

Permit Fact Sheet

General Information

Permit Number:	WI-0042528-05-0
Permittee Name:	Birchwood Manufacturing Co
Address:	38 E Messenger St
City/State/Zip:	Rice Lake WI 54868
Discharge Location:	38 E. Messenger Street, Rice Lake, WI (mainly in NW¼ SE¼ of Section 21; T35N-R11W)
Receiving Water:	The Red Cedar River within the Brill and Red Cedar Rivers Watershed in the Lower Chippewa River Drainage Basin in Barron County
StreamFlow (Q _{7,10}):	84 cfs
Stream Classification:	Warmwater sport fish community, non-public water supply and within the ceded territory.
Wild Rice Impacts: <i>(no specific wild rice standards exist at this time)</i>	No impacts identified at this location. Wild rice habitat may be found upstream near the mouth of Rice Lake. (Evaluation completed March 2017)
Discharge Type:	Existing seasonal discharger

Facility Description

Birchwood Manufacturing Company produces hardwood veneer products. The facility generates log spraying wastewater from late April through October annually. Logs stacked onsite are sprayed as needed with water to maintain adequate moisture content required for veneer manufacturing.

The wastewater from the unpaved log yard flows across the unpaved ground to a collection tank. The tank is 5 feet wide by 12 feet long, and 2.5 feet deep containing baffles to aid in settling sediment. Water from the tank discharges to a gravel filled trench approximately 7 feet wide and 300 feet long before reaching a storm sewer at the southeast corner of the yard. This storm sewer ultimately discharges into the Red Cedar River. Most of the spray water is expected to enter the trench and infiltrate into the groundwater with little reaching the surface water. During rainfall events wastewater and storm water from the lot commingle prior to discharge to the storm sewer. Language is included in the permit which requires a Storm Water Pollution Prevention Plan to manage runoff from rain events.

Substantial Compliance Determination

All conditions and standard requirements of the permit are being met. No further action is required.

After a review of all Discharge Monitoring Reports and a site visit on 9/21/2022 by Carson Johnson, WDNR, Birchwood Manufacturing Co has been found to be in substantial compliance with their current permit.

Compliance determination entered by Carson Johnson, Wastewater Engineer on September 26, 2022.

Sample Point Designation		
Sample Point Number	Discharge Flow, Units, and Averaging Period	Sample Point Location, Waste Type/Sample Contents and Treatment Description (as applicable)
001	<ul style="list-style-type: none"> – Log spraying occurred over an average of 122 days per year. – Average flow rate is 26,000 gpd – Maximum flow rate 249,000 gpd (2019-2023 data) 	Representative samples shall be collected after all wastewater streams converge prior to discharge to the Red Cedar River. Samples shall be collected during or immediately after a log spraying event once spraying begins in April continuing through October or until spraying is discontinued for the season.

1 Surface Water - Monitoring and Limitations

Sample Point Number: 001- LOG SPRAYING DISCHARGE

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow Rate		MGD	Daily	Estimated	
BOD5, Total	Weekly Avg	40 mg/L	2/Month	Grab	
Suspended Solids, Total	Daily Max	40 mg/L	2/Month	Grab	
pH Field	Daily Max	9.0 su	2/Month	Grab	
pH Field	Daily Min	6.0 su	2/Month	Grab	
Phosphorus, Total		mg/L	2/Month	Grab	
Phosphorus, Total		lbs/day	Monthly	Calculated	See the "Tainter Lake and Lake Menomin Total Maximum Daily Load (TMDL)" section for more information.
Phosphorus, Total	Annual Total	4.5 lbs/yr	Annual	Calculated	Record the seasonal total. See the "Tainter Lake and Lake Menomin Total Maximum Daily Load (TMDL)" section for more information.

Changes from Previous Permit

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

Ammonia monitoring and limits are not required this permit term.

Explanation of Limits and Monitoring Requirements

Detailed information on limits can be found in the “Water Quality-Based Effluent Limitations for the Birchwood Manufacturing Company WPDES Permit No. WI-0042528-05”, and “Technology-Based Effluent Limitations for Birchwood Manufacturing Co WPDES Permit No. WI-0042528-05-0” memos dated March 29, 2024.

BOD5 and Total Suspended Solids – The limits are based on best professional judgment-based limits as described in subch. 3 of ch. NR 220, Wis. Adm. Code, and applied to industrial discharges.

pH – This is a technology-based effluent limit (TBEL) based on limit guidelines as described in s. NR 297.09 Wis. Adm. Code for wet storage of timber products.

Phosphorus – Phosphorus requirements are based on the Phosphorus Rules as detailed in NR 102 (water quality standards) and NR 217, Wis. Adm. Code (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 three types of limit calculations used to determine if a phosphorus limit is needed: a technology based effluent limit (TBEL), a water quality-based effluent limit (WQBEL) determined by stream criteria and a WQBEL based on a Total Daily Maximum Daily Load (TMDL) allocation.

