance determination entered by Ashley Brechlin, Wastewater Engineer on 2/21/2023.**

| <b>Sample Point Designation</b> |   |   |
|---------------------------------|---|---|
| <b>Sample Point Number</b>      | <b>Discharge Flow, Units, and Averaging Period</b>  | <b>Sample Point Location, Waste Type/Sample Contents and Treatment Description (as applicable)</b>  |
| 701                             | 3.42 MGD Average Intake <sup>1</sup>  | INTAKE: Combination of groundwater from a radial horizontal collector well and water from the Rock River. Four flow meters are used: three for the West Riverside plant and one at the Riverside plant. There is no surface water intake. Any river water in the well is from the surrounding soil.   |
| 001                             | 1.919 MGD Maximum Day <sup>2</sup><br>1.830 MGD Maximum 7-Day Average <sup>2</sup><br>1.740 MGD Maximum 30-Day Average <sup>2</sup><br>0.745 MGD Maximum Annual Average <sup>2</sup>  | EFFLUENT: Combined discharge of comingled in-plant sample points 103 and 113. 24-hr flow proportional composite and grab samples shall be taken from each power plant prior to discharge to the Rock River and a flow weighted average shall be applied to the waste streams to determine a calculated discharge.   |
| 101                             | 0.163 MGD Maximum Day <sup>1</sup><br>0.136 MGD Maximum 7-Day Average <sup>1</sup><br>0.133 MGD Maximum 30-Day Average <sup>1</sup><br>0.0870 MGD Maximum Annual Average <sup>1</sup> | IN-PLANT: Riverside Low Volume Wastewater (LVW) consisting of Multimedia Filter backwash and RO concentrate. 24-hr flow proportional composite and grab samples shall be taken within the building housing the filters and RO system prior to discharge to the wastewater sump pit or discharged for reuse in the cooling tower.  |
| 102                             | 1.13 MGD Maximum Day <sup>1</sup><br>0.878 MGD Maximum 7-Day Average <sup>1</sup><br>0.815 MGD Maximum 30-Day Average <sup>1</sup><br>0.562 MGD Maximum Annual Average <sup>1</sup>   | IN-PLANT: Riverside Wastewater consisting of cooling tower blowdown, raw water, condenser effluent, aux cooling effluent, and various flows from sump pumps around the plant. Low Volume Wastewater (LVW) from in-plant sampling point 101 is also reused within the cooling tower. 24-hr flow proportional composite samples shall be taken from within the chemical building prior to discharge to the wastewater sump pit. |
| 103                             | 1.47 MGD Maximum Day <sup>1</sup><br>1.43 MGD Maximum 7-Day   | IN-PLANT: Wastewater consisting of cooling tower blowdown and low-volume wastewater from Riverside after it has mixed. Combined discharge of in-plant sampling points 101 (LVW) and   |

<sup>1</sup> Calculated from data submitted on the eDMRs between May 1<sup>st</sup> 2019 and April 30<sup>th</sup> 2024

<sup>2</sup> Data submitted on "Wisconsin Pollutant Discharge Elimination System (WPDES) Wastewater Discharge Individual Permit Application" (Form 3400-178) by Wisconsin Power and Light Company's Riverside Energy Center

| <b>Sample Point Designation</b> |  |  |
|---------------------------------|--|--|
| <b>Sample Point Number</b>      | <b>Discharge Flow, Units, and Averaging Period</b>   | <b>Sample Point Location, Waste Type/Sample Contents and Treatment Description (as applicable)</b>   |
|                                 | Average <sup>1</sup><br>1.41 MGD Maximum 30-Day Average <sup>1</sup><br>0.595 MGD Maximum Annual Average <sup>1</sup>  | 102 (blowdown) after it has mixed. 24-hr flow proportional and grab samples shall be taken from the pipe downstream of the mixing of the two Riverside streams prior to discharging out of Outfall 001   |
| 111                             | 0.419 MGD Maximum Day <sup>1</sup><br>0.176 MGD Maximum 7-Day Average <sup>1</sup><br>0.0960 MGD Maximum 30-Day Average <sup>1</sup><br>0.0224 MGD Maximum Annual Average <sup>1</sup> | IN-PLANT: Wastewater consisting of low volume wastewater (LVW) from West Riverside sampled prior to commingling with in-plant sample point 112 and going through the treatment system.   |
| 112                             | 0.563 MGD Maximum Day <sup>1</sup><br>0.468 MGD Maximum 7-Day Average <sup>1</sup><br>0.449 MGD Maximum 30-Day Average <sup>1</sup><br>0.330 MGD Maximum Annual Average <sup>1</sup>   | IN-PLANT: Wastewater consisting of cooling tower blowdown from West Riverside sampled prior to commingling with in-plant sample point 111 and going through the treatment system.  |
| 113                             | 0.499 MGD Maximum Day <sup>1</sup><br>0.454 MGD Maximum 7-Day Average <sup>1</sup><br>0.441 MGD Maximum 30-Day Average <sup>1</sup><br>0.289 MGD Maximum Annual Average <sup>1</sup>   | IN-PLANT: Wastewater consisting of cooling tower blowdown and low-volume wastewater from West Riverside after it has mixed and gone through the treatment system. Combined discharge of in-plant sampling points 111 (LVW) and 112 (blowdown) after going through treatment system. 24-hr flow proportional and grab samples shall be taken from the pipe downstream of the treatment processes prior to mixing with wastewater from the "Riverside Facility." |
| 199                             | N/A  | FIELD BLANK: Collect total recoverable mercury field blanks using standard sample handling procedures.   |

## 1 Influent – Monitoring Requirements

## Sample Point Number: 701- Intake Water

| Monitoring Requirements and Limitations |            |                 |                  |             |       |
|---|------------|-----------------|------------------|-------------|-------|
| Parameter                               | Limit Type | Limit and Units | Sample Frequency | Sample Type | Notes |
| Flow Rate                               |            | MGD             | Daily            | Continuous  |       |
| Mercury, Total Recoverable              |            | ng/L            | Quarterly        | Grab        |       |

### Changes from Previous Permit:

The department has determined that no changes are necessary.

### Explanation of Limits and Monitoring Requirements

#### Mercury

Mercury monitoring is included to help characterize mercury within source water to be used in calculating water quality-based limits in next permit reissuance.

## 2 Inplant - Monitoring and Limitations

### Sample Point Number: 101- Riverside Low Volume Wastewater (LVW)

| Monitoring Requirements and Limitations |               |                 |                  |                      |  |
|---|---------------|-----------------|------------------|----------------------|--|
| Parameter                               | Limit Type    | Limit and Units | Sample Frequency | Sample Type          | Notes  |
| Flow Rate                               |               | MGD             | Daily            | Continuous           |  |
| Suspended Solids, Total                 | Daily Max     | 100 mg/L        | Weekly           | 24-Hr Flow Prop Comp |  |
| Suspended Solids, Total                 | Monthly Avg   | 30 mg/L         | Weekly           | 24-Hr Flow Prop Comp |  |
| Oil & Grease (Hexane)                   | Daily Max     | 20 mg/L         | Weekly           | Grab                 |  |
| Oil & Grease (Hexane)                   | Monthly Avg   | 15 mg/L         | Weekly           | Grab                 |  |
| pH (Maximum)                            | Daily Max     | 11.0 su         | Continuous       | Continuous           | pH monitoring and limits do not apply if LVW is reused in the cooling tower. |
| pH (Minimum)                            | Daily Min     | 4.0 su          | Continuous       | Continuous           | pH monitoring and limits do not apply if LVW is reused in the cooling tower. |
| pH Total Exceedance Time Minutes        | Monthly Total | 446 minutes     | Monthly          | Calculated           | pH monitoring and limits do not apply if LVW is                              |

| Monitoring Requirements and Limitations |            |                 |                  |             |  |
|---|------------|-----------------|------------------|-------------|--|
| Parameter                               | Limit Type | Limit and Units | Sample Frequency | Sample Type | Notes  |
|   |            |                 |                  |             | reused in the cooling tower.   |
| pH Exceedances Greater Than 60 Minutes  | Daily Max  | 0 Number        | Daily            | Calculated  | pH monitoring and limits do not apply if LVW is reused in the cooling tower. |

### Changes from Previous Permit:

The department has determined that no changes are necessary.

### Explanation of Limits and Monitoring Requirements

#### TSS and Oil & Grease

Low volume wastewater is subject to TSS and oil & grease limits per ch. NR 290, Wis. Adm. Code.

#### pH

s. NR 290.12 (1)(a), Wis. Adm. Code, requires the pH of all discharges, except once through cooling water, to be between 6.0 and 9.0. However s. NR 205.06, Wis. Adm. Code, allows for pH excursions that do not exceed 7 hours and 26 minutes per calendar month and do not exceed 60 minutes per excursion.

### Sample Point Number: 102- Riverside Cooling Tower Blowdown & LVW

| Monitoring Requirements and Limitations |               |                 |                  |                      |       |
|---|---------------|-----------------|------------------|----------------------|-------|
| Parameter                               | Limit Type    | Limit and Units | Sample Frequency | Sample Type          | Notes |
| Flow Rate                               |               | MGD             | Daily            | Continuous           |       |
| Zinc, Total Recoverable                 | Daily Max     | 1.0 mg/L        | Quarterly        | 24-Hr Flow Prop Comp |       |
| Zinc, Total Recoverable                 | Monthly Avg   | 1.0 mg/L        | Quarterly        | 24-Hr Flow Prop Comp |       |
| Chromium, Total Recoverable             | Daily Max     | 0.2 mg/L        | Quarterly        | 24-Hr Flow Prop Comp |       |
| Chromium, Total Recoverable             | Monthly Avg   | 0.2 mg/L        | Quarterly        | 24-Hr Flow Prop Comp |       |
| pH (Maximum)                            | Daily Max     | 11.0 su         | Continuous       | Continuous           |       |
| pH (Minimum)                            | Daily Min     | 4.0 su          | Continuous       | Continuous           |       |
| pH Total Exceedance Time Minutes        | Monthly Total | 446 minutes     | Monthly          | Calculated           |       |
| pH Exceedances Greater Than 60 Minutes  | Daily Max     | 0 Number        | Daily            | Calculated           |       |

### Changes from Previous Permit:

The department has determined that no changes are necessary.

