

Permit Fact Sheet

General Information

Permit Number:	WI-0000035-10-0												
Permittee Name:	Foremost Farms USA Reedsburg												
Address:	501 S Pine St												
City/State/Zip:	Reedsburg WI 53959												
Discharge Location:	NE ¼ of NW ¼ of Section 15 in T12N-R4E												
Receiving Water:	The Baraboo River via storm sewer												
StreamFlow (Q _{7,10}):	50 cfs												
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	7-Q10 (cfs)	63	64	84	130	92	70	60	57	64	70	84	64
	7-Q2 (cfs)	93	94	124	192	136	104	89	84	95	104	124	95
Stream Classification:	Warm water sport fish												
Discharge Type:	Existing, continuous												

Facility Description

The operations at the facility include receiving, transfer, and storage of bulk milk from dairy farms and receiving cream from other dairy plants. The plant receives 1,400,000 pounds of milk per day. These products are processed to produce butter with current production at 425,000 pounds per day. Also, currently produced are condensed skim milk and condensed buttermilk (300,000 pounds per day) through a mechanical vapor recompression evaporator prior to shipment to other Foremost Farms USA cheese plants. The evaporator generated excess condensate of whey (COW), is discharged to Outfall 001. The plant washes all trucks after unloading. Plant equipment is washed, either by hand or by clean-in-place (CIP) with all process wash water, boiler blow down and sanitary waste is discharged to the City of Reedsburg wastewater treatment plant (WWTP).

Currently the non-contact cooling water and condensate of whey (COW) are discharged via outfall 001 to the Baraboo River via a storm sewer which turns into an unnamed tributary. The conductivity of the effluent is monitored continuously with a daily maximum value (umhos/cm) reported on the DMR. Any value that exceeds the set point is diverted to sanitary wastewater drain. High strength dairy waste is land applied under Outfall 002 on department approved landspreading sites.

Substantial Compliance Determination

After a desk top review of all discharge monitoring reports, land application reports, compliance schedule items, and a site visit on March 23, 2023, this facility has been found to be in substantial compliance with their current permit.

Sample Point Designation		
Sample Point Number	Discharge Flow, Units, and Averaging Period	Sample Point Location, Waste Type/Sample Contents and Treatment Description (as applicable)
001	0.219 (Oct 2018 – July 2023)	Effluent: 24-Hr flow proportional composite sample of the non-contact cooling water and excess condensate of whey from the vapor recompression evaporator located prior to discharge to the storm sewer. Grab samples taken prior to discharge to the storm sewer.
002	3,000,000 gallons/year (according to the permit application)	Land Application: High strength dairy wastewaters from the separation process and first wash CIP wastewater, applied to approved landspreading sites or an approved manure pit. Note: This could also include small amounts of CIP wastewater from the equalization silo in an emergency event.
003	30,000 gallons/year (according to the permit application)	Land Application: Unusable milk, dairy product solids or whey, applied to approved land spreading or discharged to an approved manure pit. (This is an emergency outfall - sampling requirements apply only when this outfall is used.)

1 Surface Water - Monitoring and Limitations

Sample Point Number: 001- SURFACE WATER

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow Rate		MGD	Daily	Continuous	
BOD5, Total		mg/L	Weekly	24-Hr Flow Prop Comp	
BOD5, Total	Daily Max	24 lbs/day	Weekly	Calculated	
BOD5, Total	Monthly Avg	12 lbs/day	Weekly	Calculated	
Suspended Solids, Total		mg/L	Weekly	24-Hr Flow Prop Comp	
Suspended Solids, Total	Daily Max	237 lbs/day	Weekly	Calculated	
Suspended Solids, Total	Monthly Avg	118 lbs/day	Weekly	Calculated	
Conductivity		umhos/cm	Daily	Continuous	
pH Field	Daily Max	9.0 su	5/Week	Grab	
pH Field	Daily Min	6.0 su	5/Week	Grab	

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Phosphorus, Total	Monthly Avg	0.23 mg/L	Weekly	24-Hr Flow Prop Comp	This is an interim limit. See the phosphorus compliance schedule.
Phosphorus, Total	Monthly Avg	0.45 lbs/day	Weekly	Calculated	Reporting of mass discharged required upon permit effective date. Final TMDL-based mass limits go into effect June 30, 2029 per the phosphorus compliance schedule.
Phosphorus, Total	6-Month Avg	0.15 lbs/day	Weekly	Calculated	Monitoring only upon permit effective date. Final TMDL-based mass limits go into effect June 30, 2029 per the phosphorus compliance schedule.
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.
Temperature Maximum		deg F	Daily	Continuous	
Acute WET		TUa	See Listed Qtr(s)	24-Hr Flow Prop Comp	See WET section.

Changes from Previous Permit

Flow Rate: Flow rate sample type and frequency updated.

TSS: TSS mass limits added.

Conductivity: Sample frequency increased.

pH: Sample frequency increased.

Phosphorus TMDL Limits- Sample frequency increased to weekly throughout the permit term. An interim limit of 0.23 mg/L monthly average goes into effect upon reissuance and will remain in effect unless a more stringent limit is required

at a future permit issuance by ss. NR 217.13 and NR 217.16(2), Wis. Adm. Code, or the limit is relaxed following procedures outlined in ch. NR 207, Wis. Adm. Code. Discharge effluent concentration (mg/L) shall be reported weekly upon permit reissuance and will be used to calculate amounts reported for mass-based parameters. An additional reporting requirement for lbs/month will be used to calculate the facility's 12-month rolling sum of total monthly discharge, which can be compared directly to the facility's designated WLA. Final TMDL WLA-based effluent limits of 0.15 lbs/day as a six-month average and 0.45 lbs/day as a monthly average will go into effect in accordance with the phosphorus compliance schedule.

Temperature: Sample frequency and type updated to reflect that the permittee has continuous temperature monitoring.

WET: Wet testing quarters updated.

Explanation of Limits and Monitoring Requirements

Refer to the WQBEL memo for the detailed calculations, prepared by Sarah Luck dated February 26, 2024 used for this reissuance. The TBEL memo for detailed calculations for Technology Based Effluent Limits, prepared by Sarah Luck dated February 26, 2024 was also used for this reissuance.

BOD - Production-based limits were calculated per s. NR 240.06(4), Wis. Adm. Code. The BOD mass limitations are retained unchanged. The department has determined that calculated BOD₅ mass limits are greater than the limits calculated in the previous permit (24 lbs/day as a daily maximum and 12 lbs/day as a monthly average). If Foremost Farms USA – Reedsburg would like to request an increase to the existing permit limits, an assessment of their effluent data, consistent with the requirements of ss. NR 207.04(1)(a) and (c), Wis. Adm. Code, must be provided. This evaluation is on a parameter-by-parameter basis and includes consideration of operations, maintenance, and temporary upsets. Without a demonstration of need for a higher limit in accordance with s. NR 207.04, Wis. Adm. Code, the current limits should be continued in the reissued permit.

