Permit Fact Sheet

General Information

Permit Number	WI-0020559-09-0
Permittee Name and Address	Sussex Village N64 W23760 Main Street Sussex, WI 53089
Permitted Facility Name and Address	Sussex Wastewater Treatment Facility N59 W23551 Clover Dr Sussex, WI 53089
Permit Term	July 01, 2025 to June 30, 2030
Discharge Location	East bank of Spring Creek; Lat: 43.12409° N, Long: 88.21785° W
Receiving Water	Spring Creek in Upper Fox River/Illinois of Fox River Watershed in Waukesha County
Stream Flow ($Q_{7,10}$)	0.23 cfs
Stream Classification	Warm Water Sport Fish (WWSF) community, non-public water supply
Discharge Type	Existing, continuous
Annual Average Design Flow (MGD)	5.1
Industrial or Commercial Contributors	Quad Graphics and Nature's Path
Plant Classification	A1 - Suspended Growth Processes; B - Solids Separation; C - Biological Solids/Sludges; P - Total Phosphorus; D - Disinfection; L - Laboratory; SS - Sanitary Sewage Collection System
Approved Pretreatment Program?	N/A

Facility Description

The Village of Sussex operates a 5.1 MGD wastewater treatment plant. The plant serves approximately 15,900 people from Village of Sussex; the Village of Lannon; a portion of the Village of Menomonee Falls. and Village of Lisbon. The plant has a mechanical bar screen, grit removal, a 3-ring extended aeration (Orbal) oxidation ditch, three final clarifiers, four tertiary anthracite filters, and seasonal disinfection with ultraviolet light. Polyaluminum chloride is added at the central ring of the ditch for phosphorus removal. Effluent is discharged to the east bank of Spring Creek, southwest of the treatment facility. Spring Creek (WBIC 773400) is known locally as Sussex Creek. Waste sludge from clarifiers is pumped into the gravity thickener and then to sludge storage tanks. Biosolids are land applied onto Department approved agricultural fields.

Substantial Compliance Determination

Enforcement During Last Permit:

During the last permit term, no formal enforcement actions occurred.

After a desk top review of all discharge monitoring reports, CMARs, land application reports, compliance schedule items, and a site visit on June 12, 2024, by Nick Lent, Wastewater Engineer, this facility has been found to be in substantial compliance with their current permit.

Sample Point Descriptions

Sample Point Designation		
Sample Point Number	**Discharge Flow, Units, and Averaging Period**	**Sample Point Location, Waste Type/Sample Contents and Treatment Description (as applicable)**
701	2.66 MGD (October 2019 – October 2024)	INFLUENT: 24-hour flow proportional composite samples shall be collected after screening and grit removal. Samples at this location include all recycled flows from effluent filter backwashes, sludge thickening and storage tank supernatant.
001	2.06 MGD (October 2019 – October 2024)	EFFLUENT: 24-hour flow proportional composite samples shall be collected just prior to disinfection. Grab samples shall be collected at the outfall channel flume, prior to discharge.
002	590 dry US Tons (Permit Application)	SLUDGE: Class B, gravity thickened liquid sludge. Representative samples shall be collected and composited from the sludge mixing/truck fill pump sample line.
102	N/A	FIELD BLANK: Collect mercury field blank using standard sample handling procedures.

Permit Requirements

1 Influent – Monitoring Requirements

1.1 Sample Point Number: 701- INFLUENT PLANT

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Daily	Continuous	
Suspended Solids, Total		mg/L	4/Week	24-Hr Flow Prop Comp	
BOD5, Total		mg/L	4/Week	24-Hr Flow Prop Comp	
Mercury, Total Recoverable		ng/L	Annual	24-Hr Flow Prop Comp	See 'Mercury Monitoring' permit section.

1.1.1 Changes from Previous Permit:

Influent limitations and monitoring requirements were evaluated for this permit term and the following changes were made:

Flow: The sample frequency for flow has been changed from "continuous" to "daily" for eDMR reporting purposes.

1.1.2 Explanation of Limits and Monitoring Requirements

Monitoring of influent flow, BOD_5 and total suspended solids is required by s. NR 210.04(2), Wis. Adm. Code, to assess wastewater strengths and volumes and to demonstrate the percent removal requirements in s. NR 210.05, Wis. Adm. Code, and in the Standard Requirements section of the permit.

2 Inplant - Monitoring and Limitations

2.1 Sample Point Number: 102- Mercury Field Blanks

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Mercury, Total Recoverable		ng/L	Annual	Blank	See 'Mercury Monitoring' permit section.

2.1.1 Changes from Previous Permit:

In-plant limitations and monitoring requirements were evaluated for this permit term and no changes were required in this permit section.

2.1.2 Explanation of Limits and Monitoring Requirements

Mercury: Monitoring is included in the permit pursuant to s. NR 106.145, Wis. Adm. Code. Field blanks must meet the requirements under s. NR 106.145(9) and (10), Wis. Adm. Code. The permittee shall collect a mercury field blank for each set of mercury samples (a set of samples may include a combination of influent, effluent or other samples all collected on the same day). Field blanks are required to verify a sample has not been contaminated during collection, transportation or analysis.

3 Surface Water - Monitoring and Limitations

3.1 Sample Point Number: 001- EFFLUENT

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Daily	Continuous	
BOD5, Total	Weekly Avg	5.0 mg/L	4/Week	24-Hr Flow Prop Comp	Limit effective May - October.
BOD5, Total	Weekly Avg	10 mg/L	4/Week	24-Hr Flow Prop Comp	Limit effective November - April.
BOD5, Total	Monthly Avg	5.0 mg/L	4/Week	24-Hr Flow Prop Comp	Limit effective May - October.

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
BOD5, Total	Monthly Avg	10 mg/L	4/Week	24-Hr Flow Prop Comp	Limit effective November - April.
Suspended Solids, Total	Monthly Avg	10 mg/L	4/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total	Weekly Avg	10 mg/L	4/Week	24-Hr Flow Prop Comp	
pH Field	Daily Min	6.0 su	Daily	Grab	
pH Field	Daily Max	9.0 su	Daily	Grab	
Dissolved Oxygen	Daily Min	7.0 mg/L	Daily	Grab	
Nitrogen, Ammonia (NH3-N) Total	Daily Max	6.7 mg/L	4/Week	24-Hr Flow Prop Comp	Limit effective year-round.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	6.7 mg/L	4/Week	24-Hr Flow Prop Comp	Limit effective November - April.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	4.8 mg/L	4/Week	24-Hr Flow Prop Comp	Limit effective May - September.
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	3.2 mg/L	4/Week	24-Hr Flow Prop Comp	Limit effective April.
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	1.9 mg/L	4/Week	24-Hr Flow Prop Comp	Limit effective May - September.
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	3.8 mg/L	4/Week	24-Hr Flow Prop Comp	Limit effective October.
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	5.0 mg/L	4/Week	24-Hr Flow Prop Comp	Limit effective November - March.
E. coli	Geometric Mean - Monthly	126 #/100 ml	2/Week	Grab	Monitoring and limit effective May through September annually.
E. coli	% Exceedance	10 Percent	Monthly	Calculated	Monitoring and limit effective May through September annually. See the E. coli Percent Limit section. Enter the result in the eDMR on the last day of the month.
Phosphorus, Total	6-Month Avg	0.075 mg/L	4/Week	24-Hr Flow Prop Comp	
Phosphorus, Total	Monthly Avg	0.225 mg/L	4/Week	24-Hr Flow Prop Comp	

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Phosphorus, Total	6-Month Avg	3.2 lbs/day	4/Week	Calculated	
Mercury, Total Recoverable		ng/L	Annual	Grab	See 'Mercury Monitoring' permit section.
Chloride	Weekly Avg	511 mg/L	4/Month	24-Hr Flow Prop Comp	Interim limit effective December - April. Sampling shall be conducted on four consecutive days one week per month. See the Chloride Variance - Implement Source Reduction Measures section and the Chloride Source Reduction Measures (Target Value) Schedule.
Chloride	Weekly Avg	500 mg/L	4/Month	24-Hr Flow Prop Comp	Interim limit effective May - November. Sampling shall be conducted on four consecutive days one week per month. See the Chloride Variance - Implement Source Reduction Measures section and the Chloride Source Reduction Measures (Target Value) Schedule.
Chloride		lbs/day	4/Month	Calculated	Chloride mass (lbs/day) = daily concentration (mg/L) x daily flow (MGD) x 8.34.
PFOS		ng/L	1/ 2 Months	Grab	Monitoring only. See PFOS/PFOA Minimization Plan Determination of Need schedule.
PFOA		ng/L	1/ 2 Months	Grab	Monitoring only. See PFOS/PFOA Minimization Plan Determination of Need schedule.
Acute WET		TUa	See Listed Qtr(s)	24-Hr Flow Prop Comp	See WET Testing permit section.
Chronic WET	Monthly Avg	1.0 TUc	See Listed Qtr(s)	24-Hr Flow Prop Comp	See WET Testing permit section.
Temperature Maximum		deg F	3/Week	Continuous	Monitoring in calendar year 2028. See 'Effluent Temperature Monitoring'

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
					permit section.
Nitrogen, Total Kjeldahl		mg/L	Quarterly	24-Hr Flow Prop Comp	
Nitrogen, Nitrite + Nitrate Total		mg/L	Quarterly	24-Hr Flow Prop Comp	
Nitrogen, Total		mg/L	Quarterly	Calculated	Total Nitrogen shall be calculated as the sum of reported values for Total Kjeldahl Nitrogen and Total Nitrite + Nitrate Nitrogen.

3.1.1 Changes from Previous Permit

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

Flow: The sample frequency for flow has been changed from "continuous" to "daily" for eDMR reporting purposes.

E. coli: Fecal coliform monitoring and limits have been replaced with Escherichia coli (E. coli) monitoring and limits.

PFOA/PFOS: Addition of PFOA/PFOS monitoring at a frequency of every other month in accordance with s. NR 106.98(2), Wis. Adm. Code.

Chronic WET: Updated the monitoring quarters for the chronic whole effluent toxicity (WET) testing and added a monthly average limit of 1.0 TU_c.

