Permit Fact Sheet

General Information

Permit Number	WI-0001236-09-0
Permittee Name and Address	Actus Nutrition – Adell P O Box 249 Adell WI 53001
Permitted Facility Name and Address	Actus Nutrition – Adell 627 Maine Avenue, Adell
Permit Term	April 01, 2025 to March 31, 2030
Discharge Location	North Branch Milwaukee River
Receiving Water	North Branch Milwaukee River of Milwaukee River in Sheboygan county
Stream Flow ($Q_{7,10}$)	7.9 cfs (cubic feet per second)
Stream Classification	Warm Water Sport Fish (WWSF) community, non-public water supply. Note: Cold Water and Public Water Supply criteria are used for bioaccumulating compounds of concern, because the discharge is within the Great Lakes basin.
Discharge Type	Existing, continuous.

Facility Description

Actus Nutrition – Adell (ANA), previously Milk Specialties Global – Adell manufactures dry and liquid animal feeds from primarily cheese and dairy whey. The plant typically operates 24 hours per day, 7 days per week. Raw whey is stored in tanks prior to processing. The whey processing results in 2 products, whey protein and lactose, through a process of ultra-filtration. A reverse osmosis process removes water from the lactose. Higher solids content is achieved by evaporation when the protein and lactose products are dried. The whey protein concentrate is dried separately or mixed with fat to produce a product called PEF (protein encapsulated fat) blended powder. The lactose is dried into a powder in crude form after evaporation or allowed to crystallize. The crystallized lactose is separated from the soluble ingredients and dried as a high lactose level powder. The facility also manufactures a liquid veal feed product consisting of whey protein, fats and oils, and nutritional supplements.

ANA withdraws approximately 1.1 ANA of groundwater from two high capacity wells and 750 gpd from the Village of Adell, for all production operations at the facility.

The ANA wastewater treatment plant (WWTP) consists of an equalization tank (EQ), dissolved air flotation (DAF), grit chamber, anaerobic tank, oxidation ditch (OD), clarifier, aeration basin and chemical assisted phosphorus removal. DAF sludge is transferred to a storage tank and waste activated sludge (WAS) is dewatered through a gravity belt press prior to being transferred to a storage tank. The supernatant derived from the gravity belt press is routed to the oxidation ditch and re-treated. Both DAF sludge (Outfall 005) and WAS (Outfall 004) are transported off-site by a contract hauler to a licensed facility. ANA also has the option to land apply sludge with approved land application sites located primarily in Sheboygan, Washington and Fond du Lac Counties.

Process wastewater is captured in the C3 Collection Tank prior to being transferred to the EQ Tank. A total carbon analyzer measures the total organic carbon concentration of the process wastewater. Wastewater that has a high organic carbon concentration is diverted to the Spill Tank. Out-of-spec wastewater from the Spill Tank is either bled back into the wastestream at a controlled rate or hauled to a POTW for treatment (Outfall 007).

Wastewater from the EQ Tank is pumped to the DAF then to the Anaerobic Tank and then delivered to the Oxidation Ditch OD-1 (anaerobic), OD-2 (anoxic) and finally OD-3 (aerobic). Upon exiting OD-3, ferric chloride is added to the wastewater and transferred to the Clarifier. Wastewater passes through the Aeration Basin and flows to the final channel where it is combined with noncontact cooling water (NCCW). Flow of the treated wastewater and NCCW is measured by

a Parshall flume and characterized by samples collected by an ISCO 3710 composite sampler (Sampling Point 008) prior to being discharged to the North Branch of the Milwaukee River via Outfall 008. Sanitary waste is discharged in a public owned treatment works (POTW) operated by Hingham Sanitary District.

Substantial Compliance Determination

Enforcement During Last Permit: None.

After a desk top review of all discharge monitoring reports, land app reports, compliance schedule items, and a site visit on 11/15/2023, this facility has been found to be in substantial compliance with their current permit.

Compliance determination made by Curt Nickels, Wastewater Engineer on 11/17/2023.

Sample Point Descriptions

Discharge flow, units, and averaging period provided by the permit application.

Sample Point Designation		
Sample Point Number	**Discharge Flow, Units, and Averaging Period**	**Sample Point Location, Waste Type/Sample Contents and Treatment Description (as applicable)**
701	Not applicable, internal sample point.	[INDUSTRIAL LIQUID WASTE] Process wastewater is monitored prior to the dissolved air flotation system as the flow exits the equalization tank. The sample point is located in the multifunction building. This sample point has been inactivated.
003	None reported on permit application.	[INDUSTRIAL LIQUID WASTE] At Sampling Point 003, a combination of gravity belt press sludge and dissolved air flotation sludge shall be sampled prior to land application via Outfall 003. Waste would be hauled by either 5 Line LLC or Rivers Edge Dairy LLC.
004	3.4 MGD of industrial sludge hauled offsite in an average year.	[INDUSTRIAL SLUDGE] At Sampling Point 004, located at the gravity belt sludge tank, gravity belt sludge shall be sampled prior to land application via Outfall 004. Sludge is stored in a 16,000-gallon storage tank. Sludge is hauled by either 5 Line LLC or Rivers Edge Dairy LLC.
005	1.05 MGD of liquid sludge hauled offsite per year.	[INDUSTRIAL SLUDGE] At Sampling Point 005, located at the dissolved air flotation sludge tank, dissolved air flotation sludge shall be sampled prior to land application via Outfall 005. Waste is hauled by either 5 Line LLC or Rivers Edge Dairy LLC.
007	5.89 MGD of liquid waste hauled offsite per year.	[INDUSTRIAL LIQUID WASTE] High strength, out-of-spec wastewater from the Spill Tank is stored in the 16,000-gallon high strength tank. Grab samples of properly mixed wastewater shall be collected prior to land application. Wastewater is hauled by either 5 Line LLC or Rivers Edge Dairy LLC.
008	Daily maximum = 1.41 MGD on 7/23/2022. Annual average maximum = 1.18 MGD in 2021.	[EFFLUENT] Combined wastewater discharge includes a flow-proportional mixture of treated process wastewater and noncontact cooling water. Grab and 24-hr composite samples shall be collected after the gravity belt thickener building prior to discharge to the North Branch Milwaukee River. The outfall pipe is located along

Sample Point Designation		
Sample Point Number	**Discharge Flow, Units, and Averaging Period**	**Sample Point Location, Waste Type/Sample Contents and Treatment Description (as applicable)**
	Average non-contact cooling water discharged is 0.8-0.9 MGD. Average WWTP effluent discharged is 1.1 MGD.	the east bank approximately 37 feet north of the bridge where County HWY A crosses the North Branch of the Milwaukee River

Permit Requirements

1 Surface Water - Monitoring and Limitations

1.1 Sample Point Number: 008- to N Branch Milwaukee River

Monitoring Requirements and Effluent Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Daily	Continuous	
BOD_5, Total	Weekly Avg	10 mg/L	3/Week	24-Hr Comp	
BOD_5, Total	Daily Max	247 lbs/day	3/Week	Calculated	Technology based effluent limit.
BOD_5, Total	Monthly Avg	101 lbs/day	3/Week	Calculated	Technology based effluent limit.
Suspended Solids, Total	Monthly Avg	149 lbs/day	3/Week	Calculated	TBEL Limit. Effective each month.
Suspended Solids, Total	Monthly Avg	10 mg/L	3/Week	24-Hr Comp	TMDL limit. Effective each month.
Suspended Solids, Total	Daily Max	12 mg/L	3/Week	24-Hr Comp	TMDL limit. Effective March and April each year.
Suspended Solids, Total	Daily Max	20 mg/L	3/Week	24-Hr Comp	TMDL limit. Effective January, February, May, June, July, August, September, October, November, and December each year.
Suspended Solids, Total	Daily Max	141 lbs/day	3/Week	Calculated	TMDL limit. Effective in January each year.
Suspended Solids, Total	Daily Max	113 lbs/day	3/Week	Calculated	TMDL limit. Effective in February each year.