## Explanation of Limits and Monitoring Requirements

### Zinc and Chromium

Cooling tower blowdown is subject to zinc, chromium, chlorine, and other priority pollutant limits per ch. NR 290, Wis. Adm. Code. The chlorine limits are applied at sample point 001 and the nondetect limit for the other priority pollutants is included as a narrative limit in the permit.

### pH

s. NR 290.12 (1)(a), Wis. Adm. Code, requires the pH of all discharges, except once through cooling water to be between 6.0 and 9.0. However s. NR 205.06, Wis. Adm. Code, allows for pH excursions that do not exceed 7 hours and 26 minutes per calendar month and do not exceed 60 minutes per excursion.

### Free Available Chlorine (FAC)

The FAC standard from the Effluent Limitations Guidelines (ELG) are monitored at the outfall 001 for this cooling tower blowdown for Riverside and for cooling tower blowdown from West Riverside (see sample point 112 below). It was determined that the water quality-based limits for chlorine, applicable at outfall 001, are more stringent than the ELGs.

## Sample Point Number: 103- Riverside LVW and Cooling Tower Blowdown

| Monitoring Requirements and Limitations |            |                 |                  |                      |       |
|---|------------|-----------------|------------------|----------------------|-------|
| Parameter                               | Limit Type | Limit and Units | Sample Frequency | Sample Type          | Notes |
| Flow Rate                               |            | MGD             | Daily            | Continuous           |       |
| Suspended Solids, Total                 |            | mg/L            | Weekly           | 24-Hr Flow Prop Comp |       |
| Chlorine, Total Residual                |            | ug/L            | Daily            | Grab                 |       |
| Zinc, Total Recoverable                 |            | ug/L            | Quarterly        | 24-Hr Flow Prop Comp |       |
| Mercury, Total Recoverable              |            | ng/L            | Quarterly        | Grab                 |       |
| Phosphorus, Total                       |            | mg/L            | Weekly           | 24-Hr Flow Prop Comp |       |

### Changes from Previous Permit:

The department has determined that no changes are necessary.

## Explanation of Limits and Monitoring Requirements

Monitoring at this sampling point will aid in calculating compliance at Outfall 001. Parameters monitored for outfall 001 compliance include TSS, chlorine, zinc, mercury, and phosphorus. Data reported at outfall 001 is a flow weighted combination of parameters sampled at 103 and 113.

## Sample Point Number: 111- West Riverside: LVW

| Monitoring Requirements and Limitations |             |                 |                  |             |       |
|---|-------------|-----------------|------------------|-------------|-------|
| Parameter                               | Limit Type  | Limit and Units | Sample Frequency | Sample Type | Notes |
| Flow Rate                               |             | MGD             | Daily            | Calculated  |       |
| Suspended Solids, Total                 | Daily Max   | 100 mg/L        | Weekly           | Grab        |       |
| Suspended Solids, Total                 | Monthly Avg | 30 mg/L         | Weekly           | Grab        |       |
| Suspended Solids, Total                 |             | lbs/day         | Weekly           | Calculated  |       |
| Oil & Grease (Hexane)                   | Daily Max   | 20 mg/L         | Weekly           | Grab        |       |
| Oil & Grease (Hexane)                   | Monthly Avg | 15 mg/L         | Weekly           | Grab        |       |
| Oil & Grease (Hexane)                   |             | lbs/day         | Weekly           | Calculated  |       |

### Changes from Previous Permit:

The department has determined that no changes are necessary.

### Explanation of Limits and Monitoring Requirements

#### Flow Rate

Flow monitoring remains a requirement at this point for future calculation of categorical limits. The flow rate is calculated by taking the difference from the measured flow rate at 113 and the measured flow rate at 112. This is being done because there are multiple flows that make up the low volume wastewater at this sampling point.

#### TSS and Oil & Grease

See Appendix A for the categorical limit explanation. Since cooling tower blowdown is no longer being combined with the LVW wastestream prior to limits applying, limits may be expressed as concentrations only. Mass discharge monitoring has been included at sample point 111.

## Sample Point Number: 112- West Riverside: Cooling Tower Blowdown

| Monitoring Requirements and Limitations |            |                 |                  |             |       |
|---|------------|-----------------|------------------|-------------|-------|
| Parameter                               | Limit Type | Limit and Units | Sample Frequency | Sample Type | Notes |
| Flow Rate                               |            | MGD             | Daily            | Continuous  |       |

### Changes from Previous Permit:

The department has determined that no changes are necessary.

### Explanation of Limits and Monitoring Requirements

## Flow Rate

Flow monitoring remains a requirement at this point for future calculation of categorical limits.

## Sample Point Number: 113- West Riverside: Post Treatment

| Monitoring Requirements and Limitations |               |                 |                  |                      |       |
|---|---------------|-----------------|------------------|----------------------|-------|
| Parameter                               | Limit Type    | Limit and Units | Sample Frequency | Sample Type          | Notes |
| Flow Rate                               |               | MGD             | Daily            | Continuous           |       |
| Chromium, Total Recoverable             |               | mg/L            | Quarterly        | 24-Hr Flow Prop Comp |       |
| Chromium, Total Recoverable             | Daily Max     | 0.94 lbs/day    | Quarterly        | Calculated           |       |
| Chromium, Total Recoverable             | Monthly Avg   | 0.94 lbs/day    | Quarterly        | Calculated           |       |
| Suspended Solids, Total                 |               | mg/L            | Weekly           | 24-Hr Flow Prop Comp |       |
| Zinc, Total Recoverable                 |               | mg/L            | Quarterly        | 24-Hr Flow Prop Comp |       |
| Zinc, Total Recoverable                 | Daily Max     | 4.7 lbs/day     | Quarterly        | Calculated           |       |
| Zinc, Total Recoverable                 | Monthly Avg   | 4.7 lbs/day     | Quarterly        | Calculated           |       |
| pH (Minimum)                            | Daily Min     | 4.0 su          | Daily            | Continuous           |       |
| pH (Maximum)                            | Daily Max     | 11.0 su         | Daily            | Continuous           |       |
| pH Total Exceedance Time Minutes        | Monthly Total | 446 minutes     | Monthly          | Calculated           |       |
| pH Exceedances Greater Than 60 Minutes  | Daily Max     | 0 Number        | Daily            | Calculated           |       |
| Chlorine, Total Residual                |               | ug/L            | Daily            | Grab                 |       |
| Mercury, Total Recoverable              |               | ng/L            | Quarterly        | Grab                 |       |
| Phosphorus, Total                       |               | mg/L            | Weekly           | 24-Hr Flow Prop Comp |       |

### Changes from Previous Permit:

**Chromium** – Daily max and monthly average limits changed from 1.0 lbs/day to 0.94 lbs/day



**Zinc** – Daily max and monthly average limits changed from 5.1 lbs/day to 4.7 lbs/day

## Explanation of Limits and Monitoring Requirements

### Chromium and Zinc

See Appendix A for the categorical limit explanation.

### pH

s. NR 290.12 (1)(a), Wis. Adm. Code, requires the pH of all discharges, except once through cooling water, to be between 6.0 and 9.0. However s. NR 205.06, Wis. Adm. Code, allows for pH excursions that do not exceed 7 hours and 26 minutes per calendar month and do not exceed 60 minutes per excursion.

## Sample Point Number: 199- Field Blank for Mercury Sample

| Monitoring Requirements and Limitations |            |                 |                  |             |       |
|---|------------|-----------------|------------------|-------------|-------|
| Parameter                               | Limit Type | Limit and Units | Sample Frequency | Sample Type | Notes |
| Mercury, Total Recoverable              |            | ng/L            | Quarterly        | Grab        |       |

### Changes from Previous Permit:

The department has determined that no changes are necessary.

## Explanation of Limits and Monitoring Requirements

### Mercury

A field blank must be collected each day that a sample is collected for mercury. This mercury field blank fulfills the data quality requirements for ss. NR 106.145(9) and (10), Wis. Adm. Code. Therefore, the permit retains the sampling of a field blank for total recoverable mercury for this purpose

