

Permit Modification Fact Sheet

Changes from the previous permit fact sheet are highlighted in grey.

General Information

Permit Number:	WI-0028321-09-1	
Permittee Name:	CITY OF SHULLSBURG	
Address:	P O Box 580 190 North Judgement Street	
City/State/Zip:	Shullsburg WI 53586-0580	
Discharge Location:	Shullsburg WWTF, 780 West Water Street Shullsburg, WI. Outfall 001 located in the NE ¼ of the NW ¼ of Section 10, Township 1 North, Range 2 East	
Receiving Water:	Shullsburg Branch in the Galena River Watershed, GP01 – Grant-Platte River Basin in Lafayette County.	
StreamFlow (Q _{7,10}):	0.19 cfs	
Stream Classification:	Warmwater sport fishery, non-public water supply	
Design Flow(s)	Annual Average	0.2885 MGD
Significant Industrial Loading?	White Hill Cheese LLC and Shullsburg Creamery II, LLC	
Operator at Proper Grade?	Yes, Required: Advanced - A1, A2, B, C, D, P, & SS	
Approved Pretreatment Program?	N/A	

Facility Description

The City of Shullsburg operates an extended aeration activated sludge and aerated fixed-film wastewater treatment facility consisting of a vertical screen, primary clarifier, two rotating biological contactors (RBCs), two aeration tanks, chemical addition for total phosphorus removal, final clarifier, UV disinfection, and post-aeration prior to discharge. The chemical phosphorus upgrade was completed in 2018 and the UV disinfection system in 2023. Sludge from the treatment process is aerobically digested and stored onsite prior to landspreading on DNR approved sites. The facility is designed to treat an average daily flow of 0.2885 MGD and treated an annual average of 0.18 MGD from October 2018 – April 2023. Outfall 002 is no longer in use and was officially abandoned in 2023. The outfall has been made inactive; no discharge from Outfall 002 is authorized.

Substantial Compliance Determination

After a desk top review of all discharge monitoring reports, CMARs, land application reports, compliance schedule items, and a site visit on June 21, 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)
701	0.20 MGD (Oct. 2018 – Apr. 2023)	Influent: 24-hour flow proportional composite sampler located at the headworks of the wastewater treatment facility between the vertical screen and the primary clarifier. Flow monitor located in the influent channel prior to the composite sampler intake.
001	0.18 MGD (Oct. 2018 – Apr. 2023)	Effluent: 24-hour flow proportional composite sampler located after post aeration and prior to discharge to Shullsburg Branch. Grab samples also collected after post aeration. Flow monitoring occurs at the V-notch weir between UV disinfection and post aeration.
005	42 dry tons (2018 – 2022)	Aerobically digested, Liquid, Class B. Representative composite sludge samples shall be collected from the storage tanks prior to land application.

1 Influent - Proposed Monitoring

Sample Point Number: 701- Influent

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow Rate		MGD	Daily	Continuous	
BOD ₅ , Total		mg/L	3/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total		mg/L	3/Week	24-Hr Flow Prop Comp	

Changes from Previous Permit:

Sample frequency for Flow Rate updated to reflect eDMR reporting.

Explanation of Limits and Monitoring Requirements

BOD₅ and Total Suspended Solids: Tracking of BOD₅, and Suspended Solids are required for percent removal requirements found in s. NR 210.05, Wis. Adm. Code.

2 Surface Water - Proposed Monitoring and Limitations

Sample Point Number: 001- Effluent to Shullsburg Branch

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow Rate		MGD	Daily	Continuous	
BOD5, Total	Weekly Avg	20 mg/L	3/Week	24-Hr Flow Prop Comp	November through April
BOD5, Total	Monthly Avg	10 mg/L	3/Week	24-Hr Flow Prop Comp	May through October
BOD5, Total	Monthly Avg	20 mg/L	3/Week	24-Hr Flow Prop Comp	November through April
BOD5, Total	Weekly Avg	10 mg/L	3/Week	24-Hr Flow Prop Comp	May through October
BOD5, Total	Weekly Avg	48 lbs/day	3/Week	Calculated	November through April
BOD5, Total	Weekly Avg	24 lbs/day	3/Week	Calculated	May through October
Suspended Solids, Total	Weekly Avg	20 mg/L	3/Week	24-Hr Flow Prop Comp	November through April
Suspended Solids, Total	Weekly Avg	10 mg/L	3/Week	24-Hr Flow Prop Comp	May through October
Suspended Solids, Total	Monthly Avg	20 mg/L	3/Week	24-Hr Flow Prop Comp	November through April
Suspended Solids, Total	Monthly Avg	10 mg/L	3/Week	24-Hr Flow Prop Comp	May through October
Suspended Solids, Total	Weekly Avg	48 lbs/day	3/Week	Calculated	November through April
Suspended Solids, Total	Weekly Avg	24 lbs/day	3/Week	Calculated	May through October
Nitrogen, Ammonia Variable Limit		mg/L	3/Week	See Table	Look up the variable Ammonia limit from the 'Variable Ammonia Limitation' table and report the variable limit in the Ammonia Variable Limit column on the DMR.
Nitrogen, Ammonia (NH3-N) Total	Daily Max - Variable	mg/L	3/Week	24-Hr Flow Prop Comp	Limit effective October through April. Report the daily maximum Ammonia result in the Nitrogen, Ammonia (NH3-N) Total