3.1.2 Explanation of Limits and Monitoring Requirements

Detailed discussions of limits and monitoring requirements can be found in the attached water quality-based effluent limits (WQBEL) memo dated December 9, 2024 by Nicole Krueger, Water Resources Engineer.

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

Expression of Limits: In accordance with the federal regulation 40 CFR 122.45(d) and s. NR 205.065, Wis. Adm. Code, limits in this permit are to be expressed as weekly average and monthly average limits whenever practicable.

BOD_5, TSS, and pH: Categorical limits and WQBELs are included in the permit as outlined in ch. NR 210, Wis. Adm. Code.

Phosphorus: Six-month average concentrations and mass shall be calculated on the last day of the month in April and October.

Chloride: The Village of Sussex applied for a chloride variance, under the provisions of s. NR 106.83, Wis. Adm. Code, with its application for permit reissuance. The previous permit also included a chloride variance. The Department reviewed Sussex's application for a chloride variance and the information supplied in the application supports the establishment of an interim effluent limit. The permittee and the Department have reached agreement on an interim chloride weekly average limit of 511 mg/L between December and April and 500 mg/L between May and November, a year-round target value of 450 mg/L, implementation of chloride source reduction measures, and submittal of annual progress reports each year by January 31st. The chloride source reduction measures that are required to be implemented can be found in the proposed permit and in the source reduction plan dated February 21, 2025.

PFOA and PFOS: 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 taking into consideration the presence of potential PFOS or PFOA industrial wastes, remediation sites and other potential sources of PFOS or PFOA. Every other month monitoring is included in the permit in accordance with s. NR 106.98(2)(c), Wis. Adm. Code.

Acute and Chronic WET: Testing is required during the following quarters: October – December 2025; July – September 2026; January – March 2027; April – June 2028; and October – December 2029

Temperature: Monitoring in calendar year 2028.

4 Land Application - 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)**
002	B	Liquid	Fecal Coliform	Incorporation	Land Application	590
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? Yes. Once in 2027. 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.						

4.1 Sample Point Number: 002- Liquid Sludge

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Solids, Total		Percent	Quarterly	Composite	

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Arsenic Dry Wt	Ceiling	75 mg/kg	Quarterly	Composite	
Arsenic Dry Wt	High Quality	41 mg/kg	Quarterly	Composite	
Cadmium Dry Wt	Ceiling	85 mg/kg	Quarterly	Composite	
Cadmium Dry Wt	High Quality	39 mg/kg	Quarterly	Composite	
Copper Dry Wt	Ceiling	4,300 mg/kg	Quarterly	Composite	
Copper Dry Wt	High Quality	1,500 mg/kg	Quarterly	Composite	
Lead Dry Wt	Ceiling	840 mg/kg	Quarterly	Composite	
Lead Dry Wt	High Quality	300 mg/kg	Quarterly	Composite	
Mercury Dry Wt	Ceiling	57 mg/kg	Quarterly	Composite	
Mercury Dry Wt	High Quality	17 mg/kg	Quarterly	Composite	
Molybdenum Dry Wt	Ceiling	75 mg/kg	Quarterly	Composite	
Nickel Dry Wt	Ceiling	420 mg/kg	Quarterly	Composite	
Nickel Dry Wt	High Quality	420 mg/kg	Quarterly	Composite	
Selenium Dry Wt	Ceiling	100 mg/kg	Quarterly	Composite	
Selenium Dry Wt	High Quality	100 mg/kg	Quarterly	Composite	
Zinc Dry Wt	Ceiling	7,500 mg/kg	Quarterly	Composite	
Zinc Dry Wt	High Quality	2,800 mg/kg	Quarterly	Composite	
Nitrogen, Total Kjeldahl		Percent	Quarterly	Composite	
Nitrogen, Ammonium (NH4-N) Total		Percent	Quarterly	Composite	
Phosphorus, Total		Percent	Quarterly	Composite	
Phosphorus, Water Extractable		% of Tot P	Quarterly	Composite	
Potassium, Total Recoverable		Percent	Quarterly	Composite	
PCB Total Dry Wt	Ceiling	50 mg/kg	Once	Composite	Once in 2027.
PCB Total Dry Wt	High Quality	10 mg/kg	Once	Composite	Once in 2027.
Radium 226 Dry Wt		pCi/g	Annual	Grab	
PFOA + PFOS		ug/kg	Annual	Calculated	Report the sum of PFOA and PFOS. See PFAS Permit Sections for more information.

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Municipal Sludge Priority Pollutant Scan			Once	Composite	As specified in ch. NR 215.03 (1-4), Wis. Adm. Code
PFAS Dry Wt			Annual	Grab	Perfluoroalkyl and Polyfluoroalkyl Substances based on updated DNR PFAS List. See PFAS Permit Sections for more information.

4.1.1 Changes from Previous Permit:

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

Sample type was changed from grab to composite for List 1 and List 2 parameters to more accurately represent sampling methods at the facility.

PFAS: Monitoring is required annually annual pursuant to s. NR 204.06(2)(b)9., Wis. Adm. Code.

Municipal Sludge Priority Pollutant Scan: Scan included in permit in year 2027.

4.1.2 Explanation of Limits and Monitoring Requirements

Requirements for disposal, including 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). Requirements for pathogens are specified in s. NR 204.07(6) and in s. NR 204.07 (7) for vector attraction requirements. Limitations for PCBs are addressed in s. NR 204.07(3)(k). Radium requirements are addressed in s. NR 204.07(3)(n).

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 a draft risk assessment was released early 2025. In the interim, the department has developed the "Interim Strategy for Land Application of Biosolids and Industrial Sludges Containing PFAS."

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

5 Schedules

5.1 Chloride Source Reduction Measures (Target Value)

As a condition of the variance to the water quality based effluent limitation(s) for chloride granted in accordance with s. NR 106.83(2), Wis. Adm. Code, the permittee shall perform the following actions.

Required Action	Due Date
Annual Chloride Progress Report: Submit an annual chloride progress report related to the source	01/31/2026

reduction activities for the previous year. The annual chloride progress report shall: 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 the upcoming year; 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 Include an analysis of how effluent chloride varies with time and with significant loadings of chloride. Note that the interim limitation listed in the Surface Water section of this permit remains enforceable until new enforceable limits are established in the next permit issuance. The first annual chloride progress report is to be submitted by the Date Due.	
Annual Chloride Progress Report #2: Submit the chloride progress report, related to the source reduction activities for the previous year, as defined above.	01/31/2027
Annual Chloride Progress Report #3: Submit the chloride progress report, related to the source reduction activities for the previous year, as defined above.	01/31/2028
Annual Chloride Progress Report #4: Submit the chloride progress report, related to the source reduction activities for the previous year, as defined above.	01/31/2029
Final Chloride Report: Submit the final chloride report documenting the success in meeting the chloride year-round target value of 450 mg/L, as well as the anticipated future reduction in chloride sources and chloride effluent concentrations. The report shall: Summarize chloride source reduction measures that have been implemented during the current permit term and state which, if any, source reduction measures from the Source Reduction Plan were not pursued and why; Include an assessment of which source reduction measures appear to have been effective or ineffective. Evaluate any needed changes to the pollutant reduction strategy accordingly; 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 during the current permit term; and Include an analysis of how influent and effluent chloride varies with time and with significant loadings of chloride as identified in the source reduction plan. If the permittee intends to reapply for a chloride variance, for the reissued permit, proposed target limits and a detailed source reduction measures plan, outlining the source reduction activities proposed for the upcoming permit term, shall also be included per ss. NR 106.90 (5) and NR 106.83 (4), Wis. Adm. Code. An updated source reduction measures plan shall: Include an explanation of why or how each source reduction measure will result in reduced discharge of the target pollutant; and Evaluate any available information on pollutant sources, timing, and concentration to update the mass balance assumptions and expected sources of the pollutant, and Identify any information needs that would help to better determine pollutant sources and make plans to collect that information.	12/31/2029

Note that the target value is the benchmark for evaluating the effectiveness of the chloride source reduction measures but is not an enforceable limitation under the terms of this permit.	
Annual Chloride Reports After Permit Expiration: In the event that this permit is not reissued by the date the permit expires the permittee shall continue to submit annual chloride reports for the previous year following the due date of Annual Chloride Progress Reports listed above. Annual Chloride Progress Reports shall include the information as defined above.	

5.1.1 Explanation of Schedule

Chloride Source Reduction Measures (Target Value): This schedule is required to ensure that the permittee maintains compliance with the conditions and requirements of receiving a variance from the water quality-based chloride effluent limit of 400 mg/L as a weekly average. Since a compliance schedule is being granted, an interim limit is required, 511 mg/L between December and April and 500 mg/L between May and November as a weekly average limit. The schedule requires that annual reports shall indicate which source reduction measures Sussex has implemented during each calendar year, and an analysis of chloride concentration and mass discharge data based on chloride sampling and flow data. The annual reports shall document progress made towards meeting the chloride year-round target value of 450 mg/L by the end of the permit term.

5.2 PFOS/PFOA Minimization Plan Determination of Need

Required Action	Due Date
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. 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.	06/30/2026
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. 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. The permittee shall also submit a request to the department to evaluate the need for a PFOS/PFOA minimization plan. 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. 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.	06/30/2027

5.2.1 Explanation of Schedule

PFOS/PFOA Minimization Plan Determination of Need: As stated above, ch. NR 106 Subchapter VIII – Permit Requirements for PFOS and PFOA Dischargers became effective on August 1, 2022. Section 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.

Attachments

WQBEL Memo: Water Quality-Based Effluent Limitations for Sussex Wastewater Treatment Facility WPDES Permit No. WI-0020559-09 by Nicole Krueger, Water Resources Engineer, dated December 9, 2024

Chloride Variance Documents

EPA Data Sheet

Chloride SRM (Source Reduction Measures) Plan, dated February 12, 2025

Justification Of Any Waivers From Permit Application Requirements

No waivers from permit applications requirements were requested or granted.