In the case of Birchwood Manufacturing Co.:

- A TBEL of 1.0 mg/L is needed if a facility discharges more than the threshold of 60 pounds per month (s. NR 217.04(1) Wis. Adm. Code). The limit memo determined that the facility discharges less than the threshold; therefore, a TBEL is not applicable this permit term.
- Based on the size and classification of the stream, the categorical water quality criterion for the Red Cedar River is 75 ug/L. This criterion and instream background phosphorus data are used to calculate the stream criteria-based WQBELs. The calculated WQBEL is 133 mg/L (monthly average). *The TMDL (see next bullet) is more protective of the immediate receiving water therefore will be used to measure compliance.*
- The facility lies within the boundaries of the Tainter Lake and Lake Menomin total maximum daily load (TMDL) area. The TMDL was developed to address phosphorus water quality impairments. The Tainter Lake and Lake Menomin TMDL for total phosphorus was approved by the U.S. Environmental Protection Agency on September 14 2012. More information about the TMDL can be found at <https://dnr.wisconsin.gov/topic/TMDLs/TMDLReports.html>

Based on current criteria, the approved TMDL Waste Load Allocation (WLA) for Total Phosphorus is 4.5 lbs per year.

Calculation and reporting of the total mass of phosphorus discharged April through October each year is required to determine compliance with the WLA and to track progress in overall TMDL point source reductions. Record the total mass on the electronic Discharge Monitoring Report (eDMR) each October.

Calculations needed to determine compliance with the wasteload allocation are:

- *Total Daily Discharge (lbs/day)* = Daily concentration (mg/L) x total flow for the day (MG) x 8.34.
- *Total Monthly Discharge (lbs/month)* = monthly average concentration (mg/L) x total flow for the month (MG/month) x 8.34.
- *Total Annual Discharge (lbs/year)* = the sum of total monthly discharges from April through October.

Ammonia – Using ammonia toxicity criteria and limit calculating procedures found in NR 105 and 106, Wis. Adm. Code. Ammonia limitations were calculated for the facility and effluent ammonia limits. Based on a reasonable potential evaluation, limits are not needed this permit term because effluent concentrations are well below calculated limits. Ammonia monitoring results at the Birchwood operation are similar to those observed with log spray runoff at other veneer production facilities and are below limits of detection. Monitoring and limits are not required this permit term.

PFOS and PFOA – NR 106 Subchapter VIII – Permit Requirements for PFOS and PFOA Dischargers became effective on August 1, 2022. Pursuant to s. NR 106.98(3)(b), Wis. Adm. Code, the department evaluated the need for PFOS and PFOA monitoring taking into consideration the presence of potential PFOS or PFOA industrial wastes, remediation sites

and other potential sources of PFOS or PFOA. Based on information available at the time the proposed permit was drafted, the department has determined the permittee does not need to sample for PFOS or PFOA as part of this permit reissuance. 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.

Sampling frequency - The “[Monitoring Frequencies for Individual Wastewater Permits](#)” guidance document (April 12, 2021) recommends that standard monitoring frequencies be included in individual wastewater permits based on the size and type of the facility, in order to characterize effluent quality and variability, to detect events of noncompliance, and to ensure fairness and consistency in permits issued across the state. Guidance and requirements in administrative code were considered when determining the appropriate monitoring frequencies for pollutants that have final effluent limits in effect during this permit term. The department has determined at this time that the facility meets the guidance and no changes in the monitoring frequency is required this permit term.

2 Storm Water Discharges

The facility has maintained their stormwater system and water quality best management practices over the past permit term. Tier 1 Industrial Stormwater Requirements (NR 216 Wis. Adm. Code) continue to be included in the permit which incorporates implementation of a Storm Water Pollution Prevention Plan (SWPPP). An amended SWPPP shall be submitted as required in the compliance schedule by July 1, 2025 (see Schedule Section of this document). The SWPPP shall conform to the requirements specified in s. NR 216.27(3), Wis. Adm. Code.

3 Schedules

3.1 Updated Stormwater Pollution

Required Action	Due Date
Management Plan: Update the SWPPP plan in accordance with NR 216.27(3) to reflect the current conditions of the facility grounds.	07/01/2025

3.2 Annual Facility Site Compliance Inspection (AFSCI)

The AFSCI shall contain information from the annual and quarterly visual inspections.

Required Action	Due Date
Annual Report #1:	01/31/2025
Annual Report #2:	01/31/2026
Annual Report #3:	01/31/2027
Annual Report #4:	01/31/2028
Annual Report #5: Continue to submit annual reports until permit reissuance.	01/31/2029

Explanation of Schedules

The **Updated Stormwater Pollution Prevention Plan (SWPPP)** and **Annual Facility Site Compliance Inspection (AFSCI)** schedules are associated with Tier 1 Industrial Stormwater Requirements (NR 216 Wis. Adm. Code). These documents will be reviewed by storm water specialists.

Attachments:

“Water Quality-Based Effluent Limitations for the Birchwood Manufacturing Company WPDES Permit No. WI-0042528-05” memo dated March 29, 2024

“Technology-Based Effluent Limitations for Birchwood Manufacturing Co WPDES Permit No. WI-0042528-05-0” memo dated March 29, 2024

Expiration Date:

June 30, 2029

Justification Of Any Waivers From Permit Application Requirements

N/A – industrial discharger

Prepared By: Sheri A. Snowbank **Wastewater Specialist**

Date: April 4, 2024

Date updated based on Factcheck comments: No comments received (5/14/24)

Date updated based on public notice comments:

Notice of reissuance was published in the Rice Lake Chronotype, PO Box 30, Rice Lake, WI 54868-0030.