TSS – Per s. NR 240.06(4), Wis. Adm. Code TSS mass limitations have been included in the reissued permit based on production values provided to the department. See TBEL memo for the detailed calculations of these limits.

pH – Per both State and Federal code pH limits of 6.0 to 9.0 s.u. are required for any discharge subject to BPT, BCT, or NSPS limitations. The pH limitations have not changed, however sampling frequency for pH is increased to 5/week. Sampling frequency for pH was increased to 5/week.

Phosphorus - Wisconsin River Total Maximum Daily Load (TMDL): The permitted facility is included within the Wisconsin River Basin Total Maximum Daily Load (TMDL), which was approved by EPA April 26, 2019. The TMDL establishes Waste Load Allocations (WLAs) for point source dischargers and determines the maximum amounts of phosphorus that can be discharged and still protect water quality. The final effluent limits and monitoring expressed in the permit were derived from Site-Specific Criteria (SSC) for Lakes Petenwell, Castle Rock, and Wisconsin originally included in Appendix K of the TMDL report and approved by the U.S. Environmental Protection Agency on July 9, 2020. The permittee's approved SSC-based limits are consistent with the assumptions and requirements of the EPA-approved WLA in the TMDL, which is 45 lbs/yr for the permitted facility.

The approved TMDL expresses WLAs as lbs/year and lbs/day (maximum annual load divided by 365 days). As outlined in Section 4.6 of the department's *TMDL Development and Implementation Guidance: Integrating the WPDES and Impaired Waters Program*, mass limits must be given in the permit that are consistent with the TMDL WLA and the phosphorus impracticability agreement that was approved by USEPA in 2012 (see NPDES MOA Addendum dated July 12, 2012 at <https://prodoasint.dnr.wi.gov/swims/downloadDocument.do?id=167886175>). Continuously discharging facilities covered by the WRB TMDL are given monthly average mass limits. If the equivalent effluent concentration is less than or equal to 0.3 mg/L, six-month average mass limits (averaging period of May through October and November through April) are also included. The equivalent effluent concentration of 0.0058 mg/L was calculated for the facility, thus, TMDL based mass limits are expressed as a six-month average and a monthly average equal to three times the six-month average limits.

Facilities with WRB TMDL based effluent limits for phosphorus must report the 12-month rolling sum of total monthly discharge (lbs/yr). If reported 12-month rolling sums exceed the facility's max annual WLA, the facility's mass limits (monthly average and six-month average) may be recalculated using more appropriate CVs or monitoring frequencies when the permit is reissued to bring discharge levels into compliance with the facility's given WLA.

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. The permit includes a temperature monitoring reported daily because the permittee has a continuous temperature probe and therefore is required to report temperature daily.

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>). This permit includes acute wet testing in the quarters listed in the permit.

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

The department has been revisiting the sampling frequencies at every facility to evaluate whether current frequencies are appropriate or if an increase is warranted. The frequencies for phosphorus, temperature and pH were increased to align Foremost Farms Reedsburg with other facilities of similar size to ensure fairness and in consideration of department guidance on sampling frequencies. TSS sampling has been set the minimum standard for dairy processing facilities. An additional consideration for increasing sample frequency for process control parameters (pH) is that they are tested for in-house, can quickly provide information on how well a treatment system is performing and help identify potential compliance issues. The increased monitoring frequency also ensures better calibration of sampling equipment, improves data reliability and ensures more frequent operator oversight of the treatment plant. Permittees that have a continuous temperature meter take temperature data daily and therefore the sample frequency is daily.

Requirements in administrative code (NR 108, 205, 210, and 214, Wis. Adm. Code) and Sections 283.55, Wis. Stats., were considered, where applicable, when determining the appropriate monitoring frequencies for pollutants that have final effluent limits in effect during this permit term. The department has determined at this time that the aforementioned changes in monitoring frequency are warranted based on the size and type of the facility.

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.

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

Sample Point Number: 002- High strength dairy wastewater

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
BOD5, Total		mg/L	Quarterly	Grab	
Nitrogen, Total Kjeldahl		mg/L	Quarterly	Grab	
Chloride		mg/L	Quarterly	Grab	
Phosphorus, Total		mg/L	Annual	Grab	
Solids, Total		Percent	Annual	Grab	

Changes from Previous Permit:

No changes required.

Explanation of Limits and Monitoring Requirements

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

Sample Point Number: 003- Unusable milk or dairy solids

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
BOD5, Total		mg/L	Quarterly	Grab	
Nitrogen, Total Kjeldahl		mg/L	Quarterly	Grab	
Chloride		mg/L	Quarterly	Grab	
Phosphorus, Total		mg/L	Quarterly	Grab	
Phosphorus, Water Extractable		Percent	Quarterly	Grab	

Changes from Previous Permit:

No changes required.

Explanation of Limits and Monitoring Requirements

Requirements for land application of industrial sludge are determined in accordance with ch. NR 214, Wis. Adm. Code. Sampling at this outfall is only required if discharge occurs.

3 Schedules

3.1 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 June 30, 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 June 30, 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 June 30, 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 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 June 30, 2029.</p>	06/30/2025
<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>	06/30/2026
<p>Final Compliance Alternatives Plan: The permittee shall submit a final compliance alternatives plan to the Department.</p>	06/30/2027

<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>	
<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 below. (Note: Permit modification, revocation and reissuance, and reissuance are subject to s. 283.53(2), Stats.)</p> <p>Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.</p>	12/31/2027
<p>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.</p>	06/30/2028
<p>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.</p>	05/31/2029
<p>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.</p>	06/30/2029

Explanation of Compliance Schedule

Subchapter NR 217.17, Wis. Adm. Code, allows the department to provide a schedule of compliance for water quality based phosphorus limits where the permittee cannot immediately achieve compliance. This compliance schedule requires the permittee to comply with the final water quality based phosphorus limits within 5 years.

The permittee may be required to meet the final phosphorus WQBEL sooner than June 30, 2029 (less than 5 years) if the required “Operational Evaluation Report” concludes that the phosphorus WQBEL can be met using the existing treatment system with only source reduction measures, operational improvements and minor facility modifications. Also, the permittee will conduct a “Study of Feasible Alternatives” to determine whether Water Quality Trading or Adaptive Management, either alone or in combination with plant upgrades will allow the plant to meet the phosphorus WQBEL.