Monitoring Requirements and Effluent Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Suspended Solids, Total	Daily Max	145 lbs/day	3/Week	Calculated	TMDL limit. Effective in May each year.
Suspended Solids, Total	Daily Max	165 lbs/day	3/Week	Calculated	TMDL limit. Effective in June Each year
Suspended Solids, Total	Daily Max	152 lbs/day	3/Week	Calculated	TMDL limit. Effective in July each year.
Suspended Solids, Total	Daily Max	136 lbs/day	3/Week	Calculated	TMDL limit. Effective in August each year.
Suspended Solids, Total	Daily Max	161 lbs/day	3/Week	Calculated	TMDL limit. Effective in September each year.
Suspended Solids, Total	Daily Max	166 lbs/day	3/Week	Calculated	TMDL limit. Effective in October each year.
Suspended Solids, Total	Daily Max	219 lbs/day	3/Week	Calculated	TMDL limit. Effective in November each year
Suspended Solids, Total	Daily Max	157 lbs/day	3/Week	Calculated	TMDL limit. Effective in December each year.
Dissolved Oxygen	Daily Min	6.0 mg/L	5/Week	Grab	
pH Field	Daily Max	9.0 su	Weekly	Grab	
pH Field	Daily Min	6.0 su	Weekly	Grab	
Chlorine, Total Residual	Daily Max	38 µg/L	Monthly	Grab	
Chlorine, Total Residual	Monthly Avg	16 µg/L	Monthly	Grab	
Chlorine, Total Residual	Weekly Avg	16 µg/L	Monthly	Grab	
Nitrogen, Ammonia (NH_3-N) Total	Daily Max	11 mg/L	3/Week	24-Hr Comp	
Nitrogen, Ammonia (NH_3-N) Total	Monthly Avg	1.5 mg/L	3/Week	24-Hr Comp	Effective April through September each year.
Nitrogen, Ammonia (NH_3-N) Total	Monthly Avg	3.8 mg/L	3/Week	24-Hr Comp	Effective October through March each year.
Nitrogen, Ammonia (NH_3-N) Total	Weekly Avg	3.6 mg/L	3/Week	24-Hr Comp	Effective April through September each year.
Nitrogen, Ammonia (NH_3-N) Total	Weekly Avg	9.2 mg/L	3/Week	24-Hr Comp	Effective October through March each year.

Monitoring Requirements and Effluent Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Phosphorus, Total	Monthly Avg	0.5 mg/L	Weekly	24-Hr Comp	MDV Interim Limit effective upon permit reissuance.
Phosphorus, Total		lb/Month	Monthly	Calculated	
Temperature Maximum		deg F	Daily	Continuous	
Nitrogen, Total		mg/L	Quarterly	24-Hr Comp	
Acute WET		rTUa	See Listed Qtr(s)	24-Hr Comp	
Chronic WET	Monthly Avg	2.1 rTU_c	See Listed Qtr(s)	24-Hr Comp	

1.1.1 Changes from Previous Permit

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

- Phosphorus limits have been updated.
- Total Nitrogen has been added.

1.1.2 Explanation of Limits and Monitoring Requirements

Detailed discussions of limits and monitoring requirements can be found in the attached water quality-based effluent limits (WQBEL) memo dated 07/19/2024.

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

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

TSS- The Milwaukee River TMDL was approved by EPA since the last permit issuance and includes allocations for TSS; these limits are based on the TMDL.

Temperature-The temperature limits have been recalculated based on the new discharge location and the dye study submitted to the department on June 13, 2019.

See the attached WQBEL memo for full details on Water Quality Effluent Limits.

Total BOD_5 and Total Suspended Solids Technology Based Effluent Limits – The Department has calculated TBELs (Appendix A) which are applicable for this sample point. The TBELs were previously sampled at an internal sample

point, however, since the TBELs are mass based and therefore the NCCW will not affect them, the facility has requested that the TBELs be evaluated at the final effluent. The TMDL Limits for TSS are more restrictive than the Daily Maximum TBELs for TSS, therefore the Daily Maximum TMDL limits will be included but the daily maximum TBELs for TSS will not be included. The TBEL monthly average for TSS is included in this permit. The TBELs are effective at this sample point upon permit reissuance.

Explanation of Phosphorus Limits and Monitoring Requirements

Phosphorus rules became effective December 1, 2010 per NR 217, Wis. Adm. Code, that required the permittee to comply with water quality based effluent limits (WQBELs) for total phosphorous. The final phosphorus WQBELs were to become effective as scheduled unless a variance was granted. For this permit term, the permittee has applied for the Multi-Discharger Variance (MDV) for phosphorus as provided for in s. 283.16, Wis. Stats., and approved by USEPA on February 6, 2017 until February 5, 2027. The permittee qualifies for the MDV because it is an existing source and a major facility upgrade is needed to comply with the applicable phosphorus WQBELs, thereby creating a financial burden. The effluent limit for total phosphorus of 0.5 mg/L as an average monthly limit shall be effective upon permit reissuance. The limit was derived using DMR data from 07/02/2019 – 01/28/2024. The permittee is now required to report the total amount of phosphorus discharged in lbs/month and lbs/year. By March 1 of each year the permittee shall make a payment(s) to participating county(s) of $**66.62** per pound of phosphorus discharged during the previous year in excess of the target value of 0.2 mg/L.

Conditions of the MDV require the permittee to optimize phosphorus removal throughout the proposed permit term, comply with interim limits and make annual payments to participating county(s) by March 1 of each year based on the pounds of phosphorus discharged during the previous year in excess of the specified target value. The "price per pound" value is $50.00 adjusted for CPI annually during the first quarter as defined by s. 283.16(8)(a)2, Wis. Stats and takes effect for reissued permits with effective dates starting April 1. This may differ from the "price per pound" that is public noticed; however, the "price per pound" is set upon reissuance and is applicable for the entire permit term. The participating county(s) uses these payments to implement non-point source (agricultural and urban) phosphorus control strategies at the watershed level.

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

2.1 Sample Point Numbers: 003- Mixed Sludge; 004- Gravity Belt Press Sludge; 005- Dissolved Air Flotation Sludge

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Solids, Total		Percent	Annual	Calculated	Not Required if no land application during period.
Nitrogen, Total Kjeldahl		Percent	Annual	Calculated	Not Required if no land application during period.
Phosphorus, Total		Percent	Quarterly	Calculated	Not Required if no land application during period.
Phosphorus, Water Extractable		Percent	Annual	Grab	Not Required if no land application during period.
Potassium, Total Recoverable		Percent	Quarterly	Calculated	Not Required if no land application during period.

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Chloride		mg/kg	Annual	Calculated	Not Required if no land application during period.
Cadmium Dry Wt		mg/kg	Annual	Calculated	Not Required if no land application during period.
Copper Dry Wt		mg/kg	Annual	Grab	Not Required if no land application during period.
Lead Dry Wt		mg/kg	Annual	Calculated	Not Required if no land application during period.
Nickel Dry Wt		mg/kg	Annual	Calculated	Not Required if no land application during period.
Zinc Dry Wt		mg/kg	Annual	Composite	Not Required if no land application during period.
pH Field		su	Annual	Calculated	Not Required if no land application during period.
PFOS+PFOA		ng/kg	Annual	Grab	Not Required if no land application during period.
PFAS Dry Wt			Annual	Grab	Perfluoroalkyl and Polyfluoroalkyl Substances based on updated DNR PFAS List. See PFAS Permit Sections for more information. Not Required if no land application during period.

2.1.1 Changes from Previous Permit:

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

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

PFOS+PFOA monitoring is required annually.

Total Recoverable Potassium – Monitoring has been added to the permit for consistency across facilities that land apply wastewater.

Total Phosphorus - Monitoring has been changed from annual to quarterly at outfall 003.

2.1.2 Explanation of Limits and Monitoring Requirements

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

PFAS- The presence and fate of PFAS in municipal and industrial sludges is an emerging public health concern. EPA is currently developing a risk assessment to determine future land application rates and expects to release this risk assessment by the end of 2024. In the interim, the department has developed the "Interim Strategy for Land Application of Biosolids and Industrial Sludges Containing PFAS."

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

2.2 Sample Point Number: 007- High Strength Wastewater

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Annual	Measure	
Chloride		mg/L	Quarterly	Grab	
Nitrogen, Total Kjeldahl		mg/L	Quarterly	Grab	
Solids, Total		Percent	Quarterly	Grab	
Phosphorus, Total		Percent	Quarterly	Grab	
Phosphorus, Water Extractable		% of Tot P	Quarterly	Grab	
Potassium, Total Recoverable		µg/kg	Quarterly	Calculated	
PFOS+PFOA		ng/kg	Annual	Grab	
PFAS Dry Wt			Annual	Grab	Perfluoroalkyl and Polyfluoroalkyl Substances based on updated DNR PFAS List. See PFAS Permit Sections for more information.

2.2.1 Changes from Previous Permit:

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

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

PFOS+PFOA monitoring is required annually.

Total Recoverable Potassium – Monitoring has been added to the permit for consistency across facilities that land apply wastewater.

2.2.2 Explanation of Limits and Monitoring Requirements

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

PFAS- The presence and fate of PFAS in municipal and industrial sludges is an emerging public health concern. EPA is currently developing a risk assessment to determine future land application rates and expects to release this risk assessment by the end of 2024. In the interim, the department has developed the "Interim Strategy for Land Application of Biosolids and Industrial Sludges Containing PFAS."

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

3 Schedules

3.1 Land Application Management Plan

A management plan is required for the land application system.

Required Action	Due Date
Land Application Management Plan: Submit an update to the management plan to optimize the land application system performance and demonstrate compliance with Wisconsin Administrative Code NR 214.	10/01/2027

3.1.1 Explanation of Schedule

Land Treatment Management Plan (industrial)- An up-to-date Land Treatment Management plan is a standard requirement in reissued industrial permits per ch. NR 214, Wis. Adm. Code.