DATE: March 29, 2024

TO: Sheri Snowbank – NOR/Spooner Service Center

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

SUBJECT: Water Quality-Based Effluent Limitations for the Birchwood Manufacturing Co
WPDES Permit No. WI-0042528-05-0

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 Birchwood Manufacturing Co in Barron County. This secondary industrial facility discharges to the Red Cedar River, located in the Brill and Red Cedar Rivers Watershed in the Lower Chippewa River Basin. This discharge is included in the Tainter Lake/Lake Menomin total maximum daily load report 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	Annual Total	Footnotes
Flow Rate					1
BOD ₅			40 mg/L		1, 2
TSS	40 mg/L				1, 2
pH	9.0 s.u.	6.0 s.u.			1, 3
Phosphorus				4.5 lbs/yr	1, 4

Footnotes:

1. No changes from the current permit.
2. These are best professional judgment-based limits as described in subch. 3 of ch. NR 220, Wis. Adm. Code, and given to industrial discharges.
3. These are technology-based effluent limits (TBELs) based on effluent limits guidelines as described in s. NR 297.09 Wis. Adm. Code for the wet storage of timber products. Additional narrative limit: Debris may not be discharged. These limits are addressed in a separate TBEL evaluation.
4. The phosphorus mass limit is based on the Tainter Lake/Lake Menomin total maximum daily load report (TL/LM TMDL) to address phosphorus water quality impairments within the TMDL area.

No WET testing is required because information related to the discharge indicates low to no risk for toxicity. Additional limits to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Codes, are not required due to the non-continuous nature of the discharge.

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

Attachments (2) – Narrative & discharge area map.

PREPARED BY: Michael A. Polkinghorn – Water Resources Engineer

E-cc: Carson Johnson, Wastewater Engineer – NOR/Spooner Service Center
Michelle BalkLudwig, Regional Wastewater Supervisor – NOR/Spooner Service Center
Diane Figiel, Water Resources Engineer – WY/3
Nathaniel Willis, Wastewater Engineer – WY/3

**Water Quality-Based Effluent Limitations for
Birchwood Manufacturing Co**

WPDES Permit No. WI-0042528-05-0

Prepared by: Michael A. Polkinghorn

PART 1 – BACKGROUND INFORMATION

Facility Description

Birchwood Manufacturing Company produces hardwood veneer products. The facility generates log spraying wastewater during April – October each year to keep the logs from drying out and checking. Log wash wastewater that does not evaporate or infiltrate from the unpaved outside log yard discharges across the unpaved ground to a collection tank, 5 ft wide by 12 ft long, and 2.5 ft deep that contains baffles to aid in settling sediment. Water from the tank discharges to a gravel filled trench approx. 7 ft wide and 300 ft long before reaching a storm sewer at the southeast corner of the yard. The storm sewer travels for approx. 1,000 ft before discharge via Outfall 001 to the north bank of the Red Cedar River. Most of the spray water is expected to enter the trench and infiltrate into the groundwater with little reaching the surface water. During rainfall events wastewater and storm water from the lot commingle prior to discharge to the storm sewer. Language is included in the permit which requires a Storm Water Pollution Prevention Plan to manage runoff from rain events.

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

Existing Permit Limitations

The current permit, expired on 12/31/2023, includes the following effluent limitations and monitoring requirements.

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Annual Total	Footnotes
Flow Rate					1
BOD ₅			40 mg/L		2, 3
TSS	40 mg/L				2, 3
pH	9.0 s.u.	6.0 s.u.			4
Phosphorus				4.5 lbs/yr	5
Ammonia Nitrogen					1

Footnotes:

1. Monitoring only.
2. These are best professional judgment-based limits as described in subch. 3 of ch. NR 220, Wis. Adm. Code, and given to industrial discharges.
3. These limitations are not being evaluated as part of this review. Because the water quality criteria, reference effluent flow rates, and receiving water characteristics have not changed, limitations for these water quality characteristics do not need to be re-evaluated at this time.

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4. These are technology-based effluent limits (TBELs) based on effluent limits guidelines as described in s. NR 297.09 Wis. Adm. Code for the wet storage of timber products. Additional narrative limit: Debris may not be discharged. These limits are addressed in a separate TBEL evaluation.
5. The phosphorus mass limit is based on the Tainter Lake/Lake Menomin total maximum daily load report (TL/LM TMDL) to address phosphorus water quality impairments within the TMDL area.