Prepared By: Victoria Ziegler, Wastewater Specialist **Date:** December 30, 2024

CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: 12/09/2024

TO: Victoria Ziegler – SER

FROM: Nicole Krueger – SER Nicole Krueger

SUBJECT: Water Quality-Based Effluent Limitations for Sussex Wastewater Treatment Facility
WPDES Permit No. WI-0020559-09

This is in response to your request for an evaluation of the need for water quality-based effluent limitations (WQBELs) using chapters NR 102, 104, 105, 106, 207, 210, 212, and 217 of the Wisconsin Administrative Code (where applicable), for the discharge from Sussex Wastewater Treatment Facility in Waukesha County. This municipal wastewater treatment facility (WWTF) discharges to Spring Creek, located in the Upper Fox (IL) River Watershed in the Fox (IL) River Basin. The evaluation of the permit recommendations is discussed in more detail in the attached report.

The following recommendations are made on a chemical-specific basis at Outfall 001:

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Flow Rate						1,2
BOD_5 May – October November – April			 5.0 mg/L 10 mg/L	 **5.0 mg/L** **10 mg/L**		1,3
TSS			10 mg/L	**10 mg/L**		1,3,4
pH	9.0 s.u.	6.0 s.u.				1
Dissolved Oxygen		7.0 mg/L				1
Ammonia Nitrogen April May – September October November – March	 6.7 mg/L 6.7 mg/L 6.7 mg/L 6.7 mg/L		 **6.7 mg/L** 4.8 mg/L **6.7 mg/L** **6.7 mg/L**	 3.2 mg/L 1.9 mg/L 3.8 mg/L 5.0 mg/L		1,3
Bacteria						5
E. coli				126 #/100 mL geometric mean		
Phosphorus				0.225 mg/L	0.075 mg/L 3.2 lbs/day	1,4
Mercury						1,2
Chloride Wet-weather			400 mg/L 16,800 lbs/day 28,400 lbs/day			6
PFOS & PFOA						7
Acute WET						8,9
Chronic WET				1.0 TUc		8,9
Temperature						10
TKN, Nitrate+Nitrite, and Total Nitrogen						1,11

Footnotes:

1. No changes from the current permit.

2. Monitoring only.
3. Additional limits to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Codes, are included in bold.
4. A Total Maximum Daily Load (TMDL) is being developed for the Fox (IL) River Basin address phosphorus water quality impairments within the TMDL area. This TMDL will likely result in limitations for TSS and phosphorus that must be included in WPDES permits, which may be different than those calculated for this reissuance. TMDL-derived limits may be included in lieu of or in addition to the calculated limits upon permit reissuance or modification once the TMDL has been approved by U.S. EPA, according to s. NR 217.16, Wis. Adm. Code.
5. Bacteria limits apply during the disinfection season of May through September. Additional final limit: No more than 10 percent of *E. coli* bacteria samples collected in any calendar month may exceed 410 count/100 mL.
6. This is the WQBEL for chloride. Alternative effluent limitations of 500 mg/L for May - November and 511 mg/L for December - April as a weekly average may be included in the permit in place of this limit if the chloride variance application that was submitted is approved by EPA. If the variance is not approved, a wet weather mass limit would also be required.
7. Monitoring is required in accordance with s. NR 106.98(2), Wis. Adm. Code once every two months.
8. Annual acute and chronic WET monitoring is recommended. The Instream Waste Concentration (IWC) to assess chronic test results is 99%. According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), chronic testing shall be performed using a dilution series of 100%, 75%, 50%, 25% & 12.5% and the dilution water used in WET tests conducted on Outfall 001 shall be a grab sample collected from the receiving water outside of the mixing zone.
9. Sampling WET concurrently with any chemical-specific toxic substances is recommended. Tests should be done in rotating quarters, to collect seasonal information about this discharge and should continue after the permit expiration date (until the permit is reissued).
10. Monitoring only for one year.
11. As recommended in the Department's October 1, 2019 Guidance for Total Nitrogen Monitoring in Wastewater Permits, quarterly total nitrogen monitoring is recommended for all municipal major permittees. Total Nitrogen is the sum of nitrate (NO_3), nitrite (NO_2), and total kjeldahl nitrogen (TKN) (all expressed as N).

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

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

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Attachment #1

Water Quality-Based Effluent Limitations for
Sussex Wastewater Treatment Facility

WPDES Permit No. WI-0020559-09

Prepared by: Nicole Krueger

PART 1 – BACKGROUND INFORMATION

Facility Description

The Village of Sussex operates a wastewater treatment plant which has a mechanical bar screen, grit removal, a 3-ring extended aeration oxidation ditch, three final clarifiers, four tertiary anthracite filters, and seasonal disinfection with ultraviolet light. Polyaluminum chloride is added at the central ring of the ditch for phosphorus removal. Waste sludge from clarifiers is pumped into the gravity thickener and then to a sludge storage tank. Biosolids are land applied onto Department approved agricultural fields.

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

Existing Permit Limitations

The current permit, expiring on 12/31/2024, 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 May – October November – April			 5.0 mg/L 10 mg/L	 **5.0 mg/L** **10 mg/L**		2,3
TSS			10 mg/L	**10 mg/L**		2,3
pH	9.0 s.u.	6.0 s.u.				2
Dissolved Oxygen		7.0 mg/L				2
Ammonia Nitrogen April May – September October November – March	 6.7 mg/L 6.7 mg/L 6.7 mg/L 6.7 mg/L		 **6.7 mg/L** 4.8 mg/L **6.7 mg/L** **6.7 mg/L**	 3.2 mg/L 1.9 mg/L 3.8 mg/L 5.0 mg/L		3
Fecal Coliform May – September			**780#/100 mL** **geometric mean**	400#/100 mL geometric mean		3
Phosphorus				0.225 mg/L	0.075 mg/L 3.2 lbs/day	4
Mercury						1
Chloride December – April May – November			 511 mg/L 500 mg/L			5
Acute WET						6
Chronic WET						6
Temperature						1

Attachment #1

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
TKN, Nitrate+Nitrite, and Total Nitrogen						1

Footnotes:

1. Monitoring only.
2. These limitations are not being evaluated as part of this review. Because the water quality criteria (WQC), reference effluent flow rates, and receiving water characteristics have not changed, limitations for these water quality characteristics do not need to be re-evaluated at this time.
3. Limits to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Codes, are included in bold.
4. These limits became effective on October 1, 2021.
5. These are variance limits to the WQBEL of 396 mg/L.
6. Acute and chronic WET testing is required once per year. The IWC for chronic WET was 99%.

Receiving Water Information

- Name: Spring Creek
- Waterbody Identification Code (WBIC): 773400
- 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 updated 7-Q_{10} and 7-Q_2 values at the Outfall location were provided in a June 20, 2019 letter from USGS. The Harmonic Mean has been estimated as recommended in *State of Wisconsin Water Quality Rules Implementation Plan* (Publ. WT-511-98)

  7-Q_{10} = 0.23 cfs (cubic feet per second)
  7-Q_2 = 0.39 cfs
  90-Q_{10} = 0.33 cfs
  Harmonic Mean Flow = 1.35 cfs

	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
7-Q_{10} (cfs)	0.4	0.42	0.67	1.0	0.61	0.42	0.31	0.29	0.27	0.34	0.48	0.41
7-Q_2 (cfs)	077	0.86	1.5	1.8	1.3	0.85	0.62	0.54	0.57	0.70	0.89	0.80

- Hardness = 383 mg/L as $CaCO_3$. This value represents the geometric mean of data from chronic WET testing from 11/28/2017 – 07/20/2021.
- % of low flow used to calculate limits in accordance with s. NR 106.06(4)(c)5., Wis. Adm. Code: 25%
- Source of background concentration data: Metals data from Spring Creek (SWIMS ID 683226) is used for this evaluation. The facility has collected background chloride data upstream of their outfall from 12/14/2005 to 07/20/2018. The numerical values are shown in the tables below. If no data is available, the background concentration is assumed to be negligible and a value of zero is used in the computations. Background data for calculating effluent limitations for ammonia nitrogen are described later.
- Multiple dischargers: None.
- Impaired water status: Spring Creek is 303(d) listed as impaired at the point of discharge for

phosphorus.

Effluent Information

- Design flow rate(s):
  Annual average = 5.1 MGD (Million Gallons per Day)
  Peak weekly = 8.6 MGD

  For reference, the actual average flow from 10/01/2019 – 10/31/2024 was 2.06 MGD.

- Hardness = 422 mg/L as $CaCO_3$. This value represents the geometric mean of data from the permit reissuance application from 02/06/2024 – 03/17/2024.
- 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: Domestic wastewater with water supply from wells.
- Additives: Polyaluminum chloride is added for phosphorus removal.
- Effluent characterization: This facility is categorized as a major municipal, so the permit application required effluent sample analyses for all the "priority pollutants" except for the Dioxins and Furans as specified in s. NR 200.065, Table 1, Wis. Adm. Code. The permit-required monitoring for mercury, ammonia, phosphorus, and chloride is used in this evaluation.
- Effluent data for substances for which a single sample was analyzed is shown in the tables in Part 2 below, in the column titled "MEAN EFFL. CONC.". Otherwise, substances with multiple effluent data are shown in the tables below or in their respective parts in this evaluation.