## 3 Surface Water - Monitoring and Limitations

### Sample Point Number: 001- Combined WW to the Rock River

| Monitoring Requirements and Limitations |             |                 |                  |             |       |
|---|-------------|-----------------|------------------|-------------|-------|
| Parameter                               | Limit Type  | Limit and Units | Sample Frequency | Sample Type | Notes |
| Flow Rate                               |             | MGD             | Daily            | Continuous  |       |
| Suspended Solids, Total                 | Monthly Avg | 12 mg/L         | Weekly           | Calculated  |       |
| Chlorine, Total Residual                | Daily Max   | 38 ug/L         | Daily            | Calculated  |       |
| Chlorine, Total Residual                | Monthly Avg | 38 ug/L         | Daily            | Calculated  |       |
| Zinc, Total Recoverable                 | Daily Max   | 650 ug/L        | Quarterly        | Calculated  |       |

| <b>Monitoring Requirements and Limitations</b> |                      |                        |                         |                    |   |
|--|----------------------|------------------------|-------------------------|--------------------|---|
| <b>Parameter</b>                               | <b>Limit Type</b>    | <b>Limit and Units</b> | <b>Sample Frequency</b> | <b>Sample Type</b> | <b>Notes</b>  |
| Zinc, Total Recoverable                        | Monthly Avg          | 650 ug/L               | Quarterly               | Calculated         |   |
| Zinc, Total Recoverable                        | Daily Max            | 12.5 lbs/day           | Quarterly               | Calculated         |   |
| Mercury, Total Recoverable                     |                      | ng/L                   | Quarterly               | Calculated         |   |
| Temperature Maximum                            |                      | deg F                  | Daily                   | Continuous         | See Temperature Monitoring section below  |
| Nitrogen, Total                                |                      | mg/L                   | Quarterly               | Grab               | See Nitrogen Monitoring section below   |
| Chloride                                       |                      | mg/L                   | See Listed Qtr(s)       | Grab               | See Chloride Monitoring section below   |
| Acute WET                                      |                      | TUa                    | See Listed Qtr(s)       | 24-Hr Comp         | See Whole Effluent Toxicity (WET) Testing section below   |
| Phosphorus, Total                              | Rolling 12 Month Avg | 1.0 mg/L               | Weekly                  | Calculated         | Limit effective throughout the permit term, as it represents a minimum control level. See "Water Quality Trading (WQT)" sections for more information.  |
| Phosphorus, Total                              |                      | lbs/day                | Weekly                  | Calculated         | Report daily mass discharged using Equation 1a. in the "Water Quality Trading (WQT)" section.   |
| WQT Credits Used (TP)                          |                      | lbs/month              | Monthly                 | Calculated         | Report WQT TP Credits used per month using Equation 2b. in the "Water Quality Trading (WQT)" section. Available TP Credits are specified in Table 2 and in the approved Water Quality Trading Plan. |
| WQT Computed Compliance (TP)                   | Monthly Avg          | 0.65 lbs/day           | Monthly                 | Calculated         | Report the WQT TP Computed Compliance value using Equation 3a. in the "Water Quality Trading (WQT)" section. Value entered on the last day of   |

| Monitoring Requirements and Limitations |            |                 |                  |             |            |
|---|------------|-----------------|------------------|-------------|------------|
| Parameter                               | Limit Type | Limit and Units | Sample Frequency | Sample Type | Notes      |
|   |            |                 |                  |             | the month. |

### Changes from Previous Permit

**TSS** – Monthly average limit added

**Nitrogen** – Quarterly monitoring added

**Chloride** – Monitoring added

### Explanation of Limits and Monitoring Requirements

No composite sampler is located at outfall 001, rather sampling of the individual wastestreams occur at in-plant sampling points 103 and 113, prior to comingling. Individual results are then used to calculate a flow weighted combined results.

**Refer to the WQBEL memo for the detailed calculations, prepared by the Water Quality Bureau dated June 25, 2024 used for this reissuance.**

#### TSS

This target concentration limit of 12 mg/L was derived by the Department to address sediment impacts in Total Maximum Daily Load (TMDL) areas and is based on the same approach and data used to develop Wisconsin’s phosphorus criteria. This numeric target is intended to meet the narrative criteria in s. NR 102.04, Wis. Adm. Code.

#### Zinc

The zinc limits have remained unchanged due to the current limits being more stringent than the ELGs that apply to this outfall.

#### Nitrogen

Quarterly total nitrogen monitoring has been added in accordance with the Department’s *Guidance for Total Nitrogen Monitoring in Wastewater Permits* dated October 1, 2019, which recommends quarterly total nitrogen monitoring for all facilities with total nitrogen greater than 40 mg/L.

#### Chloride

Chloride monitoring has been added in the following quarters 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.: April 1st – June 30th 2025, July 1st – September 30th 2025, January 1st – March 31st 2026, April 1st – June 30th 2026, October 1st – December 31st 2026, January 1st – March 31st 2027, July 1st – September 30th 2027, October 1st – December 31st 2027, April 1st – June 30th 2028, July 1st – September 30th 2028, January 1st – March 31st 2029

#### 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). Based on the size and classification of the stream, the water quality criteria for the Rock River is 100 ug/L. Based on the Rock River TMDL, *the WQBEL is 0.65 lbs/day (monthly 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 WQBEL for the permittee as a maximum daily, weekly or monthly value. This final effluent limit was derived from and complies with the applicable water quality criterion.

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-2024-0002) or approved amendments thereof. The total ‘WQT TP Credits’ available are designated in the approved WQT Plan. Riverside is implementing a variety of management practices including perennial vegetation and stormwater practices. The WQT Plan proposes the generation of a range of 108.8 lbs/yr to 140.5 lbs/yr of phosphorus credits for the next six years. A phosphorus concentration limit is necessary to prevent backsliding during the term of the permit. The TBL limit of 1.0 mg/L will be retained in the permit.

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

**Chlorine**

The FAC standards required by the ELG for the cooling tower blowdown for both Riverside (102) and West Riverside (112) are maintained here by using a much more restrictive limitation on TRC.

**Whole Effluent Toxicity-** Whole effluent toxicity (WET) testing requirements and limits (if applicable) are determined in accordance with ss. NR 106.08 and NR 106.09 Wis. Adm. Code, as revised August 2016. (See the current version of the Whole Effluent Toxicity Program Guidance Document and checklist and WET information, guidance and test methods at <http://dnr.wi.gov/topic/wastewater/wet.html>)

April 1<sup>st</sup> – June 30<sup>th</sup> 2025, October 1<sup>st</sup> – December 31<sup>st</sup> 2026, July 1<sup>st</sup> – September 30<sup>th</sup> 2027, January 1<sup>st</sup> – March 31<sup>st</sup> 2028, April 1<sup>st</sup> – June 30<sup>th</sup> 2029

**4 Schedules**

**4.1 Annual Water Quality Trading (WQT) Report**

| Required Action   | Due Date   |
|---|------------|
| <p><b>Annual WQT Report:</b> Submit an annual WQT report that shall cover the first year of the permit term. The WQT Report shall include:</p> <p>The number of pollutant reduction credits (lbs/month) used each month of the previous year to demonstrate compliance;</p> <p>The source of each month’s pollutant reduction credits by identifying the approved water quality trading plan that details the source;</p> <p>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</p> <p>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.</p> | 01/31/2025 |
| <p><b>Annual WQT Report #2:</b> Submit an annual WQT report that shall cover the previous year.</p>   | 01/31/2026 |

|   |            |
|---|------------|
| <b>Annual WQT Report #3:</b> Submit an annual WQT report that shall cover the previous year.  | 01/31/2027 |
| <b>Annual WQT Report #4:</b> Submit the 4th 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.  | 01/31/2028 |
| <b>Annual WQT Report Required After Permit Expiration:</b> 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. |            |

## 4.2 ELG Requirements for Cooling Tower Blowdown

| Required Action  | Due Date   |
|--|------------|
| <b>Annual Report:</b> Submit annual report based on the previous calendar year according to details listed above.    | 01/31/2025 |
| <b>Annual Report #2:</b> Submit annual report based on the previous calendar year according to details listed above. | 01/31/2026 |
| <b>Annual Report #3:</b> Submit annual report based on the previous calendar year according to details listed above. | 01/31/2027 |
| <b>Annual Report #4:</b> Submit annual report based on the previous calendar year according to details listed above. | 01/31/2028 |

## Explanation of Schedules

**Annual Water Quality Trading (WQT) Reports** - 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

## Special Reporting Requirements

No special reporting requirements

## Other Comments:

No additional comments

## Attachments:

Attachment #1: Calculation of Categorical Limitations

Attachment #2: Water Quality Based Effluent Limits

## **Expiration Date:**

[Enter Date](#)

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

[Enter Justification](#)

**Prepared By: Sawyer Hanson Wastewater Engineer**

**Date: [Enter Date](#)**

Notice of reissuance was published in the [\[Enter name of publication\]](#) , [\[Enter address of publication\]](#) .

# ATTACHMENT #1

## CALCULATION OF CATEGORICAL LIMITATIONS

General Description:

At the West Riverside Power Generating Station there are two waste streams that are generated and each of these have their own categorical limits. These are the low volume wastewater and cooling tower blowdown. West Riverside is a new facility that started production of power in the fall of 2019. As such the New Source Performance Standards (NSPS) found in Table 3 of s. NR 290.12(3), Wis. Adm. Code, apply. For this permit the approach of ch NR 290.12(3)(c) will be used to apply the limits at Sampling Point 113 after the waste streams have combined.

For each of the waste streams the following then apply:

Low volume wastewater: Total suspended solids, oil and grease

Cooling tower blowdown: Free available chlorine, zinc, chromium, other priority pollutants

NSPS Effluent Limitations in mg/l

| Wastewater                           | TSS  |      | O&G  |      | Iron (total) |      | Copper (total) |      | FAC  |      | TRC <sup>1</sup> |      | Zinc (total) |      | Chromium (total) |      | Other Priority Pollutants |                  |
|--------------------------------------|------|------|------|------|--------------|------|----------------|------|------|------|------------------|------|--------------|------|------------------|------|---------------------------|------------------|
|                                      | Avg. | Max. | Avg. | Max. | Avg.         | Max. | Avg.           | Max. | Avg. | Max. | Avg.             | Max. | Avg.         | Max. | Avg.             | Max. | Avg.                      | Max.             |
| Low volume waste                     | 30   | 100  | 15   | 20   |              |      |                |      |      |      |                  |      |              |      |                  |      |                           |                  |
| Fly ash transport water <sup>2</sup> |      |      |      |      |              |      |                |      |      |      |                  |      |              |      |                  |      |                           |                  |
| Bottom ash transport water           | 30   | 100  | 15   | 20   |              |      |                |      |      |      |                  |      |              |      |                  |      |                           |                  |
| Chemical metal cleaning wastes       | 30   | 100  | 15   | 20   | 1.0          | 1.0  | 1.0            | 1.0  |      |      |                  |      |              |      |                  |      |                           |                  |
| Once through cooling water           |      |      |      |      |              |      |                |      | 0.2  | 0.5  | —                | 0.2  |              |      |                  |      |                           |                  |
| Cooling tower blowdown <sup>3</sup>  |      |      |      |      |              |      |                |      | 0.2  | 0.5  |                  |      | 1.0          | 1.0  | 0.2              | 0.2  | nda <sup>5</sup>          | nda <sup>5</sup> |
| Coal pile runoff <sup>4</sup>        | —    | 50   |      |      |              |      |                |      |      |      |                  |      |              |      |                  |      |                           |                  |

Avg. = Average of daily values for 30 consecutive days may not exceed (mg/l)

Max. = Maximum for any 1 day (mg/l)

O & G = Oil and grease

<sup>1</sup> This limitation applies only to plants with a total rated electric generating capacity of 25 or more megawatts. Those plants with a total rated electric generating capacity of less than 25 megawatts should use the FAC limits set for once through cooling water

<sup>2</sup> There may be no discharge of wastewater pollutants from fly ash transport water.