Receiving Water Information

- Name: Red Cedar River
- Waterbody Identification Code (WBIC): 2063500
- 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-Q₁₀ and 7-Q₂ values are from USGS for SE ¼ NE ¼ Section 29; T35N – R11W, approx. 1.4 mi downstream of Outfall 001.
 - 7-Q₁₀ = 84 cubic feet per second (cfs)
 - 7-Q₂ = 130 cfs
 - Harmonic Mean Flow = 181 cfs using a drainage area of 387 mi²The Harmonic Mean has been estimated based on average flow and the 7-Q₁₀ using an equation from U.S. EPA's *Technical Support Document for Water Quality-Based Toxics Control* (March 1991, EPA/505/2-90-001, pgs. 88-89).
- Hardness = 78 mg/L as CaCO₃. This value represents the geometric mean of data (n = 5, December 2015 – August 2019) from whole effluent toxicity test data from the City of Rice Lake – Utilities discharge.
- % of low flow used to calculate limits in accordance with s. NR 106.06(4)(c)5., Wis. Adm. Code: 25% .
- Source of background concentration data: Chloride data for the Red Cedar River are 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 phosphorus is described later in this evaluation.
- Multiple dischargers: The City of Rice Lake – Utilities discharges to the Red Cedar River approx. 1.4 mi downstream of Birchwood Manufacturing. This discharge is not in the immediate vicinity and the mixing zones do not overlap. Therefore, it does not impact this evaluation.
- Impaired water status: Rice Lake near Outfall 001 is on the Clean Water Act (CWA) Section 303(d) list for a phosphorus impairment. The Red Cedar River is not impaired at Outfall 001 but at approx. 9.0 mi downstream is on the CWA Section 303(d) list for phosphorus and mercury impairments. Outfall 001 is included in the TL/LM TMDL to address phosphorus impairments within the TMDL area.

Effluent Information

- Flow rate(s):
 - Maximum annual average = 0.0425 million gallons per day (MGD)This flow rate accounts for the seasonal nature of the discharge and excludes days discharge did not occur. For reference, the actual average flow from April 2019 – October 2023 was 0.0261 MGD

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excluding days discharge did not occur. This flow becomes 0.00978 MGD when days of no discharge are included in the average.

- Hardness = 143 mg/L as CaCO₃. This value represents the geometric mean of data (n = 2, July 2023) from 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: City of Rice Lake municipal supply and one private well.
- Total phosphorus wasteload allocation (WLA): 4.5 lbs/year = 0.012 lbs/day (see Table 5 of the TMDL report document, “*Phosphorus Total Maximum Daily Loads (TMDLs) Tainter Lake and Lake Menomin Dunn County, Wisconsin, May 2012*, page 15”).
- Additives: None.
- Effluent characterization: This facility is categorized as a secondary industry, so the permit application required effluent sample analyses for a limited number of common pollutants, as specified in s. NR 200.065, Table 1, Wis. Adm. Code, primarily metal substances plus chloride and hardness. The current permit required monitoring for ammonia nitrogen.
- 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	Conc. (µg/L)
07/05/2023	<3
07/07/2023	<3
07/10/2023	<3
Mean	<3

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

The following table presents the average concentrations and loadings at Outfall 001 from April 2019 – October 2023 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*
BOD ₅	3 mg/L	
TSS	2 mg/L	
pH field	7.6 s.u.	
Phosphorus		0.031 lbs/day

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

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

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

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

Acute Limits based on 1-Q₁₀

Daily maximum effluent limitations for toxic substances are based on the acute toxicity criteria (ATC), listed in ch. NR 105, Wis. Adm. Code. Previously daily maximum limits for toxic substances were calculated as two times the ATC. However, changes to ch. NR 106, Wis. Code, (September 1, 2016) require the Department to calculate acute limitations using the same mass balance equation as used for other limits along with the 1-Q₁₀ receiving water low flow to determine if more restrictive effluent limitations are needed to protect the receiving stream from discharges which may cause or contribute to an exceedance of the acute water quality standards. The mass balance equation is provided below.

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

Where:

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

Q_s = average minimum 1-day flow which occurs once in 10 years (1-day Q₁₀)
 if the 1-day Q₁₀ flow data is not available = 80% of the average minimum 7-day flow which occurs once in 10 years (7-day Q₁₀).

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

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

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

If the receiving water is effluent dominated under low stream flow conditions, the 1-Q₁₀ method of limit calculation produces the most stringent daily maximum limitations and should be used while making reasonable potential determinations. This is not the case for Birchwood Manufacturing and the limits are set based on two times the ATC.

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

Daily Maximum Limits based on Acute Toxicity Criteria (ATC)

RECEIVING WATER FLOW = 67 cfs, (1-Q₁₀ (estimated as 80% of 7-Q₁₀)), as specified in s. NR 106.06(3)(bm), Wis. Adm. Code.

SUBSTANCE	REF. HARD. mg/L	ATC	MAX. EFFL. LIMIT*	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	1-day MAX. CONC.
Arsenic		340	680	135.9	<1.0	<1.0
Cadmium	143	15.6	31.2	6.2	<2	<2
Chromium	143	2,423	4,845	969	<3	<3

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SUBSTANCE	REF. HARD. mg/L	ATC	MAX. EFFL. LIMIT*	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	1-day MAX. CONC.
Copper	143	21.8	43.6	8.7	<3	<3
Lead	143	152	303	60.6	<1	<1
Nickel	143	637	1,273	255	<8	<8
Zinc	143	165	330	66.0	<8	<8
Chloride (mg/L)		757	1,514	303	27	27

* The 2 × ATC method of limit calculation yields a more restrictive limit than consideration of ambient concentrations and 1-Q₁₀ flow rates per the changes to s. NR 106.07(3), Wis. Adm. Code, effective 09/01/2016.