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
					column of the eDMR. See Ammonia Limitation Section.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	9.2 mg/L	3/Week	24-Hr Flow Prop Comp	October through March
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	5.9 mg/L	3/Week	24-Hr Flow Prop Comp	April
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	3.1 mg/L	3/Week	24-Hr Flow Prop Comp	May through September
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	4.3 mg/L	3/Week	24-Hr Flow Prop Comp	October through March
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	2.8 mg/L	3/Week	24-Hr Flow Prop Comp	April
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	1.8 mg/L	3/Week	24-Hr Flow Prop Comp	May through September
Fecal Coliform	Geometric Mean - Monthly	400 #/100 ml	Weekly	Grab	Interim limit effective May through September until final E. coli limit goes into effect per the Effluent Limitations for E. coli Schedule.
E. coli		#/100 ml	Weekly	Grab	Monitoring only May through September annually until the final limit goes into effect per the Effluent Limitations for E. coli Schedule.
E. coli	Geometric Mean - Monthly	126 #/100 ml	Weekly	Grab	Limit Effective May through September annually per the Effluent Limitations for E. coli Schedule.
E. coli	% Exceedance	10 Percent	Monthly	Calculated	Limit Effective May through September annually per the Effluent Limitations for E. coli Schedule. See the E. coli Percent Limit section below. Enter the result in the DMR on the last day of the month.

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
pH Field	Daily Max	9.0 su	5/Week	Grab	
pH Field	Daily Min	6.0 su	5/Week	Grab	
Dissolved Oxygen	Daily Min	6.0 mg/L	5/Week	Grab	
Chloride	Monthly Avg	440 mg/L	4/Month	24-Hr Flow Prop Comp	Monitoring effective immediately. Limit effective January 1, 2025. Sampling shall be conducted on four consecutive days each month. See 'Chloride SRM' section and 'Schedules' section in permit.
Chloride	Weekly Avg	440 mg/L	4/Month	24-Hr Flow Prop Comp	Monitoring effective immediately. Limit effective January 1, 2025. Sampling shall be conducted on four consecutive days each month. See 'Chloride SRM' section and 'Schedules' section in permit.
Chloride, Variable Limit		lbs/day	4/Month	See Table	Look up the variable chloride mass limit from the 'Variable Chloride Mass Limitation' table and report the variable limit in the Chloride Variable Limit column on the DMR. See Schedules for information about the wet weather limit.
Chloride	Weekly Avg - Variable	lbs/day	4/Month	Calculated	Report the chloride mass result in the Chloride Weekly Average Mass column on the DMR. Compare to the Variable Chloride Mass Limitation table to determine compliance. See Schedules for information about the wet weather limit.
Phosphorus, Total	Monthly Avg	0.3 mg/L	3/Week	24-Hr Flow Prop Comp	Effective upon reissuance and this limit will be retained beyond the

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
					effective date of the final limits as it represents a minimum control level. See Water Quality Trading (WQT) sections for more information.
Phosphorus, Total		lbs/day	3/Week	Calculated	Report daily mass discharged using Equation 1a. in the Water Quality Trading (WQT) section.
WQT Credits Used (TP)		lbs/month	Monthly	Calculated	Report WQT TP Credits used per month using Equation 2c. in the 'Water Quality Trading (WQT)' section. Available TP Credits are specified in Table 2 and in the approved Water Quality Trading Plan.
WQT Computed Compliance (TP)	Monthly Avg	0.225 mg/L	Monthly	Calculated	Report the WQT TP Computed Compliance value using Equation 4a. in the Water Quality Trading (WQT) section. Value entered on the last day of the month.
WQT Computed Compliance (TP)	6-Month Avg	0.075 mg/L	Monthly	Calculated	Value entered on the last day of the month. Value entered at the end of the six-month period (June 30 and December 31).
WQT Computed Compliance (TP)	6-Month Avg	0.18 lbs/day	Monthly	Calculated	Report the WQT TP Computed Compliance value using Equation 4b. in the Water Quality Trading (WQT) section. Value entered on the last day of the month. Value entered at the end of the six-month period (June 30 and December 31).
WQT Credits Used (TP)	Annual Total	107 lbs/yr	Annual	Calculated	The sum of total monthly credits used may not exceed

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
					Table 2 values.
PFOS		ng/L	Annual	Grab	Monitoring only. See PFOS/PFOA Minimization Plan Determination of Need schedule.
PFOA		ng/L	Annual	Grab	Monitoring only. See PFOS/PFOA Minimization Plan Determination of Need schedule.
Temperature Maximum		deg F	3/Week	Grab	Monitoring year-round. See Temperature section.
Nitrogen, Total Kjeldahl		mg/L	See Listed Qtr(s)	24-Hr Flow Prop Comp	Annual in rotating quarters. See Nitrogen Series Monitoring section.
Nitrogen, Nitrite + Nitrate Total		mg/L	See Listed Qtr(s)	24-Hr Flow Prop Comp	Annual in rotating quarters. See Nitrogen Series Monitoring section.
Nitrogen, Total		mg/L	See Listed Qtr(s)	Calculated	Annual in rotating quarters. See Nitrogen Series Monitoring section. Total Nitrogen shall be calculated as the sum of reported values for Total Kjeldahl Nitrogen and Total Nitrite + Nitrate Nitrogen.
Acute WET		TUa	See Listed Qtr(s)	24-Hr Flow Prop Comp	See WET section.
Chronic WET	Monthly Avg	1.1 TUc	See Listed Qtr(s)	24-Hr Flow Prop Comp	See WET section.

Changes from Previous Permit

Updates have been highlighted in table above.