The department believes that the compliance schedule suggested in the draft permit provides the appropriate length of time for the permittee to evaluate these options, implement the chosen option and meet the final phosphorus limits (WQBELs).

3.2 Land Application Management Plan

A management plan is required for the land application system.

Required Action	Due Date
Land Application Management Plan: Submit an update to the management plan to optimize the land application system performance and demonstrate compliance with Wisconsin Administrative Code NR 214.	06/30/2025

Explanation of Schedules

The land application management plan needs to be updated with all department forms and maps per s. NR 214.17(6)(c) Wis. Adm. Code.

Special Reporting Requirements

None

Other Comments:

None

Attachments:

Water Quality Based Effluent Limits

Expiration Date:

June 30, 2029

Justification Of Any Waivers From Permit Application Requirements

No waivers were requested in the permit application.

Prepared By: Jennifer Jerich, Wastewater Specialist

Date: 5/1/2024

Revision date post fact check: 5/9/2024; additional explanations for sampling frequency added.

Revision date post public notice & hearing:

DATE: February 26, 2024

TO: Jennifer Jerich – SCR/Horicon

FROM: Sarah Luck – SCR/Fitchburg

SUBJECT: Technology-Based Effluent Limitations for Foremost Farms USA – Reedsburg
WPDES Permit No. WI-0000035-10-0

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

Parameter	Daily Maximum	Daily Minimum	Monthly Average
BOD ₅ , Total	24 lbs/day		12 lbs/day
TSS	237 lbs/day		118 lbs/day
pH	9.0 su	6.0 su	

PART 1 – BACKGROUND INFORMATION

Foremost Farms USA – Reedsburg produces butter, condensed skim milk, and condensed buttermilk through a mechanical vapor recompression evaporator. The evaporator generates excess condensate of whey (COW), which is discharged to Outfall 001. About half of the discharge is comprised of COW water and the other half is noncontact cooling water. Truck washing water, process wash water, boiler blow down, and sanitary waste are all discharged to the City of Reedsburg wastewater treatment plant.

Currently the non-contact cooling water and condensate of whey (COW) are discharged via Outfall 001 to the Baraboo River via a storm sewer and wetland tributary.

PART 2 – INDUSTRIAL CATEGORIES

Chapter NR 240, Wis. Adm. Code, specifies effluent guidelines for discharges from dairy product categories of point sources and subcategories. Foremost Farms – Reedsburg would fall under the Fluid Products, Butter, and Condensed Milk subcategories as defined in s. NR 240.02, Wis. Adm. Code. These guidelines are based on federal effluent guidelines in 40 CFR Part 405 Subparts B, D, and I. 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.

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 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 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

The fluid products, butter, and condensed milk have processes which construction likely commenced after May 28, 1974. Therefore, the process wastewater from these lines is subject to BPT, BCT, BAT and NSPS as specified in 40 CFR Part 405 Subparts B, D, and I and ch. NR 240.12, Wis. Adm. Code.

PART 4 – CURRENT PRODUCTION LEVELS

The current levels of production for each Subcategory are provided by Foremost Farms USA – Reedsburg.

Fluid Products

Raw Material	Material Used (lbs/day)
Raw milk	1,400,000

Butter

Raw Material	Material Used (lbs/day)
Cream	292,000

Condensed Milk

Raw Material	Material Used (lbs/day)
Skim milk	1,260,000
Buttermilk	300,000

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.

Fluid Products

Input Material	Material Used (lbs/day)	BOD Factor ¹ (lbs/100 lbs)	Adjusted Total BOD Input ² (lbs/day)
Raw milk	1,400,000	10.39	145,460

Input Material	Material Used (lbs/day)	BOD Factor¹ (lbs/100 lbs)	Adjusted Total BOD Input² (lbs/day)
Total			145,460

Butter

Input Material	Material Used (lbs/day)	BOD Factor¹ (lbs/100 lbs)	Adjusted Total BOD Input² (lbs/day)
Cream	292,000	39.77	116,128
Total			116,128

Condensed Milk

Input Material	Material Used (lbs/day)	BOD Factor¹ (lbs/100 lbs)	Adjusted Total BOD Input² (lbs/day)
Skim milk	1,260,000	7.44	93,744
Buttermilk	300,000	7.22	21,660
Total			115,404

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

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 s.u.

New Source Performance Standards (NSPS)

Fluid Products

Construction for fluid production likely commenced after May 28th, 1974. Therefore, the NSPS limitations of 40 CFR Part 405.25 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	
	Avg	Max	Avg	Max	Avg	Max	Avg	Max
145,460	0.37	0.74	0.46	0.93	54	108	67	135

Footnotes:

1. Calculated BOD Limits (lbs/day) = total BOD input (lbs/day) / 1000 * NSPS BOD limitations of 0.74 and 0.37.
For example, (145,460/1000) * 0.37 = 54 lbs/day [rounded]
2. Calculated TSS Limits (lbs/day) = total BOD input (lbs/day) / 1000 * NSPS TSS limitations of 0.93 and 0.46.

Butter

Construction for butter production likely commenced after May 28th, 1974. Therefore, the NSPS limitations of 40 CFR Part 405.45 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	
	Avg	Max	Avg	Max	Avg	Max	Avg	Max
116,128	0.08	0.16	0.10	0.20	9.3	19	12	23

Footnotes:

1. Calculated BOD Limits (lbs/day) = total BOD input (lbs/day) / 1000 * NSPS BOD limitations of 0.08 and 0.16.
For example, (116,128/1000) * 0.08 = 9.3 lbs/day [rounded]
2. Calculated TSS Limits (lbs/day) = total BOD input (lbs/day) / 1000 * NSPS TSS limitations of 0.10 and 0.20.

Condensed Milk

Construction for condensed milk production likely commenced after May 28th, 1974. Therefore, the NSPS limitations of 40 CFR Part 405.95 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	
		Avg	Max	Avg	Max	Avg	Max	Avg	Max
Condensed skim milk	93,744	0.38	0.76	0.48	0.95	36	71	45	89
Condensed buttermilk	21,660	0.38	0.76	0.48	0.95	8.2	16	10	21

Footnotes:

1. Calculated BOD Limits (lbs/day) = total BOD input (lbs/day) / 1000 * NSPS BOD limitations of 0.38 and 0.76.
For example, (93,744/1000) * 0.38 = 36 lbs/day [rounded]
2. Calculated TSS Limits (lbs/day) = total BOD input (lbs/day) / 1000 * NSPS TSS limitations of 0.48 and 0.95.