Effluent Copper Data

Sample Date	Copper µg/L	Sample Date	Copper µg/L	Sample Date	Copper µg/L
02/06/2024	2.6	02/21/2024	2.2	03/08/2024	3.5
02/09/2024	1.5	02/25/2024	2.0	03/12/2024	2.8
02/13/2024	2.6	02/29/2024	2.5	03/17/2024	1.7
02/17/2024	2.6	03/04/2024	6.6		
1-day P_{99} = 26 µg/L					
4-day P_{99} = 16 µg/L					

Effluent Chloride Data

	Chloride mg/L
1-day P_{99}	650
4-day P_{99}	553
30-day P_{99}	497
Mean	467
Std	68.7
Sample size	244
Range	263 – 654

Attachment #1

Effluent Mercury Data

Sample Date	Mercury ng/L
05/05/2020	0.13
05/24/2021	0.24
10/20/2022	<0.10
10/10/2023	<0.10
09/10/2024	<0.10
Average*	0.08

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

The following table presents the average concentrations and loadings at Outfall 001 from 10/01/2019 – 10/31/2024 for all parameters with limits in the current permit to meet the requirements of s. NR 201.03(6), Wis. Adm. Code:

Parameter Averages with Limits

	Average Measurement	Average Mass Discharged
BOD_5	0.68 mg/L*	
TSS	0.91 mg/L*	
pH field	7.46 s.u.	
Phosphorus	0.09 mg/L*	1.14 lbs/day
Ammonia Nitrogen	0.03 mg/L*	
Chloride	467 mg/L	
Fecal coliform	5.97 #/100 mL	

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

PART 2 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR TOXIC SUBSTANCES – EXCEPT AMMONIA NITROGEN

Permit limits for toxic substances are required whenever any of the following occur:

1. The maximum effluent concentration exceeds the calculated limit (s. NR 106.05(3), Wis. Adm. Code)
2. If 11 or more detected results are available in the effluent, the upper 99th percentile (or P_{99}) value exceeds the comparable calculated limit (s. NR 106.05(4), Wis. Adm. Code)
3. If fewer than 11 detected results are available, the mean effluent concentration exceeds 1/5 of the calculated limit (s. NR 106.05(6), Wis. Adm. Code)

Acute Limits based on 1-Q_{10}

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

Attachment #1

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

Where:

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

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

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

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

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

If the receiving water is effluent dominated under low stream flow conditions, the 1-Q_{10} method of limit calculation produces the most stringent daily maximum limitations and should be used while making reasonable potential determinations. This is the case for Sussex.

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

Daily Maximum Limits based on Acute Toxicity Criteria (ATC)

RECEIVING WATER FLOW = 0.18 cfs, (1-Q_{10} (estimated as 80% of 7-Q_{10})), as specified in s. NR 106.06(3)(bm), Wis. Adm. Code.

SUBSTANCE	REF. HARD.* mg/L	ATC	MEAN BACK-GRD.	MAX. EFFL. LIMIT**	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	1-day P_{99}	1-day MAX. CONC.
Arsenic		340		348	69.5	<1.1		
Cadmium	422	53.8	0.04	55.0	11.0	<0.19		
Chromium	301	4446		4550	910	<1.1		
Copper	422	60.4		61.8			26	19
Lead	356	365		373	74.6	<4.3		
Mercury (ng/L)		830		849	170	0.08		
Nickel	268	1080		1105	221	<1.2		
Zinc	333	345	5	353	70.5	16		
Phenol***		150731		154246	30849	0.12		
Chloride (mg/L)		757	261	769			650	654

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

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

* * * The limit for this substance is based on a secondary value. Acute limits are set equal to the secondary value rather than two times or using the 1-Q_{10} s. NR 106.06(3)(b)2 and s. NR 105.05(2)(f)6), Wis. Adm Code.

Weekly Average Limits based on Chronic Toxicity Criteria (CTC)

RECEIVING WATER FLOW = 0.0575 cfs (¼ of the 7-Q_{10}), as specified in s. NR 106.06(4)(c), Wis. Adm. Code

SUBSTANCE	REF. HARD.* mg/L	CTC	MEAN BACK-GRD.	WEEKLY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	4-day P_{99}
Arsenic		152		153	30.7	<1.1	
Cadmium	175	3.82	0.04	3.85	0.77	<0.19	
Chromium	301	326		328	65.6	<1.1	
Copper	383	32.7		32.9			16.1
Lead	356	95.5		96.2	19.2	<4.3	
Mercury (ng/L)		440		443	88.6	0.08	
Nickel	268	120		121	24.2	<1.2	
Zinc	333	345	5	347	69.4	16	
Phenol		49000		49357	9871	0.12	
Chloride (mg/L)		395	261	396			**553**

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

Monthly Average Limits based on Wildlife Criteria (WC)

RECEIVING WATER FLOW = 0.08 cfs (¼ of the 90-Q_{10}), as specified in s. NR 106.06(4), Wis. Adm. Code

SUBSTANCE	WC	MEAN BACK-GRD.	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Mercury (ng/L)	1.3		1.3	0.26	0.08

Monthly Average Limits based on Human Threshold Criteria (HTC)

RECEIVING WATER FLOW = 0.3755 cfs (¼ of Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

SUBSTANCE	HTC	MEAN BACK-GRD.	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Cadmium	370	0.04	388	77.5	<0.19
Chromium (+3)	3818000		3999673	799935	<1.1
Lead	140		147	29.3	<4.3
Mercury (ng/L)	1.5		1.6	0.31	0.08
Nickel	43000		45046	9009	<1.2
Phenol	3712		3889	778	0.12

Monthly Average Limits based on Human Cancer Criteria (HCC)

RECEIVING WATER FLOW = 0.3755 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		13.9	2.79	<1.1
Chloroform	1960		2053	411	0.12

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

Conclusions and Recommendations
Based on a comparison of the effluent data and calculated effluent limitations, effluent limitations are required for chloride.

Chloride – Considering available effluent data from the current permit term (10/01/2019 – 10/31/2024), the 1-day P_{99} chloride concentration is 650 mg/L, and the 4-day P_{99} of effluent data is 553 mg/L.

Because the 4-day P_{99} exceeds the calculated weekly average WQBEL, an effluent limit is needed in accordance with s. NR 106.05(4)(b), Wis. Adm. Code.

However, Subchapter VII of ch. NR 106, Wis. Adm. Code, provides for a variance from water quality standards for this substance, and Sussex has requested such a variance. That variance may be granted subject to the following conditions:
1) The permit shall include an "Interim" limitation intended to prevent an increase in the discharge of Chloride;
2) The permit shall specify "Source Reduction Measures" to be implemented during the permit term, with periodic progress reports; and
3) The permit shall include a "Target Limit" or "Target Value" to gage the effectiveness of the Source Reduction Measures, and progress toward the WQBELs.

Interim Limit for Chloride
Section NR 106.82(9), Wis. Adm. Code, defines a "Weekly average interim limitation" as either the 4-day P_{99} concentration or 105% of the highest weekly average concentration of the representative data.

Ideally, the effluent chloride concentration at facilities with variances will decrease as a result of source reduction measures. At Sussex, the chloride concentrations did not decrease to levels below the current interim limits overall during the permit term. The effluent data from the entire permit term is shown in the table below.

Effluent Chloride Data

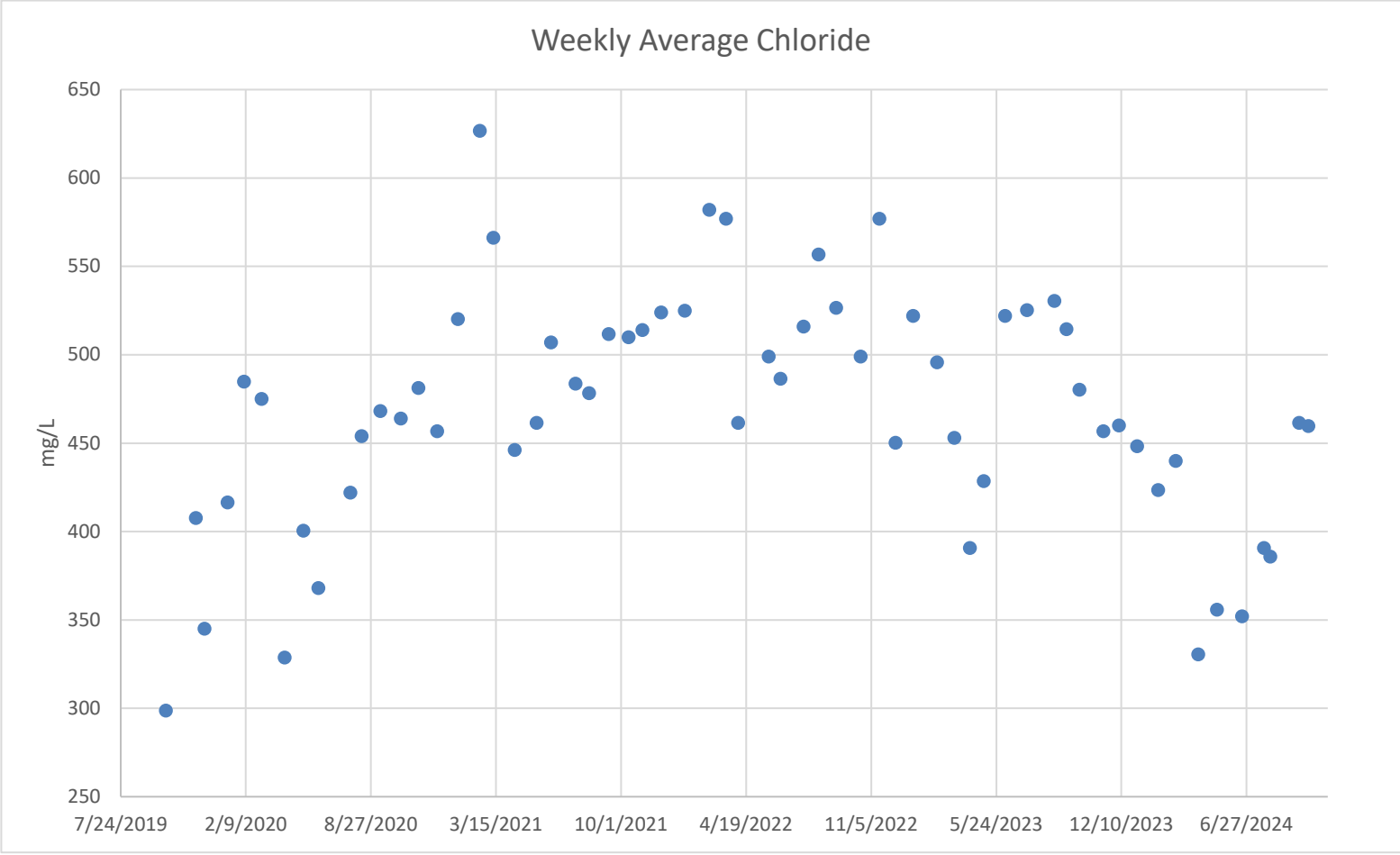
	All data	December - April	May - November
1-day P_{99}	650	674	632
4-day P_{99}	553	565	544
Max 4-day average	497	503	493
Mean	467	470	465
Standard deviation	68.7	75.8	63.4
Sample size	244	100	144
Range	263 – 654	315 – 654	263 – 627

Although the 4-day P_{99} effluent chloride concentrations at Sussex are higher than the current interim limits, the Department does not find it appropriate to increase the interim concentration limits in the reissued permit, because it would be counterproductive to meeting the final WQBEL. **Therefore, the**

current weekly average interim chlorides limits of 511 mg/L for December – April and 500 mg/L for May – November are recommended for permit reissuance.