Weekly Average Limits based on Chronic Toxicity Criteria (CTC)

RECEIVING WATER FLOW = 21 cfs (¼ of the 7-Q₁₀), as specified in s. NR 106.06(4)(c), Wis. Adm. Code

SUBSTANCE	REF. HARD.* mg/L	CTC	MEAN BACK-GRD.	WEEKLY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Arsenic		152.2		48,740	9,748	<1.0
Cadmium	78	2.03		650	130	<2
Chromium	78	108.21		34,653	6,931	<3
Copper	78	8.40		2,690	538	<3
Lead	78	22.13		7,087	1,417	<1
Nickel	78	42.47		13,600	2,720	<8
Zinc	78	97.27		31,149	6,230	<8
Chloride (mg/L)		395	6.4	124,450	24,890	27

* 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)

The effluent characterization did not include any effluent sampling results for substances for which Wildlife Criteria exist.

Monthly Average Limits based on Human Threshold Criteria (HTC)

RECEIVING WATER FLOW = 45 cfs (¼ of Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

SUBSTANCE	HTC	MEAN BACK-GRD.	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Cadmium	370		254,763	50,953	<2
Chromium	3,818,000		2,628,879,217	525,775,843	<3
Lead	140		96,397	19,279	<1
Nickel	43,000		29,607,597	5,921,519	<8

Monthly Average Limits based on Human Cancer Criteria (HCC)

RECEIVING WATER FLOW = 45 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.
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Arsenic	13.3	9,158	1,832	<1.0
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In addition to evaluating the need for limits for each individual substance for which HCC exist, s. NR 106.06(8), Wis. Adm. Code, requires the evaluation of the cumulative cancer risk. Because no effluent limits are needed based on HCC, determination of the cumulative cancer risk is not needed per s. NR 106.06(8), Wis. Adm. Code.

Conclusions and Recommendations

Based on a comparison of the effluent data and calculated effluent limitations, **effluent limitations are not recommended for any toxic substances.** Monitoring recommendations are made in the paragraph(s) below:

PFOS and PFOA – The need for PFOS and PFOA monitoring is evaluated in accordance with s. NR 106.98(2), Wis. Adm. Code. Previous monitoring produced a PFOS result of 0.170 ng/L and a PFOA result of <0.178 ng/L. These results are less than one fifth of the respective criteria for each substance. Based on the type of discharge, the available PFOS/PFOA monitoring data, and the lack of PFOS/PFOA in the source water, **PFOS and PFOA monitoring is not recommended during the reissued permit term.** 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 ammonia nitrogen in ch. NR 105, Wis. Adm. Code, effective March 1, 2004 which includes criteria based on both acute and chronic toxicity to aquatic life. Given the fact that Birchwood Manufacturing does not currently have ammonia nitrogen limits, the need for limits is evaluated at this time. The table below shows the results of effluent ammonia nitrogen sampling at Outfall 001 during June 2018 – September 2022

Ammonia Nitrogen Effluent Data

Sample Date	Conc. (mg/L)
04/29/2019	0.2
07/23/2019	0.2
10/01/2019	<0.1
05/20/2020	<0.1
08/19/2020	<0.1
05/05/2021	<0.1
07/14/2021	<0.5
10/06/2021	<0.1
06/08/2022	0.1
09/21/2022	0.1
06/07/2023	<0.1
07/19/2023	<0.1
Mean*	<0.1

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

Based on this effluent data, there is no reasonable potential for the discharge to exceed the most stringent ammonia nitrogen limits that would be calculated. **Therefore, ammonia nitrogen limits or monitoring are not recommended during the reissued permit term.**

PART 4 – PHOSPHORUS

Technology-Based Effluent Limit

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

Because Goodman V&L does not currently have an existing technology-based limit, the need for this limit in the reissued permit is evaluated. The maximum effluent phosphorus sample from the current permit term is 0.9 mg/L (08/06/2019). The maximum effluent flow from the current permit term for Outfall 001 is 0.249 MGD (06/05/2020). Assuming this concentration and flow occurs daily for 1 month, the estimated maximum monthly mass phosphorus discharge for Outfall 001 is $0.9 \text{ mg/L} \times 0.249 \text{ MGD} \times 8.34 \times 30 \text{ days/month} = 56 \text{ lbs/month}$. Assuming this maximum monthly mass phosphorus discharge for 1 year demonstrates that the annual monthly average phosphorus loading is less than the 60 lbs/month threshold in accordance with s. NR 217.04(1)(a)2, Wis. Adm. Code. **Therefore a technology-based limit is not recommended during the reissued permit term.** In addition, the need for a QWBEL for phosphorus must be considered.

Water Quality-Based Effluent Limits (QWBEL)

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

The TL/LM TMDL report was written to ensure that phosphorus water quality criteria are attained in Tainter Lake and Lake Menomin and are not necessarily protective of phosphorus water quality of other surface waterbodies in the TMDL area. Therefore, the need for a phosphorus QWBEL as described in s. NR 217.13, Wis. Adm. Code, must be considered in addition to any limits required by the TMDL report.

Section NR 102.06(3)(a), Wis. Adm. Code, specifically names river segments for which a phosphorus criterion of 0.100 mg/L applies. For other stream segments that are not specified in s. NR 102.06(3)(a), Wis. Adm. Code, s. NR 102.06(3)(b), Wis. Adm. Code, specifies a phosphorus criterion of 0.075 mg/L. The phosphorus criterion of 0.100 mg/L applies for the Red Cedar River as described in s. NR 102.06(3)(a)34, Wis. Adm. Code.

