Permit Fact Sheet

General Information

Permit Number	WI-0066371-02-0
Permittee Name and Address	Wisconsin Whey Protein 160 Christensen Drive, Darlington, WI 53530
Permitted Facility Name and Address	Wisconsin Whey Protein 360 Christensen Dr, Darlington, WI 53530, part of the plant is located at 160 Christensen Dr.
Permit Term	October 01, 2025 to September 30, 2030
Discharge Location	Unnamed tributary approximately 160 feet south of Donahoe Drive
Receiving Water	Unnamed tributary to the Ames Branch of the Pecatonica River in Lafayette County
Stream Flow ($Q_{7,10}$)	0.0 cfs
Stream Classification	Default Warm Water Sport Fish, non-public water supply.
Discharge Type	Existing, Continuous

Facility Description

Wisconsin Whey Protein, LLC (WWP) owns and operates a cheese and whey processing facility in Darlington, Wisconsin. WWP receives a maximum 2,000,000 lbs/day of milk to produce a maximum 200,000 lbs/day of white cheddar curd, 650,000 lbs/month of lactose whey powder, and 200,000 lbs./day of liquid delactosed permeate. WWP also receives an additional 200,000 lbs/day of concentrated whey that is processed further on site to produce approximately 600,000 lbs/month of whey protein concentrate 80 powder.

WWP operates an activated sludge wastewater treatment facility that became operational in May 2020 and consists of an EQ tank, automatic strainer, selector tank, two pre-aeration tanks, aeration tank, chemical phosphorus removal, three ultrafiltration membrane units, and two cooling towers. Upgrades completed during the previous permit term included the addition of a fourth ultrafiltration membrane skid, third cooling tower, chiller system, and high strength waste (HSW) tank. Treated effluent is discharged via Outfall 001 Effluent is discharged to an unnamed intermittent tributary (WBIC 921500) for approximately 1.5 miles prior to joining a second unnamed tributary (WBIC 921400). After approximately 0.75 miles, the unnamed tributary (WBIC 921400) connects with Ames Branch (WBIC 921200) and travels an additional approximately 3.9 miles to the Pecatonica River (WBIC 889100). NCCW and reverse osmosis permeate are added within the treatment process or at the end with the wastewater treatment plant effluent, prior to discharge. Industrial liquid sludge from the treatment process is thickened in two DAF units and stored in four onsite sludge storage tanks before being hauled offsite by a contract hauler via Outfall 003. High strength wastes segregated to the HSW tank are also hauled offsite by a contract hauler via Outfall 002.

Substantial Compliance Determination

Enforcement During Last Permit: Enforcement During Last Permit: Violations of effluent limitations, spills, plan approval, etc. occurred during the previous permit term. The permittee was referred to the Department of Justice in June

2022. Judgement was granted in July 2024. The permittee has been meeting the agreed upon actions as part of the enforcement process.

After a desk top review of all discharge monitoring reports, land application reports, compliance schedule items, and a site visit on 02/11/2025, this facility has been found to be in substantial compliance with their current permit.

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)**
001	0.304 MGD (May 2020 – January 2025)	Effluent: 24-hr flow proportional composite sample intake located in the effluent pit, between the ultrafiltration membranes and the cooling towers, and made up of wastewater treatment plant effluent that can be combined with reverse osmosis permeate and noncontact cooling water prior to discharge to the tributary of the Ames Branch. Representative grab samples collected at sample location. Flow meter located after the effluent pit, prior to the cooling towers. Inline temperature monitoring located after the cooling towers and chiller system.
002	0 gallons/year (2020-2024)	Industrial Liquid Wastewater: Representative grab samples of industrial liquid wastes, consisting of high strength wastes, collected from the high strength waste tank prior to land application. Monitoring is only required when land application occurs.
003	0 gallons/year (2020-2024)	Industrial Liquid Sludge: Representative grab samples of industrial liquid sludge, generated from the wastewater treatment plant's DAF units, collected from the sludge storage tanks prior to land application. Monitoring is only required when land application occurs.
004	New	Industrial Cake Sludge: Representative grab samples of industrial cake sludge, generated from the wastewater treatment plant's sludge press, collected from the cake sludge storage structure prior to land application. Composite grab samples shall be taken from multiple locations in the sludge pile and consist of a series of samples collected from the entire sludge depth, placed into a single container, and thoroughly mixed. Composite grab samples can also be collected at the discharge from the sludge press. Monitoring is only required when land application occurs.

Permit Requirements

1 Surface Water - Monitoring and Limitations

Sample Point Number: 001- Combined Discharge

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Daily	Continuous	
BOD5, Total	Daily Max	20 mg/L	3/Week	24-Hr Flow Prop Comp	
BOD5, Total	Monthly Avg	10 mg/L	3/Week	24-Hr Flow Prop Comp	
BOD5, Total	Daily Max	86 lbs/day	3/Week	Calculated	
BOD5, Total	Monthly Avg	43 lbs/day	3/Week	Calculated	
Suspended Solids, Total	Daily Max	20 mg/L	3/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total	Monthly Avg	10 mg/L	3/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total	Daily Max	108 lbs/day	3/Week	Calculated	
Suspended Solids, Total	Monthly Avg	54 lbs/day	3/Week	Calculated	
pH Field	Daily Max	9.0 su	Daily	Continuous	
pH Field	Daily Min	6.0 su	Daily	Continuous	
Dissolved Oxygen	Daily Min	7.0 mg/L	Daily	Grab	
Nitrogen, Ammonia Variable Limit		mg/L	3/Week	See Table	Look up the variable ammonia limit from the 'Variable Ammonia Limitation' table and report the variable limit in the Ammonia Variable Limit column on the eDMR.
Nitrogen, Ammonia (NH3-N) Total	Daily Max - Variable	mg/L	3/Week	24-Hr Flow Prop Comp	Report the daily maximum Ammonia result in the Nitrogen, Ammonia (NH3-N) Total column of the eDMR. See Ammonia Limitation Section.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	7.5 mg/L	3/Week	24-Hr Flow Prop Comp	April - May

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	5.7 mg/L	3/Week	24-Hr Flow Prop Comp	June - September
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	10 mg/L	3/Week	24-Hr Flow Prop Comp	October - March
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	3.0 mg/L	3/Week	24-Hr Flow Prop Comp	April - May
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	2.3 mg/L	3/Week	24-Hr Flow Prop Comp	June - September
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	4.0 mg/L	3/Week	24-Hr Flow Prop Comp	October - March
Chlorine, Total Residual	Daily Max	19 ug/L	Daily	Grab	
Chlorine, Total Residual	Weekly Avg	7.3 ug/L	Daily	Grab	
Chlorine, Total Residual	Monthly Avg	7.3 ug/L	Daily	Grab	
Phosphorus, Total	Rolling 12 Month Avg	1.0 mg/L	3/Week	24-Hr Flow Prop Comp	Limit effective throughout the permit term, as it represents a minimum control level.
Phosphorus, Total		lbs/day	3/Week	Calculated	Report daily mass discharged using Equation 1a. in the Water Quality Trading (WQT) section.
WQT Credits Used (TP)		lbs/month	Monthly	Calculated	Report WQT TP Credits used per month using Equation 2c. in the Water

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
					Quality Trading (WQT) section. Available TP Credits are specified in Table 2 and in the approved Water Quality Trading Plan.
WQT Computed Compliance (TP)	Monthly Avg	0.225 mg/L	3/Week	Calculated	Report the WQT TP Computed Compliance value using Equation 3a. in the Water Quality Trading (WQT) section. Value entered on the last day of the month.
WQT Computed Compliance (TP)	6-Month Avg	0.075 mg/L	3/Week	Calculated	Compliance with the six-month average limit is evaluated at the end of the six-month period on June 30 and Dec 31.
WQT Computed Compliance (TP)	6-Month Avg	0.21 lbs/day	3/Week	Calculated	Report the WQT TP Computed Compliance value using Equation 3b. in the Water Quality Trading (WQT) section. Compliance with the six-month average limit is evaluated at the end of the six-month period on June 30 and Dec 31.
WQT Credits Used (TP)	Annual Total	172.3 lbs/yr	Annual	Calculated	The sum of total monthly credits used may not exceed Table 2 values listed below.
Chloride		mg/L	4/Month	24-Hr Flow Prop Comp	Monitoring only in 2029.
Temperature Maximum	Daily Max	76 deg F	Daily	Continuous	January, February, and December
Temperature Maximum	Daily Max	77 deg F	Daily	Continuous	March and November
Temperature Maximum	Daily Max	79 deg F	Daily	Continuous	April
Temperature Maximum	Daily Max	84 deg F	Daily	Continuous	June and August

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Temperature Maximum	Daily Max	85 deg F	Daily	Continuous	July
Temperature Maximum	Daily Max	82 deg F	Daily	Continuous	May and September
Temperature Maximum	Daily Max	80 deg F	Daily	Continuous	October
Temperature Maximum	Weekly Avg	49 deg F	Daily	Continuous	January, November, and December
Temperature Maximum	Weekly Avg	50 deg F	Daily	Continuous	February
Temperature Maximum	Weekly Avg	52 deg F	Daily	Continuous	March
Temperature Maximum	Weekly Avg	55 deg F	Daily	Continuous	April
Temperature Maximum	Weekly Avg	65 deg F	Daily	Continuous	May
Temperature Maximum	Weekly Avg	76 deg F	Daily	Continuous	June
Temperature Maximum	Weekly Avg	81 deg F	Daily	Continuous	July and August
Temperature Maximum	Weekly Avg	73 deg F	Daily	Continuous	September
Temperature Maximum	Weekly Avg	61 deg F	Daily	Continuous	October
Nitrogen, Total Kjeldahl		mg/L	Quarterly	24-Hr Flow Prop Comp	
Nitrogen, Nitrite + Nitrate Total		mg/L	Quarterly	24-Hr Flow Prop Comp	
Nitrogen, Total		mg/L	Quarterly	Calculated	Total Nitrogen shall be calculated as the sum of reported values for Total Kjeldahl Nitrogen and Total Nitrite + Nitrate Nitrogen.
Acute WET		TUa	See Listed Qtr(s)	24-Hr Flow Prop Comp	See WET section.
Chronic WET	Monthly Avg	1.0 TUc	Quarterly	24-Hr Flow Prop Comp	See WET section.

Changes from Previous Permit

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

- **BOD and TSS-** Mass limits for BOD and TSS are updated.
- **DO-** Sample frequency increased to daily.
- **pH-** Monitoring for pH is changed to pH field. The limits are included as a pH minimum and maximum limit.
- **Ammonia-** Daily pH variable limit included and weekly average limit for October – March added.
- **Chlorine-** Chlorine sampling and limits added.
- **Phosphorus-** Minimum control level limit added and required reporting and limits for WQT corrected as needed to meet standard WQT reporting and limits.
- **Chloride-** Monitoring frequency and time period updated.
- **Total Nitrogen Monitoring (TKN, N02+N03 and Total N)**- Quarterly monitoring is required in specific quarters as outlined in the permit.
- **WET**- The number of acute and chronic WET tests updated. Chronic WET limit added.

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 April 17, 2025 and categorical limits memo dated April 17, 2025.

Monitoring Frequencies- The Monitoring Frequencies for Individual Wastewater Permits 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. Chloride sampling frequency changed to 4/month. DO increased to 7/week because the permittee has experienced variable effluent quality. Both pH and DO are parameters that are immediate indicators of issues in the plant. Additionally, pH and DO are typically set to the same frequency.

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 limits whenever practicable.

pH- Monitoring parameter has been updated to pH (Field) as the pH WQBELs in s. NR 102.04(4)(c), Wis. Adm. Code, supersede ch. NR 240, Wis. Adm. Code, pH TBEL excursions in s. NR 205.06, Wis. Adm Code, because sufficient dilution is not available at the outfall to ensure that pH water quality criteria can be met."

Phosphorus – Phosphorus requirements are based on the Phosphorus Rules that became effective December 1, 2010 as detailed in NR 102 Water Quality Standards and NR 217 Effluent Standards and Limitations for Phosphorus. Chapter NR 217 of the Wis. Adm. Code addresses point source dischargers of phosphorus to surface waters. Currently in NR 217 Wis. Adm. Code there are two methods used to determine if a phosphorus limit is needed: a technology based effluent limit (TBEL) and a water quality based effluent limit (WQBEL). Based on the size and classification of the stream, the water quality criteria for the unnamed tributary to Ames Branch is 0.075 mg/L. In this case, the WQBEL is 0.225 mg/L (monthly average), 0.075 mg/L & 0.21 lbs/day (6-month average). For the reasons explained in the April 30, 2012 paper entitled 'Justification for Use of Monthly, Growing Season and Annual Average Periods for Expression of WPDES Permit Limits for Phosphorus Discharges in Wisconsin', WDNR has determined that it is impracticable to express the phosphorus WQBEL for the permittee as a maximum daily, weekly or monthly value. The final effluent limit for

phosphorus is expressed as a six-month average. It is also expressed as a monthly average equal to three times the derived WQBEL (which equates to 0.3 mg/L). This final effluent limit was derived from and complies with the applicable water quality criterion. A phosphorus concentration limit is necessary to prevent backsliding during the term of the permit. The TBL limit of 1.0 mg/L will be retained in the permit.

The wastewater treatment facility is not able to meet the WQBEL. This permit authorizes the use of trading as a tool to demonstrate compliance with the phosphorus WQBELs. This permit includes terms and conditions related to the Water Quality Trading Plan (WQT-2023-0005) or approved amendments thereof. The total 'WQT TP Credits' available are designated in the approved WQT Plan. The permitee is implementing a perennial prairie. The WQT Plan proposes the generation of 172.3 lbs/yr of phosphorus credits for the next five years.

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

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

Sample Point Number: 002- Land Application of Ind. WW

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Solids, Total		Percent	Monthly	Grab	
Chloride		mg/L	Monthly	Grab	
Nitrogen, Total Kjeldahl		mg/L	Monthly	Grab	
Phosphorus, Total		mg/L	Quarterly	Grab	
Phosphorus, Water Extractable		% of Tot P	Quarterly	Grab	
Potassium, Total Recoverable		mg/L	Quarterly	Grab	
pH Field		su	Quarterly	Grab	
COD		mg/L	Quarterly	Grab	

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.

Reporting and monitoring for total solids, potassium added and sampling frequency changed for pH and COD.

Explanation of Limits and Monitoring Requirements

Requirements for land application of industrial liquid wastes are determined in accordance with ch. NR 214 Wis. Adm. Code. Additionally, the required monitoring is consistent with the WPDES General Permit for Landspreading of Industrial

Liquid Waste (WI-0055867-08) and ensure adequate characterization of the waste. If the permitee begins land applying waste, the frequency and required parameters will be reevaluated at the next permit reissuance.

2.1 Sample Point Number: 003- Land Application of Ind Sludge & 004 – Land Application of Ind Cake Sludge

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Solids, Total		Percent	Monthly	Grab Comp	
Nitrogen, Total Kjeldahl		Percent	Monthly	Grab Comp	
Chloride		Percent	Monthly	Grab Comp	
Phosphorus, Total		Percent	Quarterly	Grab Comp	
Phosphorus, Water Extractable		% of Tot P	Quarterly	Grab Comp	
Nitrogen, Ammonia (NH3-N) Total		Percent	Quarterly	Grab Comp	
Nitrogen, Organic Total		Percent	Quarterly	Grab Comp	
Potassium, Total Recoverable		Percent	Quarterly	Grab Comp	
pH Field		su	Quarterly	Grab	
Lead, Dry Wt.		mg/kg	Once	Grab Comp	
Zinc, Dry Wt.		mg/kg	Once	Grab Comp	
Copper, Dry Wt.		mg/kg	Once	Grab Comp	
Nickel, Dry Wt.		mg/kg	Once	Grab Comp	
Cadmium, Dry Wt.		mg/kg	Once	Grab Comp	
PCB, Total Dry Wt.		mg/kg	Once	Grab Comp	
PFOA + PFOS		mg/kg	Annual	Calculated	Sampling required annually if generated, 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 if generated, regardless of whether land application

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
					occurs. Perfluoroalkyl and Polyfluoroalkyl Substances based on updated DNR PFAS List. See PFAS Permit Sections for more information.

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.

Ammonium- Monitoring for ammonium removed.

Ammonia Nitrogen, Organic Nitrogen, metals, and PCB- Monitoring added.

PFAS –Monitoring is required annually pursuant to s. NR 214.18(5)(b), Wis. Adm. Code.

Explanation of Limits and Monitoring Requirements

Requirements for land application of industrial sludge are determined in accordance with ch. NR 214 Wis. Adm. Code. Additionally, the required monitoring is consistent with the WPDES General Permit for Landspreading of Industrial Sludge (WI-0057657-07) and ensure adequate characterization of the waste. If the permitee begins land applying waste, the frequency and required parameters will be reevaluated at the next permit reissuance.

Metals sampling is required once in the permit term, this means that over the permit term the sampling can be done at any time but must be completed once.

PFAS- This sampling is required annually even if land application does not occur. The presence and fate of PFAS in municipal and industrial sludges is an emerging public health concern. EPA is currently developing a risk assessment to determine future land application rates and expects to release this risk assessment. In the interim, the department has developed the "Interim Strategy for Land Application of Biosolids and Industrial Sludges Containing PFAS."

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

3 Schedules

3.1 Annual Water Quality Trading (WQT) Report

Required Action	Due Date
Annual WQT Report: Submit an annual WQT report that shall cover the first year of the permit term. The WQT Report shall include: The number of pollutant reduction credits (lbs/month) used each month of the previous year to	01/31/2026

demonstrate compliance; The source of each month's pollutant reduction credits by identifying the approved water quality trading plan that details the source; A summary of the annual inspection of each nonpoint source management practice that generated any of the pollutant reduction credits used during the previous year; and Identification of noncompliance or failure to implement any terms or conditions of this permit with respect to water quality trading that have not been reported in discharge monitoring reports.	
Annual WQT Report #2: Submit an annual WQT report that shall cover the previous year.	01/31/2027
Annual WQT Report #3: Submit an annual WQT report that shall cover the previous year.	01/31/2028
Annual WQT Report #4: Submit an annual WQT report that shall cover the previous year.	01/31/2029
Annual WQT Report #5: Submit the 5th annual WQT report that shall cover the previous year. If the permittee wishes to continue to comply with phosphorus limits through WQT in subsequent permit terms, the permittee shall submit a revised WQT plan including a demonstration of credit need, compliance record of the existing WQT, and any additional practices needed to maintain compliance over time.	01/31/2030
Annual WQT Report Required After Permit Expiration: In the event that this permit is not reissued by the expiration date, the permittee shall continue to submit annual WQT reports by January 31 each year covering the total number of pollutant credits used, the source of the pollution reduction credits, a summary of annual inspection reports performed, and identification of noncompliance or failure to implement any terms or conditions of the approved water quality trading plan for the previous calendar year.	

Explanation of Compliance Schedules

Reports are required, starting in 2020, that include the following information:

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

3.2 Land Application Management Plan

A management plan is required for the land application system.

Required Action	Due Date
Land Application Management Plan: Submit an update to the management plan to optimize the land application system performance and demonstrate compliance with Wisconsin Administrative Code NR 214. This plan is due 90 days prior to land application.	10/01/2026

Explanation of Compliance Schedules

A land application management plan is required prior to the permittee using land application outfalls.

Other Comments

None

Attachments

Categorical Limits Calculations dated 4/17/2025

Water Quality Based Effluent Limits dated 4/17/2025

Justification Of Any Waivers From Permit Application Requirements

No waivers requested or granted as part of this permit reissuance

Prepared By: Jennifer Jerich, Wastewater Specialist

Date: 6/11/2025
Revision date post fact check: 7/2/2025
Revision date post public notice:

CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: April 17, 2025

TO: Jennifer Jerich – SCR/Horicon

FROM: Sarah Luck – SCR/Fitchburg

SUBJECT: Technology-Based Effluent Limitations for Wisconsin Whey Protein
WPDES Permit No. WI-0066371-02-0

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

Parameter	Daily Maximum	Daily Minimum	Monthly Average
BOD_5, Total	86 lbs/day		43 lbs/day
TSS	108 lbs/day		54 lbs/day
pH	9.0 su	6.0 su	

PART 1 – BACKGROUND INFORMATION

Wisconsin Whey Protein, LLC (WWP) owns and operates a cheese and whey processing facility in Darlington, Wisconsin. WWP produces white cheddar curd, lactose whey powder, liquid delactosed permeate, and whey protein concentrate 80 powder.

Treated effluent is discharged via Outfall 001 to an unnamed intermittent tributary (WBIC 921500) for approximately 1.5 miles prior to joining unnamed tributary (WBIC 921400). After approximately 0.75 miles, the unnamed tributary (WBIC 921400) connects with Ames Branch (WBIC 921200) and travels an additional approximately 3.9 miles to the Pecatonica River (WBIC 889100).

PART 2 – INDUSTRIAL CATEGORIES

Chapter NR 240, Wis. Adm. Code, specifies effluent guidelines for discharges from dairy product categories of point sources and subcategories. Wisconsin Whey Protein would fall under the Natural and Processed Cheese, Condensed Whey, and Dry Whey subcategories as defined in s. NR 240.02, Wis. Adm. Code. These guidelines are based on federal effluent guidelines in 40 CFR Part 405 Subparts F, K, and L, respectively. 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 best practicable control technology currently available (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.

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

- The state or federal rules do not 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 best available treatment (BAT) standards for BOD_5, TSS, and pH. BAT applies to priority pollutants and nonconventional pollutants and does not apply to BOD_5, 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

Production processes were all constructed after May 28, 1974. Therefore, the process wastewater from these lines is subject to BPT, BCT, BAT and NSPS standards for the "Natural and Processed Cheese", "Condensed Whey", and "Dry Whey" subcategories are applicable as specified in 40 CFR Part 405 Subparts F, K, and L, respectively, and ch. NR 240.12, Wis. Adm. Code.

PART 4 – CURRENT PRODUCTION LEVELS

The material used for each Subcategory were provided by Wisconsin Whey Protein via the flow diagram included on page 6.

Natural and Processed Cheese

Raw Material	Material Used (lbs/day)
Milk (3.7% Fat)	1,900,000

Whey Cream

Raw Material	Material Used (lbs/day)
Raw whey (internal)	1,200,000
Raw whey (sourced)	170,000
Total	**1,370,000**

Whey Protein Concentrate

Raw Material	Material Used (lbs/day)
Whey	560,000

Lactose Powder & Whey Protein Concentrate Powder

Raw Material	Material Used (lbs/day)
Whey Protein Concentrate	120,000

PART 5 – BOD_5 INPUT

The BOD_5 input is the 5-day biochemical oxygen demand of raw materials that enter the process. The current production levels in Part 4 are converted to BOD_5 input equivalents by multiplying the amount of raw material by BOD_5 factors specified in s. NR 240.03(1) or s. NR 240.07, Wis. Adm. Code, and 40 CFR Part 405.

Natural and Processed Cheese

Input Material	Material Used (lbs/day)	BOD_5 Factor[1] (lbs/100 lbs)	Adjusted Total BOD_5 Input[2] (lbs/day)
Milk (3.7% Fat)	1,900,000	10.39	197,410

Whey Cream

Input Material	Material Used (lbs/day)	BOD_5 Factor[1] (lbs/100 lbs)	Adjusted Total BOD_5 Input[2] (lbs/day)
Raw whey (fluid whey)	1,370,000	4.72	64,664

Whey Protein Concentrate

Input Material	Material Used (lbs/day)	BOD_5 Factor[1] (lbs/100 lbs)	Adjusted Total BOD_5 Input[2] (lbs/day)
Whey (40 Percent Solids)	560,000	26.71	149,576

Lactose Powder & Whey Protein Concentrate Powder

Input Material	Material Used (lbs/day)	BOD_5 Factor[1] (lbs/100 lbs)	Adjusted Total BOD_5 Input[2] (lbs/day)
Whey Protein Concentrate Powder (40 Percent Solids)	120,000	26.71	32,052

Footnotes:

1. The BOD_5 Factors are listed in ch. NR 240.07 Wis. Adm. Code, Table 1 for generally accepted published values for protein, fat, and carbohydrate content.
2. Adjusted Total BOD_5 input = BOD_5 input * BOD_5 factor / 100

PART 6 – TBEL CALCULATIONS FOR NATURAL & PROCESSED CHEESE

pH

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

New Source Performance Standards (NSPS)
The whey production commenced construction after May 28th, 1974. Therefore, the NSPS limitations of 40 CFR Part 405.65 apply.

Total BOD_5 Input (lbs/day)	NSPS Effluent Limitations				Calculated Limits			
	BOD_5 (lbs/1,000 lbs)		TSS (lbs/1,000 lbs)		BOD_5 (lbs/day)[1]		TSS (lbs/day)[2]	
	Monthly Avg	Daily Max	Monthly Avg	Daily Max	Monthly Avg	Daily Max	Monthly Avg	Daily Max
197,410	0.08	0.16	0.10	0.20	15.8	31.6	19.7	39.5

Footnotes:
1. The limits (lbs/day) = total BOD_5 input (lbs/day) / 1000 * BOD NSPS limitations
2. The limits (lbs/day) = total BOD input (lbs/day) / 1000 * TSS NSPS limitations

PART 7 – TBEL CALCULATIONS FOR CONDENSED WHEY

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

New Source Performance Standards (NSPS)
The whey production commenced construction after May 28th, 1974. Therefore, the NSPS limitations of 40 CFR Part 405.115 apply.

Total BOD_5 Input (lbs/day)	NSPS Effluent Limitations				Calculated Limits			
	BOD_5 (lbs/1,000 lbs)		TSS (lbs/1,000 lbs)		BOD_5 (lbs/day)[1]		TSS (lbs/day)[2]	
	Monthly Avg	Daily Max	Monthly Avg	Daily Max	Monthly Avg	Daily Max	Monthly Avg	Daily Max
64,664	0.11	0.22	0.14	0.28	7.1	14.2	9.1	18.1
149,576	0.11	0.22	0.14	0.28	16.5	32.9	20.9	41.9

Footnotes:
1. The limits (lbs/day) = total BOD_5 input (lbs/day) / 1000 * BOD NSPS limitations
2. The limits (lbs/day) = total BOD input (lbs/day) / 1000 * TSS NSPS limitations

PART 8 – TBEL CALCULATIONS FOR DRY WHEY

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

New Source Performance Standards (NSPS)
The whey production commenced construction after May 28th, 1974. Therefore, the NSPS limitations of 40 CFR Part 405.125 apply.

Total BOD_5 Input (lbs/day)	NSPS Effluent Limitations				Calculated Limits			
	BOD_5 (lbs/1,000 lbs)		TSS (lbs/1,000 lbs)		BOD_5 (lbs/day)[1]		TSS (lbs/day)[2]	
	Monthly Avg	Daily Max	Monthly Avg	Daily Max	Monthly Avg	Daily Max	Monthly Avg	Daily Max
32,052	0.11	0.22	0.14	0.28	3.5	7.1	4.5	9.0

Footnotes:
1. The limits (lbs/day) = total BOD_5 input (lbs/day) / 1000 * BOD NSPS limitations
2. The limits (lbs/day) = total BOD input (lbs/day) / 1000 * TSS NSPS limitations

PART 9 – FINAL CALCULATED LIMITS

Per s. NR 240.06(4), Wis. Adm. Code, the total discharge limits shall be the total of the amounts calculated from the BOD_5 input in the final product subcategories and all of the other subcategories with intermediate products in Parts 6 – 8 of this evaluation. Since limits based on NSPS standards are applicable to all production lines, the NSPS standards are the most restrictive calculated set of limits.

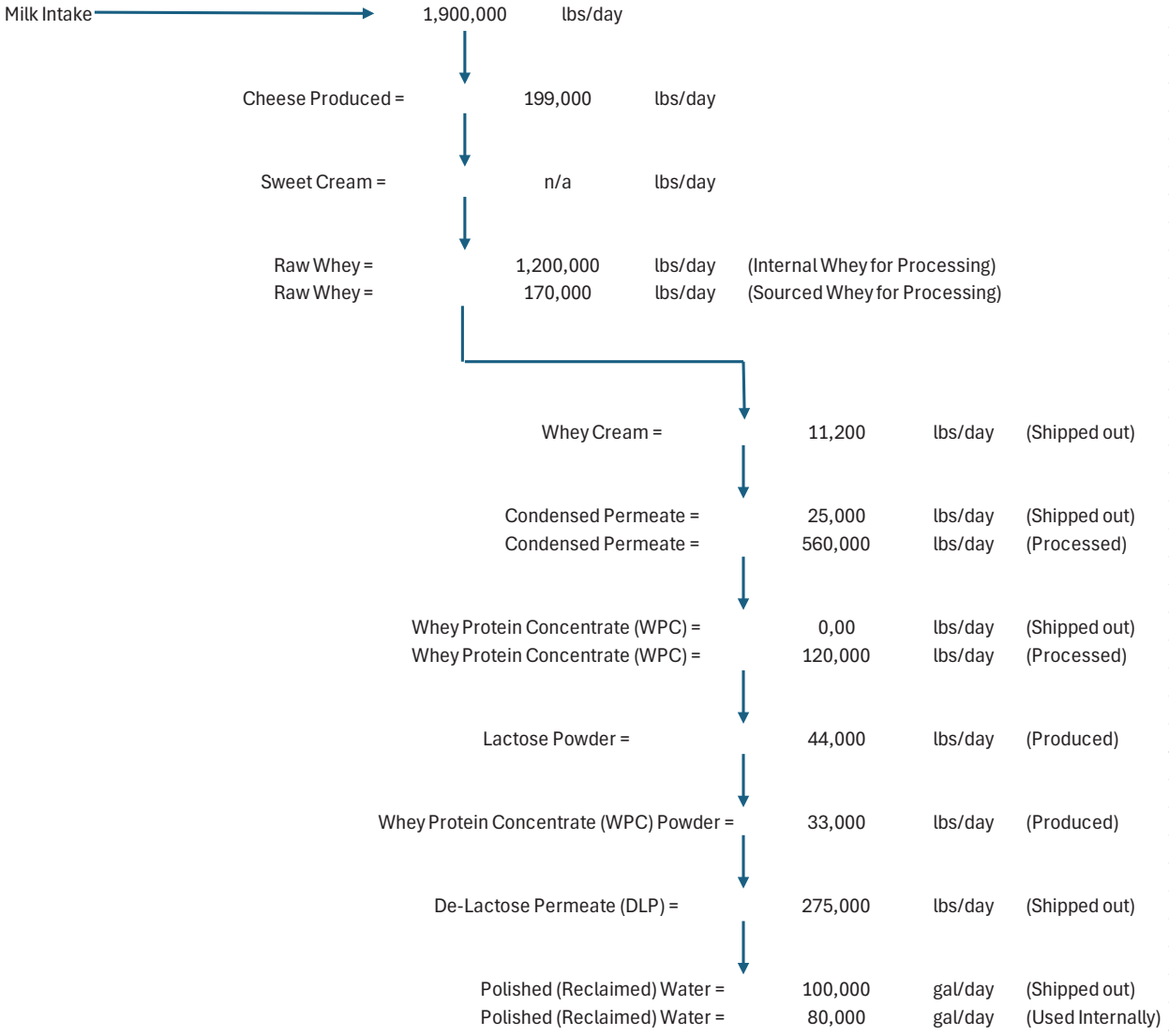
Subcategory	Monthly Average BOD_5 (lbs/day)	Daily Maximum BOD_5 (lbs/day)	Monthly Average TSS (lbs/day)	Daily Maximum TSS (lbs/day)
Natural and Processed Cheese	15.8	31.6	19.7	39.5
Condensed Whey	7.1	14.2	9.1	18.1
Condensed Whey	16.5	32.9	20.9	41.9
Dry Whey	3.5	7.1	4.5	9.0
Total	**43**	**86**	**54**	**108**

Final Calculated Effluent Limitations			
Parameter	**Daily Maximum**	**Daily Minimum**	**Monthly Average**
BOD_5	86 lbs/day		43 lbs/day
TSS	108 lbs/day		54 lbs/day
pH	9.0 su	6.0 su	

The daily maximum and monthly average concentration limits for BOD_5 and TSS in the WQBEL memo dated April 17, 2025 are also recommended to be included in the permit along with the mass limits that are recommended in this TBEL memo.

Flow Diagram

Wisconsin Whey Protein - Darlington, WI
April 11, 2025 (submitted via email)



CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: April 17, 2025

TO: Jennifer Jerich – SCR/Horicon

FROM: Sarah Luck – SCR/Fitchburg

SUBJECT: Water Quality-Based Effluent Limitations for Wisconsin Whey Protein
WPDES Permit No. WI-0066371-02-0

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 Wisconsin Whey Protein in Lafayette County. This industrial facility discharges to the Unnamed Tributary to the Ames Branch, located in the Middle Pecatonica River Watershed in the Sugar-Pecatonica River Basin. 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	Six-Month Average	Footnotes
Flow Rate						1,2
BOD_5	20 mg/L 86 lbs/day			10 mg/L 43 lbs/day		3
TSS	20 mg/L 108 lbs/day			10 mg/L 54 lbs/day		3
pH	9.0 s.u.	6.0 s.u.				2
Dissolved Oxygen		7.0 mg/L				2
Ammonia Nitrogen April - May June – September October – March	 Variable Variable Variable		 7.5 mg/L 5.7 mg/L 10 mg/L	 3.0 mg/L 2.3 mg/L 4.0 mg/L		4
Chlorine, Total Residual	19 µg/L		7.3 µg/L	**7.3 µg/L**		5
Chloride						1
Phosphorus WQT MCL Final WQBELs				 1.0 mg/L (12-mo avg) 0.225 mg/L	 0.075 mg/L 0.21 lbs/day	2,6
TKN, Nitrate+Nitrite, and Total Nitrogen						1,7
Temperature						2,8
Acute WET						9,11
Chronic WET				1.0 TU_c		10,11

Footnotes:

1. Monitoring only.
2. No changes from the current permit.

3. Categorical mass limits based on ch. NR 240, Wis. Adm. Code, were evaluated in the Technology-Based Effluent Limits memo, dated April 17, 2025, and are based on current production data.
4. The facility has communicated the preference for a variable daily maximum ammonia nitrogen limit which corresponds to various effluent pH values (shown below) in place of the single daily maximum limit. These limits apply year-round.

Effluent pH s.u.	**Limit mg/L**	**Effluent pH s.u.**	**Limit mg/L**	**Effluent pH s.u.**	**Limit mg/L**
$6.0 \leq pH \leq 6.1$	59	$7.0 < pH \leq 7.1$	33	$8.0 < pH \leq 8.1$	7.0
$6.1 < pH \leq 6.2$	53	$7.1 < pH \leq 7.2$	29	$8.1 < pH \leq 8.2$	5.7
$6.2 < pH \leq 6.3$	52	$7.2 < pH \leq 7.3$	26	$8.2 < pH \leq 8.3$	4.7
$6.3 < pH \leq 6.4$	51	$7.3 < pH \leq 7.4$	23	$8.3 < pH \leq 8.4$	3.9
$6.4 < pH \leq 6.5$	49	$7.4 < pH \leq 7.5$	20	$8.4 < pH \leq 8.5$	3.2
$6.5 < pH \leq 6.6$	47	$7.5 < pH \leq 7.6$	17	$8.5 < pH \leq 8.6$	2.7
$6.6 < pH \leq 6.7$	44	$7.6 < pH \leq 7.7$	14	$8.6 < pH \leq 8.7$	2.2
$6.7 < pH \leq 6.8$	42	$7.7 < pH \leq 7.8$	12	$8.7 < pH \leq 8.8$	1.8
$6.8 < pH \leq 6.9$	39	$7.8 < pH \leq 7.9$	10	$8.8 < pH \leq 8.9$	1.6
$6.9 < pH \leq 7.0$	36	$7.9 < pH \leq 8.0$	8.4	$8.9 < pH \leq 9.0$	1.3

5. Additional limits to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Code, are included in bold.
6. A minimum control level (MCL) is required for water quality trading (WQT). This value is 1.0 mg/L as a rolling 12-month average and should not be exceeded during the permit term.
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 Class A cheese facilities (as defined in ch. NR 240, Wis. Adm. Code). Sections 283.37(5) and 283.55(1)(e), Wis. Stats, and ss. NR 200.065(1)(g) and NR 200.065(1)(h), Wis. Adm. Code, provide the authority to request this monitoring during the permit term. Total Nitrogen is the sum of nitrate (NO_3), nitrite (NO_2), and total Kjeldahl nitrogen (TKN) (all expressed as N).
8. The following thermal limits apply:

Month	Weekly Average Effluent Limitation (°F)	Daily Maximum Effluent Limitation (°F)
JAN	49	76
FEB	50	76
MAR	52	77
APR	55	79
MAY	65	82
JUNE	76	84
JULY	81	85
AUG	81	84
SEPT	73	82
OCT	61	80
NOV	49	77
DEC	49	76

9. Twice yearly acute WET tests are required. According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), a synthetic (standard) laboratory water may be used as the dilution water and primary control in acute WET tests.

10. Quarterly chronic WET testing is required. The Instream Waste Concentration (IWC) to assess chronic test results is 100%. 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%. The primary control water used in chronic WET tests conducted on Outfall 001 shall be a synthetic (standard) laboratory water since there is no receiving water flow upstream of the discharge.
11. 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. WET testing should continue after the permit expiration date (until the permit is reissued).

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

Attachments (4) – Narrative, Site Map, Ammonia Nitrogen Calculations, and Thermal Table

PREPARED BY: Sarah Luck _____ Date: April 17, 2025

Sarah Luck
Water Resources Engineer

E-cc: Caitlin O'Connell, Wastewater Engineer – SCR/Dodgeville
Lisa Creegan, Regional Wastewater Supervisor – SCR/Fitchburg
Diane Figiel, Water Resources Engineer – WY/3
Kari Fleming, Environmental Toxicologist – WY/3
Nate Willis, Wastewater Engineer – WY/3

Attachment #1

Water Quality-Based Effluent Limitations for
Wisconsin Whey Protein

WPDES Permit No. W I-0066371-02-0

PART 1 – BACKGROUND INFORMATION

Facility Description

Wisconsin Whey Protein, LLC (WWP) owns and operates a cheese and whey processing facility in Darlington, Wisconsin. WWP receives a maximum 2,000,000 lbs/day of milk to produce a maximum 200,000 lbs/day of white cheddar curd, 650,000 lbs/month of lactose whey powder, and 200,000 lbs./day of liquid delactosed permeate. WWP also receives an additional 200,000 lbs/day of concentrated whey that is processed further on site to produce approximately 600,000 lbs/month of whey protein concentrate 80 powder.

WWP operates an activated sludge wastewater treatment facility that became operational in May 2020 and consists of an EQ tank, automatic strainer, selector tank, two pre-aeration tanks, aeration tank, chemical phosphorus removal, three ultrafiltration membrane units, and two cooling towers. Upgrades completed during the previous permit term included the addition of a fourth ultrafiltration membrane skid, third cooling tower, chiller system, and high strength waste (HSW) tank. Treated effluent is discharged via Outfall 001 Effluent is discharged to an unnamed intermittent tributary (WBIC 921500) for approximately 1.5 miles prior to joining a second unnamed tributary (WBIC 921400). After approximately 0.75 miles, the unnamed tributary (WBIC 921400) connects with Ames Branch (WBIC 921200) and travels an additional approximately 3.9 miles to the Pecatonica River (WBIC 889100). NCCW and reverse osmosis permeate are added within the treatment process or at the end with the wastewater treatment plant effluent, prior to discharge. Industrial liquid sludge from the treatment process is thickened in two DAF units and stored in four onsite sludge storage tanks before being hauled offsite by a contract hauler via Outfall 003. High strength wastes segregated to the HSW tank are also hauled offsite by a contract hauler via Outfall 002.

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

Existing Permit Limitations

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

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Flow Rate						1
BOD_5	20 mg/L 136 lbs/day			10 mg/L 68 lbs/day		-
TSS	20 mg/L 173 lbs/day			10 mg/L 86 lbs/day		-
pH	9.0 s.u.	6.0 s.u.				2
Dissolved Oxygen		7.0 mg/L				2

Attachment #1

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Ammonia Nitrogen April - May June – September October – March	 6.9 mg/L 6.9 mg/L 6.9 mg/L		 7.5 mg/L 5.7 mg/L -	 3.0 mg/L 2.3 mg/L 4.0 mg/L		-
Chloride						1
Phosphorus WQT MCL WQBELs				 1.0 mg/L 0.225 mg/L	 0.075 mg/L 0.21 lbs/day	3
Temperature						4
Acute WET						5
Chronic WET						5

Footnotes:

1. Monitoring only.
2. These limitations are not being evaluated as part of this review. Because the water quality criteria (WQC), reference effluent flow rates, and receiving water characteristics have not changed, limitations for these water quality characteristics do not need to be re-evaluated at this time.
3. The facility complied with phosphorus limits through water quality trading (WQT). The minimum control level (MCL) was 1.0 mg/L as a rolling 12-month average.
4. The following thermal limits were in effect:

Month	Weekly Average Effluent Limitation (°F)	Daily Maximum Effluent Limitation (°F)
JAN	49	76
FEB	50	76
MAR	52	77
APR	55	79
MAY	65	82
JUNE	76	84
JULY	81	85
AUG	81	84
SEPT	73	82
OCT	61	80
NOV	49	77
DEC	49	76

5. Three acute and annual chronic WET testing were required. The IWC for chronic WET was 100%. 2019 and 2020 WET tests were not completed since the facility did not start discharging until May 2020.

Receiving Water Information

- Name: Unnamed Tributary to the Ames Branch
  Effluent is discharged to an unnamed intermittent tributary (WBIC 921500) for approximately 1.5 miles prior to joining unnamed tributary (WBIC 921400). After approximately 0.75 miles, the

unnamed tributary (WBIC 921400) connects with Ames Branch (WBIC 921200) and travels an additional approximately 3.9 miles to the Pecatonica River (WBIC 889100).

- Waterbody Identification Code (WBIC): 921500
- 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:
  $7\text{-}Q_{10}$ = 0 cubic feet per second (cfs)
  $7\text{-}Q_2$ = 0 cfs
- Hardness = 245 mg/L as $CaCO_3$. Effluent hardness is used in place of receiving water because there is no receiving water flow upstream of the discharge.
- % of low flow used to calculate limits in accordance with s. NR 106.06(4)(c)5., Wis. Adm. Code: Not applicable where the receiving water low flows are zero.
- Source of background concentration data: Background concentrations are not included because they do not impact the calculated WQBEL when the receiving water low flows are equal to zero.
- Multiple dischargers: None.
- Impaired water status: Approximately 6 miles downstream, the Pecatonica River is listed as impaired for phosphorus.

Effluent Information

- Flow rate:
  Maximum annual average = 0.392 million gallons per day (MGD)
  For reference, the actual average flow from May 2020 through January 2025 was 0.304 MGD.
- Hardness = 245 mg/L as $CaCO_3$. This value represents the geometric mean of four samples collected in April 2023 which were reported on the permit application.
- Acute dilution factor used in accordance with s. NR 106.06(3)(c), Wis. Adm. Code: Not applicable – this facility does not have an approved Zone of Initial Dilution (ZID).
- Water supply: Municipality waterworks (City of Darlington)
- Additives: Wisconsin Whey Protein has included 12 additives on the permit application. They are discussed in Part 7.
- 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, in the column titled "MEAN EFFL. CONC.". Otherwise, substances with multiple effluent data are shown in the tables below or in their respective parts in this evaluation.

Copper Effluent Data

Sample Date	Copper (µg/L)
04/12/2023	<1.9
04/15/2023	<1.9
04/18/2023	<1.9
04/21/2023	<1.9
Average	<1.9

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

Attachment #1

Chloride Effluent Data

5/5/20 – 1/26/25	Chloride (mg/L)
1-day P_{99}	521
4-day P_{99}	362
30-day P_{99}	280
Mean	239
Std	90
Sample size	244
Range	81 - 530

The following table presents the average concentrations and loadings at Outfall 001 from May 2020 through January 2025 for all parameters with limits in the current permit to meet the requirements of s. NR 201.03(6), Wis. Adm. Code.

Averages of Parameters with Limits

	Average Measurement	Average Mass Discharged
BOD_5	1 mg/L*	2.9 lbs/day
TSS	1 mg/L*	3.8 lbs/day
pH field	7.26 s.u.	
Dissolved Oxygen	10.5 mg/L	
Ammonia Nitrogen	1.81 mg/L*	
Phosphorus	0.23 mg/L	0.55 lbs/day
Temperature	63°F	

*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 99th percentile (or P_{99}) 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_{10}

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.

$$\text{Limitation} = \frac{(WQC)\,(Qs + 1 - f\ \ Qe) - (Qs - f\,Qe)\,(Cs)}{Qe}$$

Where:

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

Qs = average minimum 1-day flow which occurs once in 10 years (1-day Q_{10}) if the 1-day Q_{10} 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.

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 = 0 cfs

SUBSTANCE	REF. HARD. mg/L	ATC	MAX. EFFL. LIMIT**	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	1-day P_{99}	1-day MAX. CONC.
Chlorine		19.0	19.0	3.81			
Arsenic		340	339.8	68.0	<1.1		
Cadmium	245	28.8	28.8	5.8	<0.19		
Chromium	245	3753	3752.9	751	<1.1		
Copper	245	36.1	36.1	7.2	<1.9		
Lead	245	254	253.9	50.8	<4.3		
Nickel	245	1000	1000.4	200	<1.1		
Zinc	245	263	263.3	52.7	<5.7		
Chloride (mg/L)		757	757.0			521	530

* Per the changes to s. NR 106.07(3), Wis. Adm. Code, effective 09/01/2016 consideration of ambient concentrations and 1-Q_{10} flow rates yields a more restrictive limit than the 2 × ATC method of limit calculation.

Weekly Average Limits based on Chronic Toxicity Criteria (CTC)

RECEIVING WATER FLOW = 0 cfs

SUBSTANCE	REF. HARD.* mg/L	CTC	WEEKLY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	4-day P_{99}
Chlorine		7.28	7.28	1.46		
Arsenic		152.2	152	30.4	<1.1	
Cadmium	175	3.82	3.82	0.8	<0.19	

Attachment #1

SUBSTANCE	REF. HARD.* mg/L	CTC	WEEKLY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	4-day P_{99}
Chromium	301	325.75	326	65.2	<1.1	
Copper	495	40.68	40.7	8.14	<1.9	
Lead	356	95.51	95.5	19.1	<4.3	
Nickel	268	120.18	120	24.0	<1.1	
Zinc	333	344.68	345	68.9	<5.7	
Chloride (mg/L)		395	395			362

* 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 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 = 0 cfs

SUBSTANCE	HTC	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Cadmium	370	370	74.0	<0.19
Chromium (+3)	3818000	3818000	763600	<1.1
Lead	140	140	28.0	<4.3
Nickel	43000	43000	8600	<1.1

Monthly Average Limits based on Human Cancer Criteria (HCC)
RECEIVING WATER FLOW = 0 cfs

SUBSTANCE	HCC	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Arsenic	13.3	13.3	2.66	<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. Limits and/or monitoring recommendations are made in the paragraphs below.

Total Residual Chlorine – Wisconsin Whey Protein reported chlorinating the ultrafiltration membranes, which are located near the end of the wastewater treatment process. Since chlorine is added, effluent limitations are recommended. Specifically, **a daily maximum limit of 19 µg/L and a weekly average limit of 7.3 µg/L are required.**

A non-detectable effluent concentration of <0.2 µg/L was reported on the permit application, but the actual result was <0.02 mg/L (<20 µg/L) and was from the WET test conducted on 02/07/23, confirmed by the facility in an email dated 04/03/25.

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

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 weekly average limitation is determined necessary to protect water quality:

- A monthly average limitation shall also be included in the permit and set equal to the weekly average limit unless a more restrictive limit is already determined necessary to protect water quality.

Therefore**, a monthly average chlorine limit of 7.3 µg/L is also required**.

Chloride – Considering available effluent data from the current permit term (May 2020 through January 2025), the 1-day P_{99} chloride concentration is 521 mg/L, and the 4-day P_{99} of effluent data is 362 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 a minimum of 11 sample results are available at the next permit issuance** to meet the data requirements of s. NR 106.85, Wis. Adm. Code.

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

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

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

- The maximum expected effluent pH has changed.

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

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

Where:

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

The effluent pH data was examined as part of this evaluation. A total of 1673 daily maximum pH sample results were reported from June 2020 through January 2025. The maximum reported value was 11.01 s.u. (Standard pH Units). The effluent pH was 8.25 s.u. or less 99% of the time. The 1-day P_{99}, calculated in accordance with s. NR 106.05(5), Wis. Adm. Code, is 8.19 s.u. The mean plus the standard deviation multiplied by a factor of 2.33, an estimate of the upper ninety ninth percentile for a normally distributed dataset, is 8.15 s.u. Therefore, a value of 8.25 s.u. is believed to represent the maximum reasonably expected pH. Substituting a value of 8.25 s.u. into the equation above yields an ATC = 5.2 mg/L.

It should be noted that two pH samples of 14.0 s.u. occurred on 3/26/22 and 3/27/22. The facility reported the inline effluent pH probe was malfunctioning and so these results were not included.

Daily Maximum Ammonia Nitrogen Effluent Limitations Calculation Method

In accordance with s. NR 106.32(2), Wis. Adm. Code daily maximum ammonia limitations are calculated using the 1-Q_{10} receiving water low flow if it is determined that the previous method of acute ammonia limit calculation (2×ATC) is not sufficiently protective of the fish and aquatic life. The more restrictive calculated limits shall apply.

The calculated daily maximum ammonia nitrogen effluent limits using the mass balance approach with the 1-Q_{10} (estimated as 80 % of 7-Q_{10}) and the 2×ATC approach are shown below.

Daily Maximum Ammonia Nitrogen Determination

	Ammonia Nitrogen Limit (mg/L)
2×ATC	10
1-Q_{10}	5.2

The 1-Q_{10} method yields the most stringent limits for Wisconsin Whey Protein.

Presented below is a table of daily maximum limitations corresponding to various effluent pH values.

Daily Maximum Ammonia Nitrogen Limits – WWSF

Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L
6.0 ≤ pH ≤ 6.1	59	7.0 < pH ≤ 7.1	33	8.0 < pH ≤ 8.1	7.0
6.1 < pH ≤ 6.2	53	7.1 < pH ≤ 7.2	29	8.1 < pH ≤ 8.2	5.7
6.2 < pH ≤ 6.3	52	7.2 < pH ≤ 7.3	26	8.2 < pH ≤ 8.3	4.7
6.3 < pH ≤ 6.4	51	7.3 < pH ≤ 7.4	23	8.3 < pH ≤ 8.4	3.9
6.4 < pH ≤ 6.5	49	7.4 < pH ≤ 7.5	20	8.4 < pH ≤ 8.5	3.2
6.5 < pH ≤ 6.6	47	7.5 < pH ≤ 7.6	17	8.5 < pH ≤ 8.6	2.7
6.6 < pH ≤ 6.7	44	7.6 < pH ≤ 7.7	14	8.6 < pH ≤ 8.7	2.2
6.7 < pH ≤ 6.8	42	7.7 < pH ≤ 7.8	12	8.7 < pH ≤ 8.8	1.8
6.8 < pH ≤ 6.9	39	7.8 < pH ≤ 7.9	10	8.8 < pH ≤ 8.9	1.6
6.9 < pH ≤ 7.0	36	7.9 < pH ≤ 8.0	8.4	8.9 < pH ≤ 9.0	1.3

Attachment #1

Weekly and Monthly Average Limits based on Chronic Toxicity Criteria (CTC)

The weekly and monthly average ammonia nitrogen limits calculation from the previous memo do not change because there have been no changes in the receiving water assimilative capacity, so limits are set equal to criteria. The calculations from the previous WQBEL memo are shown in Attachment #2.

Effluent Data

The following table evaluates the statistics based upon ammonia data reported from May 2020 through January 2025.

Ammonia Nitrogen Effluent Data

Ammonia Nitrogen (mg/L)	April - May	June - September	October - March
1-day P_{99}	14.36	13.96	27.32
4-day P_{99}	8.26	9.23	17.32
30-day P_{99}	3.53	3.92	7.24
Mean*	1.55	1.15	2.36
Std	3.61	4.57	8.37
Sample size	109 (16 ND)	246 (42 ND)	346 (66 ND)
Range	<0.08 - 19.43	<0.08 - 33	<0.08 - 55.91

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

Reasonable Potential

The need to include ammonia limits in the Wisconsin Whey Protein permit is determined by calculating 99th upper percentile (or P_{99}) values for ammonia and comparing those to the calculated limits. Based on this comparison, **there is reasonable potential for the discharge to exceed the calculated ammonia nitrogen limits and daily, weekly, and monthly limits are required in each month range.** All of these limits were already in effect except the weekly average limit of 10 mg/L from October to March.

Conclusions and Recommendations

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

The facility indicated in an email to the Department on 04/04/2025 that they would prefer to switch to the pH-dependent daily maximum limit in place of the single daily maximum limit of 3.5 mg/L.

Final Ammonia Nitrogen Limits

Variable Daily Max Limit	Daily Maximum mg/L	Weekly Average mg/L	Monthly Average mg/L
April – May	Variable	7.5	3.0
June – September	Variable	5.7	2.3
October – March	Variable	10	4.0

PART 4 – PHOSPHORUS

Technology-Based Effluent Limit TBEL)
Subchapter II of Chapter NR 217, Wis. Adm. Code, requires municipal wastewater treatment facilities that discharge greater than 60 pounds of total phosphorus per month to comply with a 12-month rolling average limit of 1.0 mg/L, or an approved alternative concentration limit.

Since Wisconsin Whey Protein had to comply with a limit equal to the TBEL of 1.0 mg/L as a rolling 12-month average for water quality trading, the need for a TBEL will not be considered further.

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

Water Quality-Based Effluent Limits WQBEL)
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 the Unnamed Tributary to the Ames Branch.

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.

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

Where:

WQC = 0.075 mg/L for the Unnamed Tributary to the Ames Branch
Qs = 100% of the 7-Q_2 of 0 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 = 0.392 MGD = 0.607 cfs
f = the fraction of effluent withdrawn from the receiving water = 0

The effluent limit is set equal to criteria because the receiving water flow is equal to zero.

Effluent Data
The following table summarizes effluent total phosphorus monitoring data from May 2020 through January 2025.

Total Phosphorus Effluent Data

	mg/L	lbs/day
1-day P_{99}	1.66	3.94
4-day P_{99}	0.91	2.16

Attachment #1

	mg/L	lbs/day
30-day P_{99}	0.43	1.02
Mean*	0.23	0.55
Std	0.36	0.86
Sample size	703 (13 ND)	702
Range	<0.02 - 6.08	0 - 15.97

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

Reasonable Potential Determination
The discharge has reasonable potential to cause or contribute to an exceedance of the water quality criterion and is currently operating the treatment facility to remove phosphorus and meet the WQBELs. Therefore, **the WQBELs are required to continue in the reissued permit per ss. NR 217.15 and 205.067(5), Wis. Adm. Code.**

Limit Expression
According to s. NR 217.14(2), Wis. Adm. Code, because the calculated WQBEL is less than or equal to 0.3 mg/L, the effluent limit of 0.075 mg/L may be expressed as a six-month average. If a concentration limitation expressed as a six-month average is included in the permit, a monthly average concentration limitation of 0.225 mg/L, equal to three times the WQBEL calculated under s. NR 217.13, Wis. Adm. Code shall also be included in the permit. The six-month average should be averaged during the months of May – October and November – April.

Mass Limits
A mass limit is also required, pursuant to s. NR 217.14(1)(a), Wis. Adm. Code, because the discharge is to a surface water that is upstream of a phosphorus-impaired water (Pecatonica River). This final mass limit shall be 0.075 mg/L × 8.34 × 0.39 MGD = 0.24 lbs/day expressed as a six-month average. However, this mass limit is greater than the previously calculated mass limit of 0.21 lbs/day. Without a demonstration of need for a higher limit in accordance with s. NR 207.04, Wis. Adm. Code, **the current limit of 0.21 lbs/day should be continued** in the reissued permit.

Water Quality Trading Minimum Control Level
A water quality trading plan has been conditionally approved as an alternative compliance option to offset any total phosphorus discharged from Outfall 001 that exceeds the WQBELs. The phosphorus WQBELs may be expressed as computed compliance limits, but a Minimum Control Level (MCL) must be set as a limit not to be exceeded at the outfall location. Wisconsin Whey Protein has been approved for up to 172.3 lbs/year of water quality trading credits through 2028. **The existing MCL of 1.0 mg/L as a 12-month rolling average**, equal to the TBEL for an industrial discharge, **is recommended to continue.**

PART 5 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR THERMAL

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

depending on the receiving water classification.

In accordance with s. NR 106.53(2)(b), Wis. Adm. Code, the highest daily maximum flow rate for a calendar month is used to determine the acute (daily maximum) effluent limitation. Since the receiving water flow is equal to zero, temperature limits are set equal to criteria.

The table below summarizes the maximum temperatures reported during monitoring from May 2020 through January 2025.

Monthly Temperature Effluent Data & Limits

Month	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Weekly Maximum (°F)	Daily Maximum (°F)	Weekly Average Effluent Limitation (°F)	Daily Maximum Effluent Limitation (°F)
JAN	66	76	**49**	**76**
FEB	71	77	**50**	**76**
MAR	61	75	**52**	77
APR	69	78	**55**	79
MAY	77	84	**65**	**82**
JUN	83	86	**76**	**84**
JUL	79	86	81	**85**
AUG	83	87	**81**	**84**
SEP	73	78	**73**	82
OCT	73	77	**61**	80
NOV	62	79	**49**	**77**
DEC	78	82	**49**	**76**

Reasonable Potential

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

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

Comparing the representative highest effluent temperature to the calculated effluent limits determines the reasonable potential of exceeding the effluent limits. The months in which limitations are triggered are shown in bold. However, since the facility has installed a third cooling tower (February 2022) and a chiller system (October 2024), **all thermal limits in effect must be retained** in accordance with s. NR 205.067(5)(a), Wis. Adm. Code, regardless of reasonable potential.

The following general options are available for a facility to explore potential relief from the temperature limits:

- Effluent monitoring data: Verification or additional effluent monitoring (flow and/or temperature) may be appropriate if there were questions on the representativeness of the current effluent data.
- Collection of site-specific ambient temperature: default background temperatures for streams in Wisconsin, so actual data from the direct receiving water may provide for relaxed thermal limits but only if the site-specific temperatures are lower than the small stream defaults used in the above tables
- A variance to the water quality standard: This is typically considered to be the least preferable and most complex option as it requires the evaluation of the other alternatives.

These options are explained in additional detail in the August 15, 2013 Department *Guidance for Implementation of Wisconsin's Thermal Water Quality Standards* https://dnr.wisconsin.gov/topic/Wastewater/Thermal.html.

PART 6 – WHOLE EFFLUENT TOXICITY

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_{50} (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_{25} (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 100%,** shown in the WET Checklist summary below, was calculated according to the following equation, as specified in s. NR 106.03(6), Wis. Adm Code:

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

Where:

Q_e = annual average flow = 0.392 MGD = 0.607 cfs
f = fraction of the Q_e withdrawn from the receiving water = 0
Q_s = ¼ of the 7-Q_{10} = 0 cfs ÷ 4 = 0 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 synthetic (standard laboratory water since there is no available receiving water flow upstream of the discharge.**

- 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.

WET Data History

Date Test Initiated	Acute Results LC_{50} %				Chronic Results IC_{25} %				Footnotes or Comments
	C. dubia	Fathead minnow	Pass or Fail?	Used in RP?	*C. dubia*	Fathead Minnow	Pass or Fail?	Use in RP?	
10/12/2021	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
07/05/2022	>100	>100	Pass	Yes	33.1	>100	Fail	Yes	
09/27/2022	-	-	-	-	>100	>100	Pass	Yes	Retest
10/11/2022	-	-	-	-	>100	>100	Pass	Yes	Retest
02/07/2023	-	-	-	-	>100	>100	Pass	Yes	
04/02/2024	>100	>100	Pass	Yes	>100	>100	Pass	Yes	

*The facility was not discharging until May 2020.

- 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_{50}, IC_{25} or $IC_{50} \geq 100\%$).

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

  Chronic Reasonable Potential = [(TU_c effluent) (B)(IWC)]

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Chronic WET Limit Parameters

TUc (maximum) $100/IC_{25}$	**B** (multiplication factor from s. NR 106.08(6)(c), Wis. Adm. Code, Table 4)	IWC
100/33.1 = 3.0	6.2 Based on 1 detect	100%

[(TUc effluent) (B)(IWC)] = 18.7 > 1.0

Therefore, **reasonable potential is shown for a chronic WET limit** using the procedures in s. NR 106.08(6), Wis. Adm. Code, and representative data from 2021 through 2023.

Expression of WET Limits

Chronic WET limit = [100/IWC] TU_c = [100/100] TU_c = **1.0 TU_c, expressed as a monthly average**

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

WET Checklist Summary

	Acute	**Chronic**
AMZ/IWC	Not Applicable. **0 Points**	IWC = 100% **15 Points**
Historical Data	3 tests used to calculate RP. No tests failed. **0 Points**	6 tests used to calculate RP. One test failed. **0 Points**
Effluent Variability	Permit violations and upsets. **10 Points**	Same as Acute. **10 Points**
Receiving Water Classification	WWSF **5 Points**	Same as Acute. **5 Points**
Chemical-Specific Data	Reasonable potential for ammonia nitrogen limits based on ATC; chloride detected. Additional Compounds of Concern: None. **6 Points**	Reasonable potential for ammonia nitrogen limits based on CTC; chloride detected. Additional Compounds of Concern: None. **6 Points**
Additives	Two biocides and ten water quality conditioners. Permittee has proper P chemical SOPs in place. **16 Points**	12 additives used more than once per 4 days. **16 Points**
Discharge Category	Dairy Facility **20 Points**	Same as Acute. **20 Points**
Wastewater Treatment	Secondary Treatment **0 Points**	Same as Acute. **0 Points**
Downstream	No impacts known.	Same as Acute.

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	Acute	Chronic
Impacts	**0 Points**	**0 Points**
Total Checklist Points:	**57 Points**	**72 Points**
Recommended Monitoring Frequency (from Checklist):	2x yearly	Quarterly
Limit Required?	No	Limit = 1.0 TU_c
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, **twice yearly acute and quarterly chronic WET tests are recommended in the reissued permit.** 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. Chronic testing should continue after the permit expiration date (until the permit is reissued).

- According to the requirements specified in s. NR 106.08, Wis. Adm. Code, **a chronic WET limit is required. The chronic WET limit shall be expressed as 1.0 TU_c as a monthly average** in the effluent limits table of the permit. A minimum of annual chronic monitoring is required because a chronic WET limit is required. Federal regulations in 40 CFR Part 122.44(i) require that monitoring occur at least once per year when a limit is present.

Attachment #1

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* (2022) https://dnr.wisconsin.gov/topic/Wastewater/Additives.html.

Due to the number of additives used at the facility, an abbreviated tabular approach is used below.

Additive Parameters

Name	Manufacturer	Purpose	Location Used	Max Quantity Used	Use Frequency (days/wk)	Equivalent Effluent Conc. (mg/L)[2]	Potential Use Restriction (mg/L)
Continuous Use							
Dazzel Sewer Sweetener	Aquafix	Odor control	Added to the RAS pit prior to the selector tank	1 gal/day	7	2.6 mg/L	Not expected in discharge
Hydrifloc 9880[1]	Hydrite	Flocculant	Polymer used in the DAFs	5 gal/day	5	12.8 mg/L	Not expected in discharge
San-I-King No. 451[3]	Hydrite	Sanitizer	Ultrafiltration membranes during daily flushes	5 gal/day	7	-	Chlorine WQBELs
Aluminum sulfate[3]	Affinity Chemical	Coagulant/ flocculant	Selector and aeration basin (per SOP)	300 gal/day	7	-	SOP
Quik-Zyme L	Aquafix	Fat degradation	Used in the EQ and selector tanks during upsets or FOG issues	1-2 gal/day	7	5.1 mg/L	None – below calculated secondary acute and secondary chronic values
Hydrite 1050 (Sodium Hydroxide)[3]	Hydrite	pH neutralization	Ultrafiltration membrane CIP	20 gal/day	7	-	pH WQBELs; Toxicity documented/understood

Attachment #1

Name	Manufacturer	Purpose	Location Used	Max Quantity Used	Use Frequency (days/wk)	Equivalent Effluent Conc. (mg/L)[2]	Potential Use Restriction (mg/L)
Soda Ash[3]	Genesis Alkali	pH Adjustment	EQ tank	100 lbs/day	4	-	pH WQBELs; Toxicity documented/understood
Intermittent Use							
Hydriclear 1006 (Ferric Chloride)[3]	Hydrite	Coagulant	Only used in emergencies in the aeration tank	30 gallons per application	1	-	Toxicity documented/understood
Hydrogen Peroxide 34%	Hydrite	Antibacterial agent	Spill clean up	50 gallons per application	1	-	Not expected in discharge
Ultra LFA 176	Nelson Jameson	Cleaner	Ultrafiltration membrane CIP	5 gal/day	1	-	Not expected in the discharge/nitrogen monitoring
Sodium Bisulfite 40%[3]	Hydrite	pH Adjustment	Added in the RAS pit prior to the selector tank	25 gal/day	1	-	pH WQBELs; Toxicity documented/understood
Suppressor 2360	Hydrite	Foam control	Used during emergencies for foam control in the aeration tank	4 gal/day	1	-	Toxicity documented/understood

1. Hydrifloc 9059 was listed on the permit application but has been replaced with Hydrifloc 9880.
2. Equivalent effluent concentrations are calculated based on the max quantity used, use dilution, effluent flow of 0.392 MGD, and assuming no loss to environment or neutralization.
3. An additive review is not necessary for any additives where either the toxicity is well documented and understood, can be controlled by a WQBEL, or are not believed to be present in the discharge.

Dazzel Sewer Sweetener

From the facility: "Dazzel Sewer Sweetener is an alcohol-based masking agent primarily composed of organic aromatics. It is dosed in the return activated sludge pits/sumps which ensures full aerobic treatment and decomposition as an organic substance. Further, the ingredients have low vapor points and readily boil off during the treatment process."

Wisconsin Whey Protein has requested the use of this additive at a maximum dosage rate of 1.0 gal/day. Assuming none of the additive is lost to the environment from the application point to Outfall 001, an effluent flow of 0.392 MGD, and an additive density of 1.0 g/cm^3, the equivalent effluent concentration is approximately 2.6 mg/L.

There is no available toxicological data with which to calculate secondary acute and secondary chronic values. However, given the explanation above provided by the facility, the additive is not expected in the discharge. **The Department may re-evaluate approval if toxicity is found in the effluent and may require that the facility contact the chemical manufacturer in order to provide toxicity information needed to conduct an additive review before continued use of the additive is permitted.**

Hydrifloc 9880

From the facility: "Hydrifloc 9880 (Previously used 9059) should be removed more than 80% after it runs through dissolved air flotation, with any residuals being completely removed after aerobic treatment."

Wisconsin Whey Protein has requested the use of this additive at a maximum dosage rate of 5.0 gal/day. Assuming none of the additive is lost to the environment from the application point to Outfall 001, an effluent flow of 0.392 MGD, and an additive density of 1.0 g/cm^3, the equivalent effluent concentration is approximately 12.8 mg/L.

The toxicity data available in Section 12 of the chemical manufacturer's safety data sheet does not meet the minimum toxicity information requirements to calculate any potential limits to control the discharge of this additive (toxicity information is listed as being for a similar product and not the product itself). However, given the explanation above provided by the facility, the additive is not expected in the discharge. **The Department may re-evaluate approval if toxicity is found in the effluent and may require that the facility contact the chemical manufacturer in order to provide toxicity information needed to conduct an additive review before continued use of the additive is permitted.**

From the facility: "Dazzel Sewer Sweetener and Hydrifloc 9880 will have trace petroleum distillates. These are below any level of concern due to the makeup water's dilution with the wastewater treatment system. Lastly, the dissolved air flotation allows permanent removal through waste."

Quik-Zyme L

From the facility: "Quik-Zyme L is a naturally occurring concentration of enzymes and some functional bacteria that excel in fats, oils, and greases degradation. The composition includes protein complexes to aid in enzymatic functions and product stabilization. It contains natural sources of bacterial strains noted for fat degradation. The ultrafiltration system should separate these products from entering the discharge effluent or being wholly consumed in the activated sludge process."

Wisconsin Whey Protein has requested the use of this additive at a maximum dosage rate of 2.0 gal/day. Assuming none of the additive is lost to the environment from the application point to Outfall 001, an effluent flow of 0.392 MGD, and an additive density of 1.0 g/cm^3, the equivalent effluent concentration is approximately 5.1 mg/L.

Secondary acute and chronic values are determined based on acute toxicity test data provided by Wisconsin Whey Protein in the Safety Data Sheet. The secondary acute value is 2,547 mg/L, and the secondary chronic value is 141 mg/L and is based on the default secondary acute to chronic ratio of 18 using the same conservation of mass equation as with toxic substances in Part 2 of this evaluation.

The equivalent effluent concentration of 5.1 mg/L is below the calculated secondary acute and chronic values. **Therefore, this additive is approved at the requested maximum dosage rate of 2.0 gal/day.**

Ferric chloride solution (Hydriclear 1006)
From the facility: "Ferric chloride solution (Hydriclear 1006) is dosed as needed for odor mitigation and toxicity events. When the EQ tank and/or aeration system is experiencing anaerobic conditions, the iron salts will effectively reduce sulfur bacteria. Dosing is approximately 30 gallons per day to the lift station when needed."

A Standard Operating Procedure SOP is recommended to be developed and implemented for use of this product to ensure that effluent toxicity does not occur due to this chemical (separate than the SOP for aluminum sulfate since usage/dosing differs).

Hydrogen Peroxide 34%
From the facility: "Hydrogen Peroxide 34% is dosed when there is a spill in the plant that gets sent to the equalization tank instead of high strength waste. It is added to the equalization pit to help break down product before it gets too far in the treatment process."

A Standard Operating Procedure (SOP) is recommended to be developed and implemented, if not already, for use of this product to ensure that effluent toxicity does not occur due to this chemical.

Ultra LFA 176
From the facility: "Ultra LFA 176 is a Nitric acid oxidizer at ~60% concentration. Nitric acid will break down into oxygen, water, and NO2, but will sometimes form unstable free nitrites. Further, in the presence of organics, the formation of nitrous oxides is also possible. Nitrite is unstable and will be oxidized to nitrate in a balanced wastewater treatment system. There is a possibility that untreated nitrite will persist in the effluent. However, in a complete nitrifying system, there will be a minimal chance of nitric acid introduction at 5 gpd (current dosing) when a clean-in-place is conducted given the system volume of water and aerobic treatment."