There were several exceedances of the interim limits during the permit term, some of which may have been due to dry weather and less dilution in the effluent. In response to these exceedances, Sussex updated their SRM plan to reduce chlorides and have been in compliance since late 2023 – present. Due to the limited data in compliance and the likelihood that dry weather may increase their effluent concentrations again in the future, all data from the permit term is used in this evaluation to consider alternative limits if the variance is approved again.

The graph below shows the effluent weekly average chloride data from the current permit term.



A target limit and permit language for Source Reduction Measures are not recommended as part of this evaluation. These should follow contact with Sussex. Though if the Department and Sussex are unable to reach agreement on all the terms of a Chloride Variance, the calculated limits described earlier should be included in the permit, in accordance with s. NR 106.83(3), Wis. Adm. Code.

Chloride Monitoring Recommendations
Four samples per month (on consecutive days) are recommended. This allows for averaging of the results to compare with the interim limit and allows the use of the average in determining future interim limits, and degree of success with chloride reduction measures.

In the absence of a variance, Sussex would be subject to the WQBEL of 400 mg/L as a weekly average (rounded); the weekly average mass limit of 16,800 lbs/day (396 mg/L × 5.1 MGD × 8.34); and an alternative wet weather mass limit of 28,400 lbs/day (396 mg/L × 8.6 MGD × 8.34) based on the peak weekly flow rate.

Mercury – The WQBEL for total recoverable mercury is set equal to the most stringent criterion of 1.3 ng/L, according to s. NR 106.06(6), Wis. Adm. Code, because the background concentration in the receiving water and similar inland streams is known to exceed 1.3 ng/L.

The current permit requires annual monitoring of the influent and effluent for total recoverable mercury. A total of five effluent sampling results are available from 05/05/2020 – 09/10/2024 for total recoverable mercury. The average concentration was 0.08 ng/L, which is less than $1/5^{th}$ of the lowest calculated WQBEL. Therefore, **no limits are recommended; however, monitoring is recommended to continue in the reissued permit** to determine reasonable potential in the next reissuance.

PFOS and PFOA – The need for PFOS and PFOA monitoring is evaluated in accordance with s. NR 106.98(2), Wis. Adm. Code. Previous monitoring produced a PFOS result of 1.01 ng/L and a PFOA result of 5.71 ng/L. These results are less than one fifth of the respective criteria for each substance. Based on the effluent flow rate, **PFOS and PFOA monitoring is recommended at a once every two months frequency.**

PART 3 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR BOD, TSS AND AMMONIA NITROGEN

Weekly and monthly average limits for BOD_5, TSS, and Ammonia Nitrogen
The receiving water low flows were updated on June 20, 2019. Previously, the limits were calculated based on a 7-Q_{10} of 0.17 cfs. The weekly and monthly average BOD, TSS and ammonia nitrogen limits could potentially increase with the increase in the receiving water low flows. However, to allow an increase in a limit above an existing limit the facility must demonstrate the need for the higher limits consistent with s. NR 207.04(1), Wis. Adm. Code.

If Sussex would like to request an increase to the existing permit limits for BOD_5, TSS, or ammonia nitrogen, 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. The data from the current permit term is shown below:

Effluent Data

	BOD_5 mg/L	TSS mg/L	Ammonia mg/L
1-day P_{99}	4.01	4.22	0.80
4-day P_{99}	2.43	2.81	0.46
30-day P_{99}	1.35	1.56	0.18
Mean*	0.68	0.91	0.03
Std	0.70	0.80	0.67

Attachment #1

	BOD_5 mg/L	TSS mg/L	Ammonia mg/L
Sample size	1062	1062	1061
Range	<2.0 – 6.0	<1.0 – 7.0	<0.02 – 3.0

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

A review of Sussex's data suggests that the requirements of s. NR 207.04(1)(a), Wis. Adm. Code, do not appear to be met based on BOD_5, TSS, and Ammonia Nitrogen effluent concentrations from reported data between 10/01/2019 – 10/31/2024. **Therefore, the current weekly and monthly average limits for BOD_5, TSS, and ammonia nitrogen are required to be retained in the reissued permit consistent with s. NR 207.04(2), Wis. Adm. Code.**

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

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

Where:

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

The effluent pH data was examined as part of this evaluation. A total of 1858 sample results were reported from 10/02/2019 – 10/31/2024. The maximum reported value was 8.6 s.u. (Standard pH Units). The effluent pH was 8.0 s.u. or less 99% of the time. The 1-day P_{99}, calculated in accordance with s. NR 106.05(5), Wis. Adm. Code, is 8.9 s.u. The mean plus the standard deviation multiplied by a factor of 2.33, an estimate of the upper ninety ninth percentile for a normally distributed dataset, is 7.9 s.u. Therefore, a value of 7.9 s.u. is believed to represent the maximum reasonably expected pH, and therefore most appropriate for determining daily maximum limitations for ammonia nitrogen. Substituting a value of 7.9 s.u. into the equation above yields an ATC = 10 mg/L.

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

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

Daily Maximum Ammonia Nitrogen Determination

	Ammonia Nitrogen Limit mg/L
2×ATC	20
1-Q_{10}	10

The 1-Q_{10} method yields the most stringent limits for Sussex. This limit is greater than the current daily maximum limit of 6.7 mg/L. The Department would be unable to increase the limit due to the lack of need as shown via the antidegradation rule (ch. NR 207, Wis. Adm. Code) because the highest reported

concentration was 3 mg/L during the previous permit term. **No changes are recommended for any of the permit limits for ammonia.**

PART 4 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR BACTERIA

On May 1, 2020, revisions to chs. NR 102 and NR 210, Wis. Adm. Codes, became effective which replace fecal coliform limits with new *Escherichia coli* (*E. coli*) limits for protection of recreational uses. Section NR 210.06(2)(a)1, Wis. Adm. Code, includes two limits which must be included in permits for facilities which are required to disinfect:

1. The geometric mean of *E. coli* bacteria in effluent samples collected in any calendar month may not exceed 126 counts/100 mL.
2. No more than 10 percent of *E. coli* bacteria samples collected in any calendar month may exceed 410 counts/100 mL.

E. coli monitoring is recommended at the same frequency that fecal coliform monitoring is required in the current permit. Because Sussex's permit requires 2/weekly monitoring, the 410 counts/100 mL limit will effectively function as a daily maximum limit unless the facility performs additional monitoring. Any additional monitoring beyond what is required by the permit must also be reported on the DMR as required in the standard requirements section of the permit.

These limits are required during May through September. No changes are recommended to the current recreational period and the required disinfection season.

Effluent Data
Sussex has monitored effluent *E. coli* from 05/02/2024 – 09/30/2024 and a total of 44 results are available A geometric mean of 126 counts/100 mL was not exceed, with a maximum monthly geometric mean of 13.5 counts/100 mL. The maximum reported daily value was 216 counts/100 mL. Based on this effluent data, it appears that **Sussex can meet new *E. coli* limits and a compliance schedule is not needed in the reissued permit.**

PART 5 – PHOSPHORUS

Water Quality-Based Effluent Limits (WQBEL)
Revisions to administrative rules regulating phosphorus took effect on December 1, 2010. These rule revisions include additions to s. NR 102.06, Wis. Adm. Code, which establish phosphorus standards for surface waters. Subchapter III of NR 217, Wis. Adm. Code, establishes procedures for determining WQBELs for phosphorus, based on the applicable standards in ch. NR 102, Wis. Adm. Code.

Section NR 102.06(3)(a), Wis. Adm. Code, specifically names river segments for which a phosphorus criterion of 0.100 mg/L applies. For other stream segments that are not specified in s. NR 102.06(3)(a), Wis. Adm. Code, s. NR 102.06(3)(b), Wis. Adm. Code, specifies a phosphorus criterion of 0.075 mg/L. The phosphorus criterion of 0.075 mg/L applies for Spring Creek.

The conservation of mass equation is described in s. NR 217.13(2)(a), Wis. Adm. Code, for phosphorus WQBELs and includes variables of water quality criterion (WQC), receiving water flow rate (Qs), effluent flow rate (Qe), and upstream phosphorus concentrations (Cs) provided below.

Attachment #1
Limitation = [(WQC)(Qs+(1-f) Qe) – (Qs-f Qe) (Cs)]/Qe

Where:

WQC = 0.075 mg/L for Spring Creek
Qs = 100% of the 7-Q_2 of 0.34 cfs
Cs = background concentration of phosphorus in the receiving water pursuant to s. NR 217.13(2)(d), Wis. Adm. Code
Qe = effluent flow rate = 5.1 MGD = 7.89 cfs
f = the fraction of effluent withdrawn from the receiving water = 0

Section NR 217.13(2)(d), Wis. Adm. Code, specifies that the background phosphorus concentration used in the limit calculation formula shall be calculated as a median using the procedures specified in s. NR 102.07(1)(b) to (c), Wis. Code. All representative data from the most recent 5 years shall be used, but data from the most recent 10 years may be used if representative of current conditions.

A previous evaluation resulted in a WQBEL of 0.075 mg/L using a background concentration of 0.17 mg/L. This represents the median concentration of 5 samples collected by the facility from 07/25/2012 – 05/24/2013, approximately 100 yards upstream of the discharge and this data is used in this evaluation as well.

Substituting a background concentration above criteria into the limit calculation equation above would result in a calculated limit that is less than the applicable criterion of 0.075 mg/L. However, s. NR 217.13(7), Wis. Adm. Code, specifies that "if the WQBEL calculated pursuant to the procedures in this section is less than the phosphorus criterion specified in s. NR 102.06, Wis. Adm. Code, for the water body, the effluent limit shall be set equal to the criterion."