3.2 Phosphorus Payment per Pound to County

The permittee is required to make annual payments for phosphorus reductions to the participating county or counties in accordance with s. 283.16(8), Wis. Stats, and the following schedule. The price per pound will be set at the time of permit reissuance and will apply for the duration of the permit.

Required Action	Due Date
Annual Verification of Phosphorus Payment to County: The permittee shall make a total payment to the participating county or counties approved by the Department by March 1 of each calendar year. The amount due is equal to the following: [(lbs of phosphorus discharged minus the permittee's target value) times ($**66.62** per pound)] or $640,000, whichever is less. See the payment calculation steps in the Surface Water section. The permittee shall submit Form 3200-151 to the Department by March 1 of each calendar year indicating total amount remitted to the participating counties to verify that the correct payment was made. The first payment verification form is due by the specified Due Date. Note: The applicable Target Value is 0.2 mg/L as defined by s. 283.16(1)(h), Wis. Stats. The "per pound" value is $50.00 adjusted for CPI.	03/01/2026
Annual Verification of Payment #2: Submit Form 3200-151 to the Department indicating total amount remitted to the participating counties.	03/01/2027
Annual Verification of Payment #3: Submit Form 3200-151 to the Department indicating total amount remitted to the participating counties.	03/01/2028

Annual Verification of Payment #4: Submit Form 3200-151 to the Department indicating total amount remitted to the participating counties.	03/01/2029
Annual Verification of Payment #5: Submit Form 3200-151 to the Department indicating total amount remitted to the participating counties.	03/01/2030
Continued Coverage: If the permittee intends to seek a renewed variance, an application for the MDV (Multi Discharger Variance) shall be submitted as part of the application for permit reissuance in accordance with s. 283.16(4)(b), Wis. Stats.	
Annual Verification of Payment After Permit Expiration: In the event that this permit is not reissued prior to the expiration date, the permittee shall continue to submit Form 3200-151 to the Department indicating total amount remitted to the participating counties by March 1 each year.	

3.2.1 Explanation of Schedule

Phosphorus Payment per Pound to County- The multi discharger variance for phosphorus requires the facility to submit annual verification of payments to the county for the amount of phosphorus discharged.

3.3 Phosphorus Schedule - Continued Optimization

The permittee is required to optimize performance to control phosphorus discharges per the following schedule.

Required Action	Due Date
Optimization: The permittee shall implement the optimization plan as previously approved to optimize performance to control phosphorus discharges. Submit a progress report on optimizing removal of phosphorus by the Due Date.	03/01/2026
Progress Report #2: Submit a progress report on optimizing removal of phosphorus.	03/01/2027
Progress Report #3: Submit a progress report on optimizing removal of phosphorus.	03/01/2028
Progress Report #4: Submit a progress report on optimizing removal of phosphorus.	03/01/2029
Progress Report #5: Submit a progress report on optimizing removal of phosphorus.	03/01/2030

3.3.1 Explanation of Schedule

Phosphorus Schedule Continued Optimization- As part of the multi discharge variance for phosphorus, the facility is required to continue to optimize the treatment system, operation, and maintenance as necessary to continue to optimize phosphorus reduction.

Other Comments

None.

Attachments

Technology based effluent limits memo (12/17/2024)

Water Quality Based Effluent Limits (07/19/2024)

Justification Of Any Waivers From Permit Application Requirements

No waivers requested or granted as part of this permit reissuance.

Prepared By: Jonathan Hill Wastewater Engineer **Date: 01/29/2024**

CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: 07/19/2024

TO: Jonathan Hill – WY/3

FROM: Nicole Krueger – SER Nicole Krueger

SUBJECT: Water Quality-Based Effluent Limitations for Milk Specialties Global – Adell
WPDES Permit No. WI-0001236-09

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 Milk Specialties Global – Adell in Sheboygan County. This industrial facility discharges to the North Branch of the Milwaukee River, located in the North Branch Milwaukee River Watershed in the Milwaukee River Basin. This discharge is included in the Milwaukee River Basin TMDL as approved by EPA. The evaluation of the permit recommendations is discussed in more detail in the attached report.

Based on our review, the following recommendations are made on a chemical-specific basis at Outfall 008:

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Footnotes
Flow Rate					1,2
BOD_5 TBEL	 247 lbs/day		10 mg/L	 101 lbs/day	3
TSS				10 mg/L	4
Dissolved Oxygen		6.0 mg/L			1
pH	9.0 s.u.	6.0 s.u.			1
Residual Chlorine	38 µg/L		16 µg/L	**16 µg/L**	1,5
Chloride					6
Ammonia Nitrogen April – September October – March	 11 mg/L 11 mg/L		 3.6 mg/L 9.2 mg/L	 1.5 mg/L 3.8 mg/L	1
Phosphorus LCA Interim Limit HAC Interim Limit Final				 1.0 mg/L 0.80 mg/L TMDL	4,7
Temperature					2
TKN, Nitrate+Nitrite, and Total Nitrogen					8
Acute WET					9,10
Chronic WET				2.1 TUc	9,10

Footnotes:

1. No changes from the current permit.
2. Monitoring only.
3. The mass limits are categorical limits based on ch. NR 240, Wis. Adm. Code. These limits are not addressed in this memo and may need to be adjusted based on current production.

4. The TSS and phosphorus mass limits are based on the Total Maximum Daily Load (TMDL) for the Milwaukee River Basin to address phosphorus water quality impairments within the TMDL area, shown below.

Month	TSS Daily Maximum (mg/L)	TSS Daily Maximum (lbs/day)	Phosphorus Monthly Average (lbs/day)
January	20	141	1.38
February	20	113	1.60
March	12	-	1.58
April	12	-	1.49
May	20	145	1.55
June	20	165	1.36
July	20	152	1.14
August	20	136	1.07
September	20	161	1.12
October	20	166	1.08
November	20	219	1.41
December	20	157	1.34

5. Additional limits to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Codes, are included in bold.
6. Monitoring at a frequency to ensure that 11 samples are available at the next permit issuance.
7. Under the phosphorus MDV, a level currently achievable (LCA) interim limit of 1.0 mg/L should be effective upon permit reissuance. A compliance schedule may be included in the permit until the highest attainable condition (HAC) limit of 0.80 mg/L can be met. The final limits shall continue to be the Milwaukee River Basin TMDL limts.
8. As recommended in the Department's October 1, 2019 Guidance for Total Nitrogen Monitoring in Wastewater Permits, quarterly total nitrogen monitoring is recommended for cheese plants. Total Nitrogen is the sum of nitrate (NO_3), nitrite (NO_2), and total kjeldahl nitrogen (TKN) (all expressed as N).
9. 3x/permit term acute and annual chronic WET testing are recommended in the reissued permit. The Instream Waste Concentration (IWC) to assess chronic test results is 47%. 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 008 shall be a grab sample collected from North Branch Milwaukee River.
10. Sampling WET concurrently with any chemical-specific toxic substances is recommended. Tests should be done in rotating quarters, to collect seasonal information about this discharge and should continue after the permit expiration date (until the permit is reissued).

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

Attachments (3) – Narrative, Outfall Map, & Thermal Table

PREPARED BY: Nicole Krueger, Water Resources Engineer – SER

E-cc: Curt Nickels, Wastewater Engineer – SER
Jason Knutson, Wastewater Section Chief – WY/3
Diane Figiel, Water Resources Engineer – WY/3

Kari Fleming, Environmental Toxicologist – WY/3
Michael Polkinghorn, Water Resources Engineer – NOR/Rhinelander Service Center
Nate Willis, Wastewater Engineer – WY/3

Attachment #1

Water Quality-Based Effluent Limitations for
Milk Specialties Global – Adell

WPDES Permit No. WI-0001236-09

Prepared by: Nicole Krueger

PART 1 – BACKGROUND INFORMATION

Facility Description

Milk Specialties Global – Adell manufactures dry and liquid animal feeds from primarily cheese and dairy whey. The plant typically operates 24 hours per day, 7 days per week. Raw whey is stored in tanks prior to processing. The whey processing results in 2 products, whey protein and lactose, through a process of ultra-filtration. A reverse osmosis process removes water from the lactose. Higher solids content is achieved by evaporation when the protein and lactose products are dried. The whey protein concentrate is dried separately or mixed with fat to produce a product called PEF (protein encapsulated fat) blended powder. The lactose is dried into a powder in crude form after evaporation or allowed to crystallize. The crystallized lactose is separated from the soluble ingredients and dried as a high lactose level powder. The facility also manufactures a liquid veal feed product consisting of whey protein, fats and oils, and nutritional supplements.

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

Existing Permit Limitations

The current permit, expiring on June 30, 2024, includes the following effluent limitations and monitoring requirements.