- Flow sample frequency updated to reflect eDMR reporting method.
- Fecal coliform monitoring and limits have been replaced with Escherichia coli (E. coli) monitoring and limits. E. coli monitoring is required at the permit effective date. An interim fecal coliform limit of 400 #/100 ml as a monthly geometric mean will apply from the permit effective date through the end of a compliance schedule. At the end of the compliance schedule, E. coli limits of 126 #/100 ml as a monthly geometric mean that may not be exceeded and 410 #/100 ml as a daily maximum that may not be exceeded more than 10 percent of the time in any calendar month will apply.
- DO and pH sampling frequency increased.
- Ammonia limitations updated and additional limits added.

- Chlorine sampling removed.
- Water Quality Trading requirements added.
- Nitrogen series monitoring added.
- PFOS and PFOA monitoring once every two months was included in the permit in accordance with s. NR 106.98(2)(c), Wis. Adm. Code. The monitoring frequency for PFOS and PFOA has been reduced from 1/ 2 Months to Annual.
- WET testing periods updated. Chronic WET limit updated.

Explanation of Limits and Monitoring Requirements

Refer to the Water Quality-Based Effluent Limitations (WQBELs) memo from Sarah Luck for the Shullsburg WWTF dated September 6, 2023 and used for this reissuance.

- **BOD5, TSS, Fecal Coliform, E. coli, Dissolved Oxygen, and pH** - No changes are recommended in the categorical permit limitations for BOD5, TSS, DO, or pH. Because the 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. However, on May 1, 2020 revisions to the bacteria surface water criteria became effective. Therefore, this permit has been updated to include the existing fecal coliform limit as an interim limit along with *E. coli* monitoring and a compliance schedule to meet required *E. coli* limits. The interim fecal coliform limit is effective until the final *E. coli* limits becomes effective per the schedule. Where the receiving water is classified as Warm Water Sport Fish in s. NR 102.04(3)(a), Wis. Adm. Code the surface water criterion and categorical limits for BOD5, TSS and pH are those limits enumerated in s. NR 102.04(4), in s. NR 102.04(4), Wis. Adm. Code. Sample frequency of DO and pH are increased to 5/week.
- **Nitrogen, Ammonia:** Current acute and chronic ammonia toxicity criteria for the protection of aquatic life are included in Table 2C and Table 4B of ch. NR 105, Wis. Adm. Code (effective March 1, 2004). Subchapter IV of ch. NR 106 establishes procedures for calculating water quality-based effluent limitations (WQBELs) for ammonia (effective March 1, 2004). The daily maximum limits have been updated to variable pH daily max limits for October through April and monthly average ammonia limits changed for October through March and April. See WQBEL for more information.
- **Total Phosphorus:** Phosphorus requirements are based on the Phosphorus Rules that became effective December 1, 2010 as detailed in NR 102 Water Quality Standards and NR 217 Effluent Standards and Limitations for Phosphorus. Chapter NR 217 of the Wis. Adm. Code addresses point source dischargers of phosphorus to surface waters. Currently in NR 217 Wis. Adm. Code there are two methods used to determine if a phosphorus limit is needed: a technology based effluent limit (TBEL) and a water quality based effluent limit (WQBEL). Based on the size and classification of the stream, the water quality criteria for the Shullsburg Branch is 0.075 mg/L. In this case, the WQBEL is 0.225 mg/L monthly average, 0.075 mg/L 6-month average, and 0.18 lbs/day 6-month average.

For the reasons explained in the April 30, 2012 paper entitled ‘Justification for Use of Monthly, Growing Season and Annual Average Periods for Expression of WPDES Permit Limits for Phosphorus Discharges in Wisconsin’, WDNR has determined that it is impracticable to express the phosphorus WQBEL for the permittee as a maximum daily, weekly or monthly value. The final effluent limit for phosphorus is expressed as a six-month average. This final effluent limit was derived from and complies with the applicable water quality criterion.

A phosphorus concentration limit is necessary to prevent backsliding during the term of the permit as a minimum control value. The minimum control value of 0.30 mg/L will be retained in the permit. This permit authorizes the use of trading as a tool to demonstrate compliance with the final phosphorus WQBELs. This permit includes terms and conditions related to the Water Quality Trading Plan (WQT-2023-0001) or approved amendments thereof. The total ‘WQT TP Credits’ available are designated in the approved WQT Plan. The permittee is

implementing the management practices of streambank stabilization. The WQT Plan proposes the generation of 107 lbs/yr of phosphorus credits for the next five years.

The minimum control value of 0.30 mg/L was calculated using recent effluent data and was not based on the amount of approved trading credits; therefore, compliance with the minimum control value may not guarantee compliance with the approved annual water quality trading credit quantity of 107 lbs/yr. Shullsburg is responsible for ensuring any discharge over the phosphorus WQBELs complies with the approved amount of water quality trading credits generated. Additional WQT sections in the permit provide information on compliance determinations, annual reporting and re-opening of the permit.