Effluent Data

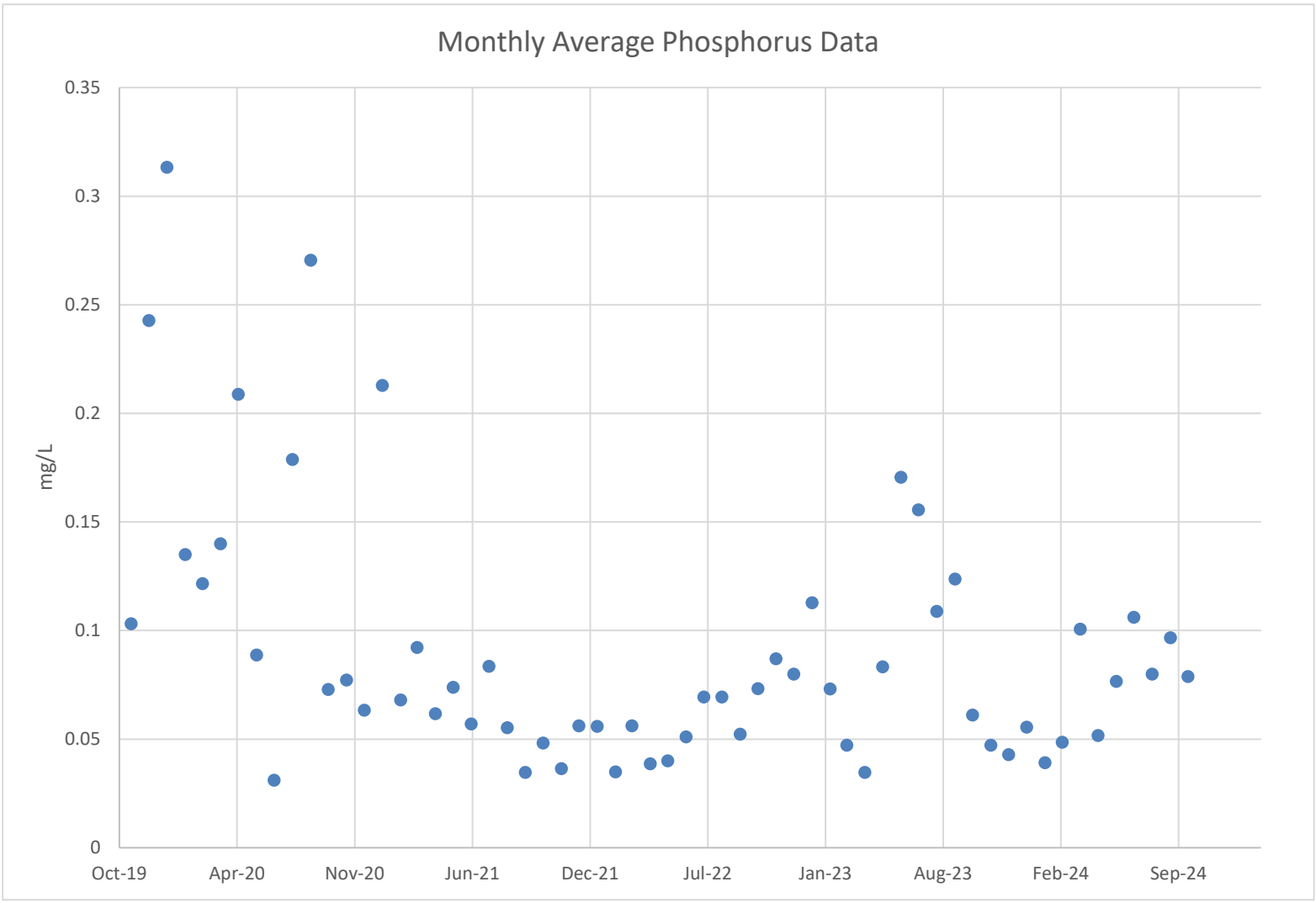
The following table summarizes effluent total phosphorus monitoring data from 10/01/2021 – 10/31/2024. WQBELs became effective on 10/01/2021.

Total Phosphorus Effluent Data

	Phosphorus mg/L	**Phosphorus lbs/day**
1-day P_{99}	0.28	4.58
4-day P_{99}	0.16	2.63
30-day P_{99}	0.10	1.59
Mean*	0.07	1.14
Std	0.06	0.92
Sample size	659	670
Range	<0.011 – 0.56	0 – 7.51

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

The graph below shows the monthly average phosphorus data from the permit term (10/01/2019 – 10/31/2024).



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

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

Mass Limits
A mass limit is also required, pursuant to s. NR 217.14(1)(a), Wis. Adm. Code, because the discharge is to a surface water that is to or upstream of a phosphorus-impaired water. **This final mass limit shall be 0.075 mg/L × 8.34 × 5.1 MGD = 3.2 lbs/day expressed as a six-month average.**

TMDL Under Development
A Total Maximum Daily Load (TMDL) is being developed for the Fox (IL) River Basin for phosphorus. The TMDL will address phosphorus water quality impairments within the basins and provide waste load allocations (WLA) required to meet water quality standards. This TMDL will likely result in phosphorus limitations that must be included in WPDES permits, which may be different than those calculated in this WQBEL memo. TMDL-derived phosphorus limits may be included in lieu of or in addition to the calculated limits upon permit reissuance or modification once the TMDL has been approved by U.S. EPA, according to s. NR 217.16, Wis. Adm. Code.

PART 6 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR THERMAL

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

In accordance with s. NR 106.53(2)(b), Wis. Adm. Code, the highest daily maximum flow rate for a calendar month is used to determine the acute (daily maximum) effluent limitation. In accordance with s. NR 106.53(2)(c), Wis. Adm. Code, the highest 7-day rolling average flow rate for a calendar month is used to determine the sub-lethal (weekly average) effluent limitation. These values were based off actual flow reported from 10/01/2019 – 10/31/2024.

The table below summarizes the maximum temperatures reported during monitoring from 01/02/2023 – 12/31/2023.

Monthly Temperature Effluent Data & Limits

Month	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Weekly Maximum (°F)	Daily Maximum (°F)	Weekly Average Effluent Limitation (°F)	Daily Maximum Effluent Limitation (°F)
JAN	52	52	**49**	77
FEB	49	50	50	77
MAR	49	50	52	78
APR	52	53	55	80
MAY	57	59	65	83
JUN	63	64	76	84

Attachment #1

Month	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Weekly Maximum (°F)	Daily Maximum (°F)	Weekly Average Effluent Limitation (°F)	Daily Maximum Effluent Limitation (°F)
JUL	66	67	81	85
AUG	68	69	81	84
SEP	67	68	73	82
OCT	65	66	**61**	81
NOV	59	59	**49**	78
DEC	55	56	**49**	77

Reasonable Potential

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

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

Comparing the representative highest effluent temperature to the calculated effluent limits determines the reasonable potential of exceeding the effluent limits. The months in which limitations are recommended are shown in bold. Based on this analysis, weekly average temperature maximum limits are necessary for the months of January, October, November, and December.

Dissipative Cooling Study

Sussex has submitted a request for consideration of dissipative cooling (DC), referencing a previous dissipative cooling study. The previous DC study was completed in November 2013 which showed that the stream temperature within the mixing zone of the effluent increased to approximately 15 degrees above ambient temperatures. All instream temperatures downstream of the effluent were below the chronic criteria for November, except one location, approximately 135 feet downstream, which was 1 degree above criteria. The local Department biologist concluded that the discharge of this temperature does not have an adverse effect on the fisheries. Based on this information, the department has found that it is not necessary to include temperature limits in the reissued permit. **Temperature monitoring is recommended for one year** per the requirements of s. NR 106.59(7), Wis. Adm. Code.

PART 7 – WHOLE EFFLUENT TOXICITY (WET)

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

- Acute tests predict the concentration that causes lethality of aquatic organisms during a 48 to 96-hour exposure. To assure that a discharge is not acutely toxic to organisms in the receiving water, WET tests must produce a statistically valid LC_{50} (Lethal Concentration to 50% of the test organisms) greater than 100% effluent, according to s. NR 106.09(2)(b), Wis. Adm Code.
- Chronic tests predict the concentration that interferes with the growth or reproduction of test organisms during a seven-day exposure. To assure that a discharge is not chronically toxic to organisms in the receiving water, WET tests must produce a statistically valid IC_{25} (Inhibition Concentration) greater than the instream waste concentration (IWC), according to s. NR 106.09(3)(b), Wis. Adm Code. The IWC is an estimate of the proportion of effluent to total volume of water (receiving water + effluent). The IWC of **99%** shown in the WET Checklist summary below was calculated according to the following equation, as specified in s. NR 106.03(6), Wis. Adm Code:

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

Where:

Q_e = annual average flow = 5.1 MGD = 7.89 cfs
f = fraction of the Q_e withdrawn from the receiving water = 0
Q_s = ¼ of the 7-Q_{10} = 0.23 cfs ÷ 4 = 0.0575 cfs

- According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), a synthetic (standard) laboratory water may be used as the dilution water and primary control in acute WET tests, unless the use of different dilution water is approved by the Department prior to use. The primary control water must be specified in the WPDES permit.
- According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), receiving water must be used as the dilution water and primary control in chronic WET tests, unless the use of different dilution water is approved by the Department prior to use. The dilution water used in WET tests conducted on Outfall 001 shall be a grab sample collected from the receiving water location, upstream and out of the influence of the mixing zone and any other known discharge. The specific receiving water location must be specified in the WPDES permit.
- Shown below is a tabulation of all available WET data for Outfall 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. Significant changes were made to WET test methods in 2004 and these changes were assumed to be fully implemented by certified labs by no later than June 2005. Tests earlier than July 1, 2005 are not included in this evaluation.