The facility has stated that, while they have the ability to run the evaporator to at the same time for both skim milk and buttermilk, the evaporator runs 85% of the time to produce condensed skim milk and 15% of the time to produce condensed buttermilk. Therefore, the calculated limits above are multiplied by these respective percentages in order to account for operations. The table on the next page shows the adjusted limits.

Product	Calculated Limits				Adjusted Calculated Limits (85% condensed skim milk and 15% condensed buttermilk)			
	BOD (lbs/day)		TSS (lbs/day)		BOD (lbs/day)		TSS (lbs/day)	
	Avg	Max	Avg	Max	Avg	Max	Avg	Max
Condensed skim milk	36	71	45	89	30	61	38	76
Condensed buttermilk	8.2	16	10	21	1.2	2.5	1.6	3.1

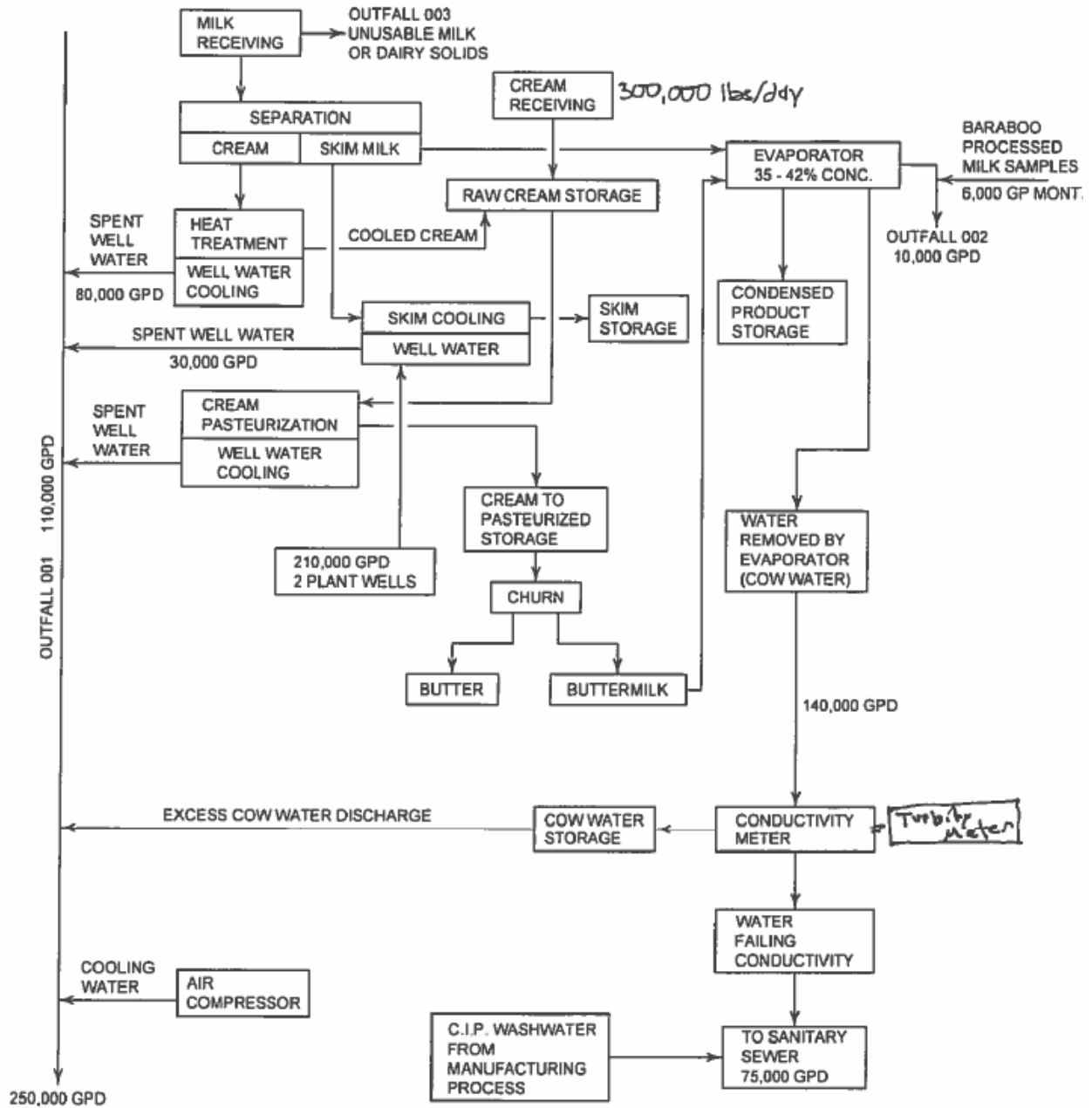
PART 9 – FINAL CALCULATED LIMITS

Per s. NR 240.06(4) Wis. Adm. Code, the total discharge limits shall be the total of the amounts calculated from the BOD input in each of the final product subcategories and all of the other subcategories with intermediate products in Part 6 of this memo.

Final Calculated Effluent Limitations			
Parameter	Daily Maximum	Daily Minimum	Monthly Average
BOD ₅	189 lbs/day		95 lbs/day
TSS	237 lbs/day		118 lbs/day
pH	9.0 su	6.0 su	

The Department has determined that calculated BOD₅ mass limits, shown in the table above, are greater than the limits calculated in the previous permit (24 lbs/day as a daily maximum and 12 lbs/day as a monthly average). Therefore, **the mass limits for BOD₅ remain the same as in the current permit (24 lbs/day and 12 lbs/day, respectively)**. If Foremost Farms USA – Reedsburg would like to request an increase to the existing permit limits, an assessment of their effluent data, consistent with the requirements of ss. NR 207.04(1)(a) and (c), Wis. Adm. Code, must be provided. This evaluation is on a parameter-by-parameter basis and includes consideration of operations, maintenance, and temporary upsets. Without a demonstration of need for a higher limit in accordance with s. NR 207.04, Wis. Adm. Code, the current limits should be continued in the reissued permit.

Flow Diagram



**FOREMOST FARMS USA
REEDSBURG, WI.**

12-5-19

CORRESPONDENCE/MEMORANDUM

DATE: February 26, 2024
TO: Jennifer Jerich – SCR/Fitchburg
FROM: Sarah Luck – SCR/Fitchburg
SUBJECT: Water Quality-Based Effluent Limitations for Foremost Farms USA Reedsburg
WPDES Permit No. WI-0000035-10-0

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 Foremost Farms USA Reedsburg in Sauk County. This industrial facility discharges to the Baraboo River, located in the Narrows Creek and Baraboo River Watershed in the Lower Wisconsin River Basin. This discharge is included in the Wisconsin River TMDL as approved by EPA on April 26, 2019 with site-specific criteria approved by EPA on July 9, 2020. 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	24 lbs/day			12 lbs/day		2,4
TSS	237 lbs/day			118 lbs/day		3
pH	9.0 s.u.	6.0 s.u.				4
Conductivity						1
Phosphorus				0.45 lbs/day	0.15 lbs/day	5
Temperature						6
Acute WET						7

Footnotes:

1. Monitoring only.
2. The BOD₅ mass limits were calculated in 1996 and were based on production values as well as a shared wasteload allocation between nearby dischargers.
3. The TSS mass limits are categorical limits based on ch. NR 240, Wis. Adm. Code. These limits are based on current production and are addressed in the technology-based effluent limits evaluation memo dated February 26, 2024.
4. No changes from the current permit.
5. The phosphorus mass limits are based on the Total Maximum Daily Load (TMDL) for the Wisconsin River Basin to address phosphorus water quality impairments within the TMDL area.
6. Temperature monitoring is recommended to continue throughout the permit term.
7. One acute WET test is recommended during the permit term. A synthetic (standard) laboratory water may be used as the dilution water and primary control.

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

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



Attachments (3) – Narrative, Site Map, and Thermal Table

PREPARED BY: Sarah Luck Date: February 26, 2024
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
Foremost Farms USA Reedsburg**

WPDES Permit No. WI-0000035-10

PART 1 – BACKGROUND INFORMATION

Facility Description

Foremost Farms-Reedsburg produces butter, condensed skim milk, and condensed buttermilk through a mechanical vapor recompression evaporator. The evaporator generates excess condensate of whey (COW), which is discharged to Outfall 001. About half of the discharge is comprised of COW water and the other half is noncontact cooling water. Truck washing water, process wash water, boiler blow down and sanitary waste are all discharged to the City of Reedsburg wastewater treatment plant.

Currently the non-contact cooling water and condensate of whey (COW) are discharged via Outfall 001 to the Baraboo River via a storm sewer and wetland tributary. The conductivity of the effluent is monitored continuously with a daily maximum value reported on the eDMR. The current permit requires that effluent with higher-than-normal conductivity measurements be diverted to the sanitary wastewater drain.

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

Existing Permit Limitations

The current permit, expiring on September 30, 2023, includes the following effluent limitations and monitoring requirements.

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Flow Rate						1
BOD ₅	24 lbs/day			12 lbs/day		2
pH	9.0 s.u.	6.0 s.u.				-
Conductivity						1
Phosphorus						1
Temperature						1
Acute WET						3

Footnotes:

1. Monitoring only.
2. These categorical limits were calculated in 1996 and are based on production values as well as a shared wasteload allocation between nearby dischargers.
3. One acute WET test was recommended during the permit term.

Receiving Water Information

- Name: Baraboo River
- Waterbody Identification Code (WBIC): 1271100

Attachment #1

- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code: Warm Water Sport Fish (WWSF) community, non-public water supply.
- Low Flows used in accordance with chs. NR 106 and 217, Wis. Adm. Code: The following 7-Q₁₀ and 7-Q₂ values were developed by USGS on February 24, 1994 for the station at NE ¼ of NE ¼ of Section 9, T12N-R4E in Sauk County, which is 300 ft upstream of Hay Creek.

7-Q₁₀ = 50 cfs (cubic feet per second)

7-Q₂ = 74 cfs

90-Q₁₀ = 62.9 cfs (estimated as 85% of 7-Q₂)

Harmonic Mean Flow = 135 cfs using the estimated annual average flow of 253 cfs from the Stream Natural Community Model. The Harmonic Mean has been estimated based on the annual average flow and the 7-Q₁₀ using an equation from U.S. EPA's *Technical Support Document for Water Quality-Based Toxics Control* (March 1991, EPA/505/2-90-001, pgs. 88-89).

Monthly 7-Q₁₀ flows were developed by USGS. The monthly 7-Q₂ flows shown below are estimated based on a 7-Q₂:7-Q₁₀ ratio of 1.48:1.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
7-Q ₁₀ (cfs)	63	64	84	130	92	70	60	57	64	70	84	64
7-Q ₂ (cfs)	93	94	124	192	136	104	89	84	95	104	124	95

Note: A USGS Station on the Baraboo River at Main Street in Reedsburg (USGS 054041665) began collecting discharge data in 2011. Flows may be updated in the future when a long enough flow record has been collected. If updated, the 7-Q₁₀ is likely to be higher than the current annual 7-Q₁₀.

- Hardness = 152 mg/L as CaCO₃. This value represents the geometric mean (n=5) of data from 2018-2022 from WET testing conducted by Reedsburg WWTF.
- % of low flow used to calculate limits in accordance with s. NR 106.06(4)(c)5., Wis. Adm. Code: 25% (except where a shared wasteload was assessed)
- Source of background concentration data: Metals data from the Baraboo River at the South 23 bridge in Reedsburg is used for this evaluation. The average of chloride data from all stations on the Baraboo River was used. 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.
- Multiple dischargers: Lakeside Foods-Reedsburg, the Reedsburg WWTF, and Saputo Cheese-Reedsburg also discharge to the same stretch of the Baraboo River. The mass discharge of BOD₅ is wasteload allocated between dischargers. No other pollutants are present at levels of concern to warrant additional shared wasteload allocations. It should also be noted that Reedsburg Wastewater Treatment Facility will be relocating approximately four miles downstream and Saputo Cheese Reedsburg is discontinuing their surface water discharge.
- Impaired water status: This segment of the Baraboo River has been listed as impaired for phosphorus since 2014. The impairment is addressed in the Wisconsin River TMDL.

Effluent Information

- Flow rate:
 - Maximum annual average = 0.256 MGD (Million Gallons per Day)
 - For reference, the average flow from October 2018 through July 2023 was 0.218 MGD.
- Hardness = 79 mg/L as CaCO₃. This value represents the geometric mean of data (n=4) collected during February 2023 as reported on the permit application.

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- Site-specific TMDL total phosphorus allocation: 45 lbs/year
- Acute dilution factor used in accordance with s. NR 106.06(3)(c), Wis. Adm. Code: Not applicable – this facility does not have an approved Zone of Initial Dilution (ZID).
- Water source: Private wells.
- Additives: None.
- Effluent characterization: This facility is categorized as a secondary industry, so the permit application required effluent sample analyses for a limited number of common pollutants, as specified in s. NR 200.065, Table 1, Wis. Adm. Code, primarily metal substances plus 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.

Copper Effluent Data

Sample Date	Copper µg/L
02/07/2023	2.7
02/13/2023	1.0
02/16/2023	0.9
02/20/2023	1.7
Average	1.6

The following table presents the average concentrations and loadings at Outfall 001 from October 2018 through July 2023 for all parameters with limits in the current permit to meet the requirements of s. NR 201.03(6), Wis. Adm. Code:

Parameter Averages with Limits

	Average Measurement	Average Mass Discharged
BOD ₅		2 lbs/day
pH field	7.30 s.u.	

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)

Acute Limits based on 1-Q₁₀

Daily maximum effluent limitations for toxic substances are based on the acute toxicity criteria (ATC), listed in ch. NR 105, Wis. Adm. Code. Previously daily maximum limits for toxic substances were calculated as two times the ATC. However, changes to ch. NR 106, Wis. Code, (September 1, 2016) require the Department to calculate acute limitations using the same mass balance equation as used for

Attachment #1

other limits along with the 1-Q₁₀ receiving water low flow to determine if more restrictive effluent limitations are needed to protect the receiving stream from discharges which may cause or contribute to an exceedance of the acute water quality standards. The mass balance equation is provided below.

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

Where:

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

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

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

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

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

If the receiving water is effluent dominated under low stream flow conditions, the 1-Q₁₀ method of limit calculation produces the most stringent daily maximum limitations and should be used while making reasonable potential determinations. This is not the case for Foremost Farms USA Reedsburg, 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 = 40 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.
Chlorine		19.0	38.1	7.61	<0.02
Arsenic		340	679.6	135.9	<14
Cadmium	79	7.9	15.8	3.2	<0.03
Chromium	79	1492	2983.5	597	1.4
Copper	79	12.5	24.9	5.0	1.6
Lead	79	86	171.0	34.2	<3.5
Nickel	79	386	771.5	154	1.6
Zinc	79	98	196.6	39.3	2.6
Chloride (mg/L)		757	1514.0	303	<2.9

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

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Weekly Average Limits based on Chronic Toxicity Criteria (CTC)

RECEIVING WATER FLOW = 12.5 cfs (¼ of the 7-Q₁₀), as specified in s. NR 106.06(4)(c), Wis. Adm. Code

SUBSTANCE	REF. HARD. mg/L	CTC	MEAN BACK-GRD.	WEEKLY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Chlorine		7.28		236.94	47.39	<0.02
Arsenic		152.2	3.7	4837	967.4	<14
Cadmium	152	3.42		111.31	22.3	<0.03
Chromium	152	186.15	1.7	6005	1201.0	1.4
Copper	152	14.81	3.1	384.2	76.84	1.6
Lead	152	41.97	2.2	1296.6	259.3	<3.5
Nickel	152	74.38		2421	484.2	1.6
Zinc	152	173.6		5650	1130.0	2.6
Chloride (mg/L)		395	8.0	12603	2520.7	<2.9

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 = 33.7 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		31877	6375.4	<0.03
Chromium (+3)	3818000	1.7	328937551	65787510	1.4
Lead	140	2.2	11874	2374.9	<3.5
Nickel	43000		3704641	740928	1.6

Monthly Average Limits based on Human Cancer Criteria (HCC)

RECEIVING WATER FLOW = 33.7 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	3.7	830.8	166.16	<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 not required.

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 during the reissued permit term. The Department may re-evaluate the need for sampling at the next permit reissuance if new information becomes available that suggests PFOS or PFOA may be present in the discharge.

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

The State of Wisconsin promulgated revised water quality standards for this substance effective March 1, 2004 which includes criteria based on both acute and chronic toxicity to aquatic life. Given the fact that Foremost Farms does not currently have ammonia nitrogen limits, the need for limits is evaluated at this time. Four samples for ammonia nitrogen were submitted with the permit application:

Ammonia Nitrogen Effluent Data

Sample Date	Nitrogen, Ammonia mg/L
02/07/2023	<0.21
02/16/2023	0.74
02/20/2023	0.41
02/23/2023	0.33
Mean	0.37

“<” 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 result.

These values are well below the lowest ammonia limits that would be recommended. The facility continuously measures conductivity of the effluent and diverts flow with higher-than-normal conductivity to the sanitary sewer. This practice ensures that the effluent quality is fairly consistent and any high ammonia levels would not be directly discharged to the Baraboo River. **No ammonia limits or monitoring are recommended in the reissued permit.**

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 12-month rolling average limit of 1.0 mg/L, or an approved alternative concentration limit.

Since Foremost Farms USA Reedsburg does not currently have an existing technology-based limit, the need for this limit in the reissued permit is evaluated. 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)	Total Effluent Flow (Million Gallons)	Calculated Mass (lbs/month)
January 2021	0.09	8.992	6.4
February 2021	0.15	6.280	7.9

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Month	Average Phosphorus Concentration (mg/L)	Total Effluent Flow (Million Gallons)	Calculated Mass (lbs/month)
March 2021	0.08	7.481	5.0
April 2021	0.07	7.590	4.4
May 2021	0.06	7.109	3.6
June 2021	0.13	7.119	7.7
July 2021	0.07	8.098	4.4
August 2021	0.08	6.683	4.2
September 2021	0.06	5.306	2.4
October 2021	0.06	7.648	3.8
November 2021	0.08	7.561	4.7
December 2021	0.06	7.726	3.9
Average			4.9

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 MGD) for that month

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

TMDL Limits

Total phosphorus (TP) 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* (November 16, 2013). The SSC were approved by EPA on July 9, 2020. Following this date, the WLA from Appendix J are no longer implemented in permits and are replaced with the WLA in Appendix K of the TMDL. Therefore, the limit calculation for the new WLA from Appendix K is shown below.

Total Phosphorus WLA: 45 lbs/year (see Appendix K of the TMDL document)

For the reasons explained in the April 30, 2012 paper entitled *Justification for Use of Monthly, Growing Season and Annual Average Periods for Expression of WPDES Permit Limits for Phosphorus Discharges in Wisconsin*, WDNR has determined that the phosphorus WQBELs set equal to WLA would not be consistent with the assumptions and requirements of the TMDL.

Therefore, limits given to continuously discharging facilities covered by the WRB TMDL are given monthly average mass limits. If the equivalent effluent concentration is less than or equal to 0.3 mg/L, six-month average mass limits are also included. The following equation shows the calculation of equivalent effluent concentration:

$$\begin{aligned} \text{Total Phosphorus Equivalent Effluent Concentration} &= \text{Daily WLA} \div (\text{Flow Rate} * \text{Conversion Factor}) \\ &= 0.12 \text{ lb/day} \div (0.256 \text{ MGD} * 8.34) \\ &= 0.058 \text{ mg/L} \end{aligned}$$

Since this value is less than 0.3 mg/L, both a six-month average mass limit and a monthly average mass limit are applicable for total phosphorus. The monthly average limit is set equal to three times the six-month average limit.

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$$\begin{aligned} \text{TP Six-Month Average Permit Limit} &= \text{Daily WLA} * \text{Six-Month Average Multiplier} \\ &= 0.12 \text{ lbs/day} * 1.28 \\ &= \mathbf{0.15 \text{ lbs/day}} \end{aligned}$$

$$\begin{aligned} \text{TP Monthly Average Permit Limit} &= \text{TP Six-Month Average Permit Limit} * 3 \\ &= 0.15 \text{ lbs/day} * 3 \\ &= \mathbf{0.45 \text{ lbs/day}} \end{aligned}$$

The multiplier used in the monthly average calculation was determined according to TMDL implementation guidance. A coefficient of variation (standard deviation divided by the mean) was calculated, based on the calculated phosphorus mass data from January 2021 through December 2021 (n=23), to be 0.57 (= 0.08 ÷ 0.14). The coefficient of variation, along with the monitoring frequency, is used to calculate the multiplier of 1.28. The current permit specifies phosphorus monitoring two times per month; however, the multiplier is the same for weekly monitoring or less. If a monitoring frequency is more often than weekly, the stated limits should be reevaluated.

The WRB TMDL establishes TP wasteload allocations to reduce the loading in the entire watershed including WLAs to meet water quality standards for tributaries to the Wisconsin River. Therefore, WLA-based WQBELs are protective of immediate receiving waters and TP WQBELs derived according to s. NR 217.13, Wis. Adm. Code are not required.

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 TP. Rolling 12-month sums can be compared directly to the annual wasteload allocation.

Effluent Data

The following table summarizes effluent total phosphorus monitoring data from January 2021 through December 2021. Mass effluent data is calculated using the concentration data and the actual effluent flow that occurred on the same day since mass reporting was not required.

Total Phosphorus Effluent Data

	mg/L	lbs/day (calculated not monitored)
1-day P ₉₉	0.22	0.43
4-day P ₉₉	0.14	0.27
30-day P ₉₉	0.10	0.18
Mean	0.08	0.14
Std	0.04	0.08
Sample size	23 (1 ND)	23
Range	<0.04 - 0.23	0 - 0.45

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

Conclusions

In summary, the following limits are recommended by this evaluation. A short compliance schedule may be included in the permit.

- Six-month average total phosphorus mass limit of 0.15 lbs/day.
- Monthly average total phosphorus mass limit of 0.45 lbs/day.

PART 5 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR THERMAL

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

The table below summarizes the maximum temperatures reported during monitoring from October 2018 through July 2023.

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	102	102	NA	120
FEB	104	104	NA	120
MAR	105	105	NA	120
APR	105	105	NA	120
MAY	103	103	NA	120
JUN	103	103	NA	120
JUL	104	104	NA	120
AUG	103	103	NA	120
SEP	105	105	NA	120
OCT	103	103	NA	120
NOV	102	102	NA	120
DEC	104	104	NA	120

NA denotes “Not Applicable” when the calculated weekly average limit is greater than or equal to 120°F.

Due to the amount of upstream flow available for dilution in the limit calculation ($Q_s:Q_e >20:1$), the lowest calculated limitation is 120°F (s. NR 106.55(6)(a), Wis. Adm. Code). While other dischargers are present, which historically required evaluation of the thermal impacts from multiple dischargers, due to the low volume of effluent, available dilution, and loss of two of the other dischargers (Reedsburg WWTF and Saputo Cheese), the 120°F limit is protective of thermal water quality standards and is unlikely to impact the thermal mixing zones of other nearby dischargers. Therefore, a multiple discharger evaluation is not necessary and is not included in this WQBEL evaluation. **Temperature monitoring is**

recommended to continue throughout the permit term.

PART 6 – WHOLE EFFLUENT TOXICITY (WET)

WET testing is used to measure, predict, and control the discharge of toxic materials that may be harmful to aquatic life. In WET tests, organisms are exposed to a series of effluent concentrations for a given time and effects are recorded. Decisions below related to the selection of representative data and the need for WET limits were made according to ss. NR 106.08 and 106.09, Wis. Adm. Code. WET monitoring frequency and toxicity reduction evaluation (TRE) recommendations were made using the best professional judgment of staff familiar with the discharge after consideration of the guidance in the *Whole Effluent Toxicity (WET) Program Guidance Document (2022)*.

- Acute tests predict the concentration that causes lethality of aquatic organisms during a 48 to 96-hour exposure. To assure that a discharge is not acutely toxic to organisms in the receiving water, WET tests must produce a statistically valid 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 testing is usually not recommended where the ratio of the 7-Q₁₀ to the effluent flow exceeds 100:1. For Foremost Farms Reedsburg, that ratio is approximately 195:1. With this amount of dilution, there is believed to be little potential for chronic toxicity effects in the Baraboo River associated with the discharge, so the need for **chronic WET testing will not be considered further.**
- 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.
- Shown below is a tabulation of all available WET data for Outfall 001. Efforts are made to ensure that decisions about WET monitoring and limits are made based on representative data, as specified in s. NR 106.08(3), Wis. Adm Code. Data which is not believed to be representative of the discharge was not included in reasonable potential calculations. The table below differentiates between tests used and not used when making WET determinations.

Tests conducted prior to 2005 are not presented in the table below due to significant changes that were made to WET test methods in 2004. These changes were assumed to be fully implemented by certified labs by no later than June 2005. Data collected before July 1, 2005 does not show repeated toxicity that was never resolved and is not the only data that is available.