The conservation of mass equation is described in s. NR 217.13(2)(a), Wis. Adm. Code, for phosphorus QWBELs and includes variables of water quality criterion (WQC), receiving water flow rate (Qs), effluent flow rate (Qe), and upstream phosphorus concentrations (Cs) provided below.

$$\text{Limitation} = [(WQC)(Qs + (1-f) Qe) - (Qs - f Qe) (Cs)] / Qe$$

Where:

Attachment #1

WQC = 0.100 mg/L for Red Cedar River.

Qs = 100% of the 7-Q₂ of 130 cfs.

Cs = background concentration of phosphorus in the receiving water pursuant to s. NR 217.13(2)(d), Wis. Adm. Code

Qe = effluent flow rate = 0.0425 MGD = 0.0658 cfs.

f = the fraction of effluent withdrawn from the receiving water = 0.

Section NR 217.13(2)(d), Wis. Adm. Code, specifies that the background phosphorus concentration used in the limit calculation formula shall be calculated as a median using the procedures specified in s. NR 102.07(1)(b) to (c), Wis. Code. All representative data from the most recent 5 years shall be used, but data from the most recent 10 years may be used if representative of current conditions.

The previous evaluation resulted in a WQBEL of 141 mg/L using a background concentration of 0.0503 mg/L. Section NR 217.13(2)(d), Wis. Adm. Code, states that the determination of upstream concentrations shall be evaluated at each permit reissuance. Additional data were considered in estimating the background phosphorus concentration.

A review of all available in stream total phosphorus data stored in the Surface Water Integrated Monitoring System database indicates updated data is available for the Red Cedar River at the CTH M crossing, approx. 3.2 mi upstream of Outfall 001. Therefore, its background phosphorus data will be used. The median background total phosphorus concentration in the Red Cedar River at the CTH M crossing (n = 15, June 2017 – October 2018, SWIMS ID: 033235) is 0.0327 mg/L.

Substituting a median value of 0.0327 mg/L into the limit calculation equation above, the calculated limit is 133 mg/L.

Effluent Data

The following table summarizes effluent total phosphorus monitoring data from April 2019 – October 2023.

Total Phosphorus Effluent Data

Statistics	Conc. (mg/L)
1-day P ₉₉	0.84
4-day P ₉₉	0.50
30-day P ₉₉	0.31
Mean	0.22
Std	0.17
Sample size	47
Range	<0.05 - 0.9

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

Reasonable Potential Determination

The discharge does not have reasonable potential to cause or contribute to an exceedance of the water quality criterion because the 30-day P₉₉ of reported effluent total phosphorus data is less than the calculated WQBEL. **Therefore, a phosphorus WQBEL is not recommended during the reissued permit term.**

TMDL Limit

The TL/LM TMDL expresses WLAs for TP as maximum annual loads (pounds per year) and maximum daily loads (pounds per day), which equal the maximum annual loads divided by the number of days in the year. For Birchwood Manufacturing, these phosphorus WLAs are 4.5 lbs/yr and 0.012 lbs/day.

For the reasons explained in the April 30, 2012 paper entitled *Justification for Use of Monthly, Growing Season and Annual Average Periods for Expression of WPDES Permit Limits for Phosphorus Discharges in Wisconsin*, WDNR has determined that the phosphorus WQBELs set equal to WLAs would not be consistent with the assumptions and requirements of the TMDL. Therefore, limits given to facilities included in the TL/LM TMDL are given monthly average mass limits since the TL/LM TMDL WLAs are derived on an effluent concentration of 1 mg/L or greater. The exception is for noncontinuous dischargers the WLA may be expressed directly as an annual total. Because Birchwood Manufacturing is a noncontinuous discharger, phosphorus limits will be set equal to the WLA as a maximum annual total during time periods when the discharge occurs. **Therefore, the annual total limit of 4.5 lbs/yr is recommended to continue during the reissued permit term.**

The table below shows the reported annual mass phosphorus totals during the current permit term on a calendar year basis for informational purposes:

Mass Phosphorus Effluent Data

Calendar Year	Annual Total (lbs/yr)
2019	1.1
2020	3.6
2021	5.2
2022	5.0
2023	11.3

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.