- **Chloride:** Using the monthly low flows, weekly average chloride limits were calculated for the winter (Oct - March), spring (April - June), and summer (July - September) seasons. When the representative data is compared to the calculated limits, the data shows there is reasonable potential for Shullsburg to exceed the calculated limits at Outfall 001. The final chloride limits are 440 mg/L weekly average, 440 monthly average, and 1,050 lbs/day monthly average. These limits will be effective 1/1/2025, one year after permit reissuance to allow the permittee time to implement Source Reduction Measures (SRMs). See WQBEL for more information about data needed to calculate wet weather alternative chloride limits.
- **Temperature:** Requirements for thermal (temperature) limits are included in ch. NR 102, Subchapter II Water Quality Standards for Temperature and ch. NR 106, Subchapter V Effluent Limitations for Temperature. The Thermal Rule establishes weekly average and daily maximum temperature limits based on receiving water classification and the ratio of stream flow (Q_s) to effluent flow (Q_e). Temperature data was evaluated and no permit limits are warranted at this time; additionally, a dissipative cooling study is recommended to be completed during the months of October and November.
- **PFOS and PFOA** – NR 106 Subchapter VIII – Permit Requirements for PFOS and PFOA Dischargers became effective on August 1, 2022. At the first reissuance of a WPDES permit after August 1, 2022, the new rule requires WPDES permits for municipal dischargers with an average flow rate less than 1 MGD, to be evaluated on a case-by-case basis to determine if monitoring is required pursuant to s. NR 106.98(2)(c), Wis. Adm. Code. The department evaluated the need for PFOS and PFOA monitoring taking into consideration the presence of potential PFOS or PFOA industrial wastes, remediation sites and other potential sources of PFOS or PFOA. Based on information available at the time the proposed permit was drafted, it was identified that the POTW has an indirect discharger(s) that may be a potential source of PFOS/PFOA.

Therefore, monitoring once every two months is included. A sample frequency of 1/2 months means one sample is taken during any two-month period. Examples of 1/2 month sample would be every other month (Jan, March, May, etc.) or back-to-back months with a break in between (February & March, May & June, Aug & Sept, etc.). DMR Short Forms will be generated for the following time periods: January-February, March-April, May-June, July-August, September-October, and November-December. At a minimum one sample result will be present on each form.

The initial determination of the need for sampling shall be conducted for up to two years in order to determine if the permitted discharge has the reasonable potential to cause or contribute to an exceedance of the PFOS or PFOA standards under s. NR 102.04(8)(d)1, Wis. Adm. Code.

Pursuant to s. NR 205.066, Wis. Adm. Code, the department may specify the monitoring frequency for PFOS and PFOA on a case-by-case basis after the initial 24 months of sampling.

After a review of the data submitted with the Year 2 Report on Effluent Discharges, the department has determined that it is warranted to reduce the sampling frequency in this case. The department is requiring continued monitoring of these compounds to complete the permit term to ensure that the current effluent quality is maintained. At the next permit reissuance, the department will make another determination as to whether further reduction or removal of monitoring is warranted, based on the continued sampling results.

- **Total Nitrogen Monitoring (NO₂+NO₃, TKN and Total N)** - The Department has included effluent monitoring for Total Nitrogen in the permit through the authority under §§ 283.55(1)(e), Wis. Stats., which allows the department to require the permittee to submit information necessary to identify the type and quantity of any pollutants discharged from the point source, and through s. NR 200.065(1)(h), Wis. Adm. Code, which allows for this monitoring to be collected during the permit term. Annual effluent monitoring in rotating quarters for Total Nitrogen is included in the permit. More information on the justification to include total nitrogen monitoring in wastewater permits can be found in the “Guidance for Total Nitrogen Monitoring in Wastewater Permits” dated October 1, 2019.
- **Acute and Chronic WET:** Whole effluent toxicity (WET) testing requirements are determined in accordance with ss. NR 106.08 and NR 106.09 Wis. Adm. Code, as revised in 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>).
- **Expression of Limits** – In accordance with the federal regulation 40 CFR 122.45(d), limits in this permit are to be expressed as weekly average and monthly average limits whenever practicable.
- **Monitoring Frequency Evaluation** - Monitoring frequencies for parameters that have final effluent limits in effect during this permit term were evaluated taking into consideration the size and type of the facility, and whether the monitoring occurs frequently enough to characterize effluent quality and variability, to detect events of noncompliance, and to ensure fairness and consistency in permits issued across the state. Monitoring frequency decisions are based on requirements in s. NR 205.066(1), Wis. Adm. Code, (decisions are case-by-case) and considering the factors in s. NR 210.04 (a) through (e), Wis. Adm. Code, along with recommendations provided in the *Monitoring Frequencies for Individual Wastewater Permits* guidance (April 12, 2021).

The department has determined at this time that an increase in monitoring frequency for Dissolved Oxygen and pH Field to 5/Week is appropriate to be consistent with facilities of similar size and effluent quality across the state and reflect recent facility upgrades. If the permittee believes the facility should be eligible to return to the previously permitted monitoring frequency based on performance during the permitted term, they may request a reduction with their next permit application.

3 Land Application - Proposed Monitoring and Limitations

Municipal Sludge Description						
Sample Point	Sludge Class (A or B)	Sludge Type (Liquid or Cake)	Pathogen Reduction Method	Vector Attraction Method	Reuse Option	Amount Reused/Disposed (Dry Tons/Year)
005	B	Liquid	Fecal Coliform	SOUR and/or Injection	Land Application	42
Does sludge management demonstrate compliance? Yes						
Is additional sludge storage required? No						
Is Radium-226 present in the water supply at a level greater than 2 pCi/liter? No If yes, special monitoring and recycling conditions will be included in the permit to track any potential problems in landapplying sludge from this facility						
Is a priority pollutant scan required? No Priority pollutant scans are required once every 10 years at facilities with design flows between 5 MGD and 40 MGD, and once every 5 years if design flow is greater than 40 MGD.						