WET Data History

Date Test Initiated	Acute Results LC ₅₀ %			
	<i>C. dubia</i>	Fathead minnow	Pass or Fail?	Used in RP?
06/17/2015	>100	>100	Pass	Yes
07/26/2017	>100	>100	Pass	Yes
05/05/2021	>100	>100	Pass	Yes

Attachment #1

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

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

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

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

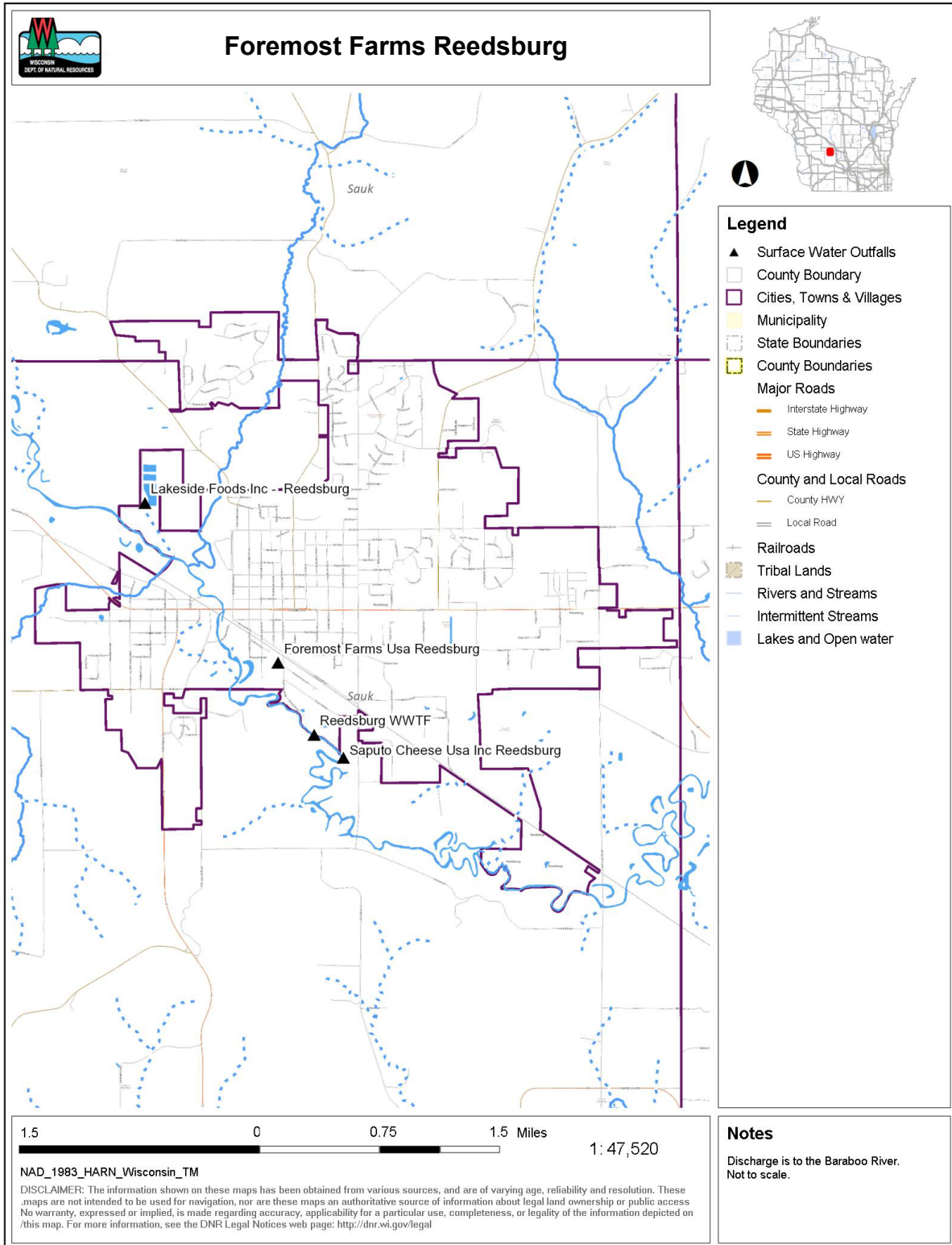
	Acute
AMZ/IWC	Not Applicable. 0 Points
Historical Data	3 tests used to calculate RP. No tests failed. 0 Points
Effluent Variability	Little variability, few violations, no upsets, consistent operations. 0 Points
Receiving Water Classification	WWSF 5 Points
Chemical-Specific Data	No reasonable potential for limits based on ATC. Ammonia nitrogen, chromium, copper, nickel, and zinc detected. Additional Compounds of Concern: None. 3 Points
Additives	No additives used. 0 Points
Discharge Category	COW water with noncontact cooling water. 5 Points
Wastewater Treatment	No treatment. 10 Points
Downstream	No impacts known.

Attachment #1

	Acute
Impacts	0 Points
Total Checklist Points:	23 Points
Recommended Monitoring Frequency (from Checklist):	2 tests during permit term.
Limit Required?	No
TRE Recommended? (from Checklist)	No

The checklist point total corresponds with two acute WET tests during the permit term. However, most of the checklist points are assessed due to the lack of wastewater treatment but treatment is not necessary for this type of discharge; therefore, **only one acute WET test is recommended. No chronic WET testing is recommended** due to the high level of dilution. WET testing shall continue after the permit expiration date (until the permit is reissued).

Attachment #2
Site Map



Temperature limits for receiving waters with unidirectional flow

(calculation using default ambient temperature data)

Facility:	Foremost Farms Reedsburg	7-Q₁₀:	50	cfs	Temp Dates		Flow Dates	
Outfall(s):	001	Dilution:	25%		Start:	10/02/18	10/01/18	
Date Prepared:	12/1/2023	f:	0		End:	07/25/23	07/31/23	
Design Flow (Q_e):	0.256	MGD	Stream type: Small warm water sport or forage fis					
Storm Sewer Dist.	0	ft	Qs:Q_e ratio:	31.5	:1			
			Calculation Needed?	NO				

Month	Water Quality Criteria			Receiving Water Flow Rate (Qs) (cfs)	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) (MGD)	Daily Maximum Flow Rate (Qea) (MGD)		Weekly Average (°F)	Daily Maximum (°F)	Weekly Average Effluent Limitation (°F)	Daily Maximum Effluent Limitation (°F)
	(°F)	(°F)	(°F)		(MGD)	(MGD)		(°F)	(°F)	(°F)	(°F)
JAN	33	49	76	50	0.347	0.397	0	102	102	NA	120
FEB	34	50	76	50	0.315	0.363	0	104	104	NA	120
MAR	38	52	77	50	0.305	0.362	0	105	105	NA	120
APR	48	55	79	50	0.303	0.388	0	105	105	NA	120
MAY	58	65	82	50	0.340	0.445	0	103	103	NA	120
JUN	66	76	84	50	0.299	0.391	0	103	103	NA	120
JUL	69	81	85	50	0.320	0.427	0	104	104	NA	120
AUG	67	81	84	50	0.290	0.329	0	103	103	NA	120
SEP	60	73	82	50	0.262	0.315	0	105	105	NA	120
OCT	50	61	80	50	0.303	0.366	0	103	103	NA	120
NOV	40	49	77	50	0.295	0.368	0	102	102	NA	120
DEC	35	49	76	50	0.314	0.375	0	104	104	NA	120