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Footnotes
Flow Rate					1
BOD_5 TBEL	 247 lbs/day		10 mg/L	 101 lbs/day	2
TSS				10 mg/L	3
Dissolved Oxygen		6.0 mg/L			4
pH	9.0 s.u.	6.0 s.u.			4
Residual Chlorine	38 µg/L		16 µg/L	**16 µg/L**	5
Chloride					1
Ammonia Nitrogen April – September October – March	 11 mg/L 11 mg/L		 3.6 mg/L 9.2 mg/L	 1.5 mg/L 3.8 mg/L	
Phosphorus MDV Interim Final				 1.0 mg/L TMDL	3
Temperature					1
Acute WET					6
Chronic WET				2.1 TUc	6

Footnotes:

1. Monitoring only.
2. The mass limits are categorical limits based on ch. NR 240, Wis. Adm. Code. These limits are not addressed in this memo and may need to be adjusted based on current production.
3. The TSS and phosphorus mass limits are based on the Total Maximum Daily Load (TMDL) for the Milwaukee River Basin to address phosphorus water quality impairments within the TMDL area, shown below.

Month	TSS Daily Maximum (mg/L)	TSS Daily Maximum (lbs/day)	Phosphorus Monthly Average (lbs/day)
January	20	141	1.38
February	20	113	1.60
March	12	-	1.58
April	12	-	1.49
May	20	145	1.55
June	20	165	1.36
July	20	152	1.14
August	20	136	1.07
September	20	161	1.12
October	20	166	1.08
November	20	219	1.41
December	20	157	1.34

4. These limitations are not being evaluated as part of this review. Because the water quality criteria (WQC), reference effluent flow rates, and receiving water characteristics have not changed, limitations for these water quality characteristics do not need to be re-evaluated at this time.
5. Additional limits to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Codes, are included in bold.
6. Acute WET testing is required 2x/permit term and chronic WET testing is required annually. The IWC for chronic WET was 47%

Receiving Water Information

- Name: North Branch Milwaukee River
- Waterbody Identification Code (WBIC): 27100
- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code: Warm Water Sport Fish (WWSF) community, non-public water supply. Note: Cold Water and Public Water Supply criteria are used for bioaccumulating compounds of concern, because the discharge is within the Great Lakes basin.
- Low flows used in accordance with chs. NR 106 and 217, Wis. Adm. Code: The following 7-Q_{10} and 7-Q_2 values are from USGS for Station #04086298, where Outfall 001 is located, updated 03/02/2018.

  7-Q_{10} = 7.9 cfs (cubic feet per second)
  7-Q_2 = 10 cfs

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
7-Q_{10} (cfs)	10	10	13	17	12	10	8.8	9.1	8.5	9.2	11	11
7-Q_2 (cfs)	14	14	19	21	17	14	12	12	12	13	15	14

- Hardness = 335 mg/L as $CaCO_3$. This value represents the geometric mean of data from chronic WET testing from 10/23/2018 – 04/06/2021.
- % of low flow used to calculate limits in accordance with s. NR 106.06(4)(c)5., Wis. Adm. Code: 64%. Milk Specialties conducted a mixing zone study in 2019 which was reviewed and approved by the Department.
- Source of background concentration data: Metals data from the Milwaukee River at Batavia is used for this evaluation because there is no data available for the North Branch Milwaukee River. The Milwaukee River is within the same ecological landscape so ambient water quality characteristics are expected to be similar. The numerical values are shown in the tables below. If no data is available, the background concentration is assumed to be negligible and a value of zero is used in the computations. Background data for calculating effluent limitations for ammonia nitrogen are described later.
- Multiple dischargers: There are several other dischargers to the North Branch Milwaukee River; however, they are not in the immediate vicinity and the mixing zones do not overlap. Therefore, the other dischargers do not impact this evaluation.
- Impaired water status: The immediate receiving water is 303(d) listed as impaired for total phosphorus which is addressed in the Milwaukee River Basin TMDL.

Effluent Information

- Flow rate(s):
  Maximum annual average = 1.19 MGD (Million Gallons per Day)
  Overall average = 1.09 MGD
- Hardness = 461 mg/L as $CaCO_3$. This value represents the geometric mean of data from 10/19/2023 – 11/19/2023 from the permit reissuance application.
- Acute dilution factor used in accordance with s. NR 106.06(3)(c), Wis. Adm. Code: Not applicable – this facility does not have an approved Zone of Initial Dilution (ZID).
- Water source: Village of Adell and two private wells.
- Additives: Two flocculation additives, one coagulation additive, and one additive for phosphorus removal is used at this facility. These are expected to be removed with treatment so use restrictions are not considered.
- Effluent characterization: This facility is categorized as a secondary industry, so the permit application required effluent sample analyses for a limited number of common pollutants, as specified in s. NR 200.065, Table 1, Wis. Adm. Code, primarily metal substances plus ammonia, chloride, hardness and phosphorus.
- Effluent data for substances for which a single sample was analyzed is shown in the tables in Part 2 below, in the column titled "MEAN EFFL. CONC.". Otherwise, substances with multiple effluent data are shown in the tables below or in their respective parts in this evaluation.

Effluent Chloride Data

	Chloride mg/L
1-day P_{99}	360
4-day P_{99}	268
30-day P_{99}	219
Mean	194
Std	55.9
Sample size	54

	Chloride mg/L
Range	69.5 – 411

Effluent Copper Data

Sample Date	Copper µg/L
10/19/2023	7.0
10/23/2023	7.3
11/16/2023	5.2
11/19/2023	5.4
Average	6.2

The following table presents the average concentrations and loadings at Outfall 008 from 07/01/2019 – 03/31/2024 for all parameters with limits in the current permit to meet the requirements of s. NR 201.03(6), Wis. Adm. Code:

Parameter Averages with Limits

	Average Measurement	Average Mass Discharged
BOD_5	0.20 mg/L*	0.86 lbs/day
TSS	0.84 mg/L*	4.4 lbs/day
pH field	7.7 s.u.	
Phosphorus	0.37 mg/L	1.1 lbs/day
Ammonia Nitrogen	0.10 mg/L*	
Dissolved Oxygen	7.6 mg/L	
Chlorine	4.3 µg/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 P_{99}) value exceeds the comparable calculated limit (s. NR 106.05(4), Wis. Adm. Code)
3. If fewer than 11 detected results are available, the mean effluent concentration exceeds 1/5 of the calculated limit (s. NR 106.05(6), Wis. Adm. Code)

Acute Limits based on 1-Q_{10}

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

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

Where:

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

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

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

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

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

If the receiving water is effluent dominated under low stream flow conditions, the 1-Q_{10} method of limit calculation produces the most stringent daily maximum limitations and should be used while making reasonable potential determinations. This is not the case for Milk Specialties and the limits are set based on two times the acute toxicity criteria.

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

Daily Maximum Limits based on Acute Toxicity Criteria (ATC)

RECEIVING WATER FLOW = 6.32 cfs, (1-Q_{10} (estimated as 80% of 7-Q_{10})), as specified in s. NR 106.06(3)(bm), Wis. Adm. Code.

SUBSTANCE	REF. HARD.* mg/L	ATC	MEAN BACK-GRD.	MAX. EFFL. LIMIT**	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	1-day P_{99}	1-day MAX. CONC.
Chlorine		19.0		38.1			10	10
Arsenic		340		680	136	<14		
Cadmium	457	58.9	0.02	118	23.6	<0.3		
Chromium	301	4446	0.50	8892	1778	<1.3		
Copper	461	65.6	1.26	131	26.2	6.23		
Lead	356	365	0.65	729	145.9	<3.5		
Nickel	268	1080		2161	432	5.2		
Zinc	333	345	2.61	689	138	<2.2		
Chloride (mg/L)		757		1514			360	411

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

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

Weekly Average Limits based on Chronic Toxicity Criteria (CTC)

RECEIVING WATER FLOW = 5.056 cfs (¼ of the 7-Q_{10}), as specified in s. NR 106.06(4)(c), Wis. Adm. Code

SUBSTANCE	REF. HARD.* mg/L	CTC	MEAN BACK-GRD.	WEEKLY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	4-day P_{99}
Chlorine		7.28		27.3			11
Arsenic		152		570	114	<14	
Cadmium	175	3.82	0.02	14.3	2.9	<0.3	
Chromium	301	326	0.50	1219	244	<1.3	
Copper	335	29.1	1.26	106	21.1	6.23	
Lead	335	90.1	0.65	336	67.1	<3.5	
Nickel	268	120		450	90.0	5.2	
Zinc	333	345	2.61	1284	257	<2.2	
Chloride (mg/L)		395		1480			268

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

Monthly Average Limits based on Wildlife Criteria (WC)

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

Monthly Average Limits based on Human Threshold Criteria (HTC)

RECEIVING WATER FLOW = 10.6 cfs (¼ of Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

SUBSTANCE	HTC	MEAN BACK-GRD.	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Cadmium	370	0.02	2508	501.67	<0.3
Chromium (+3)	3818000	0.50	25884665	5176933	<1.3
Lead	140	0.65	945	189	<3.5
Nickel	43000		291525	58305	5.2

Monthly Average Limits based on Human Cancer Criteria (HCC)

RECEIVING WATER FLOW = 10.6 cfs (¼ of Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

SUBSTANCE	HCC	MEAN BACK-GRD.	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Arsenic	13.3		90.2	18.0	<14

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.