Sample Point Number: 005- SLUDGE

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Solids, Total		Percent	Annual	Composite	
Arsenic Dry Wt	Ceiling	75 mg/kg	Annual	Composite	
Arsenic Dry Wt	High Quality	41 mg/kg	Annual	Composite	
Cadmium Dry Wt	Ceiling	85 mg/kg	Annual	Composite	
Cadmium Dry Wt	High Quality	39 mg/kg	Annual	Composite	
Copper Dry Wt	Ceiling	4,300 mg/kg	Annual	Composite	
Copper Dry Wt	High Quality	1,500 mg/kg	Annual	Composite	
Lead Dry Wt	Ceiling	840 mg/kg	Annual	Composite	
Lead Dry Wt	High Quality	300 mg/kg	Annual	Composite	
Mercury Dry Wt	Ceiling	57 mg/kg	Annual	Composite	
Mercury Dry Wt	High Quality	17 mg/kg	Annual	Composite	
Molybdenum Dry Wt	Ceiling	75 mg/kg	Annual	Composite	
Nickel Dry Wt	Ceiling	420 mg/kg	Annual	Composite	
Nickel Dry Wt	High Quality	420 mg/kg	Annual	Composite	
Selenium Dry Wt	Ceiling	100 mg/kg	Annual	Composite	
Selenium Dry Wt	High Quality	100 mg/kg	Annual	Composite	
Zinc Dry Wt	Ceiling	7,500 mg/kg	Annual	Composite	
Zinc Dry Wt	High Quality	2,800 mg/kg	Annual	Composite	
Nitrogen, Total Kjeldahl		Percent	Annual	Composite	
Nitrogen, Ammonium (NH4-N) Total		Percent	Annual	Composite	
Phosphorus, Total		Percent	Annual	Composite	
Phosphorus, Water Extractable		% of Tot P	Annual	Composite	
Potassium, Total Recoverable		Percent	Annual	Composite	
PCB Total Dry Wt	Ceiling	50 mg/kg	Once	Composite	Once in 2025
PCB Total Dry Wt	High Quality	10 mg/kg	Once	Composite	Once in 2025
PFOA + PFOS		ug/kg	Annual	Calculated	Report the sum of PFOA and PFOS. See PFAS Permit Sections for more

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

Changes from Previous Permit:

PCB sampling year updated.

Annual PFOA + PFOS monitoring is included in the permit pursuant to s. NR 204.06(2)(b)9, Wis. Adm. Code.

Explanation of Limits and Monitoring Requirements

Requirements for land application of municipal sludge are determined in accordance with ch. NR 204, Wis. Adm. Code. Ceiling and high quality limits for metals in sludge are specified in s. NR 204.07(5), Wis. Adm. Code. Requirements for pathogens are specified in s. NR 204.07(6) and in s. NR 204.07 (7), Wis. Adm. Code, for vector attraction requirements. Limitations for PCBs are addressed in s. NR 204.07(3)(k), Wis. Adm. Code.

Land application of waste shall be done in accordance with the permit conditions and applicable codes. All land application sites shall be approved prior to their use. To receive a list of approved sites, or to be notified of potential approvals, contact the WDNR Compliance Staff.

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 the proposed WPDES permit pursuant to ss. NR 214.18(5)(b) and NR 204.06(2)(b)9, Wis. Adm. Code.

4 Schedules

4.1 Effluent Limitations for E. coli

The permittee shall comply with surface water limitations for E. coli 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.

Required Action	Due Date
Status Update: The permittee shall submit information within the discharge monitoring report (DMR) comment section documenting the steps taken in preparation for properly monitoring and testing for E. coli including, but not limited to, selected test method and location of sampling.	02/21/2024

<p>Operational Evaluation Report: The permittee shall prepare and submit an Operational Evaluation Report to the Department for review and approval. The report shall include an evaluation of collected effluent data and proposed operational improvements that will optimize efficacy of disinfection at the treatment plant during the period prior to complying with final E. coli limitations and, to the extent possible, enable compliance with the final E. coli limitations. The report shall include a plan and schedule for implementation of the operational improvements. These improvements shall occur as soon as possible, but not later than April 30, 2025. The report shall state whether the operational improvements are expected to result in compliance with the final E. coli limitations.</p> <p>The permittee shall implement the operational improvements in accordance with the approved plan and schedule specified in the Operational Evaluation Report and in no case later than April 30, 2025.</p> <p>If the Operational Evaluation Report concludes that the operational improvements are expected to result in compliance with the final E. coli limitations, the permittee shall comply with the final E. coli limitations by April 30, 2025 and the permittee is not required to comply with subsequent milestones identified below in this compliance schedule ('Submit Facility Plan', 'Final Plans and Specifications', 'Treatment Plant Upgrade to Meet Limitations', 'Construction Upgrade Progress Report', 'Complete Construction', 'Achieve Compliance').</p> <p>FACILITY PLAN - If the Operational Evaluation Report concludes that operational improvements alone are not expected to result in compliance with the final E. coli limitations, the permittee shall initiate development of a facility plan for meeting final E. coli limitations and comply with the remaining required actions in this schedule of compliance.</p> <p>If the Department disagrees with the conclusion of the report and determines that the permittee can achieve final E. coli limitations using the existing treatment system with only operational improvements, the Department may reopen and modify the permit to include an implementation schedule for achieving the final E. coli limitations sooner than April 30, 2028.</p>	11/30/2024
<p>Submit Facility Plan: If the Operational Evaluation Report concluded that the permittee cannot achieve final E. coli limitations with operational improvements alone, the permittee shall submit a Facility Plan per s. NR 110.09, Wis. Adm. Code. The permittee may submit an abbreviated facility plan if the Department determines that the modifications are minor.</p>	04/30/2025
<p>Final Plans and Specifications: The permittee shall submit final construction plans to the Department for approval pursuant to ch. NR 108, Wis. Adm. Code, specifying treatment plant upgrades that must be constructed to achieve compliance with final E. coli limitations and a schedule for completing construction of the upgrades by the complete construction date specified below.</p>	03/31/2026
<p>Treatment Plant Upgrade to Meet Limitations: The permittee shall initiate bidding, procurement, and/or construction of the project. The permittee shall obtain approval of the final construction plans and schedule from the Department pursuant to s. 281.41, Stats., prior to initiating activities defined as construction under ch. NR 108, Wis. Adm. Code. 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.</p>	09/30/2026
<p>Construction Upgrade Progress Report: The permittee shall submit a progress report on construction upgrades.</p>	09/30/2027
<p>Complete Construction: The permittee shall complete construction of wastewater treatment system upgrades.</p>	03/31/2028
<p>Achieve Compliance: The permittee shall achieve compliance with final E. coli limitations.</p>	04/30/2028

Explanation of Schedules

A compliance schedule is included in the permit to provide time for the permittee to investigate options for meeting new effluent E. coli water quality-based effluent limits while coming into compliance with the limits as soon as reasonably possible.

4.2 Annual Water Quality Trading (WQT) Report

Required Action	Due Date
<p>Annual WQT Report: Submit an annual WQT report that shall cover the first year of the permit term. The WQT Report shall include:</p> <p>The number of pollutant reduction credits (lbs/month) used each month of the previous year to demonstrate compliance;</p> <p>The source of each month’s pollutant reduction credits by identifying the approved water quality trading plan that details the source;</p> <p>A summary of the annual inspection of each nonpoint source management practice that generated any of the pollutant reduction credits used during the previous year; and</p> <p>Identification of noncompliance or failure to implement any terms or conditions of this permit with respect to water quality trading that have not been reported in discharge monitoring reports.</p>	01/31/2025
<p>Annual WQT Report #2: Submit an annual WQT report that shall cover the previous year.</p>	01/31/2026
<p>Annual WQT Report #3: Submit an annual WQT report that shall cover the previous year.</p>	01/31/2027
<p>Annual WQT Report #4: Submit the 4th annual WQT report. If the permittee wishes to continue to comply with phosphorus limits through WQT in subsequent permit terms, the permittee shall submit a revised WQT plan including a demonstration of credit need, compliance record of the existing WQT, and any additional practices needed to maintain compliance over time.</p>	01/31/2028
<p>Annual WQT Report Required After Permit Expiration: In the event that this permit is not reissued by the expiration date, the permittee shall continue to submit annual WQT reports by January 31 each year covering the total number of pollutant credits used, the source of the pollution reduction credits, a summary of annual inspection reports performed, and identification of noncompliance or failure to implement any terms or conditions of the approved water quality trading plan for the previous calendar year.</p>	

Explanation of Schedules

Reports are required that include the following information:

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

4.3 Chloride Source Reduction Measures (Target Limit)

Required Action	Due Date
<p>Chloride Progress Report: Submit a chloride progress report related to the source reduction activities. The chloride progress report shall:</p> <p>Indicate which chloride source reduction measures or activities in the Source Reduction Plan have been implemented and state which, if any, source reduction measures from the Source Reduction Plan were not pursued and why. Include an assessment of whether each implemented source reduction measure appears to be effective or ineffective at reducing pollutant discharge concentrations and identify actions planned for meeting chloride limits.</p> <p>Include an analysis of trends in weekly, monthly and annual average chloride concentrations and total mass discharge of chloride based on chloride sampling and flow data; and</p> <p>Include an analysis of how effluent chloride varies with time and with significant loadings of chloride.</p>	07/01/2024
<p>Effective Chloride Target Limit Date: The chloride limitations become effective.</p>	01/01/2025

Explanation of Schedules

Final chloride limits become effective one year after permit reissuance. This schedule provides one year for the permittee to implement SRMs developed during a previous permit term and revised for current conditions prior to the limits becoming effective.

4.4 Re-Rating Capacity Evaluation

The permittee shall submit an engineering design report that complies with Ch. NR 110, Wis. Adm. Code, to evaluate the rating capacities of the wastewater treatment facility.

Required Action	Due Date
<p>Submit Re-Rating Capacity Evaluation: The permittee shall submit a detailed engineering report and transmittal letter to review and identify the design capacity flows and loadings for the wastewater treatment facility. Each unit process in the existing wastewater treatment system shall be examined, and the overall facility design flows and loads determined. The design flow criteria shall include identification of the annual average design flow, plus the maximum month, maximum week, and maximum day design flows and influent daily design loadings for BOD, total suspended solids, total phosphorus, and ammonia.</p> <p>The design wastewater flows shall be determined in accordance with s. NR 110.09(2)(j), Wis. Adm. Code. The maximum hour design flow shall be estimated based on the appropriate peaking factor, pursuant to s. NR 110.15(4)(c), Wis. Adm. Code, when flow or water use records are insufficient. The organic design loading shall be determined in accordance with s. NR 110.15(4), Wis. Adm. Code. Once approved, the chloride wet weather mass limit will be determined based on the peak weekly design flow and the permit modified to include the limit.</p>	10/31/2024

Explanation of Schedules

Recent upgrades of the wastewater treatment facility, including the addition of chemical phosphorus removal in 2018 and UV disinfection in 2023, identified new process design flows of varying capacities. A comprehensive evaluation of the existing wastewater treatment system is needed to determine the overall facility design flows and loadings. The design values are necessary for effluent limit determinations and future regulatory compliance evaluations of the existing wastewater treatment facility.

4.5 Temperature Dissipative Cooling Evaluation

This schedule requires the permittee complete a DC study prior to permit reissuance.

