### Permit Fact Sheet

### **General Information**

Permit Number	WI-0003107-09-0
Permittee Name	Actus Nutrition - Boscobel
and Address	Boscobel WI 53805
Permitted Facility	Milk Specialties Co, Inc - Boscobel
Name and Address	6128 Borden Road, Boscobel, WI 53805
Permit Term	July 01, 2025 to June 30, 2030
Discharge Location	SW 1/4 of SE 1/4 of section 33, T8N - R3W, in Grant County
Receiving Water	Crooked Creek of the Lower Wisconsin River Basin (Green River and Crooked Creek
	Watershed) in Grant County and groundwater through land spreading.
Stream Flow (Q <sub>7,10</sub> )	6.3 cfs
Stream	Warm water sport fish community (default), non-public water supply
Classification	
Discharge Type	Existing, continuous

# **Facility Description**

Actus Nutrition – Boscobel, formally Milk Specialties Co, Inc., produces animal food products from whey and whey protein concentrate, cheese, animal fat, and other protein sources. Wastewater from the production facility, primarily from cleaning operations, is treated at the onsite wastewater treatment plant (WWTP). Non-contact cooling water (NCCW) is also generated onsite and is discharged with the WWTP effluent to Crooked Creek through Outfall 001. Processing activities include spray drying, cooling, blending, and bagging. The spray drying operation (Filtermat Dryer) generates the majority of the wastewater. The blending operation (Agglomerator) is primarily dry-cleaned and washed down once or twice per month. Generated wastewater consists of water removed from the raw materials, rinses from clean in place (CIP) operations, and other wash waters.

The process wastewater is pumped into an EQ tank and periodically diverted to a high strength waste tank. From the EQ tank, the wastewater is pumped to a dissolved air flotation (DAF) unit before entering a distribution well that flows equally to two aeration tanks. After aeration, the wastewater is sent to the first final clarifier. Chemical addition, for phosphorus removal, is added before and after the first clarifier. From there, the wastewater goes to a second clarifier for further settling. After clarification, the wastewater gets polished by two sand filters and is then mixed with the NCCW prior to being discharged from Outfall 001. Solids generated in the two clarifiers is pumped to the DAF unit are stored onsite in the sludge storage tank before being land applied on department approved site through Outfall 002. Sanitary wastes discharged to an onsite septic tank system are not covered by this permit.

# **Substantial Compliance Determination**

#### **Enforcement During Last Permit:**

The facility has completed or is in the process of completing all previously required actions as part of the enforcement process.

• A Notice of Noncompliance was issued during the current permit term in response to alleged Landspreading Exceedances of Total Nitrogen. Follow-up with the industry occurred.

- A Notice of Noncompliance was issued during the current permit term in response to alleged violation of the requirement to notify the department of changes to the land application management plan prior to being implemented updated. Follow-up with the industry occurred.
- After a desk top review of all discharge monitoring reports, land application reports, compliance schedule items, and a site visit on January 23, 2025, this facility has been found to be in substantial compliance with their current permit.

Compliance determination made by Caitlin O'Connell, Wastewater Engineer, on February 3, 2025.

## **Sample Point Descriptions**

	Sample Point Designation					
Sample Point Number	Discharge Flow, Units, and Averaging Period	Sample Point Location, Waste Type/Sample Contents and Treatment Description (as applicable)				
701	N/A, influent.	[INFLUENT] Prior to treatment. 24-hr. flow proportional composite samples shall be taken in the intake located in the wet well.				
001	<ul> <li>0.449 MGD daily maximum on 10/23/2020 listed in the permit application.</li> <li>0.115 MGD maximum annual average from 05/08/2020- 05/08/2021 listed in the permit application.</li> </ul>	[EFFLUENT] 24-Hr flow proportional composite sampler intake located in the Manning building a half mile west of Borden Road, after the wastewater treatment system effluent is combined with the non-contact cooling water, prior to discharge to Crooked Creek. Representative grab samples collected from the same sample location. Flow meter also located in the Manning building.				
002	188 dry tons as an annual average from 2019-2023.	[INDUSTRIAL LIQUID SLUDGE] Representative grab samples of industrial liquid sludge that are accumulated from the wastewater treatment plant's DAF unit and are collected prior to land application at the 36,000-gallon sludge storage tank. Monitoring is only required when land application occurs.				
003	N/A Reactivated Outfall	[INDUSTRIAL LIQUID WASTE] Representative grab samples of industrial liquid waste that are accumulated from the wastewater treatment plant's high strength wastewater tank and are collected prior to land application. Monitoring is only required when land application occurs.				
005	N/A New Outfall	[INDUSTRIAL LIQUID SLUDGE] Representative grab samples of industrial liquid sludge that are accumulated from the wastewater treatment plant's final clarifiers and are collected prior to land application. Monitoring is only required when land application occurs.				
006	N/A New Outfall	[INDUSTRIAL LIQUID WASTE] Representative grab samples of industrial liquid waste that are accumulated from the wastewater treatment plant's equalization tank and are collected prior to land application. Monitoring is only required when land application occurs.				

# **Permit Requirements**

# **1** Influent – Monitoring Requirements

# 1.1 Sample Point Number: 701- PRIOR TO TREATMENT

Monitoring Requirements and Effluent Limitations						
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes	
Flow Rate		MGD	Daily	Continuous		
BOD5, Total		mg/L	3/Week	24-Hr Flow Prop Comp		
pH Field (Maximum)		su	Daily	Grab		
pH Field (Minimum)		su	Daily	Grab		
Suspended Solids, Total		mg/L	3/Week	24-Hr Flow Prop Comp		

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

None

# 2 Surface Water - Monitoring and Limitations

### 2.1 Sample Point Number: 001- SURFACE WATER

Monitoring Requirements and Effluent Limitations						
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes	
Flow Rate		MGD	Daily	Continuous		
BOD5, Total		mg/L	3/Week	24-Hr Flow Prop Comp		
BOD5, Total	Daily Max	89 lbs/day	3/Week	Calculated		
BOD5, Total	Monthly Avg	36 lbs/day	3/Week	Calculated		
Suspended Solids, Total		mg/L	3/Week	24-Hr Flow Prop Comp		
Suspended Solids, Total	Daily Max	133 lbs/day	3/Week	Calculated		