Attachment #1

WET Data History

Date Test Initiated	Acute Results LC_{50} %				Chronic Results IC_{25} %					Footnotes or Comments
	C. dubia	Fathead minnow	Pass or Fail?	Used in RP?	*C. dubia*	Fathead Minnow	Algae (IC_{50})	Pass or Fail?	Use in RP?	
12/05/2006	>100	>100	Pass	Yes	>100	>100		Pass	Yes	
09/26/2007	>100	>100	Pass	Yes	>100	>100		Pass	Yes	
03/26/2008	>100	>100	Pass	Yes	>100	>100		Pass	Yes	
06/09/2009					>100	>100		Pass	No	1
01/07/2010	>100	>100	Pass	Yes	>100	>100		Pass	No	1
06/15/2010	>100	>100	Pass	Yes	>100	>100		Pass	No	1
09/21/2010					>100	>100		Pass	No	1
03/08/2011	>100	>100	Pass	Yes	>100	>100		Pass	No	1
09/27/2011					>100	>100		Pass	Yes	
05/31/2012					>100	>100		Pass	Yes	
11/06/2012	>100	>100	Pass	Yes	>100	>100		Pass	Yes	
02/12/2013					>100	>100		Pass	Yes	
04/09/2013	>100	>100	Pass	Yes						
08/13/2013	>100	>100	Pass	Yes	>100	>100		Pass	Yes	
03/04/2014					>100	>100		Pass	Yes	
07/29/2014	>100	>100	Pass	Yes	>100	>100		Pass	Yes	
11/04/2014	>100	>100	Pass	Yes	>100	>100		Pass	Yes	
05/19/2015	>100	>100	Pass	Yes	>100	>100		Pass	Yes	
08/23/2016	>100	>100	Pass	Yes	>100	>100		Pass	Yes	
01/24/2017	>100	>100	Pass	Yes	90.7	>100		Fail	No	2
02/21/2017					>100	>100		Pass	Yes	
02/28/2017					>100	>100		Pass	Yes	
10/31/2017	>100	>100	Pass	Yes	>100	>100		Pass	No	2
11/28/2017						>100		Pass	Yes	
01/22/2019	>100	>100	Pass	Yes	>100	>100		Pass	Yes	
04/07/2020	>100	>100	Pass	Yes	>100	>100		Pass	Yes	
07/20/2021	>100	>100	Pass	Yes	>100	>100		Pass	Yes	
10/18/2022	>100	>100	Pass	Yes	39.9	73.0		Fail	Yes	
12/13/2022					>100	>100		Pass	Yes	
01/10/2023					>100	>100		Pass	Yes	
03/14/2023	>100	>100	Pass	Yes	>100	>100		Pass	Yes	
05/07/2024	>100	>100	Pass	Yes	>100	88.2		Fail	Yes	
06/18/2024					>100	>100		Pass	Yes	
07/30/2024					>100	>100		Pass	Yes	

Footnotes:

1. *Tests done by S-F Analytical, July 2008 – March 2011.* The DNR has reason to believe that WET tests completed by SF Analytical Labs from July 2008 through March 31, 2011 were not performed using proper test methods. Therefore, WET data from this lab during this period has been disqualified and was not included in the analysis.
2. *Qualified or Inconclusive Data.* The test did not meet test acceptability requirements and had to be repeated.

- According to s. NR 106.08, Wis. Adm. Code, WET reasonable potential is determined by multiplying the highest toxicity value that has been measured in the effluent by a safety factor, to predict the

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

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

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

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

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

Chronic WET Limit Parameters

TUc (maximum) $100/IC_{25}$	**B** (multiplication factor from s. NR 106.08(6)(c), Wis. Adm. Code, Table 4)	IWC
100/39.9 = 2.5	3.8 Based on 2 detects	99%

[(TUc effluent) (B)(IWC)] = 9.4 > 1.0

Therefore, reasonable potential is shown for chronic WET limits using the procedures in s. NR 106.08(6) and representative data from 12/05/2006 – 07/30/2024.

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

WET Checklist Summary

	Acute	**Chronic**
AMZ/IWC	Not Applicable. **0 Points**	IWC = 99%. **15 Points**
Historical Data	22 tests used to calculate RP. No tests failed. **0 Points**	26 tests used to calculate RP. 2 tests failed. **0 Points**

Attachment #1

	Acute	Chronic
Effluent Variability	Little variability, no violations or upsets, consistent WWTF operations. **0 Points**	Same as Acute. **0 Points**
Receiving Water Classification	Warmwater sport fish. **5 Points**	Same as Acute. **5 Points**
Chemical-Specific Data	No reasonable potential for limits based on ATC; Ammonia nitrogen limit carried over from the current permit. Copper, mercury, zinc, chloride, and ammonia detected. Additional Compounds of Concern: Chloroform and phenol **5 Points**	Reasonable potential for limits for chloride based on CTC; Ammonia nitrogen limit carried over from the current permit. Copper, mercury, zinc, and ammonia detected. Additional Compounds of Concern: Chloroform and phenol **10 Points**
Additives	0 Biocides and 1 Water Quality Conditioners added. Permittee has proper P chemical SOPs in place: Yes **1 Point**	All additives used more than once per 4 days. **1 Point**
Discharge Category	2 Industrial Contributors. **6 Points**	Same as Acute. **6 Points**
Wastewater Treatment	Secondary or Better **0 Points**	Same as Acute. **0 Points**
Downstream Impacts	No impacts known. **0 Points**	Same as Acute. **0 Points**
Total Checklist Points:	**17 Points**	**37 Points**
Recommended Monitoring Frequency (from Checklist):	1x yearly	1x yearly
Limit Required?	No	Yes Limit = 1.0 TU_c
TRE Recommended? (from Checklist)	No	No

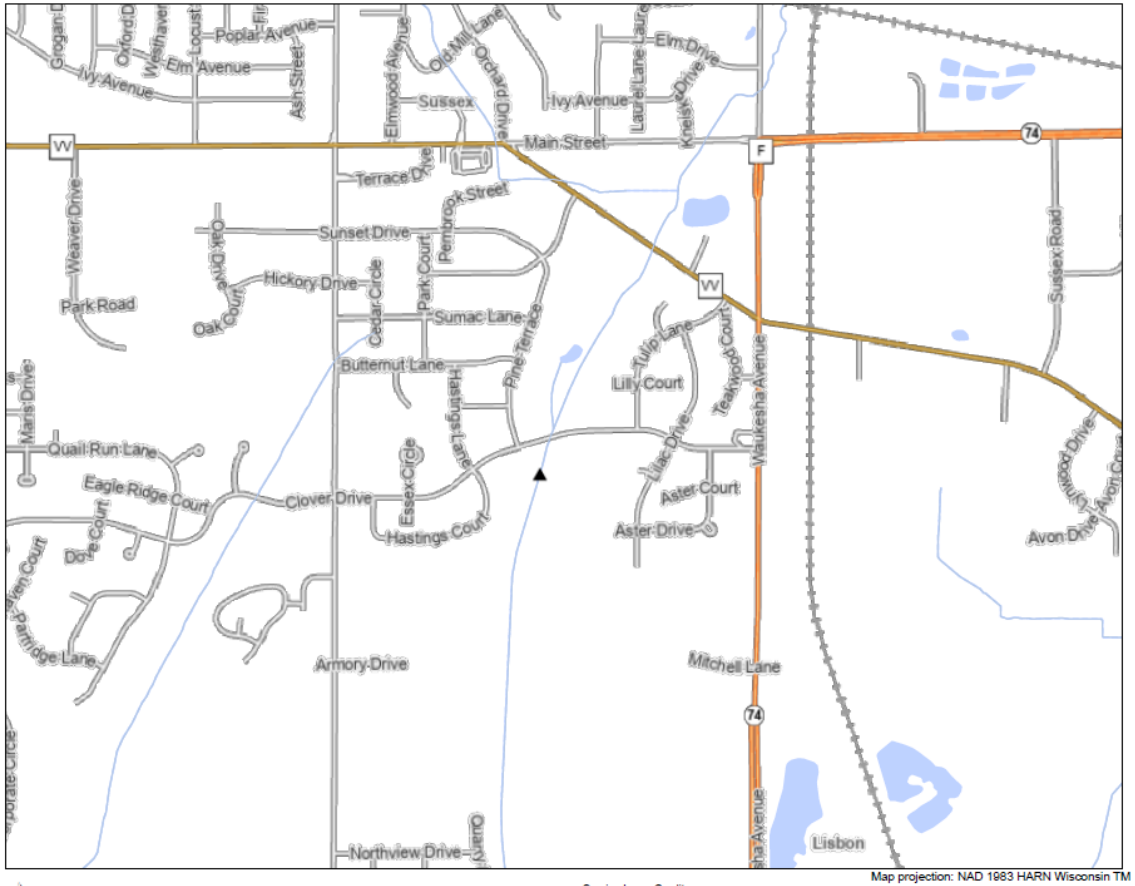
- After consideration of the guidance provided in the Department's WET Program Guidance Document (2022) and other information described above, 1x yearly acute and 1x yearly chronic WET tests are recommended in the reissued permit. Tests should be done in rotating quarters to collect seasonal information about this discharge. WET testing should continue after the permit expiration date (until the permit is reissued).
- According to the requirements specified in s. NR 106.08, Wis. Adm. Code, a chronic WET limit is required. The chronic WET limit shall be expressed as 1.0 TUc as a monthly average in the effluent limits table of the permit.
- A minimum of annual chronic monitoring is required because a chronic WET limit is required. Federal regulations in 40 CFR Part 122.44(i) require that monitoring occur at least once per year when a limit is present.
- A minimum of annual acute and chronic monitoring is recommended because Sussex is a major

municipal discharger with a design flow greater than 1.0 MGD. Federal regulations at 40 CFR Part 122.21(j) require at least 4 acute and chronic WET tests with each permit application on samples collected since the previous reissuance. Therefore, annual monitoring is recommended in the permit term, so that data will be available for the next permit application.