Required Action	Due Date
Submit DC Study Report: Submit a DC study for the months of October and November. Refer to the Surface Water subsection titled 'Dissipative Cooling Demonstration - POTW Weekly Average Limits' regarding requests for Department consideration of dissipative cooling per NR 106.59, Wis. Adm. Code, as well as re-evaluation of the limits pursuant to NR 106 Subchapters V & VI or NR 102.26, Wis. Adm. Code.	01/31/2027

Explanation of Schedules

This schedule requires the permittee complete a DC Study in the months of October/November as requested in the WQBEL. This study is required for permit reissuance.

4.6 PFOS/PFOA Minimization Plan Determination of Need

Required Action	Due Date
<p>Report on Effluent Discharge: Submit a report on effluent PFOS and PFOA concentrations and include an analysis of trends in monthly and annual average PFOS and PFOA concentrations. This analysis should also include a comparison to the applicable narrative standard in s. NR 102.04(8)(d), Wis. Adm. Code.</p> <p>This report shall include all additional PFOS and PFOA data that may be collected including any influent, intake, in-plant, collection system sampling, and blank sample results.</p>	12/31/2024
<p>Report on Effluent Discharge and Evaluation of Need: Submit a final report on effluent PFOS and PFOA concentrations and include an analysis of trends in monthly and annual average PFOS and PFOA concentrations of data collected over the last 24 months. The report shall also provide a comparison on the likelihood of the facility needing to develop a PFOS/PFOA minimization plan.</p> <p>This report shall include all additional PFOS and PFOA data that may be collected including any influent, intake, in-plant, collection system sampling, and blank sample results.</p> <p>The permittee shall also submit a request to the department to evaluate the need for a PFOS/PFOA minimization plan.</p> <p>If the Department determines a PFOS/PFOA minimization plan is needed based on a reasonable potential evaluation, the permittee will be required to develop a minimization plan for Department approval no later than 90 days after written notification was sent from the Department. The Department will modify or revoke and reissue the permit to include PFOS/PFOA minimization plan reporting requirements along with a schedule of compliance to meet WQBELs. Effluent monitoring of PFOS and PFOA shall continue as specified in the permit until the modified permit is issued.</p> <p>If, however, the Department determines there is no reasonable potential for the facility to discharge PFOS or PFOA above the narrative standard in s. NR 102.04(8)(d), Wis. Adm. Code, no further action is required and effluent monitoring of PFOS and PFOA shall continue as specified in the permit.</p>	12/31/2025

Explanation of Schedules

As stated above, NR 106 Subchapter VIII – Permit Requirements for PFOS and PFOA Dischargers became effective on August 1, 2022. S. NR 106.98, Wis. Adm. Code, specifies steps to generate data in order to determine the need for reducing PFOS and PFOA in the discharge. Data generated per the effluent monitoring requirements will be used to

determine the need for developing a PFOS/PFOA minimization plan. As part of the schedule, the permittee is required to submit two annual Reports on Effluent Discharge.

If the department determines that a minimization plan is needed, the permit will be modified or revoked/reissued to include additional requirements.

Special Reporting Requirements

None

Attachments:

~~Water Quality Based Effluent Limits with Maps~~

~~Water Quality Trading Conditional Approval letter – 1/3/2023~~

~~Water Quality Trading Plan – December 2022~~

PFOS and PFOA Water Quality-Based Effluent Limitations for the Shullsburg Wastewater Treatment Facility -WPDES Permit No. (WI-0028321) in Lafayette County, by Amy Garbe, PE, Wastewater Engineer, dated February 5, 2026

Proposed Expiration Date:

December 31, 2028

Justification Of Any Waivers From Permit Application Requirements

Prepared By: Jennifer Jerich, Wastewater Specialist

Date: 11/8/2023

Revision date post fact check: 11/8/2023

Revision date post public notice: 12/8/2023; Editorial changes made, ammonia variable limit chart added.

Revised By: Sarah Donoughe, Wastewater Specialist-Adv

Date: February 5, 2026

DATE: February 5, 2026

TO: Sarah Donoughe – NER

FROM: Kari Fleming – WY/3

SUBJECT: PFOS and PFOA Water Quality-Based Effluent Limitations for the Shullsburg Wastewater Treatment Facility -WPDES Permit No. (WI-0028321) in Lafayette County

This is in response to your request for an evaluation of the need for PFOS and PFOA limitations for the Shullsburg Wastewater Treatment Facility. This municipal wastewater treatment facility (WWTF) discharges to the Shullsburg Branch, located in the Galena River Watershed in the Grant-Platte Basin.

The current permit, effective since January 2024, has monitoring only for PFOS and PFOA. The following review is based on new regulations which are now in effect throughout the state of Wisconsin and recommendations are made in accordance with chapters NR 102, 104, 105, 106, 207, and 217 of the Wisconsin Administrative Code, where applicable.

Receiving Water Information

- Name: Shullsburg Branch
- Classification: Warm Water Sport Fish (WWSF) community, non-public water supply.
- Flow: The following 7-Q10 and 7-Q2 values were calculated by USGS for Shullsburg Branch at County O (USGS Station 05414950) in February 2018.
 - 7-Q10 = 0.19 cfs (cubic feet per second)
 - 7-Q2 = 0.67 cfs
 - 90-Q10 = 0.57 cfs
 - Harmonic Mean Flow = 1.22 cfs

The Harmonic Mean has been estimated based on 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).

- % of Flow used to calculate limits: 25%

Effluent Information

- Flow: Average Design Flow = 0.289 MGD (million gallons per day)
For reference, the actual average flow from January 2024 to December 2025 was 0.138 MGD.
- Effluent characterization: This facility is categorized as a minor municipality.

The following table lists the statistics for effluent PFOS and PFOA levels from February 2024 through December 2025.

	PFOS ng/L	PFOA ng/L
1-day P ₉₉	11.33	7.36
4-day P ₉₉	7.13	4.80
30-day P ₉₉	4.63	3.22
Mean*	3.51	2.49
Std	2.21	1.40
Sample Size	12	12



Range	<0.34-7.8	1.2-6
-------	-----------	-------

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

Water Quality Based Limit – PFOS and PFOA

Administrative rules for PFOS and PFOA took effect on August 1, 2022. These rule revisions include additions to ch. NR 102 (s. NR 102.05), Wis. Adm. Code, which establish PFOS and PFOA standards for surface waters. Revisions to ch. NR 106 (s. NR 106, Subchapter VIII), Wis. Adm. Code establish procedures for determining water quality based effluent limits for PFOS and PFOA, based on the applicable standards in ch. NR 102, Wis. Adm. Code.

PFOS

Due to PFOS being a bioaccumulating compound of concern (BCC), no mixing zone is allowed pursuant to s. NR 106.98(4), Wis. Adm. Code. Therefore, the effluent limit for PFOS is set equal to criterion (8 ng/L).

PFOA

The conservation of mass equation is described in s. NR 106.06(4)(b)1. Wis. Adm. Code, and includes variables of water quality criterion (WQC), receiving water flow rate (Qs), effluent flow rate (Qe), and upstream PFOA concentrations (Cs) provided below.

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

Where:

- WQC = 95 ng/L for the Shullsburg Branch
- Qs = 25% of the harmonic mean pursuant s. NR 106.06(4)(c)10., Wis. Adm. Code 0.305 cfs
- Cs = background concentration of PFOA in the receiving water pursuant to s. NR 106.06(4)(e), Wis. Adm. Code
- Qe = effluent flow rate = 0.289 MGD = 0.447 cfs
- f = the fraction of effluent withdrawn from the receiving water = 0

After substituting the appropriate variables, the calculated PFOA limit is 159 ng/L.

Reasonable Potential Determination

In accordance with s. NR 106.98(4)(a), Wis. Adm. Code, **the discharge does not have reasonable potential to cause or contribute to an exceedance of the water quality criterion for PFOS** because the 30-day P₉₉ of reported effluent PFOS data is less than the calculated WQBEL (8 ng/L). Therefore, a **WQBEL is not required.**

The discharge does not have reasonable potential to cause or contribute to an exceedance of the water quality criterion for PFOA because the 30-day P₉₉ of reported effluent PFOA data is less than the calculated WQBEL (159 ng/L). Therefore, a **WQBEL is not required.**

Conclusions

The discharge has no reasonable potential to cause or contribute to an exceedance of the water quality criterion for PFOS nor PFOA. Therefore, no WQBELs are required.

Pursuant to s. NR 205.066, Wis. Adm. Code, the department may specify the monitoring frequency for PFOS and PFOA on a case-by-case basis after the initial 24 months of sampling. **After a review of the**

available data, the department has determined that it is warranted to reduce the sampling frequency in this case to annually.

If there are any questions or comments on these recommendations, please contact Amy Garbe by telephone at (608) 716-9968 or by email at Amy.Garbe@wisconsin.gov.

Attachments (2) – P99 Calculations

PREPARED BY:



Amy Garbe, P.E., Wastewater Engineer

date: 2/5/26

cc: Caitlin O'Connell, Basin Engineer – SCR/Dodgeville
Nate Willis, P.E., PFAS Implementation Coordinator – CO

Attachment I – PFOS P99 Calculation

EFFLUENT VARIABILITY ANALYSIS -				
=	=	=	=	=
SUBSTANCE:				
NUMBER OF VALUES:				Data Summary
TOTAL	12			Feb-24 <0.34
DETECTED	11			Apr-24 6
NON-DETECTED	1			Jun-24 3.3
				Jul-24 4.4
				Sep-24 6.3
d	0.083333			Dec-24 7.8
				Feb-25 2
m	3.827273			Mar-25 2.5
				May-25 1.4
mean of all data	3.508333			Jul-25 1.8
				Oct-25 5
s	2.205942			Dec-25 1.6
n	1	4	30	
d^n	0.083333	4.82E-05	4.21E-33	
p	0.989091	0.99	0.99	
Z_p	2.293958	2.326767	2.326785	
1+(s/m)^2	1.332208	1.332208	1.332208	
(sigma_d)^2	0.286837	0.286837	0.286837	
mu_d	1.198734	1.198734	1.198734	
(sigma_dn)^2	0.286837	0.107307	0.014998	
mu_dn	1.198734	1.201536	1.247642	
P_99 exponent	2.427313	1.963731	1.532591	
P_99	11.33	7.13	4.63	

Attachment 2 – PFOA P99 Calculation

EFFLUENT VARIABILITY ANALYSIS -				
=	=	=	=	=
SUBSTANCE:				Data Summary
NUMBER OF VALUES: -----				
TOTAL	12			
DETECTED	11			
NON-DETECTED	1			
d	0.083333			
m	2.718182			
mean of all data	2.491667			
s	1.402012			
n	1	4	30	
d^n	0.083333	4.82E-05	4.21E-33	
p	0.989091	0.99	0.99	
Z_p	2.293958	2.326767	2.326785	
1+(s/m)^2	1.26604	1.26604	1.26604	
(sigma_d)^2	0.235894	0.235894	0.235894	
mu_d	0.882016	0.882016	0.882016	
(sigma_dn)^2	0.235894	0.090965	0.012624	
mu_dn	0.882016	0.867518	0.90664	
P_99 exponent	1.996166	1.56928	1.168074	
P_99	7.36	4.80	3.22	