Monitoring Requirements and Effluent Limitations								
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes			
Suspended Solids, Total	Monthly Avg	53 lbs/day	3/Week	Calculated				
pH Field	Daily Max	9.0 su	Daily	Grab				
pH Field	Daily Min	6.0 su	Daily	Grab				
Phosphorus, Total	Monthly Avg	0.57 mg/L	3/Week	24-Hr Flow Prop Comp				
Phosphorus, Total	Monthly Avg	1.75 lbs/day	3/Week	Calculated				
Chlorine	Daily Max	38 ug/L	Daily	Grab	Samples are required only during days chlorination occurs.			
Chlorine	Monthly Avg	38 ug/L	Daily	Calculated	Calculations are required only for days chlorination occurs.			
Nitrogen, Ammonia (NH <sub>3</sub> -N) Total		mg/L	Monthly	24-Hr Flow Prop Comp				
Nitrogen, Total		mg/L	Quarterly	Calculated	Total Nitrogen shall be calculated as the sum of reported values for Total Kjeldahl Nitrogen and Total Nitrite + Nitrate Nitrogen.			
Nitrogen, Total Kjeldahl		mg/L	Quarterly	24-Hr Flow Prop Comp				
Nitrogen, Nitrite + Nitrate Total		mg/L	Quarterly	24-Hr Flow Prop Comp				
Chloride		mg/L	Quarterly	24-Hr Flow Prop Comp				
Temperature, Maximum			Daily	Continuous				
Acute WET		rTUa	See Listed Quarters in permit.	24-Hr Flow Prop Comp				
Chronic WET		rTUc	See Listed Quarters in permit.	24-Hr Flow Prop Comp				

# 2.1.1 Changes from Previous Permit

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

- BOD5, TSS, and phosphorus –Monitoring has been updated to 3/Week.
- Flow Rate –Sample Type has been updated to continuous.
- **pH** -Monitoring has been updated to daily.
- Nitrogen Series -Quarterly monitoring has been added.
- Chloride -Sample Type has been updated to 24-hour flow proportionate composite samples.
- Chlorine- Monitoring and limits have been added.

### 2.1.2 Explanation of Limits and Monitoring Requirements

Detailed discussions of limits and monitoring requirements can be found in the attached water quality-based effluent limits (WQBEL) memo dated March 7, 2025 and the TBEL memo dated March 6, 2025.

**Chlorine-** Monitoring is required daily during days that the facility chlorinates the sand filters; on days that no chlorination occurs, chlorine samples are not required.

**Monitoring Frequencies-** The <u>Monitoring Frequencies for Individual Wastewater Permits</u> guidance (April 12, 2021) recommends that standard monitoring frequencies be included in individual wastewater permits based on the size and type of the facility, in order to characterize effluent quality and variability, to detect events of noncompliance, and to ensure consistency in permits issued across the state. Guidance and requirements in administrative code were considered when determining the appropriate monitoring frequencies for pollutants that have final effluent limits in effect during this permit term. Monitoring frequency for BOD5, TSS, pH, and phosphorus have been updated to match the guidance.

**Expression of Limits**- In accordance with the federal regulation 40 CFR 122.45(d) and s. NR 205.065, Wis. Adm. Code, limits in this permit are to be expressed as daily maximum and monthly average whenever practicable.

# 3 Land Application - Sludge/By-Product Solids (industrial only)

### 3.1 Sample Point Number: 002- Industrial Liquid Sludge

Monitoring Requirements and Limitations							
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes		
Chloride		Percent	Monthly	Grab			
Nitrogen, Total Kjeldahl		Percent	Monthly	Grab			
Nitrogen, Ammonium (NH4-N) Total		Percent	Monthly	Grab			
Nitrogen, Total Organic		Percent	Monthly	Grab			
pH Field		su	Annual	Grab			
Phosphorus, Total		Percent	Annual	Grab			

Monitoring Requirements and Limitations						
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes	
Phosphorus, Water Extractable		% of Tot P	Annual	Grab		
Potassium Dissolved		Percent	Annual	Grab		
Solids, Total		Percent	Monthly	Grab		
PFOA + PFOS		ug/kg	Annual	Calculated	Sampling required annually, regardless of whether land application occurs. Report the sum of PFOA and PFOS. See PFAS Permit Sections for more information.	
PFAS Dry Wt			Annual	Grab	Sampling required annually, regardless of whether land application occurs. Perfluoroalkyl and Polyfluoroalkyl Substances based on updated DNR PFAS List. See PFAS Permit Sections for more information.	

### 3.1.1 Changes from Previous Permit:

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

- Flow Rate– Monitoring has been removed.
- Nitrogen, Ammonia (NH<sub>3</sub>-N) Total– Monitoring has been replaced with Nitrogen, Ammonium (NH<sub>4</sub>-N) Total monitoring and changed to Monthly.
- Nitrogen, Total Kjeldahl, Nitrogen, Chloride, Total Solids– Monitoring has been changed to Monthly.
- Nitrogen, Total Organic– Monitoring has been added.
- Phosphorus, Water Extractable- Monitoring units have been changed from "percent" to "% of Total Phosphorus".
- PFAS– Monitoring is required annually pursuant to s. NR 214.18(5)(b), Wis. Adm. Code.
- PFOA + PFOS Monitoring is required annually pursuant to s. NR 214.18(5)(b), Wis. Adm. Code.

#### 3.1.2 Explanation of Limits and Monitoring Requirements

Requirements for land application of industrial sludge are determined in accordance with ch. NR 214 Wis. Adm. Code.

**PFAS:** The presence and fate of PFAS in municipal and industrial sludges is an emerging public health concern. EPA has released a draft assessment which documents the potential public health risks associated with land applying residuals contaminated with PFOA and/or PFOS, and the department is currently evaluating this information. In the interim, the department has developed the "Interim Strategy for Land Application of Biosolids and Industrial Sludges Containing PFAS".

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

### 3.2 Sampling Point (Outfall) 003 - INDUSTRIAL LIQUID WASTE-HIGH STRENGTH WASTEWATER TANK and 006- INDUSTRIAL LIQUID WASTE-EQUALIZATION TANK

Monitoring Requirements and Limitations							
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes		
Chloride		mg/L	Monthly	Grab			
Solids, Total		Percent	Monthly	Grab			
Nitrogen, Total Kjeldahl		mg/L	Monthly	Grab			
Nitrogen, Ammonia (NH <sub>3</sub> -N) Total		mg/L	Monthly	Grab			
Phosphorus, Total		mg/L	Annual	Grab			
Phosphorus, Water Extractable		% of Tot P	Annual	Grab			
Potassium, Total Recoverable		mg/L	Annual	Grab			
pH Field		su	Annual	Grab			
BOD <sub>5</sub> , Total		mg/L	Annual	Grab			

### 3.2.1 Changes from Previous Permit:

These land application outfall have been added to give the facility flexibility during maintenance events. Sludge limitations and monitoring requirements were evaluated for this permit term. See additional explanation of limits under "Explanation of Limits and Monitoring Requirements" below.

### 3.2.2 Explanation of Limits and Monitoring Requirements

Requirements for land application of industrial sludge are determined in accordance with ch. NR 214 Wis. Adm. Code.

**PFAS:** The presence and fate of PFAS in municipal and industrial sludges is an emerging public health concern. EPA has released a draft assessment which documents the potential public health risks associated with land applying residuals contaminated with PFOA and/or PFOS, and the department is currently evaluating this information. In the interim, the department has developed the "Interim Strategy for Land Application of Biosolids and Industrial Sludges Containing PFAS".

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

# 3.3 Sampling Point (Outfall) 005 - INDUSTRIAL LIQUID SLUDGE-FINAL CLARIFIERS

Monitoring Requirements and Limitations							
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes		
Chloride		Percent	Monthly	Grab			
Nitrogen, Total Kjeldahl		Percent	Monthly	Grab			
Nitrogen, Ammonia (NH <sub>3</sub> -N) Total		Percent	Monthly	Grab			
Nitrogen, Organic Total		Percent	Monthly	Grab			
pH Field		su	Annual	Grab			
Phosphorus, Total		Percent	Monthly	Grab			
Phosphorus, Water Extractable		% of Tot P	Monthly	Grab			
Potassium Dissolved		Percent	Monthly	Grab			
Solids, Total		Percent	Monthly	Grab			
PFOA + PFOS		µg/kg	Annual	Calculated			
PFAS Dry Wt			Annual	Grab	Perfluoroalkyl and Polyfluoroalkyl Substances based on updated DNR PFAS List. See PFAS Permit Sections for more information.		

### 3.3.1 Changes from Previous Permit:

This land application outfall has been added to give the facility flexibility during maintenance events. Sludge limitations and monitoring requirements were evaluated for this permit term. See additional explanation of limits under "Explanation of Limits and Monitoring Requirements" below.

### 3.3.2 Explanation of Limits and Monitoring Requirements

Requirements for land application of industrial sludge are determined in accordance with ch. NR 214 Wis. Adm. Code.

**PFAS:** The presence and fate of PFAS in municipal and industrial sludges is an emerging public health concern. EPA has released a draft assessment which documents the potential public health risks associated with land applying residuals contaminated with PFOA and/or PFOS, and the department is currently evaluating this information. In the interim, the department has developed the "Interim Strategy for Land Application of Biosolids and Industrial Sludges Containing <u>PFAS</u>".

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

# 4 Schedules

### 4.1 Land Application Management Plan

A management plan is required for the land application system.

Required Action	Due Date
<b>Land Application Management Plan:</b> Submit an update to the management plan to optimize the land application system performance and demonstrate compliance with Wisconsin Administrative Code NR 214.	03/31/2028

Land Application Management Plan Explanation: The facility is required to submit an updated Land Application Management Plan to ensure compliance with ch. NR 214 Wis. Adm. Code.

# **Other Comments**

None.

# Attachments

Categorical Limits Calculations

Water Quality Based Effluent Limits

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

No waivers requested or granted as part of this permit reissuance

Prepared By: Jonathan Hill Wastewater Engineer

Date: April 25, 2025

DATE:	March 7, 2025
2.112.	

TO: Jonathan Hill – WY/3

FROM: Diane Figiel – WY/3 Diane Figiel

SUBJECT: Water Quality-Based Effluent Limitations for the Actus Nutrition - Boscobel WPDES Permit No. WI-0033107-09-0

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 Actus Nutrition – Boscobel (formerly Milk Specialties Co, Inc.) in Grant County. This dairy processing facility discharges to the Crooked Creek, located in the Green River and Crooked Creek Watershed in the Lower Wisconsin River Basin. This discharge is located downstream of the Wisconsin River TMDL and therefore not included in the TMDL. The evaluation of the permit recommendations is discussed in more detail in the attached report.

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

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Footnotes
Flow Rate					1
BOD <sub>5</sub>	89 lbs/day			36 lbs/day	3
TSS	133 lbs/day			53 lbs/day	3
рН	9.0 s.u.	6.0 s.u.			2
Ammonia Nitrogen					1
Chlorine	38 µg/L			38 µg/L	4
Chloride					1
Phosphorus				0.57 mg/L 1.75 lbs/day	5
Temperature					6
TKN, Nitrate+Nitrite, and Total Nitrogen					7
Acute WET					8,10
Chronic WET					9,10

Footnotes:

- 1. Monitoring only.
- 2. No changes from the current permit.
- 3. The mass limits are categorical limits based on ch. NR 240, Wis. Adm. Code for dairies in the current permit. These limits are not addressed in this memo and may need to be adjusted based on current production.
- 4. A chlorine limit and monitoring are recommended when chlorine is being used in the sand filters.
- 5. If Actus Nutrition Boscobel would like to request an increase to the existing phosphorus permit limits, an assessment of their effluent data consistent with the requirements of ss. NR 207.04(1)(a) and (c), Wis. Adm. Code, must be provided. This evaluation is on a parameter-by-parameter basis and includes consideration of operations, maintenance, and temporary upsets. Without a demonstration of need for a higher limit in accordance with s. NR 207.04, Wis. Adm.



Code, the current limits should be continued in the reissued permit.

- 6. Temperature monitoring is recommended to continue at the same frequency as in the current permit.
- 7. 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 class A cheese plants. Total Nitrogen is the sum of nitrate (NO<sub>3</sub>), nitrite (NO<sub>2</sub>), and total kjeldahl nitrogen (TKN) (all expressed as N).
- 8. Three acute WET tests are recommended. 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.
- 9. Annual chronic WET testing is recommended in the reissued permit. The Instream Waste Concentration (IWC) to assess chronic test results is 11%. According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), chronic testing shall be performed using a dilution series of 100%, 75%, 50%, 25% & 12.5% and the dilution water used in WET tests conducted on Outfall 001 shall be a grab sample collected from Crooked Creek.
- 10. 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).

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

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

Attachments (2) – Narrative & Map

PREPARED BY:	Diane Figiel, PE,
	Water Resources Engineer

E-cc: Caitlin O'Connell, Wastewater Engineer – SCR/Dodgeville Lisa Creegan, Regional Wastewater Supervisor – SCR/Fitchburg Sarah Luck, Regional WQBEL Calculator – SCR/Fitchburg Kari Fleming, Program Manager – WY/3 Nate Willis, Wastewater Engineer – WY/3

#### Water Quality-Based Effluent Limitations for Actus Nutrition – Boscobel WPDES Permit No. WI-0033107-09-0

Prepared by: Diane Figiel

#### PART 1 – BACKGROUND INFORMATION

#### **Facility Description**

Actus Nutrition – Boscobel, formally Milk Specialties Global, operates a manufacturing facility in Boscobel, Wisconsin. The facility produces animal food products from whey and whey protein concentrate, animal fat, cheese, and other protein sources. Wastewater from the facility, primarily from cleaning operations, is treated at an onsite wastewater treatment plant (WWTP). Non-contact cooling water is also used at this site and is discharged with the WWTP effluent to Crooked Creek via Outfall 001.

Process water from the production plant is pumped to an equalization (EQ) tank and periodically diverted to a high strength waste tank. From the EQ tank, the water is pumped to a dissolved air flotation (DAF) unit to removed solids, fats, oils and grease. From the DAF, the water goes to a distribution well and flows equally to two aeration tanks. After aeration, the water flows to a clarifier. Chemical addition, for phosphorus removal, is added before and after the first clarifier. After the first clarifier, wastewater goes to a second clarifier for further settling. Once leaving the clarifier, the water gets polished by two sand filters prior to being discharged at Outfall 001.

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, 2024, includes the following effluent limitations and monitoring requirements.

	Daily	Daily	Weekly	Monthly	Footnotes
Parameter	Maximum	Minimum	Average	Average	
Flow Rate					1
BOD <sub>5</sub>	89 lbs/day			36 lbs/day	2
TSS	133 lbs/day			53 lbs/day	2
pН	9.0 s.u.	6.0 s.u.			3
Ammonia Nitrogen					1
Chloride					1
Phosphorus					
Interim				1.3 mg/L	4
Final				0.57 mg/L	
				1.75 lbs/day	
Temperature					1
Acute WET					5

Footnotes:

- 1. Monitoring only.
- 2. These limits are based on categorical standards and are not evaluated in this memo. Updates to these limits may be necessary based on changes in production rates. WQBELs for BOD<sub>5</sub> and TSS were previously calculated in the April 19, 2013 WQBEL memo and were found to be less restrictive than the categorical limits. These WQBELs are not re-calculated at this time since receiving water and effluent flow rates have not changed significantly.
- 3. These limitations are not being evaluated as part of this review. Because the water quality criteria (WQC), reference effluent flow rates, and receiving water characteristics have not changed, limitations for these water quality characteristics do not need to be re-evaluated at this time.
- 4. A compliance schedule was included in the permit and the final WQBELs for phosphorus went into effect May 1, 2021.
- 5. Acute WET testing second quarter in 2021 and third quarter in 2024.

#### **Receiving Water Information**

- Name: Crooked Creek
- Waterbody Identification Code (WBIC): 1205600
- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code: Warm Water Sport Fish (WWSF) community (default), 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 Station #05407218 on Crooked Creek at HWY 133, where Outfall 001 is located.

 $7-Q_{10} = 6.3$  cfs (cubic feet per second)

 $7-Q_2 = 7.6 \text{ cfs}$ 

Harmonic Mean Flow = 10.3 cfs using a drainage area of  $16.7 \text{ mi}^2$ 

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).

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
7-Q <sub>10</sub> (cfs)	6.4	6.6	7.2	7.6	7.3	7.0	6.9	7.0	6.9	6.8	6.9	6.5
7-Q2 (cfs)	7.8	8.0	8.7	9.4	9.1	8.9	8.7	8.5	8.3	8.4	8.5	8.2

These monthly low flows are from USGS, calculated 09/13/2013

- Hardness = 279 mg/L as CaCO<sub>3</sub>. This value represents the geometric mean of data from June 2009 to November 2017 from WET testing conducted by Actus Nutrition Boscobel.
- % of low flow used to calculate limits in accordance with s. NR 106.06(4)(c)5., Wis. Adm. Code: 100% based on a 2014 mixing zone study.
- Source of background concentration data: Metals data from Hoosier Hollow Creek is used for this evaluation because there is no data available for the Crooked Creek. Both waters are located in the Lower Wisconsin River Basin and are part of Group 5 in the Targeted Watershed Site Selection Tool. These waters are both described as: Moderate flow the watershed with predominantly cool water temperatures. A mix of agriculture and forested land cover with high slopes. Moderate soil clay content and low permeability." 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.

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- Multiple dischargers: None
- Impaired water status: The Lower Wisconsin River, about 0.5 miles downstream, is listed as impaired for PCBs and mercury. An additional 30 miles downstream, the Mississippi River is listed as impaired for phosphorus as well.

#### **Effluent Information**

- Maximum Annual Average flow rates:
  - Maximum annual average = 0.12 MGD (Million Gallons per Day) Peak daily = 0.45 MGD
  - Peak weekly = 0.35 MGD
  - Peak monthly = 0.29 MGD

The maximum annual average flow rate used at the previous reissuance was 0.37 MGD.

- Hardness = 299 mg/L as CaCO<sub>3</sub>. This value represents the geometric mean of data from June 2009 to November 2017 from WET testing and from May 2024 reported in 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: Private wells
- Additives: Five water quality conditioners. These are detailed in Part 7. Chlorine is also occasionally used in the sand filters.
- 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 ammonia, chloride, hardness and phosphorus.
- 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.

Date	Copper ug/L
05/03/2024	20
05/06/2024	11
05/09/2024	<3.2
05/13/2024	3.3
Mean	8.6

"<" 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.

Date	Chloride mg/L	Date	Chloride mg/L
01/06/2020	270	08/16/2022	193
04/06/2020	310	10/10/2022	133
07/06/2020	250	01/18/2023	336
10/05/2020	290	04/11/2023	378
03/01/2021	290	07/05/2023	371
06/02/2021	245	11/06/2023	251
07/06/2021	170	01/03/2024	220



Attachment #1									
Date	Chloride mg/L	Date	Chloride mg/L						
12/07/2021	230	06/03/2024	157						
01/05/2022	195	07/01/2024	153						
05/02/2022	239.42	10/01/2024	143						
01/06/2020	270	08/16/2022	193						
$1 - day P_{99} = 460 mg/L$									
	4-day P <sub>99</sub> =	= 339 mg/L							

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

	Average Measurement	Average Mass Discharged					
BOD <sub>5</sub>	1.6 mg/L*	1.2 lbs/day					
TSS	0.2 mg/L	8.2 lbs/day					
pH field	7.5 s.u.						
Phosphorus	0.27 mg/L	0.22 lbs/day					

#### **Parameter Averages with Limits**

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

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

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

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

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

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

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

Where:

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

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

which occurs once in 10 years (7-day  $Q_{10}$ ).

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

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

If the receiving water is effluent dominated under low stream flow conditions, the  $1-Q_{10}$  method of limit calculation produces the most stringent daily maximum limitations and should be used while making reasonable potential determinations. This is the case for Actus Nutrition – Boscobel and the limits are set based on two times the acute toxicity criteria.

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

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

RECEIVING WATER FLOW = 5.0 cfs,  $(1-Q_{10} \text{ (estimated as 80\% of } 7-Q_{10}))$ , as specified in s. NR 106.06(3)(bm), Wis. Adm. Code.

	REF.		MEAN	MAX.	1/5 OF	MEAN		1-day
	HARD.*	ATC	BACK-	EFFL.	EFFL.	EFFL.	1-day	MAX.
SUBSTANCE	mg/L		GRD.	LIMIT**	LIMIT	CONC.	P <sub>99</sub>	CONC.
Chlorine		19.0		38.1	7.61	<20		
Arsenic		340		679.6	135.9	<1.1		
Cadmium	299	36.2	0.01	72.4	14.5	< 0.098		
Chromium	299	4422		8843.3	1769	<3.3		
Copper	299	43.6		87.2	17.4	8.6		
Lead	299	308	0.28	615.6	123.1	<5.4		
Nickel	268	1080	4.0	2152.6	431	<4.7		
Zinc	299	314		627.4	125.5	9.2		
Chloride (mg/L)		757		1514.0	303		460	378

\* 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- $Q_{10}$  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 = 6.3 cfs ( $\frac{1}{4}$  of the 7-Q<sub>10</sub>), as specified in s. NR 106.06(4)(c), Wis. Adm. Code

	REF.		MEAN	WEEKLY	1/5 OF	MEAN	
	HARD.*	CTC	BACK-	AVE.	EFFL.	EFFL.	4-day
SUBSTANCE	mg/L		GRD.	LIMIT	LIMIT	CONC.	P99
Chlorine		7.28		69.03	13.81	<20	
Arsenic	No. of the second se	152.2		1443	288.7	<1.1	
Cadmium	175	3.82	0.01	36.14	7.2	< 0.098	

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Attachment #1									
	REF.		MEAN	WEEKLY	1/5 OF	MEAN			
	HARD.*	CTC	BACK-	AVE.	EFFL.	EFFL.	4-day		
SUBSTANCE	mg/L		GRD.	LIMIT	LIMIT	CONC.	P <sub>99</sub>		
Chromium	279	306.12		2903	580.6	<3.3			
Copper	279	24.90		236.1	47.22	8.6			
Lead	279	75.47	0.28	713.3	142.7	<5.4			
Nickel	268	120.18	4.0	1106	221.1	<4.7			
Zinc	279	295.27		2800	560.0	9.2			
Chloride (mg/L)		395		3746	749.1		339		

\* 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 = 10 cfs (<sup>1</sup>/<sub>4</sub> of Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

Temp02192025		MEAN	MO'LY	1/5 OF	MEAN
	HTC	BACK-	AVE.	EFFL.	EFFL.
SUBSTANCE		GRD.	LIMIT	LIMIT	CONC.
Cadmium	370	0.01	5501	1100.2	< 0.098
Chromium (+3)	3818000		56768013	11353603	<3.3
Lead	140	0.28	2078	415.5	<5.4
Nickel	43000	4.00	639291	127858	<4.7

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

RECEIVING WATER FLOW = 10 cfs (1/4 of Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

		MEAN	MO'LY	1/5 OF	MEAN
	HCC	BACK-	AVE.	EFFL.	EFFL.
SUBSTANCE		GRD.	LIMIT	LIMIT	CONC.
Arsenic	13.3		197.8	39.55	<1.1

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

#### **Conclusions and Recommendations**

Based on a comparison of the effluent data and calculated effluent limitations, **no effluent limitations are required for toxic substances**. However, because chlorine is used at the sand filters (located at the end of the wastewater treatment process), effluent limitations are recommended to address potential toxicity concerns in the receiving water.

<u>Total Residual Chlorine</u> – A daily maximum limit of  $38 \mu g/L$  is required for chlorine. Weekly average limitations are not needed based on reasonable potential as the daily maximum limitations will provide adequate protection of the resource; however, a monthly average limit is needed to meet expression of limits requirements.

#### **Expression of limits**

The methods for calculating limitations for industrial discharges to conform to 40 CFR 122.45(d) are specified in s. NR 106.07(4), 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.

In this case a monthly average limit of  $38 \mu g/L$  is required to meet expression of limits requirements. Due to revisions to s. NR 106.07(2), Wis. Adm. Code, mass limitations not required for chlorine.

<u>Chloride</u> – Considering available effluent data from the current permit term, the 1-day  $P_{99}$  chloride concentration is 378 mg/L, and the 4-day  $P_{99}$  of effluent data is 339 mg/L.

These effluent concentrations are below the calculated WQBELs for chloride, therefore no effluent limits are needed. Chloride monitoring is recommended to ensure that 11 sample results are available at the next permit issuance to meet the data requirements of s. NR 106.85, Wis. Adm. Code. Quarterly monitoring is recommended to continue in the reissued permit.

<u>PFOS and PFOA</u> – The need for PFOS and PFOA monitoring is evaluated in accordance with s. NR 106.98(2), Wis. Adm. Code. **Based on the 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 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 Actus Nutrition does not currently have ammonia nitrogen limits, the need for limits is evaluated at this time. Ammonia nitrogen effluent monitoring from December 2019 to November 2024 is summarized below:

Sample Date	Nitrogen, Ammonia mg/L	Sample Date	Nitrogen, Ammonia mg/L	Sample Date	Nitrogen, Ammonia mg/L
01/06/2020	0.07	12/07/2021	0.18	07/11/2023	< 0.08
04/06/2020	0.29	01/05/2022	< 0.05	11/07/2023	< 0.08
07/06/2020	0.13	05/02/2022	< 0.05	01/02/2024	< 0.08
10/05/2020	0.16	08/02/2022	0.12	06/03/2024	< 0.08
02/01/2021	0.1	10/03/2022	0.08	07/01/2024	< 0.08
06/02/2021	0.1	01/04/2023	< 0.08	10/01/2024	< 0.08

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Attachment #1						
Sample Date	Nitrogen, Ammonia mg/L	Sample Date	Nitrogen, Ammonia mg/L	Sample Date	Nitrogen, Ammonia mg/L	
07/06/2021 0.05 04/03/2023 <0.08						
Mean = $0.06 \text{ mg/L}$						

"<" 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.

Ten out of the 20 sample results from the last five years were non-detectable. The average of all results is 0.06 mg/L and the maximum measurement was 0.29 mg/L. These levels are well below the lowest ammonia limits that would be calculated. Therefore, no limits are recommended in the reissued permit. Quarterly monitoring is recommended to continue in the reissued permit.

#### PART 4 – PHOSPHORUS

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

Subchapter II of Chapter NR 217, Wis. Adm. Code, requires industrial wastewater treatment facilities that discharge greater than 60 pounds of Total Phosphorus per month to comply with a monthly average limit of 1.0 mg/L expressed as a 12-month rolling average, or an approved alternative concentration limit.

# Since Actus Nutrition – Boscobel has phosphorus limits in effect that are more stringent than 1.0 mg/L, the need for a TBEL will not be considered further.

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

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

Section NR 102.06(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 0.075 mg/L applies for Crooked Creek.

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

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

Where:

$$\begin{split} WQC &= 0.075 \text{ mg/L for Crooked Creek} \\ Qs &= 100\% \text{ of the } 7\text{-}Q_2 \text{ of } 7.6 \text{ cfs} \\ Cs &= \text{background concentration of phosphorus in the receiving water pursuant to s. NR} \\ 217.13(2)(d), Wis. Adm. Code \\ Qe &= \text{effluent flow rate} = 0.12 \text{ MGD} = 0.19 \text{ cfs} \\ f &= \text{the fraction of effluent withdrawn from the receiving water} = 0 \end{split}$$

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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. Adm. 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.

A previous evaluation resulted in a WQBEL of 0.57 mg/L using a background concentration of 0.038 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.

A review of all available in stream total phosphorus data shows that no additional data is available. Six results from May to October 2015 stored in the Surface Water Integrated Monitoring System database indicates the median background total phosphorus concentration in Crooked Creek near old hwy 61 (SWIMS station ID 10039070) is 0.038 mg/L, just upstream from the point of discharge to Crooked Creek.

Substituting a median value of 0.038 mg/L into the limit calculation equation above, the calculated limit is 3.1 mg/L. This limit is higher than the previously calculated WQBEL which used an effluent flow rate of 0.37 MGD.

#### **Effluent Data**

The following table summarizes effluent total phosphorus monitoring data from May 1, 2021 (when the final WQBELs became effective) to November 2024.

i otal i nosphoras Elinacht Data						
	Phosphorus mg/L	Phosphorus lbs/day				
1-day P <sub>99</sub>	1.7	1.5				
4-day P <sub>99</sub>	0.9	0.80				
30-day P <sub>99</sub>	0.45	0.39				
Mean	0.27	0.22				
Std	0.35	0.32				
Sample size	375	375				
Range	0.02 - 3.16	0 - 3.08				

#### **Total Phosphorus Effluent Data**

The discharge currently has an effective WQBEL because there was reasonable potential to cause or contribute to an exceedance of the water quality criterion at previous reissuances. The facility is currently operating the treatment facility to remove phosphorus and meet the WQBELs. Therefore, the WQBELs of 0.57 mg/L and 1.75 lbs/day are required to continue in the reissued permit per ss. NR 217.15 and 205.067(5), Wis. Adm. Code.

#### Antidegradation

If Actus Nutrition would like to request an increase to the existing permit limits an assessment of their effluent data consistent with the requirements of ss. NR 207.04(1)(a) and (c), Wis. Adm. Code, must be provided. This evaluation is on a parameter-by-parameter basis and includes consideration of operations, maintenance and temporary upsets. Without a demonstration of need for a higher limit in accordance with s. NR 207.04, Wis. Adm. Code, the current limits should be continued 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.

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

The table below summarizes the maximum temperatures reported during monitoring from December 2019 to November 2024.

	Representat Monthly Tempe	tive Highest Effluent erature	Calculate Li	d Effluent mit
Month	Weekly Maximum	Daily Maximum	Weekly Average Effluent Limitation	Daily Maximum Effluent Limitation
	(°F)	(°F)	(°F)	(°F)
JAN	75	83	-	120
FEB	69	74	-	120
MAR	76	79	-	120
APR	77	78	-	120
MAY	76	78	-	120
JUN	80	82	-	120
JUL	82	87	-	120
AUG	80	84	-	120
SEP	78	80	-	120
OCT	75	80	-	120
NOV	74	76	-	120
DEC	70	81	-	120

#### Monthly Temperature Effluent Data & Limits

#### **Reasonable Potential**

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

• An acute limit for temperature is recommended for each month in which the representative daily maximum effluent temperature for that month exceeds the acute WQBEL. The representative daily maximum effluent temperature is the greater of the following:

(a) The highest recorded representative daily maximum effluent temperature(b) The projected 99th percentile of all representative daily maximum effluent temperatures

- A sub-lethal limitation for temperature is recommended for each month in which the representative weekly average effluent temperature for that month exceeds the weekly average WQBEL. The representative weekly average effluent temperature is the greater of the following:
  - (a) The highest weekly average effluent temperature for the month.

(b) The projected 99th percentile of all representative weekly average effluent temperatures for the month

Comparing the representative highest effluent temperature to the calculated effluent limits determines the reasonable potential of exceeding the effluent limits. Based on the available effluent data **no effluent limits are recommended for temperature. Temperature monitoring is recommended to continue in the reissued permit at the same frequency due to the discharge of non-contact cooling water to this outfall.** 

#### 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 tests predict the concentration that interferes with the growth or reproduction of test organisms during a seven-day exposure. To assure that a discharge is not chronically toxic to organisms in the receiving water, WET tests must produce a statistically valid IC<sub>25</sub> (Inhibition Concentration) greater than the instream waste concentration (IWC), according to s. NR 106.09(3)(b), Wis. Adm Code. The IWC is an estimate of the proportion of effluent to total volume of water (receiving water + effluent). The IWC of 11%, shown in the WET Checklist summary below, was calculated according to the following equation, as specified in s. NR 106.03(6), Wis. Adm Code:

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

Where:

 $Q_e$  = actual annual average flow = 0.12 MGD = 0.19 cfs f = fraction of the  $Q_e$  withdrawn from the receiving water = 0  $Q_s = \frac{1}{4}$  of the 7- $Q_{10} = 6.3$  cfs  $\div 4 = 1.575$  cfs

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

- According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), receiving water must be used as the dilution water and primary control in chronic WET tests, unless the use of different dilution water is approved by the Department prior to use. The dilution water used in WET tests conducted on Outfall 001 shall be a grab sample collected from the receiving water location, upstream and out of the influence of the mixing zone and any other known discharge. The specific receiving water location must be specified in the WPDES permit.
- Shown below is a tabulation of all available WET data for Outfall 001. Efforts are made to ensure that decisions about WET monitoring and limits are made based on representative data, as specified in s. NR 106.08(3), Wis. Adm Code. Data which is not believed to be representative of the discharge was not included in reasonable potential calculations. The table below differentiates between tests used and not used when making WET determinations.

Date		Acute LCs	Results 50 %			Ch	ronic Resu IC <sub>25</sub> %	ılts		Footnotes
Test Initiated	C. dubia	Fathead minnow	Pass or Fail?	Used in RP?	C. dubia	Fathead Minnow	Algae (IC <sub>50</sub> )	Pass or Fail?	Use in RP?	or Comments
09/26/2000	>100	>100	Pass	No						1
07/17/2002	>100	>100	Pass	No						1
06/03/2009	>100	>100	Pass	No						2
02/01/2012	>100	>100	Pass	Yes						
06/09/2015					>100	>100		Pass	Yes	
11/28/2017					>100	>100		Pass	Yes	
06/22/2021	>100	>100	Pass	Yes						
09/18/2024	>100	>100	Pass	Yes						

	WET	Data	History
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Footnotes:

- 1. *Data Not Representative.* Significant changes were made to WET test methods in 2004 and these changes were assumed to be fully implemented by certified labs by no later than June 2005. It may be appropriate to exclude data collected before July 1, 2005, unless 1) it shows repeated toxicity that was never resolved or 2) older data is all that is available, and no significant changes have occurred which obviously make it unrepresentative.
- Tests done by S-F Analytical, July 2008 March 2011. The DNR has reason to believe that WET tests completed by SF Analytical Labs from July 2008 through March 31, 2011 were not performed using proper test methods. Therefore, WET data from this lab during this period has been disqualified and was not included in the analysis.
- According to s. NR 106.08, Wis. Adm. Code, WET reasonable potential is determined by multiplying the highest toxicity value that has been measured in the effluent by a safety factor, to predict the likelihood (95% probability) of toxicity occurring in the effluent above the applicable WET limit. The safety factor used in the equation changes based on the number of toxicity detects in the dataset. The fewer detects present, the higher the safety factor, because there is more uncertainty surrounding the predicted value. WET limits must be given, according to s. NR 106.08(6), Wis. Adm. Code, whenever the applicable Reasonable Potential equation results in a value greater than 1.0.

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

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

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

Therefore, **no reasonable potential is shown for acute or chronic WET limits** using the procedures in s. NR 106.08(6) and representative data from February 2012 through September 2024.

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

	Acute	Chronic
	Not Applicable.	IWC = 11 %.
AMZ/IWC	0 Points	0 Points
	3 tests used to calculate RP.	2 tests used to calculate RP.
Historical	No tests failed.	No data not available in past 5 years
Data		
	0 Points	5 Points
	Little variability, no violations or upsets,	Same as Acute.
Effluent	consistent operations.	
Variability	0 Points	0 Points
	Warm water sport fish	Same as Acute.
Receiving Water	······································	
	5 Points	5 Points
	Reasonable potential for no limits based on ATC;	Reasonable potential for no limits based on CTC;
	Ammonia nitrogen, copper, zinc and chloride	Ammonia nitrogen, copper, zinc and chloride
Chemical-Specific	detected.	detected.
Data	Additional Compounds of Concern: None	Additional Compounds of Concern: None
	3 Points	3 Points
	1 Biocide and 5 Water Ouality Conditioners	All water quality conditioners used more than
A 1144	added.	once per 4 days. Biocide is not.
Additives		
	8 Points	5 Points
Discharge	Dairy	Same as Acute.
Category		
ouregozy	20 Points	20 Points
Wastewater	Secondary Treatment	Same as Acute.
Treatment	0 Points	0 Points
Downstream	No impacts known	Same as Acute.
Impacts	1	

#### WET Checklist Summary

Attachment #	#1
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	Acute	Chronic
	0 Points	0 Points
Total Checklist Points:	36 Points	38 Points
Recommended Monitoring Frequency (from Checklist):	3 tests during permit term (year 1,3,5)	1x yearly
Limit Required?	No	No
TRE Recommended? (from Checklist)	No	No

• After consideration of the guidance provided in the Department's *WET Program Guidance Document* (2022) and other information described above, **three acute and annual chronic WET tests are recommended** in the reissued permit. Tests should be done in rotating quarters to collect seasonal information about this discharge. WET testing should continue after the permit expiration date (until the permit is reissued).

#### **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. Guidance related to conducting an additive review can be found in *Water Quality Review Procedures for Additives* (2019) (http://dnr.wi.gov/topic/wastewater/Guidance.html).

Additive Name	Manufacturer	Purpose of Additive	Intermittent or	Frequency Use	y of	Estimated Effluent	Potential Use	Is Additive Authorized
		including where added	Continuous Feed	Months per/yr.	Days/ week	Concentration mg/L	Restriction mg/L <sup>1</sup>	in Current Permit? <sup>2</sup>
Hyperfloc CB 478	Hychem, Inc.	Coagulant	Continuous	12	7			
Hyperfloc CP 737	Hychem, Inc.	Flocculant	Continuous	12	7			
Hyperfloc CP 738	Hychem, Inc.	Flocculant	Continuous	12	7			
Hyperfloc CB 410-60	Hychem, Inc.	Coagulant	Continuous	12	7			
Hyperfloc CE 884	Hychem, Inc.	Flocculant	Continuous	12	7			

The five water quality conditioners used at the facility are used to aid in solids removal and are expected to be removed from the wastewater with the solids. No secondary values are calculated for these additives because they're not expected to be present in the discharged effluent or contribute to effluent toxicity. Use of these additives is approved at the provided usage rates.

Chlorine is also used at the facility and is addressed in the toxics section of the memo.



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#### CORRESPONDENCE/MEMORANDUM

DATE: 03/07/2025

- TO: Caitlin O'Connell
- FROM: Jonathan Hill WY/3
- SUBJECT: Technology-Based Effluent Limitations for Actus Nutrition Boscobel WPDES Permit No. WI-0003107-09-0

Final Effluent Limitations						
Parameter	Daily Maximum	Daily Minimum	Monthly Average			
BOD5 (lb/day)	89	N/A	36			
TSS (lb/day)	133	N/A	53			
pН	9.0 s.u.	6.0 s.u.	N/A			

#### Technology-Based Effluent Limitations (TBELs) Recommended for Outfall 001:

#### PART 1 – BACKGROUND INFORMATION

Actus Nutrition – Boscobel produces protein encapsulated fat (PEF) animal food products in the form of dry whey from whey, whey protein concentrate, animal fat, cheeses, and other protein sources. The processing activities include spray drying, cooling, blending, and bagging. The spray drying operation (Filtermat Dryer) generates the majority of the wastewater. The blending operation (Agglomerator) is primarily dry-cleaned and washed down 1 or 2 times per month. Since a small amount of wastewater is contributed by the Agglomerator operation, only the production from the spray dryer will be used in establishing the production based categorical limits. Generated wastewater consists of water removed from the raw materials, rinses from clean in place (CIP) operations, and other wash waters.

#### PART 2 – INDUSTRIAL CATEGORIES

Chapter NR 240, Wis. Adm. Code, specifies effluent guidelines for discharges from dairy product categories of point sources and subcategories. Actus Nutrition – Boscobel discharges dry whey.

Because Actus Nutrition – Boscobel has a BOD input greater than 15,620 pounds per day for dry whey production, it is considered a Class A facility for dry whey production in accordance with ch. NR 240 Wis. Adm. Code. The ch. NR 240, Wis. Adm. Code for dry whey is based on federal effluent guidelines in 40 CFR Part 405 Subpart L. The permittee must meet the applicable effluent limit guidelines as described in this chapter. These effluent limit guidelines include:

- Effluent limitations representing the degree of effluent reduction attainable by the application of the BPT in s. NR 240.10, 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 240.11, Wis. Adm. Code.
- If determined to be a new source, new source performance standards (NSPS) in s. NR 240.12, Wis. Adm. Code.

If the calculated limits are less than or equal to the limits in the current permit, then the limits would be set equal to the

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recalculated limits. If the recalculated limits are less restrictive than the limits from the current permit, they cannot be increased unless the antidegradation and anti-backsliding provisions of ch. NR 207, Wis. Adm. Code, are met.

Section NR 220.13, Wis. Adm. Code, includes provisions that address cases where federal and state rules differ. Section 283.11, Wis. Stats., addresses 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, notwithstanding the federal regulations. The omissions are described below.

• Neither state nor federal rules specify a date for the definition for a new source. Therefore, it is necessary to review available federal guidance. The Boornazian memo (September 28, 2006) specifies a new source date for 40 CFR Part 405 Subparts A – L of May 28, 1974. The Department relies on the Boornazian memo to establish date of applicability for NSPS.

• State rules incorrectly list BAT standards for BOD, TSS, and pH. BAT applies to priority pollutants and nonconventional pollutants and does not apply to BOD, TSS or pH.

• The federal standard rule lists revised BCT standards requirements. All BCT limitations are set to be the same as the best practicable control technology (BPT) standards. State rules in ch. NR 240, Wis. Adm. Code, do not list standards for BCT.

#### PART 3 – LEVELS OF CONTROL

The facility's dry whey processes started before May 28, 1974 and is therefore subject to Best Practicable Treatment Effluent Limitations found in Table 2 of ch. NR 240, Wis. Adm. Code and specified in 40 CFR Part 405 Subparts L.

#### PART 4 – APPLICABLE PRODUCTION LEVELS

The levels of production for each subcategory are based on data provided by Actus Nutrition – Boscobel on February 6, 2024. On an annual average basis, Actus Nutrition – Boscobel uses the following amounts of materials per day.

	Material Used
Material	(lbs/day)
Liquid Whey Solids	134,521
Dry Whey	2,292
Liquid WPC 34 solids	32,757
Dry WPC 80	766
Fats and oils	97,052

#### PART 5 - TBEL CALCULATIONS

The BOD<sub>5</sub> input is the 5-day biochemical oxygen demand of raw materials that enter the process. The current production levels are converted to BOD input equivalents by multiplying the amount of raw material by BOD factors specified in s. NR 240.03(1), Wis. Adm. Code, or s. NR 240.07, Wis. Adm. Code and 40 CFR Part 405.

#### pН

Any discharge subject to BAT, BPT, BCT, or NSPS limitations or standards in this part must remain within the pH range of 6.0 s.u. to 9.0 s.u.

#### **Dry Whey BOD Input Calculations**

Process	Material	Material Used (lbs/day)	BOD Factor	BOD Input (lbs/Day)
Dry Whey	Liquid Whey Solids	134,521	4.72	6,349
Dry Whey	Dry Whey	2,292	65.07	1,491
Dry Whey	Liquid WPC 34 solids	32,757	26.07	8,540
Dry Whey	Dry WPC 80	766	65.07	498
Dry Whey	Fats and oils	97,052	89.00	86,376
Dry Whey	Cheese	5,006	51.35	2,571
Total				105,826

#### Dry Whey BOD Input Calculations

To determine the BOD Input, the Material Used is divided by 100 and multiplied by the BOD factor. The BOD factors are found in Table 1 in ch. NR 240 Wis. Adm. Code except for Fats and Oils. State and federal code do not have Fats and Oils listed with its own BOD factor; however, s. NR 240.03, Wis. Adm. Code, includes the following statement:

"(1) BOD input means the 5 day biochemical oxygen demand of the materials entered into process. It can be calculated by multiplying the amounts of fats, proteins, and carbohydrates by factors of 0.890, 1.031, and 0.691, respectively."

To determine the equivalent multiplying factor for the fat and oil, 0.890 is multiplied by 100 to get 89.

#### **Dry Whey Effluent Limit Calculations**

Total BOD Input	Best Practicable Treatment Effluent Limitations				WP	WPDES Categorical Limits			
	BOD (lbs/1,000 lbs)		TSS (lbs/1,000 lbs)		BOD (lbs/day)		TSS (lbs/day)		
(lbs/day)	Avg	Max	Avg	Max	Avg	Max	Avg	Max	
105,826	0.40	1.00	0.60	1.50	42.33	105.83	63.50	158.74	

To determine the categorical limit, the Total BOD input is divided by 1000 and multiplied by the applicable Best Practicable Treatment Effluent Limitation.

#### PART 6 - FINAL LIMITS

The new BOD<sub>5</sub> and TSS limitations calculated are higher than BOD<sub>5</sub> and TSS limitations included in the current permit. However, because no NR 207 Anti-degradation evaluation has been performed, the categorical limit in the current permit will be used in this issuance. The highlighted limits shown below will be included in the permit.

Final Calculated Effluent Limitations						
Parameter & units	Current Daily Maximum	New Daily Maximum	Daily Minimum	Current Monthly Average	New Monthly Average	
BOD5 (lbs/day)	89	106	N/A	36	42	
TSS (lbs/day)	133	159	N/A	53	64	
pH S.U.	9.0	9.0	6.0	6.0	N/A	