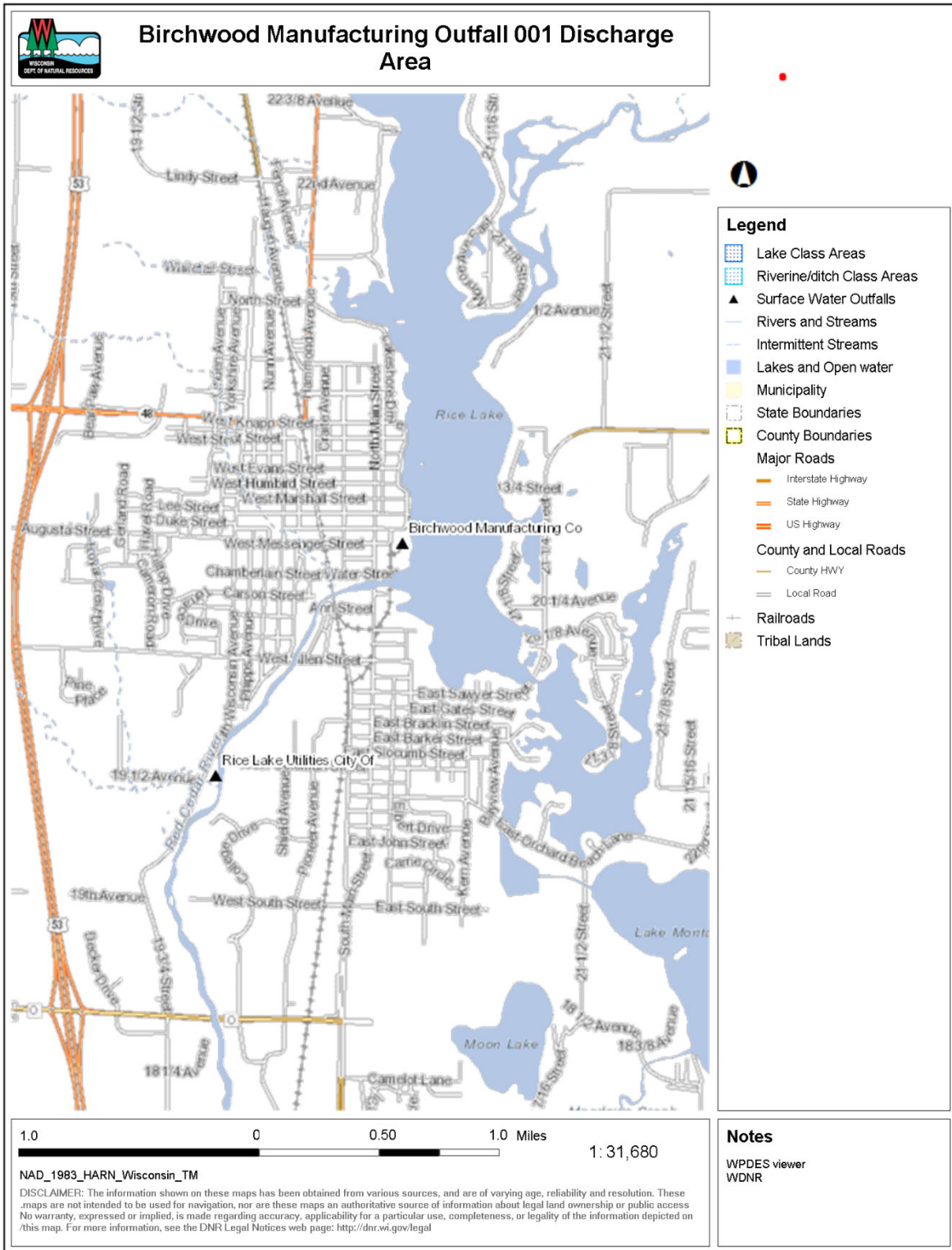
Due to the amount of upstream flow available for dilution in the limit calculation ($Q_s:Q_e > 20:1$), the lowest calculated limitation is 120° F as a daily maximum as described in s. NR 106.55(6)(a), Wis. Adm. Code. Effluent temperature data is not available for Birchwood Manufacturing but available data from Columbia Forest Products shows the maximum temperature sample was 78 °F during July 2017.

Therefore, temperature limits are not recommended during the reissued permit term. Although it is not likely Outfall 001 will exceed 120 °F given a discharge of stormwater and log wash wastewater, updated effluent temperature data specific to the facility is desired to properly determine reasonable potential. Because the maximum temperature is likely to occur during July, **one effluent temperature sample from Outfall 001 is recommended for the permit application of the next permit reissuance.**

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)*.

Outfall 001 is comprised of log spray wastewater and stormwater. The discharge does not have a history of WET failures, no additives are used, and toxic compounds are not expected at levels of concern. Since there is believed to be a very low risk of toxicity, **WET testing is not recommended during the reissued permit term.**



DATE: March 29, 2024

TO: Sheri Snowbank – NOR/Spooner Service Center

FROM: Michael Polkinghorn – NOR/Rhineland Service Center

*Michael Polkinghorn*SUBJECT: Technology-Based Effluent Limitations for Birchwood Manufacturing Co
WPDES Permit No. WI-0042528-05-0

This is in response to your request for an evaluation of the need for technology-based effluent limitations (TBELs) using Chapters NR 220 and NR 297 of the Wisconsin Administrative Code (where applicable), for the discharge from Birchwood Manufacturing Co in Barron County. This secondary industrial facility discharges to the Red Cedar River, located in the Brill and Red Cedar Rivers Watershed in the Lower Chippewa River Basin. This discharge is included in the Tainter Lake/Lake Menomin total maximum daily load report as approved by EPA.