<sup>3</sup> Except as shown for total chromium and total zinc, discharge of cooling tower blowdown shall be limited to no detectable amount for the other priority pollutants contained in chemicals added for cooling tower maintenance.

Based on data submitted on the facilities eDMRs between May 1<sup>st</sup> 2019 and April 30<sup>th</sup> 2024 the maximum daily flows for each of the waste streams are:

Cooling tower blowdown: 0.563 MGD

Low Volume Wastewater: 0.419 MGD

To calculate the mass limit the following equation was used.

$$\text{Mass limit} = \text{concentration limit (mg/L)} \times \text{daily flow (MGD)} \times 8.34$$

The following limits were then calculated to two significant figures.

Cooling tower blowdown:

Chromium Monthly Average: 0.94 lbs/day

Chromium Daily Max: 0.94 lbs/day

Zinc Monthly Average: 4.7 lbs/day

Zinc Daily Max: 4.7 lbs/day

Low Volume Wastewater:

Total Suspended Solids Monthly Average: 100 lbs/day

Total Suspended Solids Daily Max: 350 lbs/day

Oil and Grease Monthly Average: 52 lbs/day

Oil and Grease Daily Max: 70 lbs/day

The free available chlorine limit is covered at Outfall 001 by the water quality based effluent limit which has a limit of 38 µg/L which is much more stringent than the 0.2 mg/L limit for the cooling tower blowdown even accounting for any possible dilution from the low volume wastewater and is thus not included in this analysis.



**CORRESPONDENCE/MEMORANDUM**

DATE: June 25, 2024  
 TO: Sawyer Hanson – WY/3  
 FROM: Sarah Luck – SCR/Fitchburg  
 SUBJECT: Water Quality-Based Effluent Limitations for WPL – Riverside Energy Center  
 WPDES Permit No. WI-0061921-04-0

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 WPL – Riverside Energy Center in Rock County. This industrial plant discharges to the Rock River, located in the in the Rock River Watershed (LR18) in the Lower Rock River Basin. This discharge is included in the Rock River TMDL as approved by EPA. The evaluation of the permit recommendations is discussed in more detail in the attached report.

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

| Parameter                                      | Daily Maximum            | Daily Minimum | Weekly Average | Monthly Average | 12-Month Rolling Avg. | Footnotes |
|--|--------------------------|---------------|----------------|-----------------|-----------------------|-----------|
| Flow Rate                                      |                          |               |                |                 |                       | 1         |
| TSS  |                          |               |                | 12 mg/L         |                       | 2         |
| Residual Chlorine                              | 38 µg/L                  |               |                | <b>38 µg/L</b>  |                       | 3,4       |
| Phosphorus                                     |                          |               |                | 0.65 lbs/day    | 1.0 mg/L              | 3,5       |
| Zinc   | 650 µg/L<br>12.5 lbs/day |               |                | <b>650 µg/L</b> |                       | 3,4       |
| Mercury  |                          |               |                |                 |                       | 1         |
| TKN,<br>Nitrate+Nitrite, and<br>Total Nitrogen |                          |               |                |                 |                       | 6         |
| Chloride                                       |                          |               |                |                 |                       | 7         |
| Temperature                                    |                          |               |                |                 |                       | 1         |
| Acute WET                                      |                          |               |                |                 |                       | 8         |

Footnotes:

1. Monitoring only.
2. This target concentration limit of 12 mg/L was derived by the Department to address sediment impacts in Total Maximum Daily Load (TMDL) areas and is based on the same approach and data used to develop Wisconsin’s phosphorus criteria. This numeric target is intended to meet the narrative criteria in s. NR 102.04, Wis. Adm. Code.
3. No changes from the current permit.
4. Additional limits to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Code, are included in bold.
5. The phosphorus mass limit is based on the TMDL for the Rock River basin to address phosphorus water quality impairments within the TMDL area. The concentration limit of 1.0 mg/L as a 12-month rolling average represents a minimum control level not to be exceeded at the outfall. The limits are already in effect, and compliance is achieved with water quality trading.
6. As recommended in the Department's October 1, 2019 *Guidance for Total Nitrogen Monitoring in Wastewater Permits*, quarterly total nitrogen monitoring is recommended for all facilities with


total nitrogen greater than 40 mg/L. Total Nitrogen is the sum of nitrate (NO<sub>3</sub>), nitrite (NO<sub>2</sub>), and total kjeldahl nitrogen (TKN) (all expressed as N).

7. Monitoring at a frequency to ensure that 11 samples are available at the next permit issuance.
8. Annual acute WET testing 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. 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).

Note: In lieu of a pH limit at Outfall 001, there is continuous pH monitoring at internal sampling points 101, 102, and 113. In accordance with NR 205.06 Wis. Adm. Code, effluent pH is allowed to vary outside of this range if the total time of excursions is no greater than 446 minutes per calendar month, no individual excursion is longer than 60 minutes, and no individual excursion goes outside the range of 4.0 – 11.0 s.u. These limits should be retained in the reissued permit.

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 Thermal Table

PREPARED BY:  Date: June 25, 2024  
Sarah Luck  
Water Resources Engineer

E-cc: Ashley Brechlin, Wastewater Engineer – SCR/Fitchburg  
Jason Knutson, Wastewater Section Chief – WY/3  
Diane Figiel, Water Resources Engineer – WY/3

**Water Quality-Based Effluent Limitations for  
WPL – Riverside Energy Center**

**WPDES Permit No. WI-0061921-04-0**

**PART 1 – BACKGROUND INFORMATION**

**Facility Description**

Wisconsin Power and Light (WPL) - Riverside Energy Center (an Alliant Company) is a campus containing two natural gas-fired combined-cycle electric power generation facilities, West Riverside and Riverside. The original Riverside plant has two natural gas fired combustion turbines yielding about 460 MW capacity under standard conditions and approximately 140-MW of additional peaking capacity using steam augmentation and duct firing. West Riverside was added to the campus in 2019 and is a nominal 700-MW electrical generating facility consisting of two natural gas-fired combustion turbines and a heat recovery steam generator. Heat recovery from the exhaust of the combustion turbines at both Riverside and West Riverside is used to power steam turbines. Wet recirculating cooling towers are used to cool steam from the steam cycle. Cooling tower blowdown comprises a large percentage of wastewater generated.

Industrial categorical limits required nationwide for steam electric power plants are applied at internal treatment system sample points for process wastewater designated for low volume wastewater (sample point 101) and cooling tower blowdown (sample point 102).

At Riverside, wastewater from equipment and wash-down areas is treated in an oil water separator (OWS). Dechlorination of cooling tower blowdown is done using sodium bisulfite before mixing with West Riverside effluent. At West Riverside, wastewater from equipment and washdown areas is routed to a wastewater treatment system that consists of an inclined plate clarifier followed by three sand filters in series. Dechlorination of treated wastewater is done using sodium bisulfite before mixing with Riverside effluent. Riverside and West Riverside effluents are mixed and discharged to the Rock River via a single outfall. West Riverside has a sludge handling process consisting of a sludge thickening tank and plate and frame filter press. Cake sludge is disposed in offsite landfill.

Tertiary sand filters were installed for zinc and phosphorus removal during the last permit term.

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

**Existing Permit Limitations**

The current permit, which expired on December 31, 2023, includes the following effluent limitations and monitoring requirements.

| Parameter         | Daily Maximum | Daily Minimum | Weekly Average | Monthly Average | 12-Month Rolling Avg. | Footnotes |
|-------------------|---------------|---------------|----------------|-----------------|-----------------------|-----------|
| Flow Rate         |               |               |                |                 |                       | 1         |
| TSS               |               |               |                |                 |                       | 2         |
| Residual Chlorine | 38 µg/L       |               |                | <b>38 µg/L</b>  |                       | 3         |

Attachment #1

| Parameter   | Daily Maximum            | Daily Minimum | Weekly Average | Monthly Average | 12-Month Rolling Avg. | Footnotes |
|-------------|--------------------------|---------------|----------------|-----------------|-----------------------|-----------|
| Zinc        | 650 µg/L<br>12.5 lbs/day |               |                | <b>650 µg/L</b> |                       | 3         |
| Phosphorus  |                          |               |                | 0.65 lbs/day    | 1.0 mg/L              | 4         |
| Mercury     |                          |               |                |                 |                       | 1         |
| Temperature |                          |               |                |                 |                       | 1         |
| Acute WET   |                          |               |                |                 |                       | 5         |

Footnotes:

1. Monitoring only.
2. Additional requirements for optimization and reduction of TSS and monitoring for the Rock River TMDL are also required.
3. Additional limits to comply with s. NR 106.07 Wis. Adm. Code are included in bold.
4. Limits in effect. Compliance achieved with water quality trading.
5. Annual acute WET testing.

Note: In lieu of a pH limit at Outfall 001, there is continuous pH monitoring at internal sampling points 101, 102, and 113. In accordance with NR 205.06 Wis. Adm. Code, effluent pH is allowed to vary outside of this range if the total time of excursions is no greater than 446 minutes per calendar month, no individual excursion is longer than 60 minutes, and no individual excursion goes outside the range of 4.0 – 11.0 s.u. These limits should be retained in the reissued permit.

**Receiving Water Information**

- Name: Rock River
- Waterbody Identification Code (WBIC): 788800
- 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 USGS for the Rock River at Afton.
  - 7-Q<sub>10</sub> = 219 cfs (cubic feet per second)
  - 7-Q<sub>2</sub> = 418 cfs
  - 90-Q<sub>10</sub> = 353 cfs
  - Harmonic Mean Flow = 859 cfs using a drainage area of 3,340 mi<sup>2</sup>
  - The Harmonic Mean has been estimated based on average flow and the 7-Q<sub>10</sub> 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 = 283 mg/L as CaCO<sub>3</sub>. This value represents the geometric mean of data (n=5) from WET tests conducted from 07/16/2019 to 08/15/2023 by Janesville Wastewater Treatment Facility which discharges to the Rock River approximately six miles upstream of Outfall 001.
- % 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 Rock River at Afton 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: The Beloit Town Wastewater Treatment Facility discharges approximately 0.75

Attachment #1

miles downstream of WPL – Riverside Energy Center’s outfall but does not impact calculated limitations for either facility due to the amount of dilution in the receiving water as compared to the discharge flow rates of both facilities.

- Impaired water status: The Rock River is listed as impaired for total phosphorus and total suspended solids at the point of discharge and has an EPA-approved TMDL in effect.

**Effluent Information**

- Flow rate:  
 Maximum annual average = 0.83 MGD (Million Gallons per Day)  
 For reference, the actual average flow from January 2019 through March 2024 was 0.67 MGD.
- Hardness = 1630 mg/L as CaCO<sub>3</sub>. This value represents the geometric mean of data (n=4) from February 2023 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).
- Water source: Groundwater wells.
- Additives: One biocide and 20 water quality conditioners – see Part 7 for more information.
- Effluent characterization: This facility is categorized as an industrial discharger, 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.
- 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 | Result |
|-------------|--------|
| 02/14/2023  | 4.5    |
| 02/18/2023  | 2.7    |
| 02/22/2023  | 3.7    |
| 02/26/2023  | 4.8    |
| Average     | 3.9    |

**Zinc and Mercury Effluent Data**

|                        | Zn - µg/L      | Hg - ng/L    |
|------------------------|----------------|--------------|
| 1-day P <sub>99</sub>  | 512.08         | 21.34        |
| 4-day P <sub>99</sub>  | 284.17         | 12.30        |
| 30-day P <sub>99</sub> | 165.41         | 7.71         |
| Mean                   | 114.59         | 5.68         |
| Std                    | 103.30         | 4.22         |
| Sample size            | 21             | 21           |
| Range                  | 0.179 - 334.22 | 0.21 - 16.94 |

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

**Parameter Averages with Limits**

|                          | Average Measurement | Average Mass Discharged |
|--------------------------|---------------------|-------------------------|
| pH field                 | 7.3 s.u.            |                         |
| Phosphorus               | 0.084 mg/L          | 0.50 lbs/day            |
| Zinc                     | 5.68 µg/L           |                         |
| Chlorine, total residual | <100 µg/L           |                         |

“<” indicates a result below the level of detection (LOD).

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

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

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

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

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

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

Where:

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

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

Q<sub>e</sub> = Effluent flow (in units of volume per unit time) as specified in s. NR 106.06(4)(d), Wis. Adm. Code.

f = Fraction of the effluent flow that is withdrawn from the receiving water, and

C<sub>s</sub> = Background concentration of the substance (in units of mass per unit volume) as specified in s. NR 106.06(4)(e), Wis. Adm. Code.

If the receiving water is effluent dominated under low stream flow conditions, the 1-Q<sub>10</sub> method of limit calculation produces the most stringent daily maximum limitations and should be used while making reasonable potential determinations. This is not the case for WPL – Riverside Energy Center and the limits are set based on two times the acute toxicity criteria.

Attachment #1

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

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

RECEIVING WATER FLOW = 175 cfs, (1-Q<sub>10</sub> (estimated as 80% of 7-Q<sub>10</sub>)), as specified in s. NR 106.06(3)(bm), Wis. Adm. Code.

| SUBSTANCE       | REF. HARD.*<br>mg/L | ATC  | MAX. EFFL. LIMIT** | 1/5 OF EFFL. LIMIT | MEAN EFFL. CONC. | 1-day P <sub>99</sub> | 1-day MAX. CONC. |
|-----------------|---------------------|------|--------------------|--------------------|------------------|-----------------------|------------------|
| Chlorine        |                     | 19.0 | 38.1               | 7.61               | <100             |                       |                  |
| Arsenic         |                     | 340  | 679.6              | 135.9              | 1.8              |                       |                  |
| Cadmium         | 457                 | 58.9 | 117.8              | 23.6               | 0.10             |                       |                  |
| Chromium        | 301                 | 4446 | 8891.7             | 1778               | 3.6              |                       |                  |
| Copper          | 495                 | 70.2 | 140.4              | 28.1               | 3.9              |                       |                  |
| Lead            | 356                 | 365  | 729.3              | 145.9              | 0.50             |                       |                  |
| Mercury (ng/L)  |                     | 830  | 1660.0             |                    |                  | 21.34                 | 16.94            |
| Nickel          | 268                 | 1080 | 2160.6             | 432                | 2.8              |                       |                  |
| Zinc            | 333                 | 345  | 689.4              |                    |                  | 512.08                | 334.22           |
| Chloride (mg/L) |                     | 757  | 1514.0             | 303                | 337***           |                       |                  |

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

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

\*\*\*See note below tables in chloride section.

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

RECEIVING WATER FLOW = 54.8 cfs (¼ of the 7-Q<sub>10</sub>), as specified in s. NR 106.06(4)(c), Wis. Adm. Code

| SUBSTANCE       | REF. HARD.*<br>mg/L | CTC    | MEAN BACK-GRD. | WEEKLY AVE. LIMIT | 1/5 OF EFFL. LIMIT | MEAN EFFL. CONC. | 4-day P <sub>99</sub> |
|-----------------|---------------------|--------|----------------|-------------------|--------------------|------------------|-----------------------|
| Chlorine        |                     | 7.28   |                | 317.64            | 63.53              | <100             |                       |
| Arsenic         |                     | 152.2  | 1.31           | 6585              | 1317.0             | 1.8              |                       |
| Cadmium         | 175                 | 3.82   | 0.017          | 165.95            | 33.2               | 0.10             |                       |
| Chromium        | 283                 | 309.83 | 0.79           | 13485             | 2697.0             | 3.6              |                       |
| Copper          | 283                 | 25.22  | 2.1            | 1010.9            | 202.18             | 3.9              |                       |
| Lead            | 283                 | 76.56  | 0.83           | 3305.1            | 661.0              | 0.50             |                       |
| Mercury (ng/L)  |                     | 440    | 1.06           | 19153             |                    |                  | 12.30                 |
| Nickel          | 268                 | 120.18 | 1.3            | 5188              | 1037.7             | 2.8              |                       |
| Selenium        |                     | 5.00   |                | 218.16            | 43.63              | 4.6              |                       |
| Zinc            | 283                 | 299.1  | 5.2            | 12829             |                    |                  | 284.17                |
| Chloride (mg/L) |                     | 395    | 61.8           | 14600             | 2920.0             | 337              |                       |

\* 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 = 89 cfs (¼ of the 90-Q<sub>10</sub>), as specified in s. NR 106.06(4), Wis. Adm. Code

| SUBSTANCE      | WC  | MEAN BACK-GRD. | MO'LY AVE. LIMIT | 1/5 OF EFFL. LIMIT | MEAN EFFL. CONC. | 30-day P <sub>99</sub> |
|----------------|-----|----------------|------------------|--------------------|------------------|------------------------|
| Mercury (ng/L) | 1.3 | 1.06           | 17.90            |                    |                  | 7.71                   |

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

RECEIVING WATER FLOW = 215 cfs (¼ of Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

| SUBSTANCE      | HTC     | MEAN BACK-GRD. | MO'LY AVE. LIMIT | 1/5 OF EFFL. LIMIT | MEAN EFFL. CONC. | 30-day P <sub>99</sub> |
|----------------|---------|----------------|------------------|--------------------|------------------|------------------------|
| Antimony       | 373     |                | 62722            | 12544.4            | 3.7              |                        |
| Cadmium        | 370     | 0.02           | 62215            | 12443.0            | 0.10             |                        |
| Chromium (+3)  | 3818000 | 0.79           | 642018975        | 128403795          | 3.6              |                        |
| Lead           | 140     | 0.83           | 23403            | 4680.6             | 0.50             |                        |
| Mercury (ng/L) | 1.5     | 1.06           | 75.0             |                    |                  | 7.71                   |
| Nickel         | 43000   | 1.30           | 7230485          | 1446097            | 2.8              |                        |
| Selenium       | 2600    |                | 437205           | 87441              | 4.6              |                        |

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

RECEIVING WATER FLOW = 215 cfs (¼ of Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

| SUBSTANCE | HCC  | MEAN BACK-GRD. | MO'LY AVE. LIMIT | 1/5 OF EFFL. LIMIT | MEAN EFFL. CONC. |
|-----------|------|----------------|------------------|--------------------|------------------|
| Arsenic   | 13.3 | 1.31           | 2017.5           | 403.50             | 1.8              |

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

**Conclusions and Recommendations**

Based on a comparison of the effluent data and calculated effluent limitations, **effluent limitations are required for total residual chlorine.**

Total Residual Chlorine – Since chlorine is added at the facility, effluent limitations are recommended to assure proper operation of the dechlorination system. A **daily maximum limit of 38 µg/L** should be continued in the reissued permit. A weekly average limitation is not needed as the daily maximum limitations will provide adequate protection of the resource.

*Expression of Limits*

Revisions to ch. NR 106, Wis. Adm. Code, align Wisconsin’s water quality-based effluent limitations with 40 CFR 122.45(d), which requires WPDES permits for industrial discharges contain daily maximum and monthly average limitations, whenever practicable and necessary to protect water quality.



Attachment #1

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

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

Therefore, **a monthly average chlorine limit of 38 µg/L is also required.**

Chloride – A single chloride sample was reported on the 2023 permit application. This value (337 mg/L) exceeds 1/5<sup>th</sup> of the acute toxicity criteria (303 mg/L) which is used to determine the need to include a limit per s. NR 106.05(6), Wis. Adm. Code. However, using the result from the previous permit application (129 mg/L), the mean is 233 mg/L which is less than 1/5<sup>th</sup> of the acute toxicity criteria (303 mg/L). The data from the previous permit application is still considered representative and therefore there is no reasonable potential for the effluent concentration to exceed the calculated acute limit. **No limits are required for chloride, but chloride monitoring** at a frequency 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. **is recommended.**

Mercury – The current permit requires quarterly monitoring of total recoverable mercury in the effluent. A total of 21 effluent sampling results are available from February 2019 through February 2024. The average concentration was 5.68 ng/L, and the maximum was 16.94 ng/L. Mercury field blanks were collected at sample point 199 during the permit term and were all (n=42) non-detects. The geometric mean of in-stream mercury data from 2014-2015 in the Rock River at Afton is 1.06 ng/L (no new data has been collected), which is less than the wildlife criteria. Since the 30-day P<sub>99</sub> of available data (7.71 ng/L) is less than the most stringent water quality based effluent limit of 18 ng/L, **no WQBEL for mercury is recommended. Continued effluent monitoring is recommended.**

Zinc – The current permit includes zinc limits of 650 µg/L and 12.5 lbs/day as a daily maximum and a monthly average limit of 650 µg/L. Recent zinc effluent data does not show reasonable potential to exceed the limits, however, **these limits, in addition to monitoring, should continue** per the requirements of s. NR 205.067(5), Wis. Adm. Code, since treatment or pollutant control measures were added.

PFOS and PFOA – The need for PFOS and PFOA monitoring is evaluated in accordance with s. NR 106.98(2), Wis. Adm. Code. Based on the type of discharge, **PFOS and PFOA monitoring is not recommended.** The Department may re-evaluate the need for sampling at the next permit reissuance if new information becomes available that suggests PFOS or PFOA may be present in the discharge.

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

The State of Wisconsin promulgated revised water quality standards for this substance effective March 1, 2004 which includes criteria based on both acute and chronic toxicity to aquatic life. Given the fact that the Riverside Energy Center does not currently have ammonia nitrogen limits, the need for limits is evaluated at this time. Four samples for ammonia nitrogen were taken in February 2023, and the results are as follows:

**Ammonia Nitrogen Effluent Data**

| Sample Date | Ammonia Nitrogen<br>mg/L |
|-------------|--------------------------|
| 02/14/2023  | <0.14                    |
| 02/18/2023  | <0.14                    |
| 02/22/2023  | <0.14                    |
| 02/26/2023  | <0.14                    |

Ammonia was not detected in the effluent, and the limit of detection is much lower than the most restrictive ammonia limits that would be calculated. **No ammonia limits or monitoring are recommended** in the reissued permit.

**PART 4 – PHOSPHORUS AND TOTAL SUSPENDED SOLIDS****Phosphorus Technology Based Effluent Limit (TBEL)**

Subchapter II of Chapter NR 217, Wis. Adm. Code, requires industrial facilities that discharge greater than 60 pounds of total phosphorus per month to comply with a 12-month rolling average limit of 1.0 mg/L, or an approved alternative concentration limit. Since WPL – Riverside Energy Center currently **has an existing technology-based limit of 1.0 mg/L, this limit should be included in the reissued permit as a minimum control level for water quality trading.** This limit remains applicable unless a more stringent water quality-based concentration limit is given.

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

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

The Department has developed a TMDL for the Upper and Lower Rock River Basins. The US EPA approved the Rock River TMDL on September 28, 2011. The document, along with the referenced appendices can be found at: <https://dnr.wisconsin.gov/topic/TMDLs/RockRiver/index.html>.

Section NR 217.16, Wis. Adm. Code, states that the Department may include a TMDL-derived water quality based effluent limit (WQBEL) for phosphorus in addition to, or in lieu of, a s. NR 217.13, Wis. Adm. Code, WQBEL in a WPDES permit. Because the Rock River Basin TMDL was developed to protect and improve the water quality of phosphorus impaired waters within the basin and the discharge from WPL – Riverside Energy Center flows directly into the Rock River, which is classified as phosphorus impaired, the TMDL-based limit can be included in the WPDES permit absent the s. NR 217.13, Wis. Adm. Code, WQBEL. This limit should be expressed in a manner consistent with the wasteload allocation and assumptions of the TMDL. If after two permit terms, the Department determines the nonpoint source load allocation has not been substantially reduced, the Department may include the s. NR 217.13, Wis. Adm. Code, WQBEL unless these reductions are likely to occur.

**Phosphorus TMDL Limits**

The current permit includes a monthly average phosphorus limit of 0.65 lbs/day consistent with the 70% reduction required for facilities in this reach of the Rock River. This limit should be continued in the reissued permit.

For informational purposes, the following table lists the statistics for total phosphorus in the discharge as concentration and mass from January 2019 through March 2024 as reported on the Discharge Monitoring Reports (DMRs).

**Total Phosphorus Effluent Data**

|                        | <b>Phosphorus<br/>mg/L</b> | <b>Phosphorus<br/>lbs/day</b> |
|------------------------|----------------------------|-------------------------------|
| 1-day P <sub>99</sub>  | 0.39                       | 2.71                          |
| 4-day P <sub>99</sub>  | 0.22                       | 1.47                          |
| 30-day P <sub>99</sub> | 0.12                       | 0.78                          |
| Mean                   | 0.084                      | 0.50                          |
| Std                    | 0.08                       | 0.56                          |
| Sample Size            | 294                        | 297                           |
| Range                  | 0.004 - 0.65               | 0 - 5.556                     |

A water quality trading (WQT) plan to offset phosphorus levels discharged over the limit has been approved by the Department. Therefore, **the TMDL limit of 0.65 lbs/day will be expressed as a WQT Computed Compliance limit in the reissued permit.**

**TSS TMDL Limits**

The Rock River TMDL also has wasteload allocations (WLA) for total suspended solids (TSS). A TSS load reduction target is not specified for WPL – Riverside Energy Center in the TMDL report.

For informational purposes, the following table lists the statistics for total suspended solids in the discharge as both a concentration and a mass, from January 2019 through March 2024. Mass data is based on concentration sampling paired with actual flow data during the same time period.

**Total Suspended Solids Effluent Data**

|                        | <b>TSS<br/>mg/L</b> | <b>TSS<br/>lbs/day</b> |
|------------------------|---------------------|------------------------|
| 1-day P <sub>99</sub>  | 13.5                | 92                     |
| 4-day P <sub>99</sub>  | 7.5                 | 50                     |
| 30-day P <sub>99</sub> | 4.1                 | 26                     |
| Mean*                  | 2.7                 | 16                     |
| Std                    | 2.8                 | 19                     |
| Sample Size            | 321 (14 ND)         | 321                    |
| Range                  | <0.95 - 20.4        | 0 - 194.7              |

\*“<” 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.

The current permit includes a narrative limit that includes requirements for optimization of TSS reductions. However, a target **concentration of 12 mg/L as monthly average limit for TSS** was derived by the Department for use in TMDL areas to address sediment impacts, based on the same approach and data used to develop Wisconsin’s phosphorus criteria. This numeric target is intended to meet the narrative criteria in s. NR 102.04, Wis. Adm. Code, and **is recommended in the reissued permit.**

**PART 5 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR THERMAL**

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

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

The table below summarizes the maximum temperatures reported during monitoring from January 2019 through March 2024.

**Monthly Temperature Effluent Data & Limits**

| Month | Representative Highest Monthly Effluent Temperature |               | Calculated Effluent Limit          |                                   |
|-------|---|---------------|------------------------------------|-----------------------------------|
|       | Weekly Maximum                                      | Daily Maximum | Weekly Average Effluent Limitation | Daily Maximum Effluent Limitation |
|       | (°F)  | (°F)          | (°F)                               | (°F)                              |
| JAN   | 84  | 103           | -                                  | 120                               |
| FEB   | 112   | 117           | -                                  | 120                               |
| MAR   | 86  | 107           | -                                  | 120                               |
| APR   | 87  | 99            | -                                  | 120                               |
| MAY   | 93  | 114           | -                                  | 120                               |
| JUN   | 83  | 88            | -                                  | 120                               |
| JUL   | 86  | 88            | -                                  | 120                               |
| AUG   | 88  | 94            | -                                  | 120                               |
| SEP   | 83  | 87            | -                                  | 120                               |
| OCT   | 83  | 87            | -                                  | 120                               |
| NOV   | 80  | 89            | -                                  | 120                               |
| DEC   | 83  | 115           | -                                  | 120                               |

**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 and the amount upstream flow rate available for dilution in the limit calculation, **no effluent limits are recommended for temperature. Monitoring is recommended to continue.** The complete thermal table used for the limit calculation can be found in Attachment #3.

### PART 6 – WHOLE EFFLUENT TOXICITY (WET)

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

- Acute tests predict the concentration that causes lethality of aquatic organisms during a 48 to 96-hour exposure. To assure that a discharge is not acutely toxic to organisms in the receiving water, WET tests must produce a statistically valid LC<sub>50</sub> (Lethal Concentration to 50% of the test organisms) greater than 100% effluent, according to s. NR 106.09(2)(b), Wis. Adm Code.
- Chronic testing is usually not recommended where the ratio of the 7-Q<sub>10</sub> to the effluent flow exceeds 100:1. For the WPL – Riverside Energy Center, that ratio is approximately 170:1. With this amount of dilution, there is believed to be little potential for chronic toxicity effects in the Rock River associated with the discharge from the WPL – Riverside Energy Center, so **the need for chronic WET testing will not be considered further.**
- According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), a synthetic (standard) laboratory water may be used as the dilution water and primary control in acute WET tests, unless the use of different dilution water is approved by the Department prior to use. The primary control water must be specified in the WPDES permit.
- Shown below is a tabulation of all available WET data for Outfall 001. Efforts are made to ensure that decisions about WET monitoring and limits are made based on representative data, as specified in s. NR 106.08(3), Wis. Adm Code. Data which is not believed to be representative of the discharge was not included in reasonable potential calculations. The table on the following page differentiates between tests used and not used when making WET determinations.

Tests conducted prior to July 1, 2005 are not presented in the table on the following page 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.

Attachment #1  
**WET Data History**

| Date Test Initiated | Acute Results<br>LC <sub>50</sub> % |                |               |             |
|---------------------|-------------------------------------|----------------|---------------|-------------|
|                     | <i>C. dubia</i>                     | Fathead minnow | Pass or Fail? | Used in RP? |
| 08/31/2005          | >100                                | >100           | Pass          | Yes         |
| 01/31/2007          | >100                                | >100           | Pass          | Yes         |
| 09/10/2014          | >100                                | >100           | Pass          | Yes         |
| 10/07/2015          | >100                                | >100           | Pass          | Yes         |
| 03/02/2016          | >100                                | >100           | Pass          | Yes         |
| 03/21/2018          | >100                                | >100           | Pass          | Yes         |
| 09/13/2018          | >100                                | >100           | Pass          | Yes         |
| 02/19/2019          | >100                                | >100           | Pass          | Yes         |
| 05/27/2020          | >100                                | >100           | Pass          | Yes         |
| 08/17/2021          | >100                                | >100           | Pass          | Yes         |
| 12/14/2022          | >100                                | >100           | Pass          | Yes         |
| 02/08/2023          | >100                                | >100           | Pass          | Yes         |
| 03/06/2024          | >100                                | >100           | Pass          | Yes         |

- 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, TU<sub>a</sub> effluent values are equal to zero whenever toxicity is not detected (i.e., when the LC<sub>50</sub> ≥ 100%).

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

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

**WET Checklist Summary**

|         | Acute                              |
|---------|------------------------------------|
| AMZ/IWC | Not Applicable.<br><b>0 Points</b> |

## Attachment #1

|   | <b>Acute</b>   |
|---|--|
| <b>Historical Data</b>                                    | 13 tests used to calculate RP.<br>No tests failed.<br><b>0 Points</b>  |
| <b>Effluent Variability</b>                               | Little variability, no violations or upsets, consistent operations.<br><b>0 Points</b>   |
| <b>Receiving Water Classification</b>                     | WWSF<br><b>5 Points</b>  |
| <b>Chemical-Specific Data</b>                             | No reasonable potential for limits based on ATC. Arsenic, cadmium, chloride, chromium, copper, lead, mercury, nickel, and zinc detected.<br>Additional Compounds of Concern: Antimony, selenium, and thallium detected.<br><b>5 Points</b> |
| <b>Additives</b>  | 1 biocide (chlorine) and 21 Water Quality Conditioners added.<br><b>20 Points</b>  |
| <b>Discharge Category</b>                                 | Steam Electric Power Generation<br><b>5 Points</b>   |
| <b>Wastewater Treatment</b>                               | Oil/water separator, dechlorination, and aeration only.<br><b>8 Points</b>   |
| <b>Downstream Impacts</b>                                 | No impacts known.<br><b>0 Points</b>   |
| <b>Total Checklist Points:</b>                            | <b>43 Points</b>   |
| <b>Recommended Monitoring Frequency (from Checklist):</b> | 1x yearly  |
| <b>Limit Required?</b>                                    | No   |
| <b>TRE Recommended? (from Checklist)</b>                  | No   |

After consideration of the guidance provided in the Department's *WET Program Guidance Document* (2022) and other information described above, **annual acute WET tests are recommended in the reissued permit.** A minimum of annual WET testing would also be recommended since WPL – Riverside Energy Center is a primary industry. Chronic WET monitoring is not recommended because of the high amount of available dilution in the receiving water. WET 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).

**PART 7 – ADDITIVE REVIEW**

Unlike the metals and toxic substances evaluated in Part 2, most additives have not undergone the amount of toxicity testing needed to calculate water quality criteria. Instead, in cases where the minimum data requirements necessary to calculate a WQC are not met, a secondary value can be used to regulate the substance, according to s. NR 105.05, Wis. Adm. Code. Whenever an additive is discharged directly into a surface water without receiving treatment or an additive is used in the treatment process and is not expected to be removed before discharge, a review of the additive is needed. Secondary values should be derived according to s. NR 105.05, Wis. Adm. Code. More information about additives, including guidance related to conducting an additive review, can be found at <https://dnr.wisconsin.gov/topic/Wastewater/Additives.html>.

**Riverside Facility:**

| Additive Name       | Purpose of Additive        | Intermittent or Continuous Feed | Frequency of Use (months/days per year) | Maximum Quantity Used (lb/day) | Average Quantity Used (lb/day) | Estimated Dosage (ppm) | Estimated Max Concentration at the Outfall (mg/L) | Potential Use Restriction* (mg/L) | Footnotes |
|---------------------|----------------------------|---------------------------------|---|--------------------------------|--------------------------------|------------------------|---|-----------------------------------|-----------|
| Sodium hypochlorite | Chlorinate raw water       | Continuous                      | 12/7                                    | 5.25                           | 2.10                           | 2                      | 0.0   | N/A                               | 1,2       |
| Chemtreat RL9002    | Anti scalant               | Continuous                      | 12/7                                    | 9.51                           | 6.35                           | 6                      | 2.4   | 165                               | -         |
| Chemtreat RL2002    | Clean-in-place (cip)       | Intermittent                    | 1 day per quarter                       | 48.2 lbs/cip                   | -                              | -                      | 14.6  | 73.2                              | 3         |
| Chemtreat RL1700    | Clean-in-place (cip)       | Intermittent                    | 1 day per quarter                       | 49.4 lbs/cip                   | -                              | -                      | 11.8  | 7.07                              | 3,4       |
| Sodium bisulfite    | Dechlorination (pre-RO)    | Continuous                      | 12/7                                    | 6.35                           | 4.23                           | 4                      | 1.6   | N/A                               | 2         |
| Sodium hydroxide    | CO <sub>2</sub> removal    | Continuous                      | 12/7                                    | 4.76                           | 3.17                           | 3                      | 1.2   | N/A                               | 2         |
| Chemtreat BL-152    | pH control                 | Continuous                      | 12/7                                    | 35.00                          | 29.20                          | 6                      | 8.8   | 14.2                              | 5         |
| Chemtreat BL1795    | Buffer                     | Continuous                      | 12/7                                    | 20.00                          | 16.70                          | 3                      | 5.0   | 1,864                             | -         |
| Chemtreat BL8301    | Corrosion inhibitor        | Continuous                      | 12/7                                    | 25.20                          | 21.00                          | 0.3                    | 0.033   | 0.14                              | 6         |
| Sodium hypochlorite | Chlorinate (cooling tower) | Continuous                      | 12/7                                    | 1101.00                        | 969.00                         | 240                    | 0.0   | N/A                               | 1,2       |
| Sulfuric acid       | pH control                 | Continuous                      | 12/7                                    | 5945.00                        | 5174.00                        | 280-300                | 1280.0  | N/A                               | 2,5       |
| Chemtreat CL4657    | Corrosion inhibitor        | Continuous                      | 12/7                                    | 220.20                         | 176.20                         | 30                     | 40.0  | 550                               | -         |
| Chemtreat CL4800    | Corrosion inhibitor        | Continuous                      | 12/7                                    | 66.10                          | 44.00                          | 8                      | 10.0  | 225                               | -         |
| Sodium bisulfite    | Dechlorination (blowdown)  | Continuous                      | 12/7                                    | 27.80                          | 16.80                          | 4                      | 4.0   | N/A                               | 2         |

*\*The use restriction values were calculated, unless otherwise noted, using the secondary chronic value and the available dilution in the receiving water (25% of the 7-Q<sub>10</sub> of 219 cfs) and the maximum annual average flow rate of 0.83 MGD.*



**Footnotes:**

1. Neutralized with sodium bisulfite.
2. Evaluation is not necessary for additives that have active ingredients consisting only of chlorine, caustic soda (sodium hydroxide), hypochlorite, sulfuric acid, hydrochloric acid.
3. The use restriction value is the secondary acute value stated in the additive approval letter dated September 23, 2021.
4. Although the maximum effluent concentration exceeds the use restriction level, the additive is approved for use since it is used on an intermittent basis.
5. There is continuous pH monitoring at internal sampling points 101, 102, and 113. In accordance with NR 205.06 Wis. Adm. Code, effluent pH is allowed to vary outside of this range if the total time of excursions is no greater than 446 minutes per calendar month, no individual excursion is longer than 60 minutes, and no individual excursion goes outside the range of 4.0 – 11.0 s.u.
6. Per the facility: “This is a volatile filming additive that is expected to coat the interior of pipes. Any excess reagent is expected to volatilize prior to discharge. The expected concentration in the discharge is therefore very low. The dosage and effluent concentration reported here is from original 2018 calculations done during the additive review process.”

**West Riverside Facility:**

| Additive Name       | Purpose of Additive      | Intermittent or Continuous Feed | Frequency of Use (months/days per year) | Maximum Quantity Used (lb/day) | Average Quantity Used (lb/day) | Estimated Dosage (ppm) | Estimated Max Concentration at the Outfall (mg/L) | Potential Use Restriction* (mg/L) | Footnotes |
|---------------------|--------------------------|---------------------------------|---|--------------------------------|--------------------------------|------------------------|---|-----------------------------------|-----------|
| Sodium hypochlorite | Chlorinate raw water     | Continuous                      | 12/7                                    | 582                            | 388                            | 10                     | 0   | N/A                               | 1,2       |
| Hydrated Lime       | Water softening          | Continuous                      | 12/7                                    | 14745                          | 13231                          | 341                    | 0   | N/A                               | 3         |
| Soda ash            | Water softening          | Continuous                      | 12/7                                    | 7760                           | 6984                           | 180                    | 0   | N/A                               | 3         |
| Ferric chloride     | Water softening          | Continuous                      | 12/7                                    | 1358                           | 970                            | 25                     | 0   | N/A                               | 3         |
| Chemtreat P817E     | Water softening          | Continuous                      | 12/7                                    | 310                            | 194                            | 5                      | 0   | N/A                               | 3         |
| Sulfuric acid       | pH control               | Continuous                      | 12/7                                    | 3880                           | 3609                           | 93                     | 1154  | N/A                               | 2,4       |
| Sodium hypochlorite | Chlorinate water         | Continuous                      | 12/7                                    | 310                            | 194                            | 5                      | 0   | N/A                               | 1,2       |
| Sodium hypochlorite | Ultrafiltration backwash | Intermittent                    | 12/1                                    | -                              | 142                            | 100                    | 0   | N/A                               | 1,2       |
| Citric acid         | Ultrafiltration backwash | Intermittent                    | 12/1                                    | -                              | 140                            | 100                    | 41.6  | -                                 | 5         |
| Chemtreat RL-9904   | Anti scalant             | Continuous                      | 12/7                                    | 32.8                           | 16.4                           | 3                      | 9.76  | 183                               |           |

| Additive Name       | Purpose of Additive        | Intermittent or Continuous Feed | Frequency of Use (months/days per year) | Maximum Quantity Used (lb/day) | Average Quantity Used (lb/day) | Estimated Dosage (ppm) | Estimated Max Concentration at the Outfall (mg/L) | Potential Use Restriction* (mg/L) | Footnotes |
|---------------------|----------------------------|---------------------------------|---|--------------------------------|--------------------------------|------------------------|---|-----------------------------------|-----------|
| Sodium bisulfite    | Dechlorination (pre-RO)    | Continuous                      | 12/7                                    | 48                             | 32                             | 5                      | 9.52  | N/A                               | 2         |
| Chemtreat RL2002    | Clean-in-place (cip)       | Intermittent                    | 2-5 days per quarter                    | 48.2 lbs/cip                   | -                              | -                      | 14.6  | 73.2                              | 6         |
| Chemtreat RL1700    | Clean-in-place (cip)       | Intermittent                    | 2-5 days per quarter                    | 49.4 lbs/cip                   | -                              | -                      | 11.8  | 7.07                              | 6,7       |
| Chemtreat BL-152    | pH control                 | Continuous                      | 12/7                                    | 35                             | 29.2                           | 3                      | 8.69  | 14.2                              | 4         |
| Sodium hypochlorite | Chlorinate (cooling tower) | Continuous                      | 12/7                                    | 254                            | 223                            | 0.2-0.5                | 0   | N/A                               | 1,2       |
| Sulfuric acid       | pH control                 | Continuous                      | 12/7                                    | 1598                           | 1172                           | 300                    | 476   | N/A                               | 2,4       |
| Chemtreat CL4800    | Dispersant                 | Continuous                      | 12/7                                    | 76.1                           | 60.9                           | 12                     | 23  | 225                               | -         |
| Chemtreat CL5432    | Corrosion inhibitor        | Continuous                      | 12/7                                    | 330                            | 304                            | 60                     | 98  | 166                               | -         |
| Chemtreat P8007L    | Metal precipitant          | Continuous                      | 12/7                                    | 40.6                           | 30.4                           | 8                      | 12.1  | 25.7                              | -         |
| Ferric chloride     | Coagulant                  | Continuous                      | 12/7                                    | 507                            | 456                            | 90                     | 0   | N/A                               | 3         |
| Chemtreat P817E     | Wastewater treatment       | Continuous                      | 12/7                                    | 35.5                           | 25.4                           | 5                      | 0   | N/A                               | 3         |
| Sodium bisulfite    | Dechlorination             | Continuous                      | 12/7                                    | 25.3                           | 15.2                           | 4                      | 7   | N/A                               | 2         |
| Chemtreat CT917     | Lime slurry conditioner    | Continuous                      | 12/7                                    | 20                             | 10                             | 2.9                    | 5.9   | 186                               | 3         |

*\*The use restriction values were calculated, unless otherwise noted, using the secondary chronic value and the available dilution in the receiving water (25% of the 7-Q<sub>10</sub> of 219 cfs) and the maximum annual average flow rate of 0.83 MGD.*

**Footnotes:**

1. Neutralized with sodium bisulfite.
2. Evaluation is not necessary for additives that have active ingredients consisting only of chlorine, caustic soda (sodium hydroxide), hypochlorite, sulfuric acid, hydrochloric acid.
3. Removed through filter press solids.
4. There is continuous pH monitoring at internal sampling points 101, 102, and 113. In accordance with NR 205.06 Wis. Adm. Code, effluent pH is allowed to vary outside of this range if the total time of excursions is no greater than 446 minutes per calendar month, no individual excursion is longer than 60 minutes, and no individual excursion goes outside the range of 4.0 – 11.0 s.u.
5. Calculation of a use restriction value is not necessary due to the intermittent usage of the additive.

Attachment #1

6. The use restriction value is the secondary acute value stated in the additive approval letter dated September 23, 2021.
7. Although the maximum effluent concentration exceeds the use restriction level, the additive is approved for use since it is used on an intermittent basis.

Attachment #2  
Site Map



### Temperature limits for receiving waters with unidirectional flow

(calculation using default ambient temperature data)

|                          |                             |     |
|--------------------------|-----------------------------|-----|
| <b>Facility:</b>         | WPL-Riverside Energy Center |     |
| <b>Outfall(s):</b>       | 001                         |     |
| <b>Date Prepared:</b>    | 5/14/2024                   |     |
| <b>Design Flow (Qe):</b> | 0.83                        | MGD |
| <b>Storm Sewer Dist.</b> | 0                           | ft  |

|                          |     |     |
|--------------------------|-----|-----|
| <b>7-Q<sub>10</sub>:</b> | 219 | cfs |
| <b>Dilution:</b>         | 25% |     |
| <b>f:</b>                | 0   |     |

**Stream type:** Small warm water sport or forage fish

**Qs:Qe ratio:** 42.6 :1

**Calculation Needed?:** NO

|                   |                   |
|-------------------|-------------------|
| <b>Temp Dates</b> | <b>Flow Dates</b> |
| 01/10/19          | 01/01/19          |
| 03/31/24          | 03/31/24          |

| Month | Water Quality Criteria |                     | Receiving Water Flow Rate (Qs) (cfs) | Representative Highest Effluent Flow Rate (Qe) |                                    |                                     | Representative Highest Monthly Effluent Temperature |                    | Calculated Effluent Limit               |  |
|-------|------------------------|---------------------|--------------------------------------|--|------------------------------------|-------------------------------------|---|--------------------|---|--|
|       | Ta (default) (°F)      | Sub-Lethal WQC (°F) |                                      | Acute WQC (°F)                                 | 7-day Rolling Average (Qesl) (MGD) | Daily Maximum Flow Rate (Qea) (MGD) | Weekly Average (°F)                                 | Daily Maximum (°F) | Weekly Average Effluent Limitation (°F) | Daily Maximum Effluent Limitation (°F) |
| JAN   | 33                     | 49                  | 76                                   | 0.934  | 1.348                              | 0                                   | 84  | 103                | -                                       | 120                                    |
| FEB   | 34                     | 50                  | 76                                   | 0.911  | 1.004                              | 0                                   | 112   | 117                | -                                       | 120                                    |
| MAR   | 38                     | 52                  | 77                                   | 0.997  | 1.117                              | 0                                   | 86  | 107                | -                                       | 120                                    |
| APR   | 48                     | 55                  | 79                                   | 0.982  | 1.249                              | 0                                   | 87  | 99                 | -                                       | 120                                    |
| MAY   | 58                     | 65                  | 82                                   | 1.081  | 1.429                              | 0                                   | 93  | 114                | -                                       | 120                                    |
| JUN   | 66                     | 76                  | 84                                   | 1.237  | 1.455                              | 0                                   | 83  | 88                 | -                                       | 120                                    |
| JUL   | 69                     | 81                  | 85                                   | 1.250  | 1.403                              | 0                                   | 86  | 88                 | -                                       | 120                                    |
| AUG   | 67                     | 81                  | 84                                   | 1.830  | 1.919                              | 0                                   | 88  | 94                 | -                                       | 120                                    |
| SEP   | 60                     | 73                  | 82                                   | 1.443  | 1.640                              | 0                                   | 83  | 87                 | -                                       | 120                                    |
| OCT   | 50                     | 61                  | 80                                   | 0.914  | 1.004                              | 0                                   | 83  | 87                 | -                                       | 120                                    |
| NOV   | 40                     | 49                  | 77                                   | 0.803  | 0.971                              | 0                                   | 80  | 89                 | -                                       | 120                                    |
| DEC   | 35                     | 49                  | 76                                   | 0.890  | 1.496                              | 0                                   | 83  | 115                | -                                       | 120                                    |