Chlorine – The current permit has daily maximum and weekly and monthly average chlorine limits. The daily maximum is 38 µg/L and the weekly and monthly average limits are 16 µg/L. **These limits are recommended to continue in the reissued permit due to antibacksliding requirements per s. NR 207.12, Wis. Adm. Code.**

Chloride **–** Considering available effluent data from the current permit term (07/08/2019 – 01/25/2024), the 1-day P_{99} chloride concentration is 359 mg/L, and the 4-day P_{99} of effluent data is 267 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, PFOS and PFOA monitoring is not recommended.** The Department may re-evaluate the need for sampling at the next permit reissuance if new information becomes available that suggests PFOS or PFOA may be present in the discharge.

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

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

- Subchapter IV of ch. NR 106, Wis. Adm. Code allows limits based on available dilution instead of limits set to twice the acute criteria.
- The maximum expected effluent pH has changed

Daily Maximum Limits based on Acute Toxicity Criteria (ATC)

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

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

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 1676 sample results were reported from 07/01/2019 – 01/31/2024. The maximum reported value was 8.80 s.u. (Standard pH Units). The effluent pH was 8.16 s.u. or less 99% of the time. The 1-day P_{99}, calculated in accordance with s. NR 106.05(5), Wis. Adm. Code, is 8.20 s.u. The mean plus the standard deviation multiplied by a factor of 2.33, an estimate of the upper ninety ninth percentile for a normally distributed dataset, is 8.19 s.u. Therefore, a value of 8.2 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 8.2 s.u. into the equation above yields an ATC = 5.7 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 calculated using the the 1-Q_{10} receiving water low flow if it is determined that the previous method of acute ammonia limit calculation (2×ATC) is not sufficiently protective of the fish and aquatic life. The more restrictive calculated limits shall apply.

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

Daily Maximum Ammonia Nitrogen Determination

	Ammonia Nitrogen Limit mg/L
2×ATC	11
1-Q_{10}	25

The 2×ATC method yields the most stringent limits for Milk Specialties.

Weekly and Monthly Average Limits based on Chronic Toxicity Criteria (CTC)
The ammonia limit calculation also warrants evaluation of weekly and monthly average limits based on chronic toxicity criteria for ammonia, because those limits relate to the assimilative capacity of the receiving water.

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 (ºC) of the receiving water – (Early Life Stages Present), or
T = the maximum of the actual temperature (ºC) and 7 - (Early Life Stages Absent)

The 4-day criterion is equal to the 30-day criterion multiplied by 2.5. The 4-day criteria are used in a mass-balance equation with the 7-Q_{10} (4-Q_3, if available) to derive weekly average limitations. And the 30-day criteria are used with the 30-Q_5 (estimated as 85% of the 7-Q_2 if the 30-Q_5 is not available) to derive monthly average limitations. The stream flow value is further adjusted to temperature; 100% of the flow is used if the Temperature ≥ 16 ºC, 25% of the flow is used if the Temperature < 11 ºC, and 50% of the flow is used if the Temperature ≥ 11 ºC but < 16 ºC.

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 ºC, during the winter and spring months. Burbot, an early spawning species, are not believed to be present in the North Branch Milwaukee River 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 warmwater 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

		Spring	Winter
		April – Sept	**Oct. - March**
Effluent Flow	Qe (MGD)	1.19	1.19
Background Information	7-Q_{10} (cfs)	7.9	7.9
	7-Q_2 (cfs)	10	10
	Ammonia (mg/L)	0.04	0.08
	Average Temperature (°C)	16	4
	Maximum Temperature (°C)	21	10
	pH (s.u.)	8.09	7.98
	% of Flow used	100	25
	Reference Weekly Flow (cfs)	7.9	2.0
	Reference Monthly Flow (cfs)	8.5	2.1
Criteria mg/L	4-day Chronic		
	Early Life Stages Present	3.61	
	Early Life Stages Absent		8.38
	30-day Chronic		
	Early Life Stages Present	1.44	
	Early Life Stages Absent		3.35
Effluent Limitations mg/L	Weekly Average		
	Early Life Stages Present	**19**	
	Early Life Stages Absent		**31**
	Monthly Average		
	Early Life Stages Present	**7.9**	
	Early Life Stages Absent		**13**

Antidegradation

The calculated weekly average and monthly average limits are less restrictive than the limits in the current permit. Without a demonstration of need for a higher limit in accordance with s. NR 207.04, Wis. Adm. Code, the current limits must be continued in the reissued permit.

Effluent Data

The following table evaluates the statistics based upon ammonia data reported from 07/02/2019 – 01/21/2024, with those results being compared to the calculated limits to determine the need to include ammonia limits in Milk Specialties' permit for the respective month ranges. That need is determined by calculating 99th upper percentile (or P_{99}) values for ammonia during each of the month ranges and comparing the daily maximum values to the daily maximum limit.

Attachment #1

Ammonia Nitrogen Effluent Data

Ammonia Nitrogen mg/L	April – September	October – March
1-day P_{99}	1.43	0.85
4-day P_{99}	0.74	0.44
30-day P_{99}	0.31	0.20
Mean*	0.11	0.09
Std	0.51	0.24
Sample size	325	378
Range	<0.022 - 3.9	<0.022 - 1.69

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

Based on this comparison, there is no reasonable potential for the discharge to exceed any of the calculated ammonia nitrogen limits.

The permit currently has daily maximum, weekly average, and monthly average limits year-round. Where there are existing ammonia nitrogen limits in the permit, the limits must be retained regardless of reasonable potential, consistent with s. NR 106.33(1)(b), Wis. Adm. Code:

> (b) If a permittee is subject to an ammonia limitation in an existing permit, the limitation shall be included in any reissued permit. Ammonia limitations shall be included in the permit if the permitted facility will be providing treatment for ammonia discharges.

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 – September	11	3.6	1.5
October – March	11	9.2	3.8

PART 4 – PHOSPHORUS

Technology-Based Effluent Limit

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

Because Milk Specialties currently has a limit of 1.0 mg/L, this limit should be included in the reissued permit. This limit remains applicable unless a more stringent WQBEL is given.

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

Milwaukee River Basin TMDL

The TMDL report addresses phosphorus water quality impairments within the Milwaukee River Basin and provides waste load allocations (WLAs) required to meet water quality standards. Effluent limitations based on these WLAs must be included in WPDES permits according to s. NR 217.16, Wis. Adm. Code. The TMDL-derived phosphorus limits may be included in lieu of or in addition to the calculated limits upon permit reissuance or modification if certain conditions are met and the s. NR 217.13, Wis. Adm. Code WQBEL has not yet taken effect.

Because the Milwaukee River Basin TMDL was developed to protect and improve the water quality of all streams and rivers within the basin, and the s. NR 217.13, Wis. Adm. Code WQBEL has not taken effect for , the TMDL-based limits can be included in the WPDES permit in place of the s. NR 217.13, Wis. Adm. Code, WQBEL. The TMDL-based limits should be expressed in a manner consistent with the wasteload allocation and assumptions of the TMDL.

The monthly average total phosphorus (TP) effluent limits in lbs/day are calculated based on the maximum monthly phosphorus WLA given in pounds per month as suggested in the TMDL report and implementation guidance. The monthly maximum TP WLAs for this facility are found in Appendix A of the Milwaukee River Basin TMDL report. **The monthly average limits shown in the table below are recommended in place of the s. NR 217.13, Wis. Adm. Code, limit, and should be expressed in pounds per day.** For informational purposes, the TMDL mass limits in the following table are equivalent to monthly average concentrations ranging from 0.109 mg/L to 0.161 mg/L at the maximum annual average flow of 1.19 MGD.

Total Phosphorus Wasteload Allocations and Effluent Limits

Month	Monthly Maximum TP WLA[1] (lbs/month)	Days Per Month	Monthly Average TP Effluent Limit[2] (lbs/day)
Jan	42.70	31	1.38
Feb	44.84	28	1.60
Mar	48.88	31	1.58
Apr	44.83	30	1.49
May	48.12	31	1.55
Jun	40.72	30	1.36
Jul	35.46	31	1.14
Aug	33.31	31	1.07
Sep	33.62	30	1.12
Oct	33.49	31	1.08
Nov	42.22	30	1.41
Dec	41.59	31	1.34

Footnotes:
1- Milwaukee River Basin TMDL Appendix A. Monthly Total Suspended Solids Wasteload Allocation by Permitted Point Source. Table A.17 for the Milwaukee River Basin
2- Monthly Average Total P effluent limit (lbs/day) = monthly Total P WLA (lbs/month) ÷ days per month

Because these WLAs must be included in the reissued permit, a reasonable potential determination is not needed.

Effluent Data

The following table summarizes effluent total phosphorus monitoring data from 07/02/2019 – 01/28/2024. The mass data was calculated using the effluent flow reported on the same days as the concentration data.

Total Phosphorus Effluent Data

	Phosphorus mg/L	Phosphorus lbs/day
1-day P_{99}	1.60	4.81
4-day P_{99}	0.89	2.68
30-day P_{99}	0.53	1.58
Mean	0.37	1.11
Std	0.32	0.97
Sample size	245	245
Range	0.03 - 2.4	0.092 – 6.73

Multi-Discharge Variance Interim Limit

With the permit application, Milk Specialties has applied for the phosphorus multi-discharger variance (MDV). Conditions of the phosphorus MDV require the facility to comply with an interim phosphorus limit in lieu of meeting the final WQBEL for this permit term. The recommended interim limit, pursuant to s. 283.16 (6) 1, Wis. Stats., is 0.8 mg/L as a monthly average. A compliance schedule may be appropriate to meet this interim limit, but compliance with 0.8 mg/L shall be no later than the end of the reissued permit.

The current interim limit of **1.0 mg/L as a monthly average is the level currently achievable (LCA)** for the discharge. A limit of 1.0 mg/L as a monthly average should not be exceeded during the compliance schedule.

PART 5 – TOTAL SUSPENDED SOLIDS

The TMDL also has wasteload allocations (WLAs) for total suspended solids (TSS). For an industrial discharge, the limits for TSS must be expressed as daily maximums and monthly averages. The current permit includes a monthly average limit of 10 mg/L year round and variable TMD-based daily maximum limits. Consistent with Section 6.4.1 of the Milwaukee River TMDL Report, in cases where the equivalent TSS concentration limit is < 12 mg/L, the effluent limit will be expressed as a concentration of 12 mg/L, instead of a mass limit.

Total Suspended Solids Wasteload Allocations

Month	Monthly TSS WLA[1] (lbs/month)	Days Per Month	Monthly Ave TSS Effluent Limit[2] (lbs/day)	Equivalent Conc. Limit[3] at 1.19 MGD (mg/L)
Jan	1,822.37	31	**58.8**	5.92
Feb	1,327.05	28	**47.4**	4.78
March	1,272.32	31	**41.0**	4.14
April	1,134.02	30	**37.8**	3.81
May	1,880.40	31	**60.7**	6.11
June	2,068.88	30	**69.0**	6.95

Month	Daily TSS WLA[4] (lbs/day)	Daily Max TSS Effluent Limit[5] (lbs/day)	Equivalent Conc. Limit[3] at 1.19 MGD (mg/L)
Jan	140.50	**141**	14.2
Feb	113.27	**113**	11.4
March	98.09	**98.1**	9.88
April	90.34	**90.3**	9.10
May	144.97	**145**	14.6
June	164.82	**165**	16.6

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Month	Monthly TSS WLA[1] (lbs/month)	Days Per Month	Monthly Ave TSS Effluent Limit[2] (lbs/day)	Equivalent Conc. Limit[3] at 1.19 MGD (mg/L)
July	1,972.48	31	**63.6**	6.41
Aug	1,759.12	31	**56.7**	5.72
Sept	2,019.59	30	**67.3**	6.78
Oct	2,150.16	31	**69.4**	6.99
Nov	2,746.83	30	**91.6**	9.23
Dec	2,039.17	31	**65.8**	6.63

Month	Daily TSS WLA[4] (lbs/day)	Daily Max TSS Effluent Limit[5] (lbs/day)	Equivalent Conc. Limit[3] at 1.19 MGD (mg/L)
July	152.07	**152**	15.3
Aug	135.62	**136**	13.7
Sept	160.89	**161**	16.2
Oct	165.77	**166**	16.7
Nov	218.83	**219**	22.0
Dec	157.21	**157**	15.8

Footnotes:
1- Milwaukee River TMDL Appendix A. Monthly Total Suspended Solids Wasteload Allocation by Permitted Point Source. Table A.19
2- Monthly average TSS effluent limit (lbs/day) = maximum monthly TSS WLA (lbs/month) ÷ days per month
3-Equivalent Concentration = mass / (maximum annual average flow * 8.34)
4- Milwaukee River TMDL Appendix A. Daily Total Suspended Solids Wasteload Allocation by Permitted Point Source. Table A.18
5- Daily maximum TSS effluent limit (lbs/day) = daily TSS WLA (lbs/day)

Because the daily maximum TSS effluent limits for February, March, and April, and the monthly average limits year round equate to concentration limits of less than 12 mg/L, mass-based limits for TSS are not needed for permit reissuance. However, because the current permit has a daily maximum limit of 113 lbs/day as a daily maximum for February, this limit is recommended to remain the same for antibacksliding purposes per s. NR 207.12, Wis. Adm. Code. **It is recommended that the daily maximum limits for March and April of 12 mg/L be included in the reissued permit.**

Because the existing monthly average concentration limit of 10 mg/L as a monthly average is more restrictive than 12 mg/L, the Department would be unable to increase the permit limits for TSS without a demonstration of need as required in ch. NR 207, Wis. Adm. Code. An initial review suggests that the requirements of s. NR 207.04(1)(a), Wis. Adm. Code, do not appear to be met based on Milk Specialties's effluent concentrations from the current permit term's discharge monitoring reports. Therefore, the monthly average of 10 mg/L year round is recommended to continue in the reissued permit.

Below is the summary table of limits recommended for TSS:

TSS Limits

Month	Daily Max TSS Effluent Limit (lbs/day)	Daily Max TSS Effluent Limit (mg/L)	Monthly Ave TSS Effluent Limit (mg/L)
Jan	141	20	10
Feb	113		10
Mar		12	10
Apr		12	10
May	145	20	10
Jun	165	20	10
Jul	152	20	10
Aug	136	20	10
Sep	161	20	10
Oct	166	20	10

Attachment #1

Month	Daily Max TSS Effluent Limit (lbs/day)	Daily Max TSS Effluent Limit (mg/L)	Monthly Ave TSS Effluent Limit (mg/L)
Nov	219	20	10
Dec	157	20	10

The following table lists the statistics for TSS as both a concentration and a mass, reported from 11/01/2019 – 04/30/2024.

TSS Effluent Data

	TSS (mg/L)	TSS (lbs/day)
1-day P_{99}	9.56	54.0
4-day P_{99}	4.79	32.6
30-day P_{99}	2.09	13.6
Mean*	0.84	4.36
Std	3.03	18.2
Sample Size	703	1212
Range	<2 - 38.4	0 - 322

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

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. These values were based off actual flow reported from 07/01/2019 – 01/31/2024.

The table below summarizes the maximum temperatures reported during monitoring from 11/01/2019 – 04/30/2024.

Monthly Temperature Effluent Data & Limits

Month	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Weekly Maximum (°F)	Daily Maximum (°F)	Weekly Average Effluent Limitation (°F)	Daily Maximum Effluent Limitation (°F)
JAN	79	83	114	120

Attachment #1

Month	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Weekly Maximum (°F)	Daily Maximum (°F)	Weekly Average Effluent Limitation (°F)	Daily Maximum Effluent Limitation (°F)
FEB	78	82	113	120
MAR	81	89	109	120
APR	80	85	83	120
MAY	81	86	94	120
JUN	84	88	116	120
JUL	85	88	NA	120
AUG	83	89	NA	120
SEP	83	88	NA	120
OCT	82	86	106	120
NOV	79	87	84	120
DEC	80	84	105	120

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

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

Based on the available effluent data no effluent limits are recommended for temperature. The complete thermal table used for the limit calculation is attached. **Monitoring only is recommended to continue in the reissued permit.**

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 (2022).*

- Acute tests predict the concentration that causes lethality of aquatic organisms during a 48 to 96-hour exposure. To assure that a discharge is not acutely toxic to organisms in the receiving water, WET tests must produce a statistically valid LC_{50} (Lethal Concentration to 50% of the test organisms) greater than 100% effluent, according to s. NR 106.09(2)(b), Wis. Adm Code.
- Chronic tests predict the concentration that interferes with the growth or reproduction of test organisms during a seven-day exposure. To assure that a discharge is not chronically toxic to organisms in the receiving water, WET tests must produce a statistically valid IC_{25} (Inhibition Concentration) greater than the instream waste concentration (IWC), according to s. NR 106.09(3)(b), Wis. Adm Code. The IWC is an estimate of the proportion of effluent to total volume of water (receiving water + effluent). The IWC of **27%** shown in the WET Checklist summary below was calculated according to the following equation, as specified in s. NR 106.03(6), Wis. Adm Code:

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

Where:

Q_e = annual average flow = 1.19 MGD = 1.84 cfs
f = fraction of the Q_e withdrawn from the receiving water = 0
Q_s = 64% of the 7-Q_{10} = 7.9 cfs × 0.64 = 5.056 cfs

*The current IWC is 47%. The updated IWC of 27% was calculated using 64% mixing rather than the default of 25% mixing which was used previously.

- 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 008 shall be a grab sample collected from the receiving water location, upstream and out of the influence of the mixing zone and any other known discharge. The specific receiving water location must be specified in the WPDES permit.
- Shown below is a tabulation of all available WET data for Outfall 008. Efforts are made to ensure that decisions about WET monitoring and limits are made based on representative data, as specified in s. NR 106.08(3), Wis. Adm Code. Data which is not believed to be representative of the discharge was not included in reasonable potential calculations. The table below differentiates between tests used and not used when making WET determinations. Significant changes were made to WET test methods in 2004 and these changes were assumed to be fully implemented by certified labs by no later than June 2005. Data collected before July 1, 2005 has been excluded in this evaluation.

WET Data History

Date Test Initiated	Acute Results LC_{50} %				Chronic Results IC_{25} %				Footnotes or Comments
	C. dubia	Fathead minnow	Pass or Fail?	Used in RP?	*C. dubia*	Fathead Minnow	Pass or Fail?	Use in RP?	
08/18/2005	>100	>100	Pass	Yes	>100	>100	Pass	Yes	

Attachment #1

Date Test Initiated	Acute Results LC_{50} %				Chronic Results IC_{25} %				Footnotes or Comments
	C. dubia	Fathead minnow	Pass or Fail?	Used in RP?	*C. dubia*	Fathead Minnow	Pass or Fail?	Use in RP?	
02/06/2007	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
04/15/2008	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
08/09/2016	>100	>100	Pass	Yes	>100	93	Fail	Yes	1
09/27/2016					>100	>100	Pass	Yes	
11/08/2016					>100	>100	Pass	Yes	
10/23/2018	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
10/29/2019					>100	>100	Pass	Yes	
08/25/2020	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
04/06/2021					>100	>100	Pass	Yes	
02/22/2022					>100	>100	Pass	Yes	
06/14/2023	>100	>100	Pass	Yes					
10/17/2023					95.1	>100	Pass	Yes	

Footnotes:

1. This would not have been a fail if the updated low flows were used. The IWC at this time was 100% using a 7-Q_{10} of 0.01 cfs and mixing of 25%.

- According to s. NR 106.08, Wis. Adm. Code, WET reasonable potential is determined by multiplying the highest toxicity value that has been measured in the effluent by a safety factor, to predict the likelihood (95% probability) of toxicity occurring in the effluent above the applicable WET limit. The safety factor used in the equation changes based on the number of toxicity detects in the dataset. The fewer detects present, the higher the safety factor, because there is more uncertainty surrounding the predicted value. **WET limits must be given, according to s. NR 106.08(6), Wis. Adm. Code, whenever the applicable Reasonable Potential equation results in a value greater than 1.0.**

  Acute Reasonable Potential = [(TUa effluent) (B)(AMZ)]
  Chronic Reasonable Potential = [(TUc effluent) (B)(IWC)]

  According to s. NR 106.08(6)(d), Wis. Adm. Code, TUa and TUc effluent values are equal to zero whenever toxicity is not detected (i.e. when the LC_{50}, IC_{25} or $IC_{50} \geq 100\%$).

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

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

Chronic WET Limit Parameters

TUc (maximum) $100/IC_{25}$	**B** (multiplication factor from s. NR 106.08(6)(c), Wis. Adm. Code, Table 4)	**IWC**
100/93 = 1.08	3.8 Based on 2 detects	27%

[(TUc effluent) (B)(IWC)] = 1.10 > 1.0

Therefore, reasonable potential is shown for chronic WET limits using the procedures in s. NR 106.08(6) and representative data from 08/18/2005 – 10/17/2023.

Expression of WET limits

Chronic WET limit = [100/IWC] TU_c = 3.7 TU_c expressed as a monthly average

This limit is greater than the current limit of 2.1 TU_c. If Milk Specialties would like to request an increase to the existing permit limits an assessment of their effluent data consistent with the requirements of ss. NR 207.04(1)(a) and (c), Wis. Adm. Code, must be provided. Without a demonstration of need for a higher limit in accordance with s. NR 207.04, Wis. Adm. Code, **the current limit of 2.1 TU_c must be continued in the reissued permit along with the current corresponding IWC of 47%.** The Department would be unable to increase the limit due to the lack of need as shown via the antidegradation rule (ch. NR 207, Wis. Adm. Code).

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

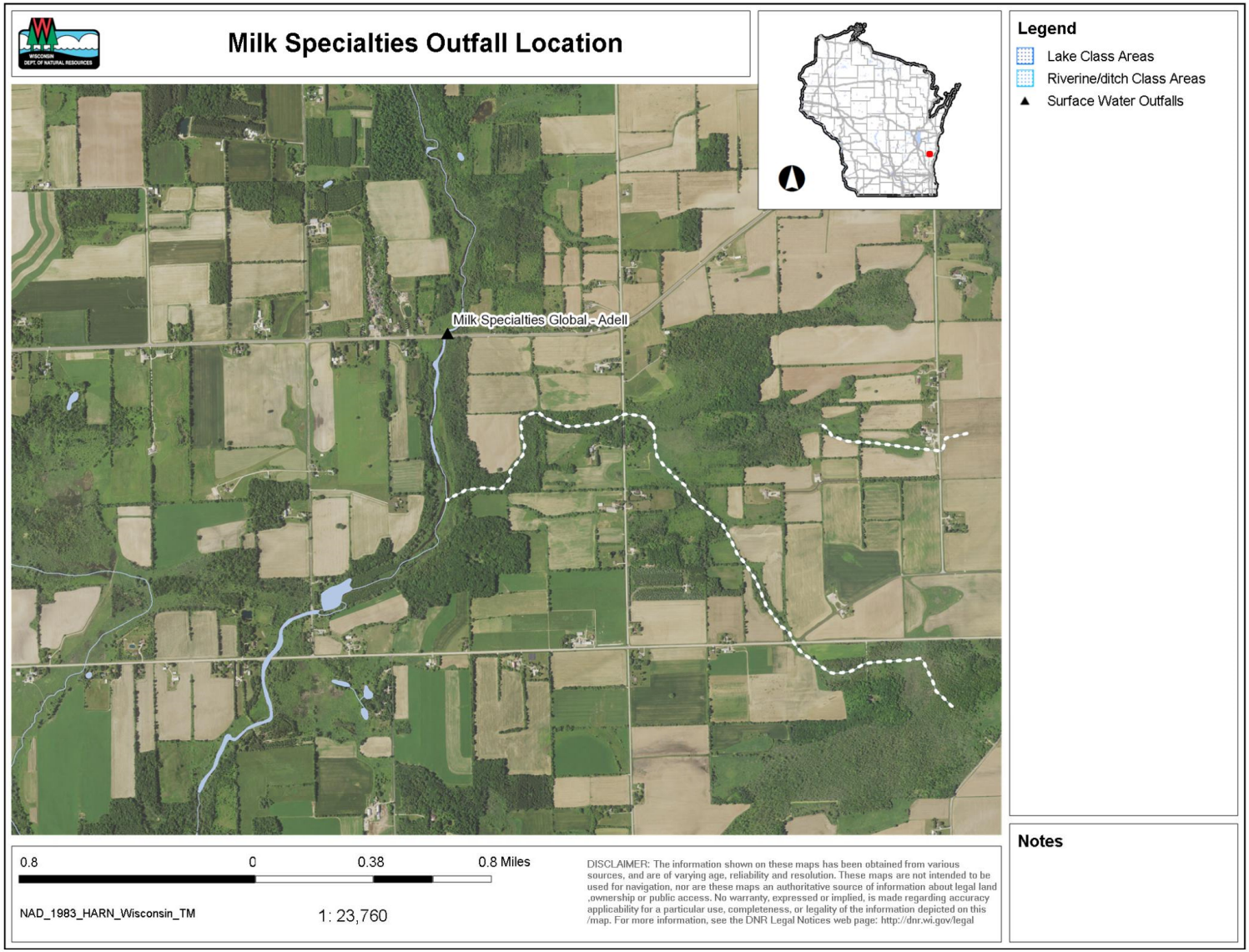
	Acute	Chronic
AMZ/IWC	Not Applicable. **0 Points**	IWC = 47%. **10 Points**
Historical Data	7 tests used to calculate RP. No tests failed. **0 Points**	12 tests used to calculate RP. 1 test failed. **0 Points**
Effluent Variability	Little variability, no violations or upsets, consistent WWTF operations. **0 Points**	Same as Acute. **0 Points**
Receiving Water Classification	Warmwater sport fish. **5 Points**	Same as Acute. **5 Points**
Chemical-Specific Data	Reasonable potential for limits are not needed based on ATC; Ammonia nitrogen limit carried over from the current permit. Ammonia, hlorine, copper, nickel and chloride detected. Additional Compounds of Concern: None. **3 Points**	Reasonable potential for limits are not needed based on CTC; Ammonia nitrogen limit carried over from the current permit. Ammonia, hlorine, copper, nickel and chloride detected. Additional Compounds of Concern: None. **3 Points**
Additives	4 Water Quality Conditioners added. Permittee has proper P chemical SOPs in place.	All additives used more than once per 4 days.