Facility Description

Birchwood Manufacturing Company produces hardwood veneer products. The facility generates log spraying wastewater during April – October each year to keep the logs from drying out and checking. Log wash wastewater that does not evaporate or infiltrate from the unpaved outside log yard discharges across the unpaved ground to a collection tank, 5 ft wide by 12 ft long, and 2.5 ft deep that contains baffles to aid in settling sediment. Water from the tank discharges to a gravel filled trench approx. 7 ft wide and 300 ft long before reaching a storm sewer at the southeast corner of the yard. The storm sewer travels for approx. 1,000 ft before discharge via Outfall 001 to the north bank of the Red Cedar River. Most of the spray water is expected to enter the trench and infiltrate into the groundwater with little reaching the surface water. During rainfall events wastewater and storm water from the lot commingle prior to discharge to the storm sewer. Language is included in the permit which requires a Storm Water Pollution Prevention Plan to manage runoff from rain events.

Existing Permit Limitations

The current permit, expired on 12/31/2023, includes the following effluent limitations and monitoring requirements.

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Annual Total	Footnotes
Flow Rate					1
BOD ₅			40 mg/L		2, 3
TSS	40 mg/L				2, 3
pH	9.0 s.u.	6.0 s.u.			4
Phosphorus				4.5 lbs/yr	5
Ammonia Nitrogen					1

Footnotes:

1. Monitoring only.
2. These are best professional judgment-based limits as described in subch. 3 of ch. NR 220, Wis. Adm. Code, and given to industrial discharges.

3. These limitations are not being evaluated as part of this review. Because the water quality criteria, reference effluent flow rates, and receiving water characteristics have not changed, limitations for these water quality characteristics do not need to be re-evaluated at this time.
4. These are technology-based effluent limits (TBELs) based on effluent limits guidelines as described in s. NR 297.09 Wis. Adm. Code for the wet storage of timber products. Additional narrative limit: Debris may not be discharged.
5. The phosphorus mass limit is based on the Tainter Lake/Lake Menomin total maximum daily load report (TL/LM TMDL) to address phosphorus water quality impairments within the TMDL area.

Industrial Category

Chapter NR 297, Wis. Adm. Code specifies effluent limit guidelines for any point source discharges of wastewater generated from the processing of timber products. Birchwood Manufacturing has historically discharged timber process wastewater generated from spraying water on stored logs with the intention of maintaining their moisture content before further processing. This practice was brought into compliance from previous evaluations using the effluent limit guidelines in the wet storage timber processing category as described in s. NR 297.09, Wis. Adm. Code. The facility has stated in the permit application their process has not changed during the current permit term nor do they plan on altering the current process or adding additional processes to generate additional process wastewater in the reissued permit term. Therefore, the discharge from the wet storage of timber at CFP would continue to be applicable under the “Wet Storage Subcategory” of Subchapter IX of ch. NR 297, Wis. Adm. Code. The permittee must meet the applicable effluent limit guidelines as described in this subchapter. These effluent limit guidelines include:

- Effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT) in s. NR 297.091, Wis. Adm. Code.
- Effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT) in s. NR 297.092, Wis. Adm. Code.
- If determined to be a new source, new source performance standards (NSPS) in s. NR 297.093, Wis. Adm. Code.

Chapter NR 297, Wis. Adm. Code is based on federal effluent guidelines in 40 CFR Part 429 Subpart I. Section NR 220.13, Wis. Adm. Code, includes provisions that address cases where federal and state rule differ. Wisconsin statutes at s. 283.11, Wis. Stats., address compliance with federal standards. In this case, the state rules are consistent with federal rules with a few exceptions. In such cases, the permit will in all cases be based on the state rule regardless of the federal regulations. The omissions are described below.

New Source Determination

Regarding NSPS, the state defines the new source date as October 31, 1979 in s. NR 297.003(9), Wis. Adm. Code. However, the new source date for direct dischargers is January 26, 1981 based the Boornazian memo (September 28, 2006) which specifies new source dates for federal effluent limit guidelines. The Department relies on the Boornazian memo to establish date of applicability for NSPS when it is not specified in the state or federal rules or if state rules differ. This date does not need to be determined at this time because the applicable TBELs for the “Wet Storage Category” are the same regardless of if Birchwood Manufacturing is a new or existing source. Therefore, at least BPT and BAT

standards, for the “Wet Storage Subcategory” are applicable as specified in Subchapter IX of ch. NR 297, Wis. Adm. Code.

Wet Storage Subcategory: BPT, BAT, and NSPS (ss. NR 297.091, NR 297.092 and NR 297.093, Wis. Adm. Code):

BPT, BAT, NSPS standards are the same. These standards state that any discharge of pollutants to waters of the state from a wet storage facility shall achieve the following:

- Debris may not be discharged, and the pH shall be within the range of 6.0 to 9.0.

Recommended Final TBELs

Numeric TBELs Recommended for Outfall 001

Parameter	Daily Maximum	Daily Minimum	Monthly Average
pH	9.0 s.u.	6.0 s.u.	-

Narrative TBELs Recommended for Outfall 001

- There shall be no debris* discharged.

*The term “debris” means woody material such as bark, twigs, branches, heartwood or sapwood that will not pass through a 2.54 cm (1.0 in) diameter round opening and is present in the discharge from a wet storage facility as defined in s. NR 297.003(3), Wis. Adm. Code.

Conclusion

The Department has determined that TBEL limits are the same as those limits calculated in the previous permit. **Therefore, numeric and narrative limits and monitoring are recommended to remain the same and continue during the reissued permit term.** These limits are recommended in addition to any limits determined in the WQBEL evaluation dated March 2024.