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

WISCONSIN DEPARTMENT OF NATURAL RESOURCES

Sussex Outfall Location



Legend: (some map layers may not be displayed)

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

Latest Leaf Off Imagery

- Red: Band_1
- Green: Band_2
- Blue: Band_3

Notes:
Not to scale

Map projection: NAD 1983 HARN Wisconsin TM

N

Map: 0 1,000 2,000 Feet
0 340 680 Meters

Service Layer Credits:
Latest Leaf Off Imagery: , Basic Basemap (Cached):

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

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Attachment #3

Temperature limits for receiving waters with unidirectional flow

(calculation using default ambient temperature data)

						Temp Dates	Flow Dates
Facility:	Sussex WWTF		**7-Q_{10}:**	0.23	cfs		
Outfall(s):	001		**Dilution:**	25%		**Start:**	01/02/23	10/01/19
Date Prepared:	11/19/2024		**f:**	0		**End:**	12/31/23	10/31/24
Design Flow (Qe):	5.10	MGD	**Stream type:**	Small warm water sport or forage fish co			
Storm Sewer Dist.	0	ft	**Qs:Qe ratio:**	0.0	:1		
			Calculation Needed?	YES			

Month	Water Quality Criteria			Receiving Water Flow Rate (Qs)	Representative Highest Effluent Flow Rate (Qe)		f	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Ta (default)	Sub-Lethal WQC	Acute WQC		7-day Rolling Average (Qesl)	Daily Maximum Flow Rate (Qea)		Weekly Average	Daily Maximum	Weekly Average Effluent Limitation	Daily Maximum Effluent Limitation
	(°F)	(°F)	(°F)	(cfs)	(MGD)	(MGD)		(°F)	(°F)	(°F)	(°F)
JAN	33	49	76	0.40	2.548	2.767	0	52	52	**49**	77
FEB	34	50	76	0.42	2.690	4.382	0	49	50	50	77
MAR	38	52	77	0.67	3.678	4.387	0	49	50	52	78
APR	48	55	79	1.00	5.348	6.597	0	52	53	55	80
MAY	58	65	82	0.61	3.438	3.842	0	57	59	65	83
JUN	66	76	84	0.42	4.088	4.840	0	63	64	76	84
JUL	69	81	85	0.31	3.491	3.759	0	66	67	81	85
AUG	67	81	84	0.29	2.695	2.910	0	68	69	81	84
SEP	60	73	82	0.27	3.410	5.522	0	67	68	73	82
OCT	50	61	80	0.34	1.900	2.052	0	65	66	**61**	81
NOV	40	49	77	0.48	2.587	3.461	0	59	59	**49**	78
DEC	35	49	76	0.41	2.354	2.608	0	55	56	**49**	77

Facility Specific Chloride Variance Data Sheet

Directions: Please complete this form electronically. Record information in the space provided. Select checkboxes by double clicking on them. Do not delete or alter any fields. For citations, include page number and section if applicable. Please ensure that all data requested are included and as complete as possible. Attach additional sheets if needed.

Section I: General Information

A. Name of Permittee: Village of Sussex

B. Facility Name: Sussex Wastewater Treatment Facility

C. Submitted by: Wisconsin Department of Natural Resources

D. State: Wisconsin **Substance:** Chloride **Date completed:** January 27, 2025

E. Permit #: WI-0020559-09-0 **WQSTS #:** (EPA USE ONLY)

F. Duration of Variance **Start Date:** July 1, 2025 **End Date:** June 30, 2030

G. Date of Variance Application: June 17, 2024

H. Is this permit a:
☐ **First time submittal for variance**
☒ **Renewal of a previous submittal for variance** *(Complete Section IX)*

I. Description of proposed variance: The Sussex Wastewater Treatment Facility seeks a variance to the water quality standard for chloride. The Department concludes that Sussex Wastewater Treatment Facility has met the requirements of s. NR 106.83(2), Wisconsin Administrative Code, and s. 283.15, Wisconsin Statutes. The Department further concludes that requiring the Sussex Wastewater Treatment Facility to meet the water quality standard of chloride would result in substantial and widespread adverse social and economic impacts in its service area.

Variance for chloride from the water quality-based effluent limit of 396 mg/L (400 rounded), expressed as a weekly average limit, to a seasonal weekly average interim limit of 511 mg/L (December-April) and 500 mg/L (May- November). The permit includes requirements to implement source reduction measures and an effluent target value of 460 mg/L.

Citation: An interim chloride effluent limitation under s. NR 106.83(2), Wis. Adm. Code, represents a variance to water quality standards authorized by s. 283.15, Wis. Stats., and 40 CFR §131.14.

J. List of all who assisted in the compilation of data for this form

Name	Email	Phone	Contribution
Victoria Ziegler	Victoria.Ziegler@wisconsin.gov	414-391-8946	Permit Drafter and Variance Coordinator
Nick Lent	Nicholas.Lent@wisconsin.gov	414-239-1938	Compliance Staff
Nicole Krueger	Nicole.Krueger@wisconsin.gov	414-897-5750	Limits Calculator Parts II D-H and J

Section II: Criteria and Variance Information

A. Water Quality Standard from which variance is sought: Chloride

B. List other criteria likely to be affected by variance: No other variances were requested.

C. Source of Substance: Primarily from residential home water softeners and winter road salt application, plus some contributions from industrial processes and industrial water softening needs.

D. Ambient Substance Concentration: 261 mg/L ☒ **Measured** ☐ **Estimated** ☐ **Default** ☐ **Unknown**

E. If measured or estimated, what was the basis? Include citation. The facility collected instream chloride data from upstream of their outfall from 12/14/2005 – 07/20/2018.

F. Average effluent discharge rate: 5.1 MGD (annual average design flow) **Maximum effluent discharge rate:** 12.75 MGD (peak daily design flow)

G. Effluent Substance Concentration: 1-day P99 = 650 mg/L; 4-day P99 = 553 mg/L; 30-day P99 = 497 mg/L; Average all data = 467 mg/L — ☒ **Measured** ☐ **Estimated** ☐ **Default** ☐ **Unknown**

H. If measured or estimated, what was the basis? Include Citation. Permit-required monitoring from 10/01/2019 – 10/04/2024.

I. Type of HAC:
☐ **Type 1: HAC reflects waterbody/receiving water conditions**
☐ **Type 2: HAC reflects achievable effluent conditions**
☒ **Type 3: HAC reflects current effluent conditions**

J. Statement of HAC: The Department has determined the highest attainable condition of the receiving water is achieved through the application of the variance limit in the permit, combined with a permit requirement that the permittee implement its Chloride SRM plan. Thus, the HAC at commencement of this variance is 511 mg/L for December – April and 500 mg/L for May – November, which reflects the greatest chloride reduction achievable with the current treatment processes, in conjunction with the implementation of the permittee's Chloride SRM plan. The current effluent condition is reflective of on-site optimization measures that have already occurred. This HAC determination is based on the economic feasibility of available compliance options for Sussex Wastewater Treatment Facility at this time (see Economic Section below). The permittee may seek to renew this variance in the subsequent reissuance of this permit; the Department will reevaluate the HAC in its review of such a request. A subsequent HAC cannot be defined as less stringent than this HAC.

K. Variance Limit: December-April: 511 mg/L, May-November: 500 mg/L

L. Level currently achievable (LCA): 553 mg/L

M. What data were used to calculate the LCA, and how was the LCA derived? (*Immediate compliance with LCA is required.)*
4-day P99 from the entire permit term (10/01/2019 – 10/04/2024)

N. Explain the basis used to determine the variance limit (which must be ≤ LCA). Include citation.
Typically, the 4-day P99 of effluent data is used as the variance interim limit. However, the calculated 4-day P99's from the last permit term are greater than the current variance limits for these time periods which were calculated based on older data. However, it would be counterproductive to increase the variance limit in the proposed permit, and the facility is usually in compliance with the existing interim limits, so they are retained in the proposed permit. With increased emphasis on source reduction measures and meeting the highest attainable condition, it is expected that Sussex can meet the proposed variance limits of 511 mg/L from December through April and 500 mg/L from May through November.

Chapter NR 106, Subchapter VII, Wis. Adm. Code, allows for a variance; the imposition of a less restrictive interim limit; a compliance schedule that stresses source reduction and public education; and allowance for a target value or limit to be a goal for reduction.

{Ex. The variance limit = 4 Day P99. The limit is established in accordance with s. 283.15 (5), Wis. Stats. and ch. NR 106 Subchapter II, Wis. Adm. Code.}

O. Select all factors applicable as the basis for the variance provided under 40 CFR 131.10(g). Summarize justification below: ☐ **1** ☐ **2** ☐ **3** ☐ **4** ☐ **5** ☒ **6**

The use of a reverse osmosis system was evaluated. The cost of the reverse osmosis treatment system was estimated to result in an average that would be about 8.39% of the MHI. Installing centralized lime softening on the current municipal water supply system was also evaluated, and the estimated cost of doing so would be about 3.78% of the MHI. The cost estimates are in the range in which the application of either treatment would be expected to result in substantial and widespread economic and social impacts to the community. Without a variance, meeting the water quality-based effluent limit of 400 mg/L would result in substantial and widespread economic and social impacts.

Section III: Location Information

A. Counties in which water quality is potentially impacted: Waukesha County

B. Receiving waterbody at discharge point: Spring Creek

C. Flows into which stream/river? Fox (IL) River **How many miles downstream?** ~5 miles

D. Coordinates of discharge point (UTM or Lat/Long): Lat: 43.12409° N, Long: 88.21785° W

E. What is the distance from the point of discharge to the point downstream where the concentration of the substance falls to less than or equal to the chronic criterion of the substance for aquatic life protection?
About 15 miles downstream of Sussex, there is enough dilution at Waukesha for the instream chloride concentration to be below the chronic criterion of 395 mg/L during low flow conditions.

F. Provide the equation used to calculate that distance *(Include definitions of all variables, identify the values used for the clarification, and include citation):*
(interim limit in mg/L x effluent design flow in cfs) + (background concentration mg/L x background stream flow in cfs)) / (effluent design flow in cfs + background stream flow in cfs) = ≤ 395 mg/L.

Brookfield background: 620 mg/L variance limit and 12.5 MGD design flow, 7Q10 = 6.7 cfs
Waukesha background: 470 mg/L WQBEL limit and 4.7 MGD design flow, 7Q10 = 14 cfs

G. What are the designated uses associated with the direct receiving waterbody, and the designated uses for any downstream waterbodies until the water quality standard is met?
Spring Creek is classified as a warm water sport fish community and is not used for a public water supply.

H. Identify all other variance permittees for the same substance which discharge to the same stream, river, or waterbody in a location where the effects of the combined variances would have an additive effect on the waterbody:

Permