

Permit Fact Sheet

General Information

Permit Number:	WI-0067148-01-0
Permittee Name:	Saputo Cheese USA Inc Greenway
Address:	355 Crawford Blvd
City/State/Zip:	Las Cruces NM 88005
Discharge Location:	Stormwater pond which drains to the Unnamed Tributary which ultimately drains to the Baraboo River, Sauk County
Receiving Water:	Unnamed tributary located in the Narrows Creek – Baraboo River Watershed in the Lower Wisconsin River Basin.
StreamFlow (Q _{7,10}):	7-Q ₁₀ = 0 cfs
Stream Classification:	Default Warm Water Sport Fish (WWSF) community, non-public water supply.

Facility Description

Saputo Cheese USA Inc Reedsburg Greenway (formerly owned by Omega Protein Inc.) receives liquid whey from bovine and caprine cheese makers that is used to make whey protein concentrate and lactose. The bovine and caprine permeate from the make process is sold as liquid animal feed. The polished reverse osmosis (RO) permeate from the make process is discharged to a stormwater pond. The discharge from the pond travels approximately 0.2 mile before its confluence with the Unnamed Tributary (WBIC 5030415) as described in the letter from the department to Omega Protein dated September 23, 2016 (see Attachment #3).

This discharge was previously covered under the Non-Contact Cooling Water or Condensate and Boiler Blowdown (WI-0044938-6) General Permit. The discharge is now being covered under an individual permit in order to evaluate the effluent in more detail and to include facility-specific technology-based limitations.

Conversion of NCCW general permit to individual permit.

Sample Point Designation		
Sample Point Number	Discharge Flow, Units, and Averaging Period	Sample Point Location, WasteType/sample Contents and Treatment Description (as applicable)
001		Representative samples of the polished RO permeate shall be collected prior to discharge to the stormwater pond.
002		Thermal monitoring shall be recorded at the overflow point of the stormwater pond when there is active discharge from the plant resulting in overflow from the stormwater pond.

1 Surface Water - Proposed Monitoring and Limitations

Sample Point Number: 001- RO Polished Water

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow Rate		gpd	Daily	Total Daily	
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	7.2 lbs/day	3/Week	24-Hr Flow Prop Comp	
BOD5, Total	Monthly Avg	3.6 lbs/day	3/Week	24-Hr Flow Prop Comp	
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	9.1 lbs/day	3/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total	Monthly Avg	4.5 lbs/day	3/Week	24-Hr Flow Prop Comp	
pH Field	Daily Max	9.0 su	5/Week	Grab	
pH Field	Daily Min	6.0 su	5/Week	Grab	
Dissolved Oxygen	Daily Min	7.0 mg/L	5/Week	Grab	
Temperature Maximum		deg F	Daily	Continuous	For effluent limitations see Table 2. Limit effective per schedule.
Chlorine, Total Residual	Daily Max	19 ug/L	Daily	Grab	Monitoring upon reissuance. Limit effective per schedule.
Chlorine, Total Residual	Weekly Avg	7.3 ug/L	Daily	Grab	Monitoring upon reissuance. Limit effective per schedule.
Chlorine, Total Residual	Monthly Avg	7.3 ug/L	Daily	Grab	Monitoring upon reissuance. Limit effective per schedule.
Nitrogen, Ammonia	Daily Max	13 mg/L	3/Week	24-Hr Flow	Effluent limits are effective

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
(NH3-N) Total				Prop Comp	April and May.
Nitrogen, Ammonia (NH3-N) Total	Daily Max	8.5 mg/L	3/Week	24-Hr Flow Prop Comp	Effluent limits are effective June through September.
Nitrogen, Ammonia (NH3-N) Total	Daily Max	17 mg/L	3/Week	24-Hr Flow Prop Comp	Effluent limits are effective October through March.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	15 mg/L	3/Week	24-Hr Flow Prop Comp	Effluent limits are effective April and May.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	10 mg/L	3/Week	24-Hr Flow Prop Comp	Effluent limits are effective June through September.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	20 mg/L	3/Week	24-Hr Flow Prop Comp	Effluent limits are effective October through March.
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	5.9 mg/L	3/Week	24-Hr Flow Prop Comp	Effluent limits are effective April and May.
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	4.0 mg/L	3/Week	24-Hr Flow Prop Comp	Effluent limits are effective June through September.
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	7.9 mg/L	3/Week	24-Hr Flow Prop Comp	Effluent limits are effective October through March.
Copper, Total Recoverable		ug/L	Quarterly	24-Hr Flow Prop Comp	
Hardness, Total as CaCO3		mg/L	Quarterly	24-Hr Flow Prop Comp	Monitoring shall occur on the same day Copper monitoring occurs.
Chloride		ug/L	Monthly	24-Hr Flow Prop Comp	Monitoring required in January through December 2024 only.
Oil & Grease (Hexane)	Daily Max	15 mg/L	Annual	Grab	
Oil & Grease (Hexane)	Monthly Avg	15 mg/L	Annual	Grab	
Phosphorus, Total	Monthly Avg	0.54 mg/L	3/Week	24-Hr Flow Prop Comp	This is an interim limit. The final effluent limits are 0.225 mg/L monthly average and 0.075 mg/L as a 6-month average which go into effect per the compliance schedule. See Phosphorus footnotes and compliance schedule in permit.

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Phosphorus, Total	6-Month Avg	lbs/day	Monthly	Calculated	The final effluent limit is a 6-month average of 0.10 lb/day which goes into effect per the compliance schedule. See footnotes and compliance schedule in permit.
Phosphorus, Total		lbs/month	Monthly	Calculated	Calculate the Total Monthly Discharge of phosphorus and report on the last day of the month on the DMR. See TMDL section.
Phosphorus, Total		lbs/yr	Monthly	Calculated	Calculate the 12-month rolling sum of total monthly mass of phosphorus discharged and report on the last day of the month on the DMR. See TMDL section.
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	
Acute WET		TUa	See Listed Qtr(s)	24-Hr Flow Prop Comp	
Chronic WET		TUc	See Listed Qtr(s)	24-Hr Flow Prop Comp	

Changes from Previous Permit

New individual WPDES permit.

Explanation of Limits and Monitoring Requirements

Water Quality Based Limits and WET Requirements

Refer to the WQBEL memo for the detailed calculations, prepared by the Water Quality Bureau dated May 17, 2023 used for this reissuance.

INDUSTRIAL EFFLUENT LIMITS - In accordance with the federal regulation 40 CFR 122.45(d), limits in this permit are to be expressed as daily maximum and monthly average limits whenever practicable.

The following additional limitations, denoted in bold type, are required to comply with ss. NR 106.07 and NR 205.065(7), Wis. Adm. Code.

Expression of Limits Summary

Parameter	Daily Maximum	Weekly Average	Monthly Average
Residual chlorine	19 µg/L	7.3 µg/L	7.3 µg/L
Ammonia Nitrogen			
April & May	13 mg/L	15 mg/L	5.9 mg/L
June – September	8.5 mg/L	10 mg/L	4.0 mg/L
October – March	17 mg/L	20 mg/L	7.9 mg/L

PFOS and PFOA - NR 106 Subchapter VIII – Permit Requirements for PFOS and PFOA Dischargers became effective on August 1, 2022. Pursuant to s. NR 106.98(3)(b), Wis. Adm. Code, the department evaluated the need for PFOS and PFOA monitoring. Based on information available at the time the proposed permit was drafted, the department has determined the permittee does not need to sample for PFOS or PFOA as part of this permit reissuance. The department may re-evaluate the need for sampling at the next permit reissuance if new information becomes available that suggests PFOS or PFOA may be present in the discharge.

Monitoring Frequency - 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 fairness and consistency in permits issued across the state. Guidance and requirements in administrative code were considered when determining the appropriate monitoring frequencies for pollutants that have final effluent limits in effect during this permit term.

Sample Point Locations - The policy document “Permitted Discharges to Stormwater Practices” includes recommendations for sampling point locations and considerations for discharges to stormwater ponds which discharge to surface water that are captured in the March 4, 2016, Memo from Adrian Stocks with the subject “[Limit Calculation for Stormwater Ponds](#)”. This memo considers the discharge point and the point of compliance to be the point at which wastewater is discharged from the industry into the stormwater pond. In addition, it directs that thermal monitoring is needed at both the discharge location where the industrial waste enters the pond, and at the pond outlet during periods of active discharge to a surface water of the state.

Thermal - Requirements for Temperature are included in NR 102 Subchapter II Water Quality Standards for Temperature and NR 106 Subchapter V Effluent Limitations for Temperature. Thermal discharges must meet the Public Health criterion of 120 degrees F and the Fish & Aquatic Life criteria which are established to protect aquatic communities from lethal and sub-lethal thermal effects. In the absence of data for January through March and October through December, weekly average and daily maximum limits are required in accordance with s. NR 106.56(12), Wis. Adm. Code to be protective of the receiving water. Temperature monitoring for at least one year in order to assess reasonable potential, a compliance schedule has been included to allow time for temperature data to be collected.

Month	Weekly Average Effluent Limitation (°F)	Daily Maximum Effluent Limitation (°F)
JAN	49	76
FEB	50	76
MAR	52	77
APR	55	-

Month	Weekly Average Effluent Limitation	Daily Maximum Effluent Limitation
MAY	65	-
OCT	61	80
NOV	49	77
DEC	49	76

Oil and Grease - Monitoring and limit continued at the same frequency as the general permit that initially covered this discharge.

Phosphorus Rules – Phosphorus requirements based on the Phosphorus Rules which are effective 12/1/2010 and detailed in NR 102 – Water Quality Standards for Wisconsin Surface Waters and NR 217 – Effluent Standards and Limitations for Phosphorus.

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 values. 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. This final effluent limit was derived from and complies with the applicable water quality criterion and is consistent with the assumptions and requirements of the EPA- approved WLA for the Wisconsin River Basin. Please see the phosphorus compliance schedule included in the Schedules section.

TMDL (Total Maximum Daily Load) Derived Mass Limits - TMDL Waste load allocations determined based on maintaining the protection of the immediate receiving for Saputo Cheese USA Inc Reedsburg Greenway shall be 37 lbs/year (0.10 lb/day * 365 days/year) and expressed as a WQBEL (water quality based effluent limit). The waste load allocated-derived WQBELs are consistent with the assumptions and requirements of the approved Wisconsin River Basin TMDL.

Copper - In the absence of limits, quarterly monitoring is recommended as are the adoption of clean sampling techniques, including the use of bag inserts, in order to reduce the possibility of contamination.

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

Ammonia - Current acute and chronic ammonia toxicity criteria for the protection of aquatic life are included in Tables 2C and 4B of ch. NR 105, Wis. Adm. Code. Subchapter IV of ch. NR 106 establishes the procedure for calculating water quality based effluent limitations (WQBELs) for ammonia.

Chloride - Acute and chronic chloride toxicity criteria for the protection of aquatic life are included in Tables 1 and 5 of ch. NR 105, Wis. Adm. Code. Subchapter VII of ch. NR 106 establishes the procedure for calculating water quality based effluent limitations (WQBELs) for chloride. If the permittee's effluent data shows that a calculated WQBEL for chloride cannot be met, then the permit will include a chloride effluent limitation. Monitoring included in permit in 2024 to ensure that 12 chloride results will be available to include in the application for the next permit reissuance.

Total Nitrogen Monitoring (NO₂+NO₃, TKN and Total N) - Based on the “Guidance for Total Nitrogen Monitoring in WPDES Permits” dated October 2012, quarterly effluent monitoring for Total Nitrogen is required for facilities discharging to the Mississippi River Basin whose permit applications show > 40 mg/L Total Nitrogen due to industrial contribution.

Categorical Limits for pH, TSS and BOD5 - Chapter NR 240, Wis. Adm. Code, specifies effluent guidelines for discharges from dairy (bovine) product categories of point sources and subcategories. Limits for caprine products are also calculated in accordance with ch. NR 240, Wis. Adm. Code, as it is the closest category and are considered best professional judgment. These limits point of standards is at the discharge from the facility. Note this point of standard is different than WQBEL limits (see WQBEL).

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

Parameter	Daily Maximum	Daily Minimum	Monthly Average
BOD ₅ , Total	7.2 lbs/day		3.6 lbs/day
TSS	9.1 lbs/day		4.5 lbs/day
pH	9.0 su	6.0 su	

Sample Point Number: 002- Stormwater Pond Outlet

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Temperature Maximum		deg F	Daily	Continuous	

Changes from Previous Permit

New individual WPDES permit.

Explanation of Limits and Monitoring Requirements

The March 4, 2016, Memo from Adrian Stocks with the subject “[Limit Calculation for Stormwater Ponds](#)” notes that thermal monitoring is needed at both the discharge location where the industrial waste enters the pond, and at the pond outlet. The resulting data will be used to establish if the enthalpy load from the industry causes or has the potential to cause an exceedance of the water quality criteria for temperature at the receiving water of the stormwater pond. If the discharge is the contributing factor to any excursions, then thermal limitations will be given to the overflow point. Long term monitoring may be placed at either or both outfalls 001 and 002 for temperature. Sampling should be reported daily on the eDMR, if there is no flow out of the stormwater pond indicated those days in the comments field of the eDMR.

2 Schedules

2.1 Temperature Limits (Industrial Facilities)

This compliance schedule requires the permittee to achieve compliance by the specified date.

Required Action	Due Date
Report on Effluent Discharges: Submit a report on effluent temperature with conclusions regarding compliance. If the Department determines that because of data variability, 24 months of monitoring	04/30/2025

data is required to determine the need for temperature limits, the Department will so notify the permittee in writing and all dates in the permit schedule will be extended by 12 months. Informational Note - Refer to the Surface Water subsection regarding 'Determination of Need for Effluent Limits' for information concerning a Department determination on the need for limits and pursuing re-evaluation of limits per NR 106 Subchapters V & VI or NR 102.26, Wis. Adm. Code.	
Action Plan: Submit an action plan for complying with all effluent temperature limits that remain following the Department's review for necessity. The Department's review will also establish if the enthalpy load from the industry causes or has the potential to cause an exceedance of the water quality criteria for temperature at the receiving water of the stormwater pond. If the discharge is the contributing factor to the excursion, then thermal limitations will be given to the overflow point.	04/30/2026
Construction Plans: Submit construction plans (if construction is required for complying with effluent temperature limits) and include plans and specifications with the submittal.	10/31/2026
Initiate Actions: Initiate actions identified in the plan.	04/30/2027
Complete Actions: Complete actions necessary to achieve compliance with effluent temperature limits.	04/30/2028

Explanation of Schedules

A schedule is included for meeting temperature limits to allow time for the collection of at least 1 year of data to use in a determination of potential to exceed those limitations. It also allows time for the facility to upgrade if needed to meet the temperature limits.

2.2 Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus

The permittee shall comply with the WQBELs for Phosphorus as specified. No later than 14 days following each compliance date, the permittee shall notify the Department in writing of its compliance or noncompliance. If a submittal is required, a timely submittal fulfills the notification requirement.

Required Action	Due Date
<p>Operational Evaluation Report: The permittee shall prepare and submit to the Department for approval an operational evaluation report. The report shall include an evaluation of collected effluent data, possible source reduction measures, operational improvements or other minor facility modifications that will optimize reductions in phosphorus discharges from the treatment plant during the period prior to complying with final phosphorus WQBELs and, where possible, enable compliance with final phosphorus WQBELs by January 1, 2027. The report shall provide a plan and schedule for implementation of the measures, improvements, and modifications as soon as possible, but not later than January 1, 2027 and state whether the measures, improvements, and modifications will enable compliance with final phosphorus WQBELs. Regardless of whether they are expected to result in compliance, the permittee shall implement the measures, improvements, and modifications in accordance with the plan and schedule specified in the operational evaluation report.</p> <p>If the operational evaluation report concludes that the facility can achieve final phosphorus WQBELs using the existing treatment system with only source reduction measures, operational improvements, and minor facility modifications, the permittee shall comply with the final phosphorus WQBEL by January 1, 2027 and is not required to comply with the milestones identified below for years 3 through 9 of this compliance schedule ('Preliminary Compliance Alternatives Plan', 'Final Compliance Alternatives Plan', 'Final Plans and Specifications', 'Treatment Plant Upgrade to Meet WQBELs', 'Complete Construction', 'Achieve Compliance').</p> <p>STUDY OF FEASIBLE ALTERNATIVES - If the Operational Evaluation Report concludes that the</p>	03/31/2025

<p>permittee cannot achieve final phosphorus WQBELs with source reduction measures, operational improvements and other minor facility modifications, the permittee shall initiate a study of feasible alternatives for meeting final phosphorus WQBELs and comply with the remaining required actions of this schedule of compliance. If the Department disagrees with the conclusion of the report, and determines that the permittee can achieve final phosphorus WQBELs using the existing treatment system with only source reduction measures, operational improvements, and minor facility modifications, the Department may reopen and modify the permit to include an implementation schedule for achieving the final phosphorus WQBELs sooner than January 1, 2033.</p>	
<p>Compliance Alternatives, Source Reduction, Improvements and Modifications Status: The permittee shall submit a 'Compliance Alternatives, Source Reduction, Operational Improvements and Minor Facility Modification' status report to the Department. The report shall provide an update on the permittee's: (1) progress implementing source reduction measures, operational improvements, and minor facility modifications to optimize reductions in phosphorus discharges and, to the extent that such measures, improvements, and modifications will not enable compliance with the WQBELs, (2) status evaluating feasible alternatives for meeting phosphorus WQBELs.</p>	03/31/2026
<p>Preliminary Compliance Alternatives Plan: The permittee shall submit a preliminary compliance alternatives plan to the Department.</p> <p>If the plan concludes upgrading of the permittee's wastewater treatment facility is necessary to achieve final phosphorus WQBELs, the submittal shall include a preliminary engineering design report.</p> <p>If the plan concludes Adaptive Management will be used, the submittal shall include a completed Watershed Adaptive Management Request Form 3200-139 without the Adaptive Management Plan.</p> <p>If water quality trading will be undertaken, the plan must state that trading will be pursued.</p>	03/31/2027
<p>Final Compliance Alternatives Plan: The permittee shall submit a final compliance alternatives plan to the Department.</p> <p>If the plan concludes upgrading of the permittee's wastewater treatment is necessary to meet final phosphorus WQBELs, the submittal shall include a final engineering design report addressing the treatment plant upgrades, and a facility plan if required pursuant to ch. NR 110, Wis. Adm. Code.</p> <p>If the plan concludes Adaptive Management will be implemented, the submittal shall include a completed Watershed Adaptive Management Request Form 3200-139 and an engineering report addressing any treatment system upgrades necessary to meet interim limits pursuant to s. NR 217.18, Wis. Adm. Code.</p> <p>If the plan concludes water quality trading will be used, the submittal shall identify potential trading partners.</p> <p>Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.</p>	03/31/2028
<p>Progress Report on Plans & Specifications: Submit progress report regarding the progress of preparing final plans and specifications. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.</p>	03/31/2029
<p>Final Plans and Specifications: Unless the permit has been modified, revoked and reissued, or reissued to include Adaptive Management or Water Quality Trading measures or to include a revised schedule based on factors in s. NR 217.17, Wis. Adm. Code, the permittee shall submit final construction plans to the Department for approval pursuant to s. 281.41, Stats., specifying treatment plant upgrades that must be constructed to achieve compliance with final phosphorus WQBELs, and a schedule for completing construction of the upgrades by the complete construction date specified</p>	03/31/2030

below. (Note: Permit modification, revocation and reissuance, and reissuance are subject to s. 283.53(2), Stats.) Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	
Treatment Plant Upgrade to Meet WQBELs: The permittee shall initiate construction of the upgrades. The permittee shall obtain approval of the final construction plans and schedule from the Department pursuant to s. 281.41, Stats. Upon approval of the final construction plans and schedule by the Department pursuant to s. 281.41, Stats., the permittee shall construct the treatment plant upgrades in accordance with the approved plans and specifications. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	06/30/2030
Construction Upgrade Progress Report #1: The permittee shall submit a progress report on construction upgrades. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	06/30/2031
Complete Construction: The permittee shall complete construction of wastewater treatment system upgrades. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	12/31/2031
Achieve Compliance: The permittee shall achieve compliance with final phosphorus WQBELs. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	03/31/2023

Explanation of Schedules

Included to allow time for the selection of options to most cost-effectively meet water quality standards which may, in many cases, be done during the term (or terms) of the permit.

2.3 Chlorine Limits Compliance

This compliance schedule requires the permittee to achieve compliance by the specified date.

Required Action	Due Date
This compliance schedule requires the permittee to achieve compliance by the specified date. Required Action	Due Date
Report on Effluent Discharges: Submit a report on effluent chlorine with conclusions regarding compliance.	10/01/2024
Action Plan: Submit an action plan within 12 months of the effective date of permit coverage for complying with applicable chlorine limits.	04/01/2025
Plans and Specifications: Submit plans and specifications for treatment plant modifications.	10/01/2025
Initiate Actions: Initiate actions identified in the plan within 24 months of the effective date of permit coverage.	04/01/2026
Complete Actions: Complete actions necessary to achieve compliance with effluent chlorine limits.	04/01/2027

Explanation of Schedules

Included to allow time for the selection of options to meet chlorine limitations and assess chlorine levels in effluent.

2.4 Dissolved Oxygen Limits Compliance

This compliance schedule requires the permittee to achieve compliance by the specified date.

Required Action	Due Date
Report on Effluent Discharges: Submit a report on effluent dissolved oxygen with conclusions regarding compliance.	10/01/2024
Action Plan: Submit an action plan within 12 months of the effective date of permit coverage for complying with applicable dissolved oxygen limits.	04/01/2025
Plans and Specifications: Submit plans and specifications for treatment plant modifications.	10/01/2025
Initiate Actions: Initiate actions identified in the plan within 24 months of the effective date of permit coverage.	04/01/2026
Complete Actions: Complete actions necessary to achieve compliance with effluent dissolved oxygen limits.	04/01/2027

Explanation of Schedules

Included to allow time for the selection of options to meet Dissolved Oxygen (DO) limitations.

Other Comments:

None

Attachments:

Water Quality Based Effluent Limits memo for Saputo Reedsburg Greenway dated May 17, 2023 by Sarah Luck.

Technology-Based Effluent Limitations for Saputo Cheese USA Inc Reedsburg Greenway dated April 25, 2023 by Sarah Luck.

Proposed Expiration Date:

March 31, 2029

Prepared By:

Brenda Howald, Wastewater Specialist

Jennifer Jerich, Wastewater Specialist

Date: 1/18/2024

Date post Fact Check revisions: 1/25/2024

DATE: May 17, 2023

TO: Brenda Howald – SCR/Fitchburg

FROM: Sarah Luck – SCR/Fitchburg

SUBJECT: Water Quality-Based Effluent Limitations for the Saputo Cheese USA Inc Reedsburg Greenway
WPDES Permit No. WI-0067841-01-0

This is in response to your request for an evaluation of the need for water quality-based effluent limitations (WQBELs) using chapters NR 102, 104, 105, 106, 207, 210, 212, and 217 of the Wisconsin Administrative Code (where applicable), for the discharge from the Saputo Cheese USA Inc Reedsburg Greenway in Sauk County. This industrial facility discharges to a stormwater pond which drains to the Unnamed Tributary which ultimately drains to the Baraboo River, located in the Narrows Creek – Baraboo River Watershed in the Lower Wisconsin River Basin. This discharge is located within in the Wisconsin River TMDL area as approved by EPA on April 26, 2019 with site-specific criteria approved by EPA on July 9, 2020, but an individual wasteload allocation was not given since the facility was discharging under a general permit at that time. 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
BOD ₅	20 mg/L 7.2 lbs/day			10 mg/L 3.6 lbs/day		2
TSS	20 mg/L 9.1 lbs/day			10 mg/L 4.5 lbs/day		2
pH	9.0 s.u.	6.0 s.u.				3
Dissolved Oxygen		7.0 mg/L				-
Ammonia Nitrogen						4,5
April & May	13 mg/L		15 mg/L	5.9 mg/L		
June – September	8.5 mg/L		10 mg/L	4.0 mg/L		
October – March	17 mg/L		20 mg/L	7.9 mg/L		
Oil and Grease	15 mg/L			15 mg/L		3
Chloride						6
Copper						7
Hardness						8
Residual Chlorine	19 µg/L		7.3 µg/L	7.3 µg/L		4

Phosphorus						-
Interim				0.54 mg/L		
Final				0.225 mg/L	0.075 mg/L 0.10 lb/day	
Temperature						9
TKN, Nitrate+Nitrite, and Total Nitrogen						10
Acute WET						11,13
Chronic WET						12,13

Footnotes:

1. Monitoring only.
2. Categorical mass limits based on ch. NR 240, Wis. Adm. Code, were evaluated in the technology-based effluent limits memo, dated April 25, 2023, based on current production data.
3. No changes from the current general permit.
4. Additional limits to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Code, are included in bold.
5. A monitoring frequency of three times per week was used to calculate the daily maximum limits. If a different monitoring frequency is used, the limits should be reevaluated.
6. Monitoring at a frequency to ensure a minimum of 11 sample results are available at the next permit reissuance.
7. Quarterly copper monitoring is recommended, as well as the implementation of clean sampling techniques to prevent contamination.
8. Quarterly hardness monitoring is recommended because of the relationship between hardness and calculated limits based on toxicity criteria.
9. 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	-
MAY	65	-
OCT	61	80
NOV	49	77
DEC	49	76

10. As recommended in the Department's October 1, 2019 Guidance for Total Nitrogen Monitoring in Wastewater Permits, quarterly total nitrogen monitoring is recommended for all class A cheese facilities. Total Nitrogen is the sum of nitrate (NO₃), nitrite (NO₂), and total kjeldahl nitrogen (TKN) (all expressed as N).
11. Two acute WET tests are required.
12. Annual chronic WET tests are 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%, and the dilution water used in WET tests conducted on Outfall 001 shall be laboratory water since there is no flow in the Unnamed Tributary receiving water.

13. Sampling WET concurrently with any chemical-specific toxic substances is recommended. Tests should be done in rotating quarters, to collect seasonal information about this discharge and should continue after the permit expiration date (until the permit is reissued).

It should be noted that, since the stormwater pond where Outfall 001 discharges is completely contained on Saputo Cheese USA Inc Reedsburg Greenway's property, the pond is not considered waters of the state under s. 283.01(20), Wis. State Stats., and water quality criteria do not apply directly to it. The point of standards applies at the point where the stormwater pond overflows to the Unnamed Tributary, which is considered a water of the state. However, categorical limits based on ch. NR 240, Wis. Adm. Code, are not water quality-based and apply directly to discharge to the stormwater pond.

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, Historical Approval Letter, and Thermal Table

PREPARED BY: _____ Date: May 17, 2023
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Water Quality-Based Effluent Limitations for Saputo Cheese USA Inc Reedsburg Greenway

WPDES Permit No. WI-0067148-01-0

PART 1 – BACKGROUND INFORMATION

Facility Description

Saputo Cheese USA Inc Reedsburg Greenway (formerly owned by Omega Protein Inc.) receives liquid whey from bovine and caprine cheese makers that is used to make whey protein concentrate and lactose. The bovine and caprine permeate from the make process is sold as liquid animal feed. The polished reverse osmosis permeate from the make process is discharged to a stormwater pond. The discharge from the pond travels approximately 0.2 mile before its confluence with the Unnamed Tributary (WBIC 5030415) as described in the letter from the Department to Omega Protein dated September 23, 2016 (see Attachment #3)

This discharge was previously covered under the Non-Contact Cooling Water or Condensate and Boiler Blowdown (WI-0044938-6) general permit. The discharge is now being covered under an individual permit in order to evaluate the effluent in more detail and to include facility-specific technology-based limitations.

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

Existing Permit Limitations

The current general permit includes the following effluent limitations and monitoring requirements:

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Footnotes
Flow Rate					1
BOD ₅					1
TSS		40 mg/L		40 mg/L	2
pH	9.0 s.u.	6.0 s.u.			2
Oil and Grease	15 mg/L			15 mg/L	2
Ammonia Nitrogen					1
Phosphorus					1
Temperature					1

Footnotes:

1. Monitoring only.
2. These limitations are requirements for surface water discharges in the Non-Contact Cooling Water or Condensate and Boiler Blowdown (WI-0044938-6) general permit.

1) Receiving Water Information

- Name: Unnamed Tributary via a stormwater pond and channelized ditch
- Waterbody Identification Code (WBIC): 5030415

- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code: Default Warm Water Sport Fish (WWSF) community, non-public water supply.
- Low flows used in accordance with chs. NR 106 and 217, Wis. Adm. Code: The following 7-Q₁₀ and 7-Q₂ values are assumed for the channelized ditch leading to the Unnamed Tributary.
7-Q₁₀ = 0 cfs (cubic feet per second)
7-Q₂ = 0 cfs
- Hardness: 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 equal to 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. Background pH data for the Baraboo River was used for calculating ammonia nitrogen limits.
- Multiple dischargers: None.
- Impaired water status: The Baraboo River, located approximately 1.5 miles downstream of the stormwater pond, is listed (4/1/2014) as impaired for total phosphorus and is located within the Wisconsin River TMDL area.

2) Effluent Information

- Flow rate:

Maximum annual average (estimated from facility) = 0.162 MGD (Million Gallons per Day)

The facility estimated the flow as follows:

RO #1 runs for approximately 20 hours per day
20 hours per day x 60 minutes per hour = 1200 minutes
1200 minutes x 75 gpm = 90,000 gallons per day

RO #2 runs for approximately 16 hours per day
16 hours per day x 60 minutes per hour = 960 minutes
960 minutes x 75 gpm = 72,000 gallons per day

RO #1 (90,000 gpd) + RO #2 (72,000 gpd) = 162,000 gpd

For reference, the average flow rate from July 2022 through August 2022 (n=34) was 0.073 MGD.

- Hardness = 0.76 mg/L as CaCO₃. This value represents the geometric mean of eight data points from June 2022 reported on the permit application. The minimum hardness values from Table 2A in ch. NR 105, Wis. Adm. Code, are used in place of the effluent hardness since the effluent hardness is below 1 mg/L.
- Acute dilution factor used in accordance with s. NR 106.06(3)(c), Wis. Adm. Code: Not applicable – this facility does not have an approved Zone of Initial Dilution (ZID).
- Water source: Water supply from the City of Reedsburg
- Additives: Caustic soda for pH adjustment (see Part 9)
- Effluent characterization: This facility's discharge is categorized as a secondary industry, so the permit application required effluent sample analyses for a limited number of common pollutants, as specified in s. NR 200.065, Table 1, Wis. Adm. Code, primarily metal substances plus ammonia, chloride, hardness, and phosphorus.
- Effluent data for substances for which a single sample was analyzed is shown in the tables in Part 2 below, in the column titled "MEAN EFFL. CONC.". Otherwise, substances with multiple effluent

data are shown in the tables below or in their respective parts in this evaluation.

NOTE: There are two RO membrane units with polishers that discharge to Outfall 001. Sampling for the application was done separately at each RO unit for informational purposes. However, since the two streams combine into a single discharge stream, the sample results from the application are presented as a single dataset herein and limits are assessed accordingly.

Sample Date	Copper (µg/L)	Sample Date	Copper (µg/L)	Sample Date	Copper (µg/L)	Sample Date	Copper (µg/L)
06/15/2022	<5.2	06/28/2022	<5.2	03/16/2023	<5.2	03/27/2023	<5.2
06/16/2022	39.4	07/05/2022	<5.2	03/20/2023	<5.2	03/27/2023	<5.2
06/20/2022	<5.2	07/05/2022	<5.2	03/21/2023	<5.2	04/04/2023	<5.2
06/20/2022	<5.2	03/13/2023	<5.2	03/23/2023	<5.2		
06/27/2022	<5.2	03/13/2023	<5.2	03/23/2023	<5.2		
Mean = 2.2 µg/L							

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

See note above about duplicate sampling dates.

Sample Date	Chloride (mg/L)	Sample Date	Chloride (mg/L)	Sample Date	Chloride (mg/L)	Sample Date	Chloride (mg/L)
06/15/2022	210	03/20/2023	9.0	03/27/2023	<1.0	04/13/2023	7.4
06/16/2022	68	03/21/2023	1.3	04/03/2023	8.8	04/13/2023	1.7
03/13/2023	6.1	03/23/2023	9.3	04/04/2023	1.0	04/18/2023	7.5
03/13/2023	1.4	03/23/2023	<1.0	04/05/2023	4.8	04/18/2023	2.3
03/16/2023	6.6	03/27/2023	8.9	04/07/2023	1.2	04/20/2023	2.9
1-day P ₉₉ = 185 mg/L							
4-day P ₉₉ = 113 mg/L							

“<” means that the pollutant was not detected at the indicated level of detection.

See note above about duplicate sampling dates.

The following table presents the average concentrations and loadings at Outfall 001 from October 2017 through August 2022 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
TSS	5 mg/L
pH field	6.1 s.u.
Oil & Grease	2 mg/L

*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 P₉₉) value exceeds the comparable calculated limit (s. NR 106.05(4), Wis. Adm. Code)
3. If fewer than 11 detected results are available, the mean effluent concentration exceeds 1/5 of the calculated limit (s. NR 106.05(6), Wis. Adm. Code)

Daily Maximum Limit Calculation Method

Daily maximum effluent limitations for toxic substances are based on the acute toxicity criteria (ATC), listed in ch. NR 105, Wis. Adm. Code. In accordance with s. NR 106.06(3)(b), limitations based on acute toxicity are either set equal to two times the acute criteria (the final acute value) or calculated using the mass balance equation below, whichever is more restrictive.

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

Where:

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

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

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

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

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

In this case, limits calculated based on the mass balance equation are more restrictive, and this method is used to calculate the daily maximum limits shown in the table below.

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, (1-Q₁₀ (estimated as 80% of 7-Q₁₀)), as specified in s. NR 106.06(3)(bm), Wis. Adm. Code.

SUBSTANCE	REF. HARD.* mg/L	ATC	MAX. EFFL. LIMIT**	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	1-day P ₉₉	1-day MAX. CONC.
Chlorine		19.0	19.0	3.81	20		
Arsenic		340	340	68.0	<7.7		
Cadmium	6	0.410	0.410	0.082	<0.41		
Chromium	13	339.1	339.1	67.8	<1.1		
Copper	13	2.26	2.26	0.45	2.2***		
Lead	12	13.8	13.8	2.76	<1.4		
Nickel	13	83.5	83.5	16.7	<1.5		
Zinc	12	18.9	18.9	3.8	<4.5		
Chloride (mg/L)		757	757			185	210

* The minimum hardness values from Table 2A in ch. NR 105, Wis. Adm. Code, are used in place of the effluent hardness since the effluent hardness is below 1 mg/L.

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

***Refer to copper discussion paragraph following tables.

Weekly Average Limits based on Chronic Toxicity Criteria (CTC)

RECEIVING WATER FLOW = 0 cfs (¼ of the 7-Q₁₀), as specified in s. NR 106.06(4)(c), Wis. Adm. Code

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	20	
Arsenic		152.2	152.2	30.4	<7.7	
Cadmium	6	0.27	0.27	0.05	<0.41	
Chromium	13	24.85	25	5.0	<1.1	
Copper	13	1.81	1.81	0.36	2.2**	
Lead	12	3.61	3.61	0.72	<1.4	
Nickel	13	9.3	9.3	1.9	<1.5	
Zinc	12	18.85	18.9	3.8	<4.5	
Chloride (mg/L)		395	395			113

* The minimum hardness values from Table 2A in ch. NR 105, Wis. Adm. Code, are used in place of the effluent hardness since the effluent hardness is below 1 mg/L.

**Refer to copper discussion paragraph following tables.

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 (¼ of Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

SUBSTANCE	HTC	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Cadmium	370	370	74.0	<0.41
Chromium (+3)	3818000	3818000	763600	<1.1
Lead	140	140	28.0	<1.4
Nickel	43000	43000	8600	<1.5

Monthly Average Limits based on Human Cancer Criteria (HCC)

RECEIVING WATER FLOW = 0 cfs (¼ of Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

SUBSTANCE	HCC	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Arsenic	13.3	13.3	2.66	<7.7

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

Conclusions and Recommendations

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

Total Residual Chlorine – **A daily maximum limit of 19 µg/L and a weekly average limit of 7.3 µg/L are required** because the discharge concentration (20 µg/L on 6/16/22) exceeds the limitations based on the acute and chronic toxicity. Additional limits to meet the requirements in s. NR 106.07, Wis. Adm Code, are addressed in Part 8 of this memo.

Copper – Considering available effluent data reported on the permit application and from additional sampling (n=18 with one detected result), the mean copper effluent concentration is 2.2 µg/L. Although the mean exceeds 1/5th of the calculated acute and chronic limits, **effluent limits are not recommended at this time** since all other results were below the level of detection and since the RO polisher is expected to remove most pollutants. Although there is no specific reason to exclude the 39.4 µg/L sample result, this result does not seem typical of either RO polisher and could have possibly been caused by contamination or end-of-life of the RO filter. In the absence of limits, however, **quarterly monitoring is recommended as are the adoption of clean sampling techniques, including the use of bag inserts, in order to reduce the possibility of contamination.**

Quarterly hardness monitoring is also recommended because of the relationship between hardness and calculated limits based on toxicity criteria.

Additional note: The samples submitted for copper were analyzed using the EPA 200.7 analytical method. The limit of detection (5.2 µg/L) of this analytical method is significantly higher than 1/5th of the calculated limit based on ATC and CTC and is not necessarily determinate that the non-detect sample is actually lower than 0.36 µg/L, which is 1/5th of the chronic limit of 1.8 µg/L. **A different approved analytical method is recommended for future samples for copper such that the limit of detection is less than or equal to 0.36 µg/L to better determine the need for copper limits at the next permit reissuance.**

Chloride – Considering available effluent data reported on the permit application and from additional sampling (n=20), the 1-day P₉₉ chloride concentration is 185 mg/L, and the 4-day P₉₉ of effluent data is 113 mg/L. These effluent concentrations are below the calculated WQBELs for chloride; therefore, **no effluent limits are needed. Chloride monitoring is recommended to ensure that 11 sample results are available at the next permit issuance** to meet the data requirements of s. NR 106.85, Wis. Adm. Code.

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, the effluent flow rate, and lack of effluent data or source water data for PFOS and PFOA, **PFOS and PFOA monitoring is not recommended.** If information becomes available that indicates PFOS or PFOA may be present in the discharge, the monitoring requirements may change.

PART 3 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR BOD, TSS, AND DISSOLVED OXYGEN

Water Quality-Based BOD₅ & TSS Concentration Limits

In establishing BOD₅ limitations, the primary intent is to prevent a lowering of dissolved oxygen levels in the receiving water below water quality standards as specified in ss. NR 102.04(4)(a) and (b). The 26-lb method is the most frequently used approach for calculating BOD₅ limits when resources are not available to develop a detailed water quality model. This simplified model was developed in the 1970's by the Wisconsin Committee on Water Pollution on the Fox, Wisconsin, Oconto, and Flambeau Rivers. Further studies throughout the 1970's proved this model to be relatively accurate. The model has since then been used by the Department on many occasions when resources are not available to perform a site-specific model. The "26" value stems from the following equation:

$$\frac{26 \text{ lbs/day}}{\text{ft}^3/\text{sec}} * \frac{1 \text{ day}}{86,400 \text{ sec}} * \frac{454,000 \text{ mg}}{\text{lbs}} * \frac{1 \text{ ft}^3}{28.32 \text{ L}} = 4.8 = 2.4 * 2 \text{ mg/L}$$

The 4.8 mg/L has been calculated by taking 2.4 mg/L which is the number one receives when converting 26 lbs. of BOD/day/cfs into mg/L, multiplied by 2.0 which is the change in the DO level. A typical background DO level for Wisconsin waters is 7 mg/L, so a 2 mg/L decrease is allowed to meet the 5 mg/L standard for warm water streams. The above relationship is temperature dependent, and an appropriate temperature correction factor is applied. The 26-lb method is based on a typical 24°C summer value for warm water streams. Adjustments for temperature are made using the following equation:

$$k_t = k_{24} (0.967^{(T-24)})$$

Where k_{24} = 26 lbs. of BOD/day/cfs

Calculations based on Full Assimilative Capacity at 7-Q₁₀ Conditions:

$$\text{Limitation (mg / L)} = 2.4(DO_{\text{stream}} - DO_{\text{std}}) \left(\frac{(7Q_{10} + Q_{\text{eff}})}{Q_{\text{eff}}} \right) (0.967^{(T-24)})$$

Where:

Q_{eff} = effluent design flow = 0.162 MGD

DO_{stream} = background dissolved oxygen = 7 mg/L

DO_{std} = dissolved oxygen criteria from s. NR 102.04(4) = 5.0 mg/L

7-Q₁₀ = 0 cfs

T = Receiving water temperature from s. NR 102.25

Since no dilution is available in the receiving water, the calculated limits would be the lowest that the Department typically gives to industrial facilities. The recommended effluent limitation is 10 mg/L as a monthly average applied year-round. As there is little or no dilution available under low flow conditions, **a dissolved oxygen limit of 7.0 mg/L as a daily minimum is also recommended.** This is consistent with the assumed dissolved oxygen effluent concentration in the calculation of the BOD₅ limitations.

In the absence of a TMDL, TSS limits are typically set equal to the BOD₅ limits unless the wastewater process is not biological in which case an alternative TSS limit may be given based on best professional judgement. The Department typically sets TSS limits equal to BOD₅ limits, but not at levels lower than 10

mg/L. This is expected to meet compliance with s. NR 102.04(1) (a) & (b), in which the narrative criteria for TSS are outlined.

It should be noted that, since the stormwater pond where Outfall 001 discharges is completely contained on Saputo Cheese USA Inc Reedsburg Greenway's property, the pond is not considered waters of the state under s. 283.01(20), Wis. State Stats., and water quality criteria do not apply directly to it. The point of standards applies at the point where the stormwater pond overflows to the Unnamed Tributary, which is considered a water of the state.

BOD and TSS Mass Limits

Mass limits for BOD₅ from the water quality-based effluent limits are not recommended because the receiving water is completely effluent dominated. However, technology-based effluent mass limits of 7.2 lbs/day and 3.6 lbs/day as a daily maximum and monthly average, respectively, are required based on s. NR 240.12, Wis. Adm. Code.

The technology-based effluent mass limits for TSS of 9.1 lbs/day and 4.5 lbs/day as a daily maximum and monthly average, respectively, are required as described in s. NR 240.12, Wis. Adm. Code.

These limits are based on current production data and are described in detail in the separate technology based effluent limits memo dated April 25, 2023. Categorical limits based on ch. NR 240, Wis. Adm. Code, are not water quality-based and apply directly to discharge to the stormwater pond.

**PART 4 – WATER QUALITY-BASED EFFLUENT LIMITATIONS
FOR AMMONIA NITROGEN**

The State of Wisconsin promulgated revised water quality standards for ammonia nitrogen in ch. NR 105, Wis. Adm. Code, effective March 1, 2004, which includes criteria based on both acute and chronic toxicity to aquatic life. Given the fact that the Saputo Cheese USA Inc Reedsburg Greenway does not currently have ammonia nitrogen limits, the need for limits is evaluated at this time.

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 three sample results were reported from October 2017 through August 2022. The maximum reported value was 7.0 s.u. (Standard pH Units). 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 8.7 s.u. Given the limited dataset, a value of 7.0 s.u. is believed to represent the maximum reasonably expected pH, and therefore most appropriate for determining daily maximum limitations for ammonia nitrogen. Substituting a value of 7.0 s.u. into the equation above yields an ATC = 36 mg/L.

Daily Maximum Ammonia Nitrogen Effluent Limitations Calculation Method

In accordance with s. NR 106.32(2), Wis. Adm. Code daily maximum ammonia limitations are either set equal to two times the acute criteria (the final acute value) or calculated using the mass balance equation in s. NR 106.32(2)(e), Wis. Adm. Code.

In this case, limits calculated based on the mass balance equation are more restrictive. This method is used to calculate the daily maximum limit of **36 mg/L**.

Presented below is a table of daily maximum limitations corresponding to various effluent pH values updated using the 1-Q₁₀. Use of this table is not necessarily recommended in the permit, but it is presented herein for informational purposes.

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	54	7.0 < pH ≤ 7.1	33	8.0 < pH ≤ 8.1	6.9
6.1 < pH ≤ 6.2	53	7.1 < pH ≤ 7.2	30	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	45	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

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

Weekly and monthly average limits based on chronic toxicity criteria for ammonia are also calculated to determine the weekly and monthly average limits to meet the requirements of s. NR 106.07(3), Wis. Adm. Code.

Weekly average and monthly average limits for ammonia nitrogen are based on chronic toxicity criteria in ch. NR 105, Wis. Adm. Code. The 30-day chronic toxicity criterion (CTC) for ammonia in waters classified as a Warm Water Sport Fish Community is calculated by the following equation, according to subchapter IV of NR 106, Wis. Adm. Code.

$$CTC = E \times \{ [0.0676 \div (1 + 10^{(7.688 - pH)})] + [2.912 \div (1 + 10^{(pH - 7.688)})] \} \times C$$

Where:

pH = the pH (s.u.) of the receiving water,

E = 0.854,

C = the minimum of 2.85 or $1.45 \times 10^{(0.028 \times (25 - T))}$ – (Early Life Stages Present), or

C = $1.45 \times 10^{(0.028 \times (25 - T))}$ – (Early Life Stages Absent), and

T = the temperature (°C) of the receiving water – (Early Life Stages Present), or

T = the maximum of the actual temperature (°C) and 7 - (Early Life Stages Absent)

Section NR 106.32 (3), Wis. Adm. Code, provides 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 °C, during the winter and spring months. Burbot, an early spawning species, are not believed to be present in the Unnamed Tributary based on conversations with local fisheries biologists. So “ELS Absent” criteria apply from October through March, and “ELS Present” criteria will apply from April through September for a warm water sport fish classification.

The “default” basin assumed values are used for Temperature, pH and background ammonia concentrations, because minimum ambient data is available. These values are shown in the table below, with the resulting criteria and effluent limitations.

Weekly and Monthly Ammonia Nitrogen Limits – WWSF

		Spring	Summer	Winter
		April & May	June – Sept.	Oct. - March
Effluent Flow	Qe (MGD)	0.162	0.162	0.162
Background Information	7-Q ₁₀ (cfs)	0	0	0
	7-Q ₂ (cfs)	0	0	0
	Ammonia (mg/L)	0.06	0.06	0.085
	Temperature (°C)	12	19	4
	pH (s.u.)	7.0	7.0	7.0
	% of Flow used	50	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	14.77	10.01	14.77
	Early Life Stages Absent	14.84	10.01	19.77
	30-day Chronic			
	Early Life Stages Present	5.91	4.00	5.91
	Early Life Stages Absent	5.94	4.00	7.91
Effluent Limitations mg/L	Weekly Average			
	Early Life Stages Present	15	10	
	Early Life Stages Absent			20
	Monthly Average			
	Early Life Stages Present	5.9	4.0	
	Early Life Stages Absent			7.9

Effluent Data

Sampling for ammonia nitrogen was conducted during June and July 2022, and the results were as follows:

Ammonia Nitrogen Effluent Data

Sample Date	Ammonia Nitrogen (mg/L)	Sample Date	Ammonia Nitrogen (mg/L)
06/15/2022	12	06/27/2022	7.5
06/16/2022	2.1	06/27/2022	0.83
06/20/2022	9.0	07/05/2022	12
06/20/2022	1.2	07/05/2022	2.2
Mean = 5.9 mg/L			

NOTE: There are two RO membrane units with polishers that discharge to Outfall 001. Sampling for the application was done separately at each RO unit for informational purposes. However, since the two streams combine into a single discharge stream, the sample results from the application are presented as a single dataset and limits are assessed accordingly.

Since fewer than 11 sample results are available, the average, 5.9 mg/L, is compared to one fifth of calculated limits to determine reasonable potential. Based on this comparison, **weekly and monthly limits are required year-round.**

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.

Final Ammonia Nitrogen Limits

	Daily Maximum mg/L	Weekly Average mg/L	Monthly Average mg/L
April & May	13	15	5.9
June – September	8.5	10	4.0
October – March	17	20	7.9

Additional limits to meet the requirements in s. NR 106.07, Wis. Adm Code, denoted in bold text in the table above, are addressed in Part 8 of this memo.

PART 5 – PHOSPHORUS

Technology-Based Effluent Limit

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

Since Saputo Cheese USA Inc Reedsburg Greenway does not currently have an existing technology-based limit, the need for this limit in the reissued permit is evaluated. Although there is a limited dataset, the data demonstrates that the annual monthly average phosphorus loading is less than 60 lbs/month which is the threshold for industrial facilities in accordance with s. NR 217.04(1)(a)2, Wis. Adm. Code, and therefore no technology-based limit is required.

Annual Average Mass Total Phosphorus Loading

Month	Average Phosphorus Concentration (mg/L)	Maximum annual average (0.162) x 30 days (Million Gallons)	Calculated Mass (lbs/month)
June 2022	0.42	4.86	17
July 2022	0.40	4.86	17

Total P (lbs/month) = Monthly average (mg/L) × total flow (MG/month) × 8.34 (lbs/gallon)
 Where total flow is the sum of the actual (not design) flow (in MG) for that month

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

TMDL and Water Quality-Based Effluent Limits (WQBEL)

The Department developed a Total Maximum Daily Load (TMDL) for the Wisconsin River Basin. The U.S. EPA approved the Wisconsin River TMDL on April 26, 2019. On July 9, 2020 the U.S. EPA approved site-specific phosphorus criteria for Petenwell Lake, Castle Rock Lake and Lake Wisconsin. The document, along with the referenced appendices can be found at: <https://dnr.wisconsin.gov/topic/TMDLs/WisconsinRiver/index.html>

Since Saputo Cheese USA Inc Reedsburg Greenway was covered under a general permit at the time of the TMDL development and approval, an individual TMDL wasteload allocation (WLA) was not given. Therefore, the total phosphorus effluent limits in pounds per day (lbs/day) are calculated as recommended in the *TMDL Development and Implementation Guidance: Integrating the WPDES and Impaired Waters Programs* (May 2020).

In order to be protective of the immediate receiving water, WQBELs calculated in accordance with s. NR 217.13, Wis. Adm. Code, are needed.

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.

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):

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

Where:

WQC = 0.075 mg/L for the Unnamed Tributary

Qs = 100% of the 7-Q₂ 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 = 0.162 MGD = 0.251 cfs

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

Since the receiving water flow is equal to zero, the effluent limit is set equal to criteria.

Effluent Data

The following table summarizes effluent total phosphorus monitoring data from June and July 2022.

Total Phosphorus Effluent Data

Sample Date	Phosphorus (mg/L)	Sample Date	Phosphorus (mg/L)	Sample Date	Phosphorus (mg/L)
06/14/2022	0.61	06/21/2022	0.25	06/29/2022	0.36
06/15/2022	0.48	06/22/2022	0.42	07/05/2022	0.50
06/16/2022	0.41	06/27/2022	0.31	07/06/2022	0.29
06/20/2022	0.49	06/28/2022	0.43	07/07/2022	0.40
1-day P ₉₉ = 0.66 mg/L					
4-day P ₉₉ = 0.54 mg/L					
30-day P ₉₉ = 0.32 mg/L					
Sample size = 24 (12 non-detects from Polisher 2 (goat) not shown in this table)					

NOTE: There are two RO membrane units with polishers that discharge to Outfall 001. Sampling for the application was done separately at each RO unit for informational purposes. However, since the two streams combine into a single discharge stream, the sample results from the application are presented as a single dataset herein and limits are assessed accordingly.

Reasonable Potential Determination

The discharge has reasonable potential to cause or contribute to an exceedance of the water quality criterion because the 30-day P₉₉ of reported effluent total phosphorus data is greater than the calculated WQBEL. Therefore, **a WQBEL is required.**

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.

TMDL 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. **This final mass limit shall be 0.075 mg/L × 8.34 × 0.162 MGD = 0.10 lb/day expressed as a six-month average.**

Since wasteload allocations are expressed as annual loads (lbs/yr), permits with TMDL-derived monthly average permit limits should require the permittee to calculate and report rolling 12-month sums of total monthly loads for total phosphorus. Rolling 12-month sums can be compared directly to the annual wasteload allocation. Six-month average limits apply in the periods May – October and November – April.

The annual wasteload allocation for Saputo Cheese USA Inc Reedsburg Greenway shall be 37 lbs/year (0.10 lb/day * 365 days/year) after rounding.

Interim Limit

An interim limit is required per s. NR 217.17, Wis. Adm. Code, when a compliance schedule is needed in the permit to meet the WQBEL. The interim limit should reflect a concentration that the facility is able to meet without investing in additional “temporary” treatment, but also should prevent backsliding from current conditions. Therefore, **it is recommended that the interim limit be set equal to 0.54 mg/L for permit reissuance along with requirements for optimization of phosphorus removal.** This value reflects the 4-day P₉₉ concentration of 0.54 mg/L from the past six years. This value is recommended instead of the 30-day P₉₉ concentration of 0.32 mg/L to allow operational flexibility when the facility begins to initiate phosphorus treatment optimization activities, which often consist of trial and error, and due to the limited dataset.

PART 6 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR THERMAL

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

In accordance with s. NR 106.53(2)(b), Wis. Adm. Code, the highest daily maximum flow rate for a calendar month is used to determine the acute (daily maximum) effluent limitation. In accordance with s. NR 106.53(2)(c), Wis. Adm. Code, the highest 7-day rolling average flow rate for a calendar month is used to determine the sub-lethal (weekly average) effluent limitation. Given the limited effluent flow data and since the receiving water flow is equal to zero, limits are set equal to criteria.

The table below summarizes the maximum temperatures reported during monitoring from 2018 and 2022.

Monthly Temperature Effluent Data & Limits

Month	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Weekly Maximum	Daily Maximum	Weekly Average Effluent Limitation	Daily Maximum Effluent Limitation
	(°F)	(°F)	(°F)	(°F)
JAN			49	76
FEB			50	76
MAR			52	77
APR	79	79	55	79
MAY	68	68	65	82
JUN	68	68	76	84
JUL	72	72	81	85
AUG	68	72	81	84
SEP	73	73	73	82
OCT			61	80

Month	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Weekly Maximum	Daily Maximum	Weekly Average Effluent Limitation	Daily Maximum Effluent Limitation
	(°F)	(°F)	(°F)	(°F)
NOV			49	77
DEC			49	76

Temperature Effluent Data

Sample Date	Temperature (°F)	Sample Date	Temperature (°F)
4/1/2018	78.7	8/9/2018	68
5/22/2018	68	7/25/2022	72
6/11/2018	68	8/30/2022	72.1
7/3/2018	68	9/21/2022	73.2

Reasonable Potential

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

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

Comparing the representative highest effluent temperature to the calculated effluent limits determines the reasonable potential of exceeding the effluent limits. Based on the available effluent data, **weekly average limits are required for April and May. Additionally, since no data is available for January through March and October through December, limits are required** in accordance with s. NR 106.56(12), Wis. Adm. Code. **Temperature monitoring for at least one year is recommend in order to assess reasonable potential at the next permit reissuance.** The complete thermal table used for the limit calculation is shown in Attachment #4.

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*
<http://dnr.wi.gov/topic/surfacewater/documents/ThermalGuidance2edition8152013.pdf>

It should be noted that, since the stormwater pond where Outfall 001 discharges is completely contained on Saputo Cheese USA Inc Reedsburg Greenway's property, the pond is not considered waters of the state under s. 283.01(20), Wis. State Stats., and water quality criteria do not apply directly to it. The point of standards applies at the point where the stormwater pond overflows to the Unnamed Tributary, which is considered a water of the state.

PART 7 – WHOLE EFFLUENT TOXICITY (WET)

WET testing is used to measure, predict, and control the discharge of toxic materials that may be harmful to aquatic life. In WET tests, organisms are exposed to a series of effluent concentrations for a given time and effects are recorded. Decisions below related to the selection of representative data and the need for WET limits were made according to ss. NR 106.08 and 106.09, Wis. Adm. Code. WET monitoring frequency and toxicity reduction evaluation (TRE) recommendations were made using the best professional judgment of staff familiar with the discharge after consideration of the guidance in the *Whole Effluent Toxicity (WET) Program Guidance Document (October 29, 2019)*.

- 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 LC₅₀ (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 IC₂₅ (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:

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

Where:

Q_e = annual average flow = 0.162 MGD = 0.251 cfs

f = fraction of the Q_e withdrawn from the receiving water = 0

Q_s = ¼ of the 7-Q₁₀ = 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 laboratory water since there is no flow in the receiving water (Unnamed Tributary).

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	No data available. 5 Points	No data available. 5 Points
Effluent Variability	Little variability, no violations or upsets, consistent operations. 0 Points	Same as Acute. 0 Points
Receiving Water Classification	WWSF. 5 Points	Same as Acute. 5 Points
Chemical-Specific Data	Reasonable potential for limits for residual chlorine based on ATC. Chloride, copper, and ammonia detected. Additional Compounds of Concern: None. 8 Points	Reasonable potential limits for ammonia and residual chlorine. Chloride and copper detected. Additional Compounds of Concern: None. 8 Points
Additives	No biocides and one water quality conditioner (caustic soda) added. P chemical treatment? No. 1 Point	All additives used more than once per 4 days. 1 Point
Discharge Category	Process Wastewater 5 Points	Same as Acute. 5 Points
Wastewater Treatment	Secondary or better. 0 Points	Same as Acute. 0 Points
Downstream Impacts	No impacts known. 0 Points	Same as Acute. 0 Points
Total Checklist Points:	24 Points	39 Points
Recommended Monitoring Frequency (from Checklist):	2 tests during permit term.	1x yearly.

	Acute	Chronic
Limit Required?	No	No
TRE Recommended? (from Checklist)	No	No

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

PART 8 – EXPRESSION OF LIMITS

Sections NR 106.07(3), NR 106.07(4), and NR 205.067(7), Wis. Adm. Code, and 40 CFR 122.45(d) require WPDES permits contain the following concentration limits, whenever practicable and necessary to protect water quality:

- Weekly average and monthly average limitations for continuous discharges subject to ch. NR 210.
- Daily maximum and monthly average limitations for all other discharges.

Saputo Cheese USA Inc Reedsburg Greenway is an industrial discharge and is therefore subject to daily maximum and monthly average limitations whenever limitations are determined to be necessary.

This evaluation provides additional limitations necessary to comply with the expression of limits in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Code. Pollutants already compliant with these rules or that have an approved impracticability demonstration, are excluded from this evaluation including water-quality based effluent limitations for phosphorus, temperature, pH, and *E. coli* among other parameters. **Mass limitations are not subject to the limit expression requirements if concentrations limits are given.**

Method for Calculation

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:

1. Whenever a daily maximum limitation is determined necessary to protect water quality, a monthly average limitation shall also be included in the permit and set equal to the daily maximum limit unless a more restrictive limit is already determined necessary to protect water quality.
2. 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.
 - Residual chlorine
 - A daily maximum limitation shall also be included in the permit and set equal to the daily maximum WQBEL calculated under s. NR 106.06, Wis. Adm. Code, or a daily maximum limitation calculated using the following procedure, whichever is more restrictive.

Daily Maximum Limitation= $WQBEL_c \times DMF$

Where:

DMF = Daily Multiplication Factor as defined in Table 2

CV = coefficient of variation (CV) as calculated in s. NR 106.07(5m), Wis. Adm. Code.

s. NR 106.07 (4) (e). Table 2 — Daily Multiplication Factors

CV	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
DMF	1.114	1.235	1.359	1.460	1.557	1.639	1.712	1.764	1.802	1.828

CV	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
DMF	1.842	1.849	1.851	1.843	1.830	1.815	1.801	1.781	1.751	1.744

- Whenever a monthly average limitation is determined necessary to protect water quality, a daily maximum limit shall be calculated using the following procedure and included in the permit unless a more restrictive limit is already determined necessary to protect water quality:

- o Ammonia Nitrogen

Daily Maximum Limit = (Monthly Average Limitation \times MF)

Where:

MF= Multiplication factor as defined in Table 1

CV= coefficient of variation (CV) as calculated in s. NR 106.07(5m), Wis. Adm. Code.

= 0.6 since there are fewer than 10 data points available

n= the number of samples per month required in the permit – assumed to be 3x/week.

If the monitoring frequency changes, limits will need to be reevaluated.

April & May Daily Maximum Limitation = Monthly Limit \times DMF = 5.9 mg/L \times 2.12 = **13 mg/L**

June - September Daily Maximum Limitation = Monthly Limit \times DMF = 4.0 mg/L \times 2.12 = **8.5 mg/L**

October – March Daily Maximum Limitation = Monthly Limit \times DMF = 7.9 mg/L \times 2.12 = **17 mg/L**

Since the limits above are more restrictive than the calculated daily maximum limit of 36 mg/L, they should be included in the permit.

s. NR 106.07(3)(e)4, Table 1, Wis. Adm. Code — Multiplication Factor (for CV = 0.6)

CV	n=1	n=2	n=3	n=4	n=8	n=12	n=16	n=20	n=24	n=30
0.6	1.00	1.31	1.51	1.64	1.95	2.12	2.23	2.30	2.36	2.43

Note: This methodology is based on the *Technical Support Document for Water Quality-based Toxics Control* (March 1991). PB91-127415.

Summary of Additional Limitations:

In conclusion, the following additional limitations, denoted in bold type, are required to comply with ss. NR 106.07 and NR 205.065(7), Wis. Adm. Code.

Expression of Limits Summary

Parameter	Daily Maximum	Weekly Average	Monthly Average
Residual chlorine	19 µg/L	7.3 µg/L	7.3 µg/L
Ammonia Nitrogen			
April & May	13 mg/L	15 mg/L	5.9 mg/L
June – September	8.5 mg/L	10 mg/L	4.0 mg/L
October - March	17 mg/L	20 mg/L	7.9 mg/L

PART 9 – ADDITIVE REVIEW

Unlike the metals and toxic substances evaluated in Part 2, most additives have not undergone the amount of toxicity testing needed to calculate water quality criteria. Instead, in cases where the minimum data requirements necessary to calculate a WQC are not met, a secondary value can be used to regulate the substance, according to s. NR 105.05, Wis. Adm. Code. Whenever an additive is discharged directly into a surface water without receiving treatment or an additive is used in the treatment process and is not expected to be removed before discharge, a review of the additive is needed. Secondary values should be derived according to s. NR 105.05, Wis. Adm. Code. Guidance related to conducting an additive review can be found in *Water Quality Review Procedures for Additives* (2019) (<https://dnr.wisconsin.gov/topic/Wastewater/Additives.html>).

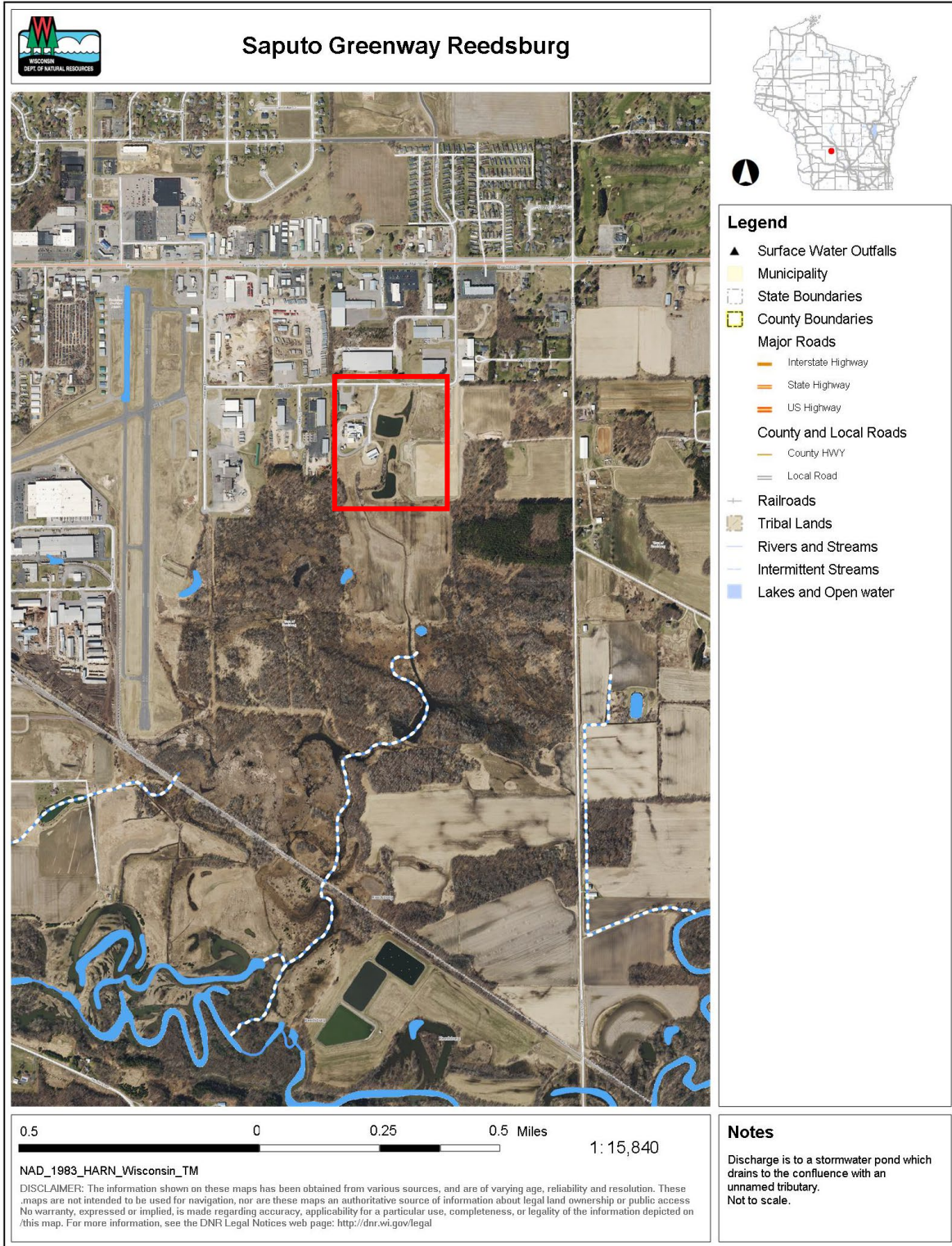
Additive Parameters

Additive Name	Manufacturer	Purpose of Additive including where added	Intermittent or Continuous Feed	Frequency of Use		Estimated Effluent Concentration	Potential Use Restriction ¹	Is Additive Authorized in Current Permit?
				Months per/yr.	Days/week			
Caustic soda liquid 50%	Hydrite Chemical	pH equalization	Continuous	12	5	76 gal/day	N/A	Yes

1. Evaluation is not necessary for additives that have active ingredients consisting only of chlorine, caustic soda (sodium hydroxide), hypochlorite, sulfuric acid, hydrochloric acid.

A secondary value does not need to be calculated for caustic soda because this product is used for pH adjustment.

Site Map



Historical Approval Letter



State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

Scott Walker, Governor
Cathy Stepp, Secretary
Mark Aquino, Regional Director

South Central Region Headquarters
3911 Fish Hatchery Road
Fitchburg, WI 53711-5397
Telephone (608) 275-3266
FAX (608) 275-3338
TTY Access via relay - 711

September 23, 2016

FIN: 52307

Omega Protein, Inc
ATTN: Randy Pierce
522 Greenway Court
Reedsburg, WI 53959

**SUBJECT: Conditional Approval – WPDES Permit No. WI-0044938-5
Noncontact Cooling Water or Condensate and Boiler Water
Omega Protein – Reedsburg, Wisconsin**

Dear Mr. Pierce,

The Wisconsin Department of Natural Resources (the “Department”) has reviewed your application for authorization to discharge reverse osmosis effluent from your Omega Protein facility located at 522 Greenway Court, Reedsburg, Wisconsin. Your proposed discharge is eligible for coverage, and is hereby authorized under Wisconsin Pollutant Discharge Elimination System (WPDES) Permit No. WI-0044938-5, Noncontact Cooling Water or Condensate and Boiler Water. You are responsible for compliance with the conditions contained in the permit and this letter. The permit and fact sheet should be downloaded from the Department website at <http://dnr.wi.gov/topic/wastewater/generalpermits.html>.

PATH OF DISCHARGE

Wastewater from the facility’s reverse osmosis system will be discharged at a rate of approximately 250,000 gallons per day. The effluent will discharge to a stormwater pond adjacent to Greenway Court to the east (Outfall 001), travel approximately 0.2 miles to the confluence with an unnamed tributary [Waterbody Identification Code (WBIC) 5030415], and ultimately drain to the Baraboo River. The anticipated duration for the discharge is recurrent for the length of the permit term.

GENERAL REQUIREMENTS

Please note there may be other permits and/or approvals required by the Department or other federal, state, and local governments associated with your discharge activity. It is your responsibility to secure all appropriate approvals and permits prior to project startup. This letter is not inclusive of these requirements.

Groundwater Protection

Limits based on groundwater quality protection are set at the preventive action limits in ch. NR 140, Wis. Adm. Code. These limits are based on substances reported to be in the discharge, but may not necessarily include all substances of public health or welfare concern which are in the discharge. However, nothing in this permit allows the permittee to discharge any substance in a concentration that would cause groundwater standards in ch. NR 140 to be exceeded.

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PERMIT REQUIREMENTS

Water Treatment Additives

As stated in permit section B(1)(a), discharges containing non-biocide water treatment additives are prohibited under this general permit unless the use of the water treatment additive is approved, in writing, by the Department.

Notice of Discharge

James Brodzeller, Department Wastewater Specialist, (608) 275-3281, shall be notified:

- Prior to the startup of any discharge
- Within 24 hours of the permittee being notified of any permit limit exceedance
- When the discharge has ended

Sample Point

The sample point for Outfall 001 shall be upon exiting the discharge pipe just prior to entering the stormwater pond.

Monitoring Parameters and Frequency

Pursuant to permit section D, Table 2, all discharges to surface water shall be monitored quarterly for flow and temperature, in addition to annual sampling for oil/grease, five day biochemical oxygen demand (BOD₅), total phosphorus, and ammonia nitrogen. Records of additive additions shall be submitted on a monthly basis when applicable.

Effluent Limitations

Applicable effluent limitations for your discharge are listed in Table 2, permit section D, as well as on the enclosed Discharge Monitoring Report (DMR) form. The permittee shall comply with a Temperature Eligibility Value (TEV) of 120° F year-round. Pursuant to s. NR 205.07(3)(e), Wis. Adm. Code, upon being notified of any permit limit exceedance, or if an oily sheen or turbid discharge is observed, curtail production or wastewater discharges or both until the treatment facility operations are restored or an alternative method of treatment is provided.

Special Note: Based on the source water of your operation, the proposed discharge may not meet the current State Water Quality Criteria standards for phosphorus, chlorine, and/or other contaminants. However, your proposed discharge is covered under the existing WPDES Non-Contact Cooling Water General Permit until receiving further notification from the Department.

Reporting

DMR forms (enclosed) summarizing the previous month's discharge activities, including a copy of the actual lab reports, are due February 15th, annually. Completed forms shall be mailed to the address listed to the left of the signature line on the DMR. Records required by this permit must be kept for the duration of the permit, and made available for inspection by Department staff upon request.

Additional information on the Department's legal authority in this matter, including your rights of appeal, is shown on page three of this letter. If you have any questions regarding the requirements of the permit or this letter, please don't hesitate to contact me at (608) 275-3281 or James.Brodzeller@wisconsin.gov.

Regards,


James Brodzeller

Wastewater Specialist – Water District South

Attachment #3

Cc: Permit File – Region and Central Office
Trevor Moen – DNR Wastewater Engineer
Tania Deb, Omega Protein
Lynn Morrison – The Probst Group, LLC

LEGAL AUTHORITIES AND APPEAL RIGHTS

Section 283.35, Wisconsin Statutes, authorizes the Department to issue general permits for discharges from categories or classes of point sources. If a permittee believes coverage of a facility under a general WPDES permit is not appropriate, the permittee may apply for issuance of an individual WPDES permit pursuant to section 283.35(2) and may petition the Department for withdrawal of coverage under the general permit. The individual permit application should indicate which site specific factors would justify alternate WPDES limits for the operation. Issuance of such a site specific WPDES permit will provide for a 30 day public comment period, and potentially a public informational hearing and/or an adjudicatory hearing. The Department may withdraw a facility from coverage under a general permit if it is determined that a discharge is a significant contributor of pollutants to waters of Wisconsin, or in certain other cases set out in s. 283.35, Stats. In lieu of general permit withdrawal, the Department may refer any violation of this permit to the Department of Justice for enforcement under s. 283.89, Stats. In order to avoid any enforcement action, **please read the WPDES permit carefully and comply with the permit requirements.**

If you believe you have a right to challenge the Department decision to cover this facility with a WPDES general permit, you should know that Wisconsin statutes and administrative rules establish time periods within which requests to review Department decisions must be filed. To request a contested case hearing pursuant to section 227.42, Wis. Stats., you have 30 days after the decision is mailed, or otherwise served by the Department, to serve a petition for hearing on the Secretary of the Department of Natural Resources. Such a petition should identify pollutant(s) that are believed to be not appropriately regulated by the general permit for the specific site. All requests for contested case hearings must be made in accordance with section NR 2.05(5), Wis. Adm. Code, and served on the Secretary in accordance with section NR 2.03, Wis. Adm. Code. The filing of a request for a contested case hearing is not a prerequisite for judicial review and does not extend the time period for filing a petition for judicial review.

For judicial review of a decision pursuant to sections 227.52 and 227.53, Wis. Stats., you have 30 days after the decision is mailed, or otherwise served by the Department, to file your petition with the appropriate circuit court and serve the petition on the Department. A petition for judicial review must name the Department of Natural Resources as the respondent.

Temperature limits for receiving waters with unidirectional flow

(calculation using default ambient temperature data)

Facility:	Saputo Reedsburg Greenway	7-Q₁₀:	0 cfs	Temp Dates	Flow Dates
Outfall(s):	001	Dilution:	25%	Start:	04/01/18 07/12/22
Date Prepared:		f:	0	End:	09/21/22 08/18/22
Design Flow (Q_e):	0.16 MGD	Stream type:	Small warm water sport or forag		
Storm Sewer Dist.	0 ft	Q_s:Q_e ratio:	0.0 :1		
		Calculation Needed?	YES		

Month	Water Quality Criteria			Receiving Water Flow Rate (Q _s) (cfs)	Representative Highest Effluent Flow Rate (Q _e)		f	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	T _a (default)	Sub-Lethal WQC	Acute WQC		7-day Rolling Average (Q _{esl}) (MGD)	Daily Maximum Flow Rate (Q _{ea}) (MGD)		Weekly Average	Daily Maximum	Weekly Average Effluent Limitation	Daily Maximum Effluent Limitation
	(°F)	(°F)	(°F)		(MGD)	(MGD)		(°F)	(°F)	(°F)	(°F)
JAN	33	49	76	0			0			49	76
FEB	34	50	76	0			0			50	76
MAR	38	52	77	0			0			52	77
APR	48	55	79	0			0	79	79	55	79
MAY	58	65	82	0			0	68	68	65	82
JUN	66	76	84	0			0	68	68	76	84
JUL	69	81	85	0	0.116	0.138	0	72	72	81	85
AUG	67	81	84	0	0.083	0.152	0	68	72	81	84
SEP	60	73	82	0			0	73	73	73	82
OCT	50	61	80	0			0			61	80
NOV	40	49	77	0			0			49	77
DEC	35	49	76	0			0			49	76

DATE: April 25, 2023

TO: Brenda Howald – SCR/Fitchburg

FROM: Sarah Luck – SCR/Fitchburg

SUBJECT: Technology-Based Effluent Limitations for Saputo Cheese USA Inc Reedsburg Greenway
WPDES Permit No. WI-0067841-01-0

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

Parameter	Daily Maximum	Daily Minimum	Monthly Average
BOD ₅ , Total	7.2 lbs/day		3.6 lbs/day
TSS	9.1 lbs/day		4.5 lbs/day
pH	9.0 su	6.0 su	

PART 1 – BACKGROUND INFORMATION

Saputo Cheese USA Inc Reedsburg Greenway (formerly owned by Omega Protein Inc.) receives liquid whey from bovine and caprine cheese makers that is used to make whey protein concentrate and lactose. The bovine and caprine permeate from the make process is sold as liquid animal feed. The polished water from the make process is discharged to a stormwater pond. The discharge from the pond travels approximately 0.2 mile before its confluence with an unnamed tributary. The powder dryers do not produce any wastewater.

PART 2 – INDUSTRIAL CATEGORIES

Chapter NR 240, Wis. Adm. Code, specifies effluent guidelines for discharges from dairy (bovine) product categories of point sources and subcategories. Limits for caprine products are also calculated in accordance with ch. NR 240, Wis. Adm. Code, as it is the closest category and are considered best professional judgment. Discharge from Saputo Cheese USA Inc Reedsburg Greenway falls under the “Dry Whey” subcategory as defined in s. NR 240.02, Wis. Adm. Code. These guidelines are based on federal effluent guidelines in 40 CFR Part 405 Subpart L. The permittee must meet the applicable effluent limit guidelines as described in this chapter. These effluent limit guidelines include:

- Effluent limitations representing the degree of effluent reduction attainable by the application of the 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, TSS, and pH. BAT applies to priority pollutants and nonconventional pollutants and does not apply to BOD, TSS or pH.
- The federal standard rule lists revised BCT standards requirements. All BCT limitations are set to be the same as the best practicable control technology (BPT) standards. State rules in ch. NR 240, Wis. Adm. Code, do not list standards for BCT.

PART 3 – LEVELS OF CONTROL

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 “Dry Whey” subcategory are applicable as specified in 40 CFR Part 405 Subpart L and ch. NR 240.12, Wis. Adm. Code.

PART 4 – CURRENT PRODUCTION LEVELS

The current levels of production for each Subcategory are provided by Saputo Cheese USA Inc Reedsburg Greenway.

Dry Whey

Process	Material Used (lbs/day)
Wet processing from whey	670,000
Wet processing from skim milk	10,000

PART 5 – BOD INPUT

The BOD₅ 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 input equivalents by multiplying the amount of raw material by BOD factors specified in s. NR 240.03(1) or s. NR 240.07 Wis. Adm. Code and 40 CFR Part 405.

Dry Whey

Process	Material Used (lbs/day)	BOD Factor ¹ (lbs/100 lbs)	Adjusted Total BOD Input ² (lbs/day)
Wet processing from whey	670,000	4.72	31,624
Wet processing from skim milk	10,000	7.44	744

Footnotes:

1. The BOD 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 input = BOD input * BOD factor / 100

PART 6 – 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 405.115 and 405.125 would apply.

Total BOD Input (lbs/day)	NSPS Effluent Limitations				Calculated Limits			
	BOD (lbs/1,000 lbs)		TSS (lbs/1,000 lbs)		BOD (lbs/day) ¹		TSS (lbs/day) ¹	
	Monthly Avg	Daily Max	Monthly Avg	Daily Max	Monthly Avg	Daily Max	Monthly Avg	Daily Max
31,624	0.11	0.22	0.14	0.28	3.5	7.0	4.4	8.9
744	0.11	0.22	0.14	0.28	0.1	0.2	0.1	0.2

Footnote:

1. The limits (lbs/day) = total BOD input (lbs/day) / 1000 * NSPS limitations

PART 7 – FINAL CALCULATED LIMITS

Per s. NR 240.06(3) Wis. Adm. Code, the total discharge limits shall be the total of the amounts calculated from the BOD input in the final product subcategory.

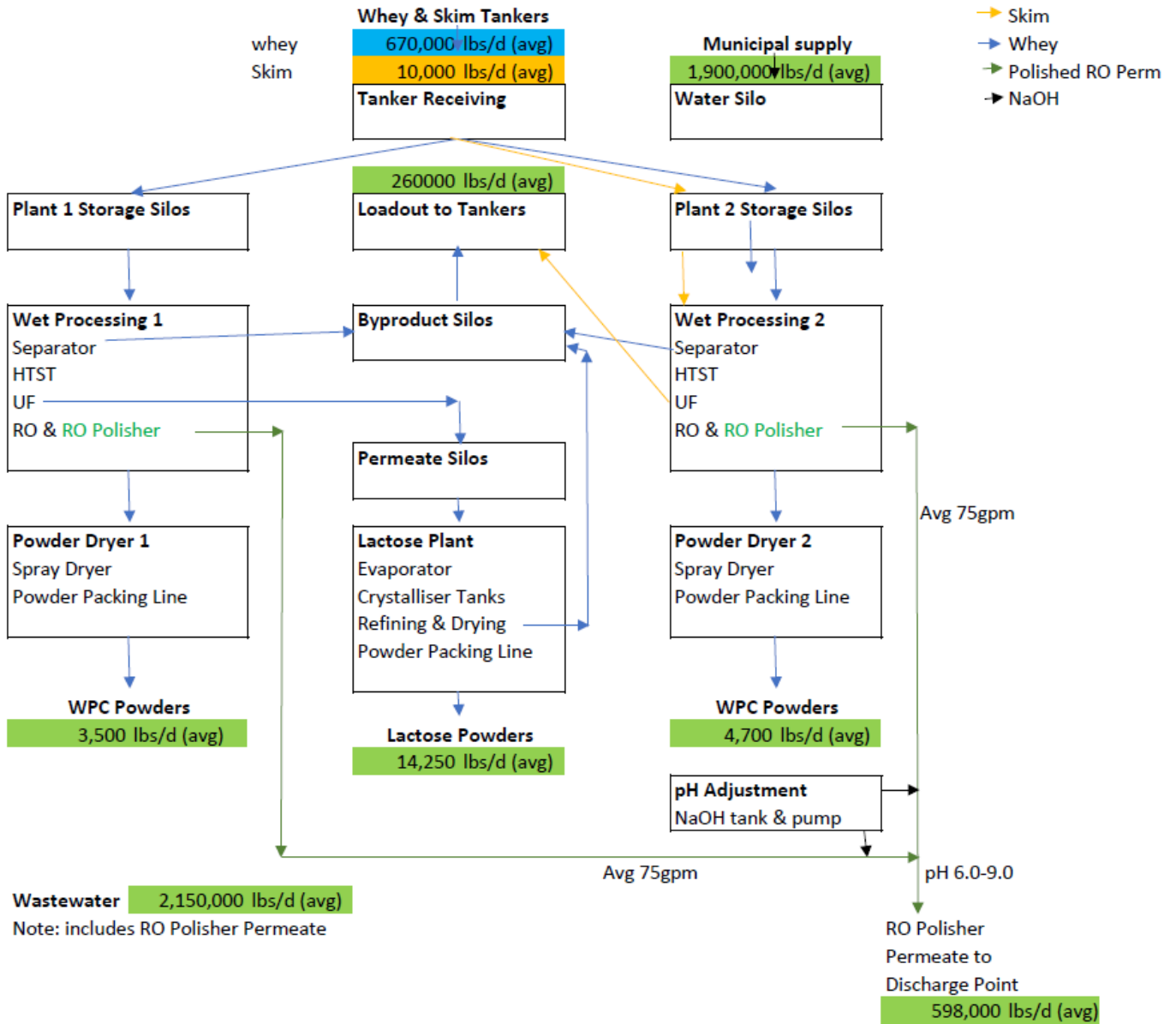
Since limits based on NSPS standards are applicable to all production lines, the NSPS standards are the most restrictive calculated set of limits.

Subcategory	Monthly average BOD (lbs/day)	Daily maximum BOD (lbs/day)	Monthly average TSS (lbs/day)	Daily maximum TSS (lbs/day)
Dry whey from whey	3.5	7.0	4.4	8.9
Dry whey from skim milk	0.1	0.2	0.1	0.2
Total	3.6	7.2	4.5	9.1

Final Calculated Effluent Limitations			
Parameter & Units	Daily Maximum	Daily Minimum	Monthly Average
BOD ₅	7.2 lbs/day		3.6 lbs/day
TSS	9.1 lbs/day		4.5 lbs/day
pH	9.0 su	6.0 su	

The daily maximum and monthly average concentration limits in the WQBEL memo dated May 17, 2023 are also recommended to be included in the reissued permit along with the mass concentrations that are recommended in this TBEL memo.

Flow Diagram



CORRESPONDENCE/MEMORANDUM

DATE: May 17, 2023

TO: Brenda Howald – SCR/Fitchburg

FROM: Sarah Luck – SCR/Fitchburg

SUBJECT: Water Quality-Based Effluent Limitations for the Saputo Cheese USA Inc Reedsburg Greenway
 WPDES Permit No. WI-0067841-01-0

This is in response to your request for an evaluation of the need for water quality-based effluent limitations (WQBELs) using chapters NR 102, 104, 105, 106, 207, 210, 212, and 217 of the Wisconsin Administrative Code (where applicable), for the discharge from the Saputo Cheese USA Inc Reedsburg Greenway in Sauk County. This industrial facility discharges to a stormwater pond which drains to the Unnamed Tributary which ultimately drains to the Baraboo River, located in the Narrows Creek – Baraboo River Watershed in the Lower Wisconsin River Basin. This discharge is located within in the Wisconsin River TMDL area as approved by EPA on April 26, 2019 with site-specific criteria approved by EPA on July 9, 2020, but an individual wasteload allocation was not given since the facility was discharging under a general permit at that time. 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
BOD ₅	20 mg/L 7.2 lbs/day			10 mg/L 3.6 lbs/day		2
TSS	20 mg/L 9.1 lbs/day			10 mg/L 4.5 lbs/day		2
pH	9.0 s.u.	6.0 s.u.				3
Dissolved Oxygen		7.0 mg/L				-
Ammonia Nitrogen						4,5
April & May	13 mg/L		15 mg/L	5.9 mg/L		
June – September	8.5 mg/L		10 mg/L	4.0 mg/L		
October – March	17 mg/L		20 mg/L	7.9 mg/L		
Oil and Grease	15 mg/L			15 mg/L		3
Chloride						6
Copper						7
Hardness						8
Residual Chlorine	19 µg/L		7.3 µg/L	7.3 µg/L		4

Phosphorus						-
Interim				0.54 mg/L		
Final				0.225 mg/L	0.075 mg/L 0.10 lb/day	
Temperature						9
TKN, Nitrate+Nitrite, and Total Nitrogen						10
Acute WET						11,13
Chronic WET						12,13

Footnotes:

1. Monitoring only.
2. Categorical mass limits based on ch. NR 240, Wis. Adm. Code, were evaluated in the technology-based effluent limits memo, dated April 25, 2023, based on current production data.
3. No changes from the current general permit.
4. Additional limits to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Code, are included in bold.
5. A monitoring frequency of three times per week was used to calculate the daily maximum limits. If a different monitoring frequency is used, the limits should be reevaluated.
6. Monitoring at a frequency to ensure a minimum of 11 sample results are available at the next permit reissuance.
7. Quarterly copper monitoring is recommended, as well as the implementation of clean sampling techniques to prevent contamination.
8. Quarterly hardness monitoring is recommended because of the relationship between hardness and calculated limits based on toxicity criteria.
9. 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	-
MAY	65	-
OCT	61	80
NOV	49	77
DEC	49	76

10. As recommended in the Department's October 1, 2019 Guidance for Total Nitrogen Monitoring in Wastewater Permits, quarterly total nitrogen monitoring is recommended for all class A cheese facilities. Total Nitrogen is the sum of nitrate (NO₃), nitrite (NO₂), and total kjeldahl nitrogen (TKN) (all expressed as N).
11. Two acute WET tests are required.
12. Annual chronic WET tests are 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%, and the dilution water used in WET


tests conducted on Outfall 001 shall be laboratory water since there is no flow in the Unnamed Tributary receiving water.

13. Sampling WET concurrently with any chemical-specific toxic substances is recommended. Tests should be done in rotating quarters, to collect seasonal information about this discharge and should continue after the permit expiration date (until the permit is reissued).

It should be noted that, since the stormwater pond where Outfall 001 discharges is completely contained on Saputo Cheese USA Inc Reedsburg Greenway's property, the pond is not considered waters of the state under s. 283.01(20), Wis. State Stats., and water quality criteria do not apply directly to it. The point of standards applies at the point where the stormwater pond overflows to the Unnamed Tributary, which is considered a water of the state. However, categorical limits based on ch. NR 240, Wis. Adm. Code, are not water quality-based and apply directly to discharge to the stormwater pond.

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, Historical Approval Letter, and Thermal Table

PREPARED BY:  _____ Date: May 17, 2023
Sarah Luck
Water Resources Engineer

E-cc: Tanner Connors, Wastewater Engineer – SCR/Fitchburg
Tom Bauman, Regional Wastewater Supervisor – SCR/Fitchburg
Diane Figiel, Water Resources Engineer – WY/3

Water Quality-Based Effluent Limitations for Saputo Cheese USA Inc Reedsburg Greenway

WPDES Permit No. WI-0067148-01-0

PART 1 – BACKGROUND INFORMATION

Facility Description

Saputo Cheese USA Inc Reedsburg Greenway (formerly owned by Omega Protein Inc.) receives liquid whey from bovine and caprine cheese makers that is used to make whey protein concentrate and lactose. The bovine and caprine permeate from the make process is sold as liquid animal feed. The polished reverse osmosis permeate from the make process is discharged to a stormwater pond. The discharge from the pond travels approximately 0.2 mile before its confluence with the Unnamed Tributary (WBIC 5030415) as described in the letter from the Department to Omega Protein dated September 23, 2016 (see Attachment #3)

This discharge was previously covered under the Non-Contact Cooling Water or Condensate and Boiler Blowdown (WI-0044938-6) general permit. The discharge is now being covered under an individual permit in order to evaluate the effluent in more detail and to include facility-specific technology-based limitations.

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

Existing Permit Limitations

The current general permit includes the following effluent limitations and monitoring requirements:

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Footnotes
Flow Rate					1
BOD ₅					1
TSS		40 mg/L		40 mg/L	2
pH	9.0 s.u.	6.0 s.u.			2
Oil and Grease	15 mg/L			15 mg/L	2
Ammonia Nitrogen					1
Phosphorus					1
Temperature					1

Footnotes:

1. Monitoring only.
2. These limitations are requirements for surface water discharges in the Non-Contact Cooling Water or Condensate and Boiler Blowdown (WI-0044938-6) general permit.

Receiving Water Information

- Name: Unnamed Tributary via a stormwater pond and channelized ditch
- Waterbody Identification Code (WBIC): 5030415

Attachment #1

- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code: Default Warm Water Sport Fish (WWSF) community, non-public water supply.
- Low flows used in accordance with chs. NR 106 and 217, Wis. Adm. Code: The following 7-Q₁₀ and 7-Q₂ values are assumed for the channelized ditch leading to the Unnamed Tributary.
7-Q₁₀ = 0 cfs (cubic feet per second)
7-Q₂ = 0 cfs
- Hardness: 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 equal to 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. Background pH data for the Baraboo River was used for calculating ammonia nitrogen limits.
- Multiple dischargers: None.
- Impaired water status: The Baraboo River, located approximately 1.5 miles downstream of the stormwater pond, is listed (4/1/2014) as impaired for total phosphorus and is located within the Wisconsin River TMDL area.

Effluent Information

- Flow rate:
Maximum annual average (estimated from facility) = 0.162 MGD (Million Gallons per Day)
The facility estimated the flow as follows:
RO #1 runs for approximately 20 hours per day
20 hours per day x 60 minutes per hour = 1200 minutes
1200 minutes x 75 gpm = 90,000 gallons per day

RO #2 runs for approximately 16 hours per day
16 hours per day x 60 minutes per hour = 960 minutes
960 minutes x 75 gpm = 72,000 gallons per day

RO #1 (90,000 gpd) + RO #2 (72,000 gpd) = 162,000 gpd
For reference, the average flow rate from July 2022 through August 2022 (n=34) was 0.073 MGD.
- Hardness = 0.76 mg/L as CaCO₃. This value represents the geometric mean of eight data points from June 2022 reported on the permit application. The minimum hardness values from Table 2A in ch. NR 105, Wis. Adm. Code, are used in place of the effluent hardness since the effluent hardness is below 1 mg/L.
- Acute dilution factor used in accordance with s. NR 106.06(3)(c), Wis. Adm. Code: Not applicable – this facility does not have an approved Zone of Initial Dilution (ZID).
- Water source: Water supply from the City of Reedsburg
- Additives: Caustic soda for pH adjustment (see Part 9)
- Effluent characterization: This facility’s discharge is categorized as a secondary industry, so the permit application required effluent sample analyses for a limited number of common pollutants, as specified in s. NR 200.065, Table 1, Wis. Adm. Code, primarily metal substances plus ammonia, chloride, hardness, and phosphorus.
- Effluent data for substances for which a single sample was analyzed is shown in the tables in Part 2 below, in the column titled “MEAN EFFL. CONC.”. Otherwise, substances with multiple effluent data are shown in the tables below or in their respective parts in this evaluation.

Attachment #1

NOTE: There are two RO membrane units with polishers that discharge to Outfall 001. Sampling for the application was done separately at each RO unit for informational purposes. However, since the two streams combine into a single discharge stream, the sample results from the application are presented as a single dataset herein and limits are assessed accordingly.

Sample Date	Copper (µg/L)	Sample Date	Copper (µg/L)	Sample Date	Copper (µg/L)	Sample Date	Copper (µg/L)
06/15/2022	<5.2	06/28/2022	<5.2	03/16/2023	<5.2	03/27/2023	<5.2
06/16/2022	39.4	07/05/2022	<5.2	03/20/2023	<5.2	03/27/2023	<5.2
06/20/2022	<5.2	07/05/2022	<5.2	03/21/2023	<5.2	04/04/2023	<5.2
06/20/2022	<5.2	03/13/2023	<5.2	03/23/2023	<5.2		
06/27/2022	<5.2	03/13/2023	<5.2	03/23/2023	<5.2		
Mean = 2.2 µg/L							

“<” means that the pollutant was not detected at the indicated level of detection. The mean concentration was calculated using zero in place of the non-detected results.
See note above about duplicate sampling dates.

Sample Date	Chloride (mg/L)	Sample Date	Chloride (mg/L)	Sample Date	Chloride (mg/L)	Sample Date	Chloride (mg/L)
06/15/2022	210	03/20/2023	9.0	03/27/2023	<1.0	04/13/2023	7.4
06/16/2022	68	03/21/2023	1.3	04/03/2023	8.8	04/13/2023	1.7
03/13/2023	6.1	03/23/2023	9.3	04/04/2023	1.0	04/18/2023	7.5
03/13/2023	1.4	03/23/2023	<1.0	04/05/2023	4.8	04/18/2023	2.3
03/16/2023	6.6	03/27/2023	8.9	04/07/2023	1.2	04/20/2023	2.9
1-day P ₉₉ = 185 mg/L							
4-day P ₉₉ = 113 mg/L							

“<” means that the pollutant was not detected at the indicated level of detection.
See note above about duplicate sampling dates.

The following table presents the average concentrations and loadings at Outfall 001 from October 2017 through August 2022 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
TSS	5 mg/L
pH field	6.1 s.u.
Oil & Grease	2 mg/L

*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 P₉₉) value

- exceeds the comparable calculated limit (s. NR 106.05(4), Wis. Adm. Code)
- 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)

Daily Maximum Limit Calculation Method

Daily maximum effluent limitations for toxic substances are based on the acute toxicity criteria (ATC), listed in ch. NR 105, Wis. Adm. Code. In accordance with s. NR 106.06(3)(b), limitations based on acute toxicity are either set equal to two times the acute criteria (the final acute value) or calculated using the mass balance equation below, whichever is more restrictive.

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

Where:

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

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

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

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

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

In this case, limits calculated based on the mass balance equation are more restrictive, and this method is used to calculate the daily maximum limits shown in the table below.

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, (1-Q₁₀ (estimated as 80% of 7-Q₁₀)), as specified in s. NR 106.06(3)(bm), Wis. Adm. Code.

SUBSTANCE	REF. HARD.* mg/L	ATC	MAX. EFFL. LIMIT**	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	1-day P ₉₉	1-day MAX. CONC.
Chlorine		19.0	19.0	3.81	20		
Arsenic		340	340	68.0	<7.7		
Cadmium	6	0.410	0.410	0.082	<0.41		
Chromium	13	339.1	339.1	67.8	<1.1		
Copper	13	2.26	2.26	0.45	2.2***		
Lead	12	13.8	13.8	2.76	<1.4		
Nickel	13	83.5	83.5	16.7	<1.5		
Zinc	12	18.9	18.9	3.8	<4.5		
Chloride (mg/L)		757	757			185	210

* The minimum hardness values from Table 2A in ch. NR 105, Wis. Adm. Code, are used in place of the effluent hardness since the effluent hardness is below 1 mg/L.

Attachment #1

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

***Refer to copper discussion paragraph following tables.

Weekly Average Limits based on Chronic Toxicity Criteria (CTC)

RECEIVING WATER FLOW = 0 cfs (¼ of the 7-Q₁₀), as specified in s. NR 106.06(4)(c), Wis. Adm. Code

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	20	
Arsenic		152.2	152.2	30.4	<7.7	
Cadmium	6	0.27	0.27	0.05	<0.41	
Chromium	13	24.85	25	5.0	<1.1	
Copper	13	1.81	1.81	0.36	2.2**	
Lead	12	3.61	3.61	0.72	<1.4	
Nickel	13	9.3	9.3	1.9	<1.5	
Zinc	12	18.85	18.9	3.8	<4.5	
Chloride (mg/L)		395	395			113

* The minimum hardness values from Table 2A in ch. NR 105, Wis. Adm. Code, are used in place of the effluent hardness since the effluent hardness is below 1 mg/L.

**Refer to copper discussion paragraph following tables.

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 (¼ of Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

SUBSTANCE	HTC	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Cadmium	370	370	74.0	<0.41
Chromium (+3)	3818000	3818000	763600	<1.1
Lead	140	140	28.0	<1.4
Nickel	43000	43000	8600	<1.5

Monthly Average Limits based on Human Cancer Criteria (HCC)

RECEIVING WATER FLOW = 0 cfs (¼ of Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

SUBSTANCE	HCC	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Arsenic	13.3	13.3	2.66	<7.7

In addition to evaluating the need for limits for each individual substance for which HCC exist, s. NR 106.06(8), Wis. Adm. Code, requires the evaluation of the cumulative cancer risk. Because no effluent

limits are needed based on HCC, determination of the cumulative cancer risk is not needed per s. NR 106.06(8), Wis. Adm. Code.

Conclusions and Recommendations

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

Total Residual Chlorine – **A daily maximum limit of 19 µg/L and a weekly average limit of 7.3 µg/L are required** because the discharge concentration (20 µg/L on 6/16/22) exceeds the limitations based on the acute and chronic toxicity. Additional limits to meet the requirements in s. NR 106.07, Wis. Adm Code, are addressed in Part 8 of this memo.

Copper – Considering available effluent data reported on the permit application and from additional sampling (n=18 with one detected result), the mean copper effluent concentration is 2.2 µg/L. Although the mean exceeds 1/5th of the calculated acute and chronic limits, **effluent limits are not recommended at this time** since all other results were below the level of detection and since the RO polisher is expected to remove most pollutants. Although there is no specific reason to exclude the 39.4 µg/L sample result, this result does not seem typical of either RO polisher and could have possibly been caused by contamination or end-of-life of the RO filter. In the absence of limits, however, **quarterly monitoring is recommended as are the adoption of clean sampling techniques, including the use of bag inserts, in order to reduce the possibility of contamination.**

Quarterly hardness monitoring is also recommended because of the relationship between hardness and calculated limits based on toxicity criteria.

Additional note: The samples submitted for copper were analyzed using the EPA 200.7 analytical method. The limit of detection (5.2 µg/L) of this analytical method is significantly higher than 1/5th of the calculated limit based on ATC and CTC and is not necessarily determinate that the non-detect sample is actually lower than 0.36 µg/L, which is 1/5th of the chronic limit of 1.8 µg/L. **A different approved analytical method is recommended for future samples for copper such that the limit of detection is less than or equal to 0.36 µg/L to better determine the need for copper limits at the next permit reissuance.**

Chloride – Considering available effluent data reported on the permit application and from additional sampling (n=20), the 1-day P₉₉ chloride concentration is 185 mg/L, and the 4-day P₉₉ of effluent data is 113 mg/L. These effluent concentrations are below the calculated WQBELs for chloride; therefore, **no effluent limits are needed. Chloride monitoring is recommended to ensure that 11 sample results are available at the next permit issuance** to meet the data requirements of s. NR 106.85, Wis. Adm. Code.

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, the effluent flow rate, and lack of effluent data or source water data for PFOS and PFOA, **PFOS and PFOA monitoring is not recommended.** If information becomes available that indicates PFOS or PFOA may be present in the discharge, the monitoring requirements may change.

**PART 3 – WATER QUALITY-BASED EFFLUENT LIMITATIONS
FOR BOD, TSS, AND DISSOLVED OXYGEN**

Water Quality-Based BOD₅ & TSS Concentration Limits

In establishing BOD₅ limitations, the primary intent is to prevent a lowering of dissolved oxygen levels in the receiving water below water quality standards as specified in ss. NR 102.04(4)(a) and (b). The 26-lb method is the most frequently used approach for calculating BOD₅ limits when resources are not available to develop a detailed water quality model. This simplified model was developed in the 1970's by the Wisconsin Committee on Water Pollution on the Fox, Wisconsin, Oconto, and Flambeau Rivers. Further studies throughout the 1970's proved this model to be relatively accurate. The model has since then been used by the Department on many occasions when resources are not available to perform a site-specific model. The "26" value stems from the following equation:

$$\frac{26 \text{ lbs/day}}{\text{ft}^3/\text{sec}} * \frac{1 \text{ day}}{86,400 \text{ sec}} * \frac{454,000 \text{ mg}}{\text{lbs}} * \frac{1 \text{ ft}^3}{28.32 \text{ L}} = 4.8 = 2.4 * 2 \text{ mg/L}$$

The 4.8 mg/L has been calculated by taking 2.4 mg/L which is the number one receives when converting 26 lbs. of BOD/day/cfs into mg/L, multiplied by 2.0 which is the change in the DO level. A typical background DO level for Wisconsin waters is 7 mg/L, so a 2 mg/L decrease is allowed to meet the 5 mg/L standard for warm water streams. The above relationship is temperature dependent, and an appropriate temperature correction factor is applied. The 26-lb method is based on a typical 24°C summer value for warm water streams. Adjustments for temperature are made using the following equation:

$$k_t = k_{24} (0.967^{(T-24)})$$

Where k_{24} = 26 lbs. of BOD/day/cfs

Calculations based on Full Assimilative Capacity at 7-Q₁₀ Conditions:

$$Limitation(mg / L) = 2.4(DO_{stream} - DO_{std}) \left(\frac{(7 Q_{10} + Q_{eff})}{Q_{eff}} \right) (0.967^{(T-24)})$$

Where:

Q_{eff} = effluent design flow = 0.162 MGD

DO_{stream} = background dissolved oxygen = 7 mg/L

DO_{std} = dissolved oxygen criteria from s. NR 102.04(4) = 5.0 mg/L

7-Q₁₀ = 0 cfs

T = Receiving water temperature from s. NR 102.25

Since no dilution is available in the receiving water, the calculated limits would be the lowest that the Department typically gives to industrial facilities. The recommended effluent limitation is 10 mg/L as a monthly average applied year-round. As there is little or no dilution available under low flow conditions, **a dissolved oxygen limit of 7.0 mg/L as a daily minimum is also recommended.** This is consistent with the assumed dissolved oxygen effluent concentration in the calculation of the BOD₅ limitations.

In the absence of a TMDL, TSS limits are typically set equal to the BOD₅ limits unless the wastewater process is not biological in which case an alternative TSS limit may be given based on best professional judgement. The Department typically sets TSS limits equal to BOD₅ limits, but not at levels lower than 10

mg/L. This is expected to meet compliance with s. NR 102.04(1) (a) & (b), in which the narrative criteria for TSS are outlined.

It should be noted that, since the stormwater pond where Outfall 001 discharges is completely contained on Saputo Cheese USA Inc Reedsburg Greenway's property, the pond is not considered waters of the state under s. 283.01(20), Wis. State Stats., and water quality criteria do not apply directly to it. The point of standards applies at the point where the stormwater pond overflows to the Unnamed Tributary, which is considered a water of the state.

BOD and TSS Mass Limits

Mass limits for BOD₅ from the water quality-based effluent limits are not recommended because the receiving water is completely effluent dominated. However, technology-based effluent mass limits of 7.2 lbs/day and 3.6 lbs/day as a daily maximum and monthly average, respectively, are required based on s. NR 240.12, Wis. Adm. Code.

The technology-based effluent mass limits for TSS of 9.1 lbs/day and 4.5 lbs/day as a daily maximum and monthly average, respectively, are required as described in s. NR 240.12, Wis. Adm. Code.

These limits are based on current production data and are described in detail in the separate technology based effluent limits memo dated April 25, 2023. Categorical limits based on ch. NR 240, Wis. Adm. Code, are not water quality-based and apply directly to discharge to the stormwater pond.

**PART 4 – WATER QUALITY-BASED EFFLUENT LIMITATIONS
FOR AMMONIA NITROGEN**

The State of Wisconsin promulgated revised water quality standards for ammonia nitrogen in ch. NR 105, Wis. Adm. Code, effective March 1, 2004, which includes criteria based on both acute and chronic toxicity to aquatic life. Given the fact that the Saputo Cheese USA Inc Reedsburg Greenway does not currently have ammonia nitrogen limits, the need for limits is evaluated at this time.

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 three sample results were reported from October 2017 through August 2022. The maximum reported value was 7.0 s.u. (Standard pH Units). 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 8.7 s.u. Given the limited dataset, a value of 7.0 s.u. is believed to represent the maximum reasonably expected pH, and therefore most appropriate for determining daily maximum limitations for ammonia nitrogen. Substituting a value of 7.0 s.u. into the equation above yields an ATC = 36 mg/L.

Daily Maximum Ammonia Nitrogen Effluent Limitations Calculation Method

In accordance with s. NR 106.32(2), Wis. Adm. Code daily maximum ammonia limitations are either set equal to two times the acute criteria (the final acute value) or calculated using the mass balance equation in s. NR 106.32(2)(e), Wis. Adm. Code.

In this case, limits calculated based on the mass balance equation are more restrictive. This method is used to calculate the daily maximum limit of **36 mg/L**.

Presented below is a table of daily maximum limitations corresponding to various effluent pH values updated using the 1-Q₁₀. Use of this table is not necessarily recommended in the permit, but it is presented herein for informational purposes.

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	54	7.0 < pH ≤ 7.1	33	8.0 < pH ≤ 8.1	6.9
6.1 < pH ≤ 6.2	53	7.1 < pH ≤ 7.2	30	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	45	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

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

Weekly and monthly average limits based on chronic toxicity criteria for ammonia are also calculated to determine the weekly and monthly average limits to meet the requirements of s. NR 106.07(3), Wis. Adm. Code.

Weekly average and monthly average limits for ammonia nitrogen are based on chronic toxicity criteria in ch. NR 105, Wis. Adm. Code. The 30-day chronic toxicity criterion (CTC) for ammonia in waters classified as a Warm Water Sport Fish Community is calculated by the following equation, according to subchapter IV of NR 106, Wis. Adm. Code.

$$CTC = E \times \{ [0.0676 \div (1 + 10^{(7.688 - pH)})] + [2.912 \div (1 + 10^{(pH - 7.688)})] \} \times C$$

Where:

pH = the pH (s.u.) of the receiving water,

E = 0.854,

C = the minimum of 2.85 or $1.45 \times 10^{(0.028 \times (25 - T))}$ – (Early Life Stages Present), or

C = $1.45 \times 10^{(0.028 \times (25 - T))}$ – (Early Life Stages Absent), and

T = the temperature (°C) of the receiving water – (Early Life Stages Present), or

T = the maximum of the actual temperature (°C) and 7 - (Early Life Stages Absent)

Section NR 106.32 (3), Wis. Adm. Code, provides 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 °C, during the winter and spring months. Burbot, an early spawning species, are not believed to be present in the Unnamed Tributary based on conversations with local fisheries biologists. So “ELS Absent” criteria apply from October through March, and “ELS Present” criteria will apply from April through September for a warm water sport fish classification.

The “default” basin assumed values are used for Temperature, pH and background ammonia concentrations, because minimum ambient data is available. These values are shown in the table below, with the resulting criteria and effluent limitations.

Weekly and Monthly Ammonia Nitrogen Limits – WWSF

		Spring	Summer	Winter
		April & May	June – Sept.	Oct. - March
Effluent Flow	Qe (MGD)	0.162	0.162	0.162
Background Information	7-Q ₁₀ (cfs)	0	0	0
	7-Q ₂ (cfs)	0	0	0
	Ammonia (mg/L)	0.06	0.06	0.085
	Temperature (°C)	12	19	4
	pH (s.u.)	7.0	7.0	7.0
	% of Flow used	50	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	14.77	10.01	14.77
	Early Life Stages Absent	14.84	10.01	19.77
	30-day Chronic			
	Early Life Stages Present	5.91	4.00	5.91
	Early Life Stages Absent	5.94	4.00	7.91
Effluent Limitations mg/L	Weekly Average			
	Early Life Stages Present	15	10	
	Early Life Stages Absent			20
	Monthly Average			
	Early Life Stages Present	5.9	4.0	
	Early Life Stages Absent			7.9

Effluent Data

Sampling for ammonia nitrogen was conducted during June and July 2022, and the results were as follows:

Ammonia Nitrogen Effluent Data

Sample Date	Ammonia Nitrogen (mg/L)	Sample Date	Ammonia Nitrogen (mg/L)
06/15/2022	12	06/27/2022	7.5
06/16/2022	2.1	06/27/2022	0.83
06/20/2022	9.0	07/05/2022	12
06/20/2022	1.2	07/05/2022	2.2
Mean = 5.9 mg/L			

NOTE: There are two RO membrane units with polishers that discharge to Outfall 001. Sampling for the application was done separately at each RO unit for informational purposes. However, since the two

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streams combine into a single discharge stream, the sample results from the application are presented as a single dataset and limits are assessed accordingly.

Since fewer than 11 sample results are available, the average, 5.9 mg/L, is compared to one fifth of calculated limits to determine reasonable potential. Based on this comparison, **weekly and monthly limits are required year-round.**

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.

Final Ammonia Nitrogen Limits

	Daily Maximum mg/L	Weekly Average mg/L	Monthly Average mg/L
April & May	13	15	5.9
June – September	8.5	10	4.0
October – March	17	20	7.9

Additional limits to meet the requirements in s. NR 106.07, Wis. Adm Code, denoted in bold text in the table above, are addressed in Part 8 of this memo.

PART 5 – PHOSPHORUS

Technology-Based Effluent Limit

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

Since Saputo Cheese USA Inc Reedsburg Greenway does not currently have an existing technology-based limit, the need for this limit in the reissued permit is evaluated. Although there is a limited dataset, the data demonstrates that the annual monthly average phosphorus loading is less than 60 lbs/month which is the threshold for industrial facilities in accordance with s. NR 217.04(1)(a)2, Wis. Adm. Code, and therefore no technology-based limit is required.

Annual Average Mass Total Phosphorus Loading

Month	Average Phosphorus Concentration (mg/L)	Maximum annual average (0.162) x 30 days (Million Gallons)	Calculated Mass (lbs/month)
June 2022	0.42	4.86	17
July 2022	0.40	4.86	17

Total P (lbs/month) = Monthly average (mg/L) × total flow (MG/month) × 8.34 (lbs/gallon)
 Where total flow is the sum of the actual (not design) flow (in MG) for that month

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

TMDL and Water Quality-Based Effluent Limits (WQBEL)

The Department developed a Total Maximum Daily Load (TMDL) for the Wisconsin River Basin. The U.S. EPA approved the Wisconsin River TMDL on April 26, 2019. On July 9, 2020 the U.S. EPA approved site-specific phosphorus criteria for Petenwell Lake, Castle Rock Lake and Lake Wisconsin. The document, along with the referenced appendices can be found at:

<https://dnr.wisconsin.gov/topic/TMDLs/WisconsinRiver/index.html>

Since Saputo Cheese USA Inc Reedsburg Greenway was covered under a general permit at the time of the TMDL development and approval, an individual TMDL wasteload allocation (WLA) was not given. Therefore, the total phosphorus effluent limits in pounds per day (lbs/day) are calculated as recommended in the *TMDL Development and Implementation Guidance: Integrating the WPDES and Impaired Waters Programs* (May 2020).

In order to be protective of the immediate receiving water, WQBELs calculated in accordance with s. NR 217.13, Wis. Adm. Code, are needed.

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.

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):

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

Where:

WQC = 0.075 mg/L for the Unnamed Tributary

Qs = 100% of the 7-Q₂ 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 = 0.162 MGD = 0.251 cfs

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

Since the receiving water flow is equal to zero, the effluent limit is set equal to criteria.

Effluent Data

The following table summarizes effluent total phosphorus monitoring data from June and July 2022.

Total Phosphorus Effluent Data

Sample Date	Phosphorus (mg/L)	Sample Date	Phosphorus (mg/L)	Sample Date	Phosphorus (mg/L)
06/14/2022	0.61	06/21/2022	0.25	06/29/2022	0.36
06/15/2022	0.48	06/22/2022	0.42	07/05/2022	0.50
06/16/2022	0.41	06/27/2022	0.31	07/06/2022	0.29
06/20/2022	0.49	06/28/2022	0.43	07/07/2022	0.40
1-day P ₉₉ = 0.66 mg/L					
4-day P ₉₉ = 0.54 mg/L					
30-day P ₉₉ = 0.32 mg/L					
Sample size = 24 (12 non-detects from Polisher 2 (goat) not shown in this table)					

NOTE: There are two RO membrane units with polishers that discharge to Outfall 001. Sampling for the application was done separately at each RO unit for informational purposes. However, since the two streams combine into a single discharge stream, the sample results from the application are presented as a single dataset herein and limits are assessed accordingly.

Reasonable Potential Determination

The discharge has reasonable potential to cause or contribute to an exceedance of the water quality criterion because the 30-day P₉₉ of reported effluent total phosphorus data is greater than the calculated WQBEL. Therefore, **a WQBEL is required.**

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.

TMDL 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. **This final mass limit shall be 0.075 mg/L × 8.34 × 0.162 MGD = 0.10 lb/day expressed as a six-month average.**

Since wasteload allocations are expressed as annual loads (lbs/yr), permits with TMDL-derived monthly average permit limits should require the permittee to calculate and report rolling 12-month sums of total monthly loads for total phosphorus. Rolling 12-month sums can be compared directly to the annual wasteload allocation. Six-month average limits apply in the periods May – October and November – April.

The annual wasteload allocation for Saputo Cheese USA Inc Reedsburg Greenway shall be 37 lbs/year (0.10 lb/day * 365 days/year) after rounding.

Interim Limit

An interim limit is required per s. NR 217.17, Wis. Adm. Code, when a compliance schedule is needed in the permit to meet the WQBEL. The interim limit should reflect a concentration that the facility is able to meet without investing in additional “temporary” treatment, but also should prevent backsliding from current conditions. Therefore, **it is recommended that the interim limit be set equal to 0.54 mg/L for permit reissuance along with requirements for optimization of phosphorus removal.** This value reflects the 4-day P₉₉ concentration of 0.54 mg/L from the past six years. This value is recommended instead of the 30-day P₉₉ concentration of 0.32 mg/L to allow operational flexibility when the facility begins to initiate phosphorus treatment optimization activities, which often consist of trial and error, and due to the limited dataset.

PART 6 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR THERMAL

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

In accordance with s. NR 106.53(2)(b), Wis. Adm. Code, the highest daily maximum flow rate for a calendar month is used to determine the acute (daily maximum) effluent limitation. In accordance with s. NR 106.53(2)(c), Wis. Adm. Code, the highest 7-day rolling average flow rate for a calendar month is used to determine the sub-lethal (weekly average) effluent limitation. Given the limited effluent flow data and since the receiving water flow is equal to zero, limits are set equal to criteria.

The table below summarizes the maximum temperatures reported during monitoring from 2018 and 2022.

Monthly Temperature Effluent Data & Limits

Month	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Weekly Maximum	Daily Maximum	Weekly Average Effluent Limitation	Daily Maximum Effluent Limitation
	(°F)	(°F)	(°F)	(°F)
JAN			49	76
FEB			50	76
MAR			52	77
APR	79	79	55	79
MAY	68	68	65	82
JUN	68	68	76	84
JUL	72	72	81	85
AUG	68	72	81	84
SEP	73	73	73	82
OCT			61	80
NOV			49	77

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Month	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Weekly Maximum	Daily Maximum	Weekly Average Effluent Limitation	Daily Maximum Effluent Limitation
	(°F)	(°F)	(°F)	(°F)
DEC			49	76

Temperature Effluent Data

Sample Date	Temperature (°F)	Sample Date	Temperature (°F)
4/1/2018	78.7	8/9/2018	68
5/22/2018	68	7/25/2022	72
6/11/2018	68	8/30/2022	72.1
7/3/2018	68	9/21/2022	73.2

Reasonable Potential

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

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

Comparing the representative highest effluent temperature to the calculated effluent limits determines the reasonable potential of exceeding the effluent limits. Based on the available effluent data, **weekly average limits are required for April and May. Additionally, since no data is available for January through March and October through December, limits are required** in accordance with s. NR 106.56(12), Wis. Adm. Code. **Temperature monitoring for at least one year is recommend in order to assess reasonable potential at the next permit reissuance.** The complete thermal table used for the limit calculation is shown in Attachment #4.

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.

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- 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*
<http://dnr.wi.gov/topic/surfacewater/documents/ThermalGuidance2edition8152013.pdf>

It should be noted that, since the stormwater pond where Outfall 001 discharges is completely contained on Saputo Cheese USA Inc Reedsburg Greenway's property, the pond is not considered waters of the state under s. 283.01(20), Wis. State Stats., and water quality criteria do not apply directly to it. The point of standards applies at the point where the stormwater pond overflows to the Unnamed Tributary, which is considered a water of the state.

PART 7 – WHOLE EFFLUENT TOXICITY (WET)

WET testing is used to measure, predict, and control the discharge of toxic materials that may be harmful to aquatic life. In WET tests, organisms are exposed to a series of effluent concentrations for a given time and effects are recorded. Decisions below related to the selection of representative data and the need for WET limits were made according to ss. NR 106.08 and 106.09, Wis. Adm. Code. WET monitoring frequency and toxicity reduction evaluation (TRE) recommendations were made using the best professional judgment of staff familiar with the discharge after consideration of the guidance in the *Whole Effluent Toxicity (WET) Program Guidance Document (October 29, 2019)*.

- 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 LC₅₀ (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 IC₂₅ (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:

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

Where:

Q_e = annual average flow = 0.162 MGD = 0.251 cfs

f = fraction of the Q_e withdrawn from the receiving water = 0

Q_s = ¼ of the 7-Q₁₀ = 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

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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 laboratory water since there is no flow in the receiving water (Unnamed Tributary).

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	No data available. 5 Points	No data available. 5 Points
Effluent Variability	Little variability, no violations or upsets, consistent operations. 0 Points	Same as Acute. 0 Points
Receiving Water Classification	WWSF. 5 Points	Same as Acute. 5 Points
Chemical-Specific Data	Reasonable potential for limits for residual chlorine based on ATC. Chloride, copper, and ammonia detected. Additional Compounds of Concern: None. 8 Points	Reasonable potential limits for ammonia and residual chlorine. Chloride and copper detected. Additional Compounds of Concern: None. 8 Points
Additives	No biocides and one water quality conditioner (caustic soda) added. P chemical treatment? No. 1 Point	All additives used more than once per 4 days. 1 Point
Discharge Category	Process Wastewater 5 Points	Same as Acute. 5 Points
Wastewater Treatment	Secondary or better. 0 Points	Same as Acute. 0 Points
Downstream Impacts	No impacts known. 0 Points	Same as Acute. 0 Points
Total Checklist Points:	24 Points	39 Points
Recommended Monitoring Frequency (from Checklist):	2 tests during permit term.	1x yearly.

	Acute	Chronic
Limit Required?	No	No
TRE Recommended? (from Checklist)	No	No

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

PART 8 – EXPRESSION OF LIMITS

Sections NR 106.07(3), NR 106.07(4), and NR 205.067(7), Wis. Adm. Code, and 40 CFR 122.45(d) require WPDES permits contain the following concentration limits, whenever practicable and necessary to protect water quality:

- Weekly average and monthly average limitations for continuous discharges subject to ch. NR 210.
- Daily maximum and monthly average limitations for all other discharges.

Saputo Cheese USA Inc Reedsburg Greenway is an industrial discharge and is therefore subject to daily maximum and monthly average limitations whenever limitations are determined to be necessary.

This evaluation provides additional limitations necessary to comply with the expression of limits in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Code. Pollutants already compliant with these rules or that have an approved impracticability demonstration, are excluded from this evaluation including water-quality based effluent limitations for phosphorus, temperature, pH, and *E. coli* among other parameters. **Mass limitations are not subject to the limit expression requirements if concentrations limits are given.**

Method for Calculation

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:

1. Whenever a daily maximum limitation is determined necessary to protect water quality, a monthly average limitation shall also be included in the permit and set equal to the daily maximum limit unless a more restrictive limit is already determined necessary to protect water quality.
2. 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.
 - Residual chlorine
 - A daily maximum limitation shall also be included in the permit and set equal to the daily maximum WQBEL calculated under s. NR 106.06, Wis. Adm. Code, or a daily maximum limitation calculated using the following procedure, whichever is more restrictive.

Attachment #1

Daily Maximum Limitation= WQBELc × DMF

Where:

DMF = Daily Multiplication Factor as defined in Table 2

CV = coefficient of variation (CV) as calculated in s. NR 106.07(5m), Wis. Adm. Code.

s. NR 106.07 (4) (e). Table 2 — Daily Multiplication Factors

CV	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
DMF	1.114	1.235	1.359	1.460	1.557	1.639	1.712	1.764	1.802	1.828

CV	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
DMF	1.842	1.849	1.851	1.843	1.830	1.815	1.801	1.781	1.751	1.744

3. Whenever a monthly average limitation is determined necessary to protect water quality, a daily maximum limit shall be calculated using the following procedure and included in the permit unless a more restrictive limit is already determined necessary to protect water quality:

- o Ammonia Nitrogen

Daily Maximum Limit = (Monthly Average Limitation × MF)

Where:

MF= Multiplication factor as defined in Table 1

CV= coefficient of variation (CV) as calculated in s. NR 106.07(5m), Wis. Adm. Code.

= 0.6 since there are fewer than 10 data points available

n= the number of samples per month required in the permit – assumed to be 3x/week.

If the monitoring frequency changes, limits will need to be reevaluated.

April & May Daily Maximum Limitation = Monthly Limit × DMF = 5.9 mg/L × 2.12 = **13 mg/L**

June - September Daily Maximum Limitation = Monthly Limit × DMF = 4.0 mg/L × 2.12 = **8.5 mg/L**

October – March Daily Maximum Limitation = Monthly Limit × DMF = 7.9 mg/L × 2.12 = **17 mg/L**

Since the limits above are more restrictive than the calculated daily maximum limit of 36 mg/L, they should be included in the permit.

s. NR 106.07(3)(e)4, Table 1, Wis. Adm. Code — Multiplication Factor (for CV = 0.6)

CV	n=1	n=2	n=3	n=4	n=8	n=12	n=16	n=20	n=24	n=30
0.6	1.00	1.31	1.51	1.64	1.95	2.12	2.23	2.30	2.36	2.43

Note: This methodology is based on the *Technical Support Document for Water Quality-based Toxics Control* (March 1991). PB91-127415.

Summary of Additional Limitations:

In conclusion, the following additional limitations, denoted in bold type, are required to comply with ss. NR 106.07 and NR 205.065(7), Wis. Adm. Code.

Expression of Limits Summary

Parameter	Daily Maximum	Weekly Average	Monthly Average
Residual chlorine	19 µg/L	7.3 µg/L	7.3 µg/L
Ammonia Nitrogen			
April & May	13 mg/L	15 mg/L	5.9 mg/L
June – September	8.5 mg/L	10 mg/L	4.0 mg/L
October - March	17 mg/L	20 mg/L	7.9 mg/L

PART 9 – ADDITIVE REVIEW

Unlike the metals and toxic substances evaluated in Part 2, most additives have not undergone the amount of toxicity testing needed to calculate water quality criteria. Instead, in cases where the minimum data requirements necessary to calculate a WQC are not met, a secondary value can be used to regulate the substance, according to s. NR 105.05, Wis. Adm. Code. Whenever an additive is discharged directly into a surface water without receiving treatment or an additive is used in the treatment process and is not expected to be removed before discharge, a review of the additive is needed. Secondary values should be derived according to s. NR 105.05, Wis. Adm. Code. Guidance related to conducting an additive review can be found in *Water Quality Review Procedures for Additives* (2019) (<https://dnr.wisconsin.gov/topic/Wastewater/Additives.html>).

Additive Parameters

Additive Name	Manufacturer	Purpose of Additive including where added	Intermittent or Continuous Feed	Frequency of Use		Estimated Effluent Concentration	Potential Use Restriction ¹	Is Additive Authorized in Current Permit?
				Months per/yr.	Days/week			
Caustic soda liquid 50%	Hydrite Chemical	pH equalization	Continuous	12	5	76 gal/day	N/A	Yes

1. Evaluation is not necessary for additives that have active ingredients consisting only of chlorine, caustic soda (sodium hydroxide), hypochlorite, sulfuric acid, hydrochloric acid.

A secondary value does not need to be calculated for caustic soda because this product is used for pH adjustment.

Attachment #2
Site Map



Historical Approval Letter



State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

Scott Walker, Governor
Cathy Stepp, Secretary
Mark Aquino, Regional Director

South Central Region Headquarters
3911 Fish Hatchery Road
Fitchburg, WI 53711-5397
Telephone (608) 275-3266
FAX (608) 275-3338
TTY Access via relay - 711

September 23, 2016

FIN: 52307

Omega Protein, Inc
ATTN: Randy Pierce
522 Greenway Court
Reedsburg, WI 53959

**SUBJECT: Conditional Approval – WPDES Permit No. WI-0044938-5
Noncontact Cooling Water or Condensate and Boiler Water
Omega Protein – Reedsburg, Wisconsin**

Dear Mr. Pierce,

The Wisconsin Department of Natural Resources (the “Department”) has reviewed your application for authorization to discharge reverse osmosis effluent from your Omega Protein facility located at 522 Greenway Court, Reedsburg, Wisconsin. Your proposed discharge is eligible for coverage, and is hereby authorized under Wisconsin Pollutant Discharge Elimination System (WPDES) Permit No. WI-0044938-5, Noncontact Cooling Water or Condensate and Boiler Water. You are responsible for compliance with the conditions contained in the permit and this letter. The permit and fact sheet should be downloaded from the Department website at <http://dnr.wi.gov/topic/wastewater/generalpermits.html>.

PATH OF DISCHARGE

Wastewater from the facility’s reverse osmosis system will be discharged at a rate of approximately 250,000 gallons per day. The effluent will discharge to a stormwater pond adjacent to Greenway Court to the east (Outfall 001), travel approximately 0.2 miles to the confluence with an unnamed tributary [Waterbody Identification Code (WBIC) 5030415], and ultimately drain to the Baraboo River. The anticipated duration for the discharge is recurrent for the length of the permit term.

GENERAL REQUIREMENTS

Please note there may be other permits and/or approvals required by the Department or other federal, state, and local governments associated with your discharge activity. It is your responsibility to secure all appropriate approvals and permits prior to project startup. This letter is not inclusive of these requirements.

Groundwater Protection

Limits based on groundwater quality protection are set at the preventive action limits in ch. NR 140, Wis. Adm. Code. These limits are based on substances reported to be in the discharge, but may not necessarily include all substances of public health or welfare concern which are in the discharge. However, nothing in this permit allows the permittee to discharge any substance in a concentration that would cause groundwater standards in ch. NR 140 to be exceeded.

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Attachment #3

PERMIT REQUIREMENTS

Water Treatment Additives

As stated in permit section B(1)(a), discharges containing non-biocide water treatment additives are prohibited under this general permit unless the use of the water treatment additive is approved, in writing, by the Department.

Notice of Discharge

James Brodzeller, Department Wastewater Specialist, (608) 275-3281, shall be notified:

- Prior to the startup of any discharge
- Within 24 hours of the permittee being notified of any permit limit exceedance
- When the discharge has ended

Sample Point

The sample point for Outfall 001 shall be upon exiting the discharge pipe just prior to entering the stormwater pond.

Monitoring Parameters and Frequency

Pursuant to permit section D, Table 2, all discharges to surface water shall be monitored quarterly for flow and temperature, in addition to annual sampling for oil/grease, five day biochemical oxygen demand (BOD₅), total phosphorus, and ammonia nitrogen. Records of additive additions shall be submitted on a monthly basis when applicable.

Effluent Limitations

Applicable effluent limitations for your discharge are listed in Table 2, permit section D, as well as on the enclosed Discharge Monitoring Report (DMR) form. The permittee shall comply with a Temperature Eligibility Value (TEV) of 120° F year-round. Pursuant to s. NR 205.07(3)(e), Wis. Adm. Code, upon being notified of any permit limit exceedance, or if an oily sheen or turbid discharge is observed, curtail production or wastewater discharges or both until the treatment facility operations are restored or an alternative method of treatment is provided.

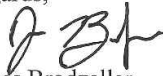
Special Note: Based on the source water of your operation, the proposed discharge may not meet the current State Water Quality Criteria standards for phosphorus, chlorine, and/or other contaminants. However, your proposed discharge is covered under the existing WPDES Non-Contact Cooling Water General Permit until receiving further notification from the Department.

Reporting

DMR forms (enclosed) summarizing the previous month's discharge activities, including a copy of the actual lab reports, are due February 15th, annually. Completed forms shall be mailed to the address listed to the left of the signature line on the DMR. Records required by this permit must be kept for the duration of the permit, and made available for inspection by Department staff upon request.

Additional information on the Department's legal authority in this matter, including your rights of appeal, is shown on page three of this letter. If you have any questions regarding the requirements of the permit or this letter, please don't hesitate to contact me at (608) 275-3281 or James.Brodzeller@wisconsin.gov.

Regards,



James Brodzeller
Wastewater Specialist – Water District South

Attachment #3

Cc: Permit File – Region and Central Office
Trevor Moen – DNR Wastewater Engineer
Tania Deb, Omega Protein
Lynn Morrison – The Probst Group, LLC

LEGAL AUTHORITIES AND APPEAL RIGHTS

Section 283.35, Wisconsin Statutes, authorizes the Department to issue general permits for discharges from categories or classes of point sources. If a permittee believes coverage of a facility under a general WPDES permit is not appropriate, the permittee may apply for issuance of an individual WPDES permit pursuant to section 283.35(2) and may petition the Department for withdrawal of coverage under the general permit. The individual permit application should indicate which site specific factors would justify alternate WPDES limits for the operation. Issuance of such a site specific WPDES permit will provide for a 30 day public comment period, and potentially a public informational hearing and/or an adjudicatory hearing. The Department may withdraw a facility from coverage under a general permit if it is determined that a discharge is a significant contributor of pollutants to waters of Wisconsin, or in certain other cases set out in s. 283.35, Stats. In lieu of general permit withdrawal, the Department may refer any violation of this permit to the Department of Justice for enforcement under s. 283.89, Stats. In order to avoid any enforcement action, **please read the WPDES permit carefully and comply with the permit requirements.**

If you believe you have a right to challenge the Department decision to cover this facility with a WPDES general permit, you should know that Wisconsin statutes and administrative rules establish time periods within which requests to review Department decisions must be filed. To request a contested case hearing pursuant to section 227.42, Wis. Stats., you have 30 days after the decision is mailed, or otherwise served by the Department, to serve a petition for hearing on the Secretary of the Department of Natural Resources. Such a petition should identify pollutant(s) that are believed to be not appropriately regulated by the general permit for the specific site. All requests for contested case hearings must be made in accordance with section NR 2.05(5), Wis. Adm. Code, and served on the Secretary in accordance with section NR 2.03, Wis. Adm. Code. The filing of a request for a contested case hearing is not a prerequisite for judicial review and does not extend the time period for filing a petition for judicial review.

For judicial review of a decision pursuant to sections 227.52 and 227.53, Wis. Stats., you have 30 days after the decision is mailed, or otherwise served by the Department, to file your petition with the appropriate circuit court and serve the petition on the Department. A petition for judicial review must name the Department of Natural Resources as the respondent.

Temperature limits for receiving waters with unidirectional flow

(calculation using default ambient temperature data)

Facility:	Saputo Reedsburg Greenway	7-Q₁₀:	0 cfs	Temp Dates	Flow Dates
Outfall(s):	001	Dilution:	25%	Start:	04/01/18 07/12/22
Date Prepared:		f:	0	End:	09/21/22 08/18/22
Design Flow (Q_e):	0.16 MGD	Stream type:	Small warm water sport or forag		
Storm Sewer Dist.	0 ft	Q_s:Q_e ratio:	0.0 :1		
		Calculation Needed?	YES		

Month	Water Quality Criteria			Receiving Water Flow Rate (Q _s) (cfs)	Representative Highest Effluent Flow Rate (Q _e)		f	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	T _a (default)	Sub-Lethal WQC	Acute WQC		7-day Rolling Average (Q _{esl}) (MGD)	Daily Maximum Flow Rate (Q _{ea}) (MGD)		Weekly Average	Daily Maximum	Weekly Average Effluent Limitation	Daily Maximum Effluent Limitation
	(°F)	(°F)	(°F)		(MGD)	(MGD)		(°F)	(°F)	(°F)	(°F)
JAN	33	49	76	0			0			49	76
FEB	34	50	76	0			0			50	76
MAR	38	52	77	0			0			52	77
APR	48	55	79	0			0	79	79	55	79
MAY	58	65	82	0			0	68	68	65	82
JUN	66	76	84	0			0	68	68	76	84
JUL	69	81	85	0	0.116	0.138	0	72	72	81	85
AUG	67	81	84	0	0.083	0.152	0	68	72	81	84
SEP	60	73	82	0			0	73	73	73	82
OCT	50	61	80	0			0			61	80
NOV	40	49	77	0			0			49	77
DEC	35	49	76	0			0			49	76

DATE: April 25, 2023

TO: Brenda Howald – SCR/Fitchburg

FROM: Sarah Luck – SCR/Fitchburg

SUBJECT: Technology-Based Effluent Limitations for Saputo Cheese USA Inc Reedsburg Greenway
WPDES Permit No. WI-0067841-01-0

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

Parameter	Daily Maximum	Daily Minimum	Monthly Average
BOD ₅ , Total	7.2 lbs/day		3.6 lbs/day
TSS	9.1 lbs/day		4.5 lbs/day
pH	9.0 su	6.0 su	

PART 1 – BACKGROUND INFORMATION

Saputo Cheese USA Inc Reedsburg Greenway (formerly owned by Omega Protein Inc.) receives liquid whey from bovine and caprine cheese makers that is used to make whey protein concentrate and lactose. The bovine and caprine permeate from the make process is sold as liquid animal feed. The polished water from the make process is discharged to a stormwater pond. The discharge from the pond travels approximately 0.2 mile before its confluence with an unnamed tributary. The powder dryers do not produce any wastewater.

PART 2 – INDUSTRIAL CATEGORIES

Chapter NR 240, Wis. Adm. Code, specifies effluent guidelines for discharges from dairy (bovine) product categories of point sources and subcategories. Limits for caprine products are also calculated in accordance with ch. NR 240, Wis. Adm. Code, as it is the closest category and are considered best professional judgment. Discharge from Saputo Cheese USA Inc Reedsburg Greenway falls under the “Dry Whey” subcategory as defined in s. NR 240.02, Wis. Adm. Code. These guidelines are based on federal effluent guidelines in 40 CFR Part 405 Subpart L. The permittee must meet the applicable effluent limit guidelines as described in this chapter. These effluent limit guidelines include:

- Effluent limitations representing the degree of effluent reduction attainable by the application of the 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, TSS, and pH. BAT applies to priority pollutants and nonconventional pollutants and does not apply to BOD, TSS or pH.
- The federal standard rule lists revised BCT standards requirements. All BCT limitations are set to be the same as the best practicable control technology (BPT) standards. State rules in ch. NR 240, Wis. Adm. Code, do not list standards for BCT.

PART 3 – LEVELS OF CONTROL

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 “Dry Whey” subcategory are applicable as specified in 40 CFR Part 405 Subpart L and ch. NR 240.12, Wis. Adm. Code.

PART 4 – CURRENT PRODUCTION LEVELS

The current levels of production for each Subcategory are provided by Saputo Cheese USA Inc Reedsburg Greenway.

Dry Whey

Process	Material Used (lbs/day)
Wet processing from whey	670,000
Wet processing from skim milk	10,000

PART 5 – BOD INPUT

The BOD₅ 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 input equivalents by multiplying the amount of raw material by BOD factors specified in s. NR 240.03(1) or s. NR 240.07 Wis. Adm. Code and 40 CFR Part 405.

Dry Whey

Process	Material Used (lbs/day)	BOD Factor ¹ (lbs/100 lbs)	Adjusted Total BOD Input ² (lbs/day)
Wet processing from whey	670,000	4.72	31,624
Wet processing from skim milk	10,000	7.44	744

Footnotes:

1. The BOD 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 input = BOD input * BOD factor / 100

PART 6 – 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 405.115 and 405.125 would apply.

Total BOD Input (lbs/day)	NSPS Effluent Limitations				Calculated Limits			
	BOD (lbs/1,000 lbs)		TSS (lbs/1,000 lbs)		BOD (lbs/day)¹		TSS (lbs/day)¹	
	Monthly Avg	Daily Max	Monthly Avg	Daily Max	Monthly Avg	Daily Max	Monthly Avg	Daily Max
31,624	0.11	0.22	0.14	0.28	3.5	7.0	4.4	8.9
744	0.11	0.22	0.14	0.28	0.1	0.2	0.1	0.2

Footnote:

1. The limits (lbs/day) = total BOD input (lbs/day) / 1000 * NSPS limitations

PART 7 – FINAL CALCULATED LIMITS

Per s. NR 240.06(3) Wis. Adm. Code, the total discharge limits shall be the total of the amounts calculated from the BOD input in the final product subcategory.

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 (lbs/day)	Daily maximum BOD (lbs/day)	Monthly average TSS (lbs/day)	Daily maximum TSS (lbs/day)
Dry whey from whey	3.5	7.0	4.4	8.9
Dry whey from skim milk	0.1	0.2	0.1	0.2
Total	3.6	7.2	4.5	9.1

Final Calculated Effluent Limitations			
Parameter & Units	Daily Maximum	Daily Minimum	Monthly Average
BOD ₅	7.2 lbs/day		3.6 lbs/day
TSS	9.1 lbs/day		4.5 lbs/day
pH	9.0 su	6.0 su	

The daily maximum and monthly average concentration limits in the WQBEL memo dated May 17, 2023 are also recommended to be included in the reissued permit along with the mass concentrations that are recommended in this TBEL memo.

Flow Diagram