Suppressor 2360

From the Safety Data Sheet: "The sample of Suppressor 2360 is not acutely toxic to *Daphnia magna* at recommended allowed dosage by the Minnesota Pollution Control Agency (MPCA), which is 100mL of product per 850 gallons of water. Daphnia magna LC50 was greater than the one hundred percent solution of 0.311 ppm.

The sample of Suppressor 2360 is not acutely toxic to fathead minnows at recommended allowed dosage by the Minnesota Pollution Control Agency (MPCA), which is 100mL of product per 850 gallons of water. *Pimephales promelas* LC50 was greater than the one hundred percent solution of 0.311 ppm.

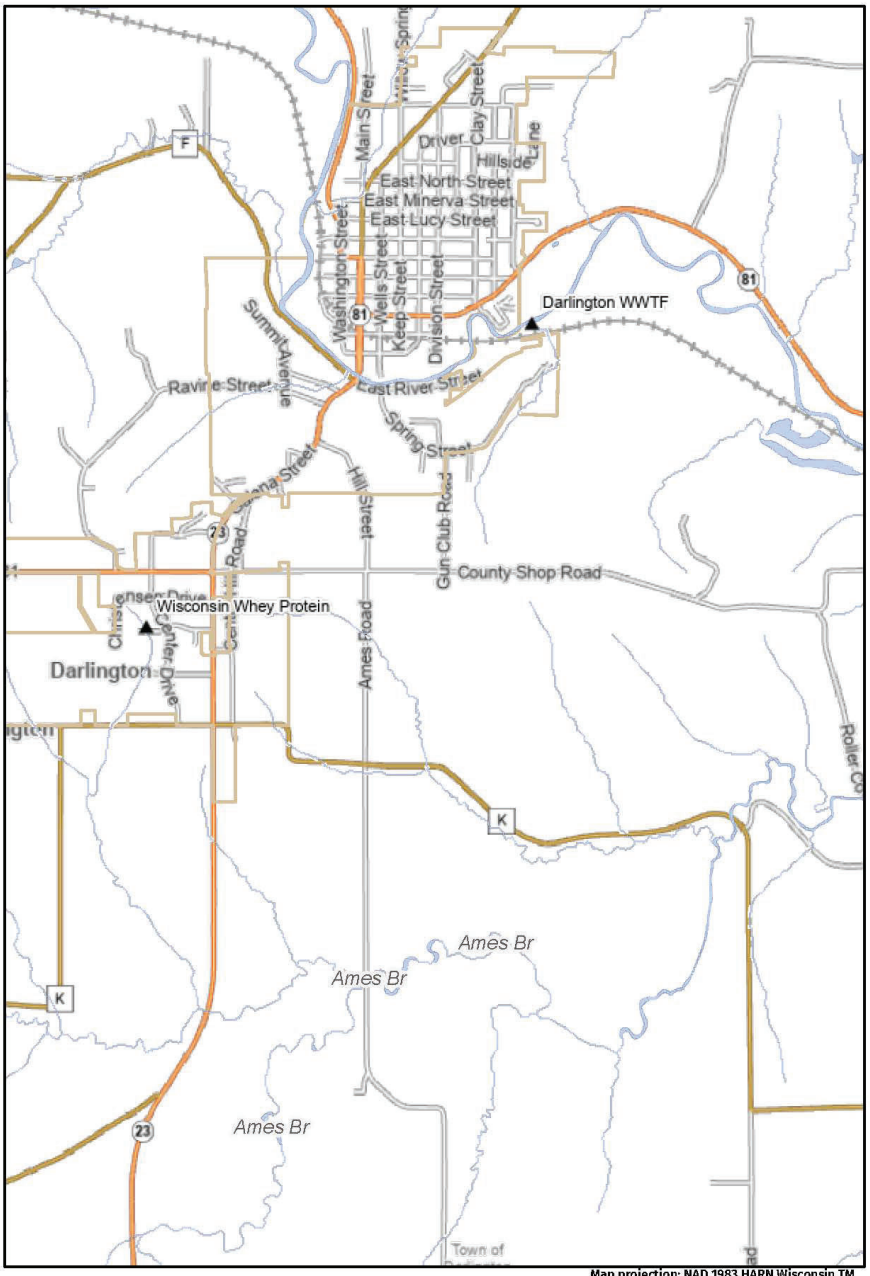
The sample of Suppressor 2360 is not acutely toxic at the highest dose allowed by the Minnesota Pollution Control Agency (MPCA), allowing SF Analytical Bioassay Laboratories to present Suppressor 2360 Defoamer Product with a PASS grade to be used at 100mL per 850 gallons of water."

The Department should be notified if the facility wishes to use any new additive, any approved additive at a greater dosage rate s) or use frequency(ies) than currently approved, or if updated toxicity information for an additive is available from the chemical manufacturer. An additional additive review evaluation will be needed in any case.

Attachment #2
Site Map

WISCONSIN DEPARTMENT OF NATURAL RESOURCES

Wisconsin Whey Protein



Legend: (some map layers may not be displayed)

- Surface Water Outfalls
- Rivers and Streams
- Intermittent Streams
- Open Water
- 24K Intermittent Streams
- 24K Lakes and Open Water

Cities, Towns & Villages
- City
- Civil Town
- City or Village
- County Boundaries

Major Roads
- State Highway

County and Local Roads
- County HWY
- Local Road
- Railroads

Notes:

No longer to scale. Discharge is to the Unnamed Tributary to Ames Branch

Service Layer Credits:
Permits & Determinations: WI DNR Bureau of Watershed Management, Cities, Roads & Boundaries: , Surface Water (Cached): WIDNR, USGS, and other data

Map projection: NAD 1983 HARN Wisconsin TM

Map: 0 2,500 5,000 Feet
0 750 1,500 Meters

N

Map Location

This map is a product generated by a DNR web mapping application.

This map is for informational purposes only and may not have been prepared for or be suitable for legal, engineering, or surveying purposes. The user is solely responsible for verifying the accuracy of information before using for any purpose. By using this product for any purpose user agrees to be bound by all disclaimers found here: https://dnr.wisconsin.gov/legal

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Attachment #3

Ammonia Nitrogen Calculations from the WQBEL Memo Dated January 29, 2018

The rules provide a mechanism for less stringent weekly average and monthly average effluent limitations when early life stages (ELS) of critical organisms are absent from the receiving water. This applies only when the water temperature is less than 14.5 ºC, during the winter and spring months. Burbot, an early spawning species, are not believed to be present in the receiving water, based on fisheries data.
Since minimal ambient data is available, the "default" basin assumed values are used for temperature, pH and background ammonia concentrations, shown in the table below, with the resulting criteria and effluent limitations.

		Spring	Summer	Winter
		April & May	**June – Sept.**	**Oct. - March**
Background Information	$7\text{-}Q_{10}$ (cfs)	0	0	0
	$7\text{-}Q_2$ (cfs)	0	0	0
	Ammonia (mg/L)	-	-	-
	Temperature (°C)	6	19	4
	pH (s.u.)	7.85	7.85	7.85
	% of Flow used	25	100	25
	Reference Weekly Flow (cfs)	0	0	0
	Reference Monthly Flow (cfs)	0	0	0
Criteria mg/L	4-day Chronic			
	Early Life Stages Present	**7.47**	**5.74**	7.47
	Early Life Stages Absent	7.72	4.92	**10.0**
	30-day Chronic			
	Early Life Stages Present	**2.99**	**2.29**	2.99
	Early Life Stages Absent	3.09	1.97	**4.00**
Effluent Limitations mg/L	Weekly Average			
	Early Life Stages Present	**7.47**	**5.74**	7.47
	Early Life Stages Absent	7.72	4.92	**10.0**
	Monthly Average			
	Early Life Stages Present	**2.99**	**2.29**	2.99
	Early Life Stages Absent	3.09	1.97	**4.00**

Note: The Spring-Summer-Winter (and corresponding months) heading for the table above were changed from how they originally appeared in the WQBEL memo dated January 29, 2018 since it is believed there was a typo; the recommendations match with the limits as shown above.

Attachment #4

Temperature limits for receiving waters with unidirectional flow

(calculation using default ambient temperature data)

						Temp Dates	Flow Dates
Facility:	Wisconsin Whey Protein		**7-Q_{10}:**	0 cfs			
Outfall(s :	001		**Dilution:**	N/A	**Start:**	05/01/20	05/05/20
Date Prepared:	3/14/2025		**f:**	0	**End:**	01/31/25	01/31/25
Design Flow (Qe):	0.39	MGD	**Stream type:**	Small warm water sport or forage fis			
Storm Sewer Dist.	0	ft	**Qs:Qe ratio:**	0.0 :1			
			Calculation Needed?	YES			

Month	Water Quality Criteria			Receiving Water Flow Rate (Qs)	Representative Highest Effluent Flow Rate (Qe)		f	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Ta (default)	Sub-Lethal WQC	Acute WQC		7-day Rolling Average (Qesl)	Daily Maximum Flow Rate (Qea)		Weekly Average	Daily Maximum	Weekly Average Effluent Limitation	Daily Maximum Effluent Limitation
	(°F)	(°F)	(°F)	(cfs)	(MGD)	(MGD)		(°F)	(°F)	(°F)	(°F)
JAN	33	49	76	0	0.387	0.509	0	66	76	**49**	**76**
FEB	34	50	76	0	0.410	0.491	0	71	77	**50**	**76**
MAR	38	52	77	0	0.493	0.558	0	61	75	**52**	77
APR	48	55	79	0	0.509	0.547	0	69	78	**55**	79
MAY	58	65	82	0	0.474	0.548	0	77	84	**65**	**82**
JUN	66	76	84	0	0.473	0.578	0	83	86	**76**	**84**
JUL	69	81	85	0	0.446	0.535	0	79	86	81	**85**
AUG	67	81	84	0	0.428	0.510	0	83	87	**81**	**84**
SEP	60	73	82	0	0.413	0.529	0	73	78	**73**	82
OCT	50	61	80	0	0.463	0.496	0	73	77	**61**	80
NOV	40	49	77	0	0.422	0.462	0	62	79	**49**	**77**
DEC	35	49	76	0	0.392	0.473	0	78	82	**49**	**76**