Attachment #1

	Acute	Chronic
	4 Points	**4 Points**
Discharge Category	Dairy industry. **20 Points**	Same as Acute. **20 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:	**32 Points**	**42 Points**
Recommended Monitoring Frequency (from Checklist):	3 tests during permit term	1x yearly
Limit Required?	No	Yes Limit = 2.1 TU_c
TRE Recommended? (from Checklist)	No	No

- After consideration of the guidance provided in the Department's WET Program Guidance Document (2022) and other information described above, 3 tests/permit term acute and 1x yearly 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).
- According to the requirements specified in s. NR 106.08, Wis. Adm. Code, a chronic WET limit is required. The chronic WET limit shall be expressed as 2.1 TUc as a monthly average in the effluent limits table of the permit.
- A minimum of annual chronic monitoring is required because a chronic WET limit is required. Federal regulations in 40 CFR Part 122.44(i) require that monitoring occur at least once per year when a limit is present.

Attachment #2



Attachment #3

Temperature limits for receiving waters with unidirectional flow

(calculation using default ambient temperature data)

						Temp Dates	Flow Dates
Facility:	Milk Specialties Global - Adell		**7-Q_{10}:**	7.90	cfs		
Outfall(s):	001		**Dilution:**	64%		**Start:**	11/01/19	11/01/19
Date Prepared:	6/5/2024		**f:**	0		**End:**	04/30/24	04/30/24
Design Flow (Qe):	1.19	MGD	**Stream type:**	Small warm water sport or forage fish co			
Storm Sewer Dist.	0	ft	**Qs:Qe ratio:**	2.7	:1		
			Calculation Needed?	YES			

Month	Water Quality Criteria			Receiving Water Flow Rate (Qs)	Representative Highest Effluent Flow Rate (Qe)		f	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Ta (default)	Sub-Lethal WQC	Acute WQC		7-day Rolling Average (Qesl)	Daily Maximum Flow Rate (Qea)		Weekly Average	Daily Maximum	Weekly Average Effluent Limitation	Daily Maximum Effluent Limitation
	(°F)	(°F)	(°F)	(cfs)	(MGD)	(MGD)		(°F)	(°F)	(°F)	(°F)
JAN	33	49	76	7.90	0.809	0.834	0	79	83	114	120
FEB	34	50	76	7.90	0.830	0.844	0	78	82	113	120
MAR	38	52	77	7.90	0.806	0.836	0	81	89	109	120
APR	48	55	79	7.90	0.816	0.836	0	80	85	83	120
MAY	58	65	82	7.90	0.789	0.817	0	81	86	94	120
JUN	66	76	84	7.90	0.818	0.865	0	84	88	116	120
JUL	69	81	85	7.90	0.791	0.916	0	85	88	NA	120
AUG	67	81	84	7.90	0.792	0.819	0	83	89	NA	120
SEP	60	73	82	7.90	0.772	0.828	0	83	88	NA	120
OCT	50	61	80	7.90	0.804	0.827	0	82	86	106	120
NOV	40	49	77	7.90	0.829	0.870	0	79	87	84	120
DEC	35	49	76	7.90	0.817	0.839	0	80	84	105	120

State of Wisconsin

CORRESPONDENCE/MEMORANDUM

DATE: 12/17/2024

TO: Curtis Nickels

FROM: Jonathan Hill – WY/3

SUBJECT: Technology-Based Effluent Limitations for Milk Specialties - Adell WPDES Permit No. WI-0001236-09-0

PART 1 – BACKGROUND INFORMATION

Milk Specialties Global – Adell (hereafter MSG) started as a milk-bottling plant in 1924 and switched to whey-processing in the 1950's. The effective compliance date for technology based effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology (BPT) currently available is July 1, 1977. The categorical limitations will be calculated based on the December 16, 2024 email which stated that 28,000,000 lbs/month of fluid whey is used for Reverse Osmosis, 40,000,000 lbs/month of fluid whey is used for Ultra Filtration and no change has occurred with their 3 driers.

PART 2 – INDUSTRIAL CATEGORIES

Chapter NR 240, Wis. Adm. Code, specifies effluent guidelines for discharges from dairy product categories of point sources and subcategories. MSG discharges a combination of Condensed Whey and dry whey.

Because MSG has a BOD input greater than 15,620 pounds per day for dry whey production, it is considered a Class A facility for dry why production. Because MSG has a BOD input greater than 14,160 pounds per day for its condensed whey production, it is considered a Class A facility for condensed whey production. The ch. NR 240, Wis. Adm. Code is based on federal effluent guidelines in 40 CFR Part 405 Subparts K and L. The permittee must meet the applicable effluent limit guidelines as described in this chapter. These effluent limit guidelines include:

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

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

Section NR 220.13, Wis. Adm. Code, includes provisions that address cases where federal and state rules differ. Section 283.11, Wis. Stats., 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.

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

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

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

PART 3 – LEVELS OF CONTROL

The facility's condensed whey processes started after May 28, 1974 and is therefore subject to new source performance standards found in table 4 of ch. NR 240, Wis. Adm. Code. The facility's dry whey processes started prior to May 28, 1974 and is therefore subject to BPT, and BCT standards as specified in 40 CFR Part 405 Subparts K and L, and ch. NR 240.12, Wis. Adm. Code.

PART 4 – APPLICABLE PRODUCTION LEVELS

The current levels of production for each subcategory are based on data provided by Milk Specialties-Adell on December 16, 2024. MSG condenses fluid whey by way of reverse osmosis and ultra-filtration. Condensed whey is further processed in three independent dryers.

PART 5 – TBEL CALCULATIONS

The BOD5 input is the 5-day biochemical oxygen demand of raw materials that enter the process. The current production levels are converted to BOD input equivalents by multiplying the amount of raw material by BOD factors specified in s. NR 240.03(1), Wis. Adm. Code, or s. NR 240.07, Wis. Adm. Code and 40 CFR Part 405.

pH

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

Condensed Whey BOD Input Calculations

Process	Material	Material Used (lbs/month)	BOD Factor	BOD Input (lbs/month)	BOD Input (lbs/Day)
Reverse Osmosis	Fluid Whey	28,000,000	4.72	1,321,600	44,053
Ultra-Filtration	Fluid Whey	40,000,000	4.72	1,888,000	62,933
Total					**106,987**

Dry Whey BOD Input Calculations

The Facility has provided the following site-specific fats, proteins, and carbohydrates for the BOD calculations for the whey entering each drier:

a) Niro Dryer 1,090,800 lbs/month fat, 1,113,660 lbs/month protein, 103,500 lbs/month carbohydrate
b) Foremost Dryer 0 lbs/month fat, 0 lbs/month protein, 4,000,000 lbs/month carbohydrate
c) Lactose Dryer 0 lbs/month fat, 0 lbs/month protein, 2,500,000 lbs/month carbohydrate

These values are used to calculate the BOD input for the dry whey subcategory below.

Sum of Drier Influent Fats, Proteins, and Carbohydrates

Process	BOD Input (lbs/month)		
	Fat	Protein	Carbohydrate
Niro Dryer	1,090,800	1,113,660	103,500
Foremost Dryer	0	0	4,000,000
Lactose Dryer	0	0	2,500,000
Total	**1,090,800**	**1,113,660**	**6,603,500**

Adjusted BOD Input to Driers

BOD Input Component	BOD Input (lbs/month)	BOD Factor	Adjusted BOD Input (lbs/month)	Adjusted BOD Input (lbs/day)
Fat	1,090,800	0.89	970,812	32,360
Protein	1,113,660	1.031	1,148,183	38,273
Carbohydrate	6,603,500	0.691	4,563,019	152,101
Total			6,682,014	**222,734**

Condensed Whey Effluent Limit Calculations

Total BOD Input (lbs/day)	Best Practicable Treatment Effluent Limitations				WPDES Categorical Limits			
	BOD (lbs/1,000 lbs)		TSS (lbs/1,000 lbs)		BOD (lbs/day)		TSS (lbs/day)	
	Avg	Max	Avg	Max	Avg	Max	Avg	Max
106,987	0.11	0.22	0.14	0.28	**12**	**24**	**15**	**30**

Dry Whey Effluent Limit Calculations

Total BOD Input (lbs/day)	Best Practicable Treatment Effluent Limitations				WPDES Categorical Limits			
	BOD (lbs/1,000 lbs)		TSS (lbs/1,000 lbs)		BOD (lbs/day)		TSS (lbs/day)	
	Avg	Max	Avg	Max	Avg	Max	Avg	Max
222,734	0.4	1.0	0.6	1.5	**89**	**223**	**134**	**334**

PART 6 – 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 and all of the other subcategories with intermediate products in Part 5 of this memo.

Subcategory	Monthly average BOD (lbs/day)	Daily maximum BOD (lbs/day)	Monthly average TSS (lbs/day)	Daily maximum TSS (lbs/day)
Condensed Whey	12	24	15	30
Dry Whey	89	223	134	334
Total	**101**	**247**	**149**	**364**

Final Calculated Effluent Limitations			
Parameter & Units	**Daily Maximum**	**Daily Minimum**	**Monthly Average**
BOD_5	**247 (lbs/day)**	N/A	**101 (lbs/day)**
TSS	**364 (lbs/day)**	N/A	**149 (lbs/day)**
pH	**9.0 s.u.**	**6.0 s.u.**	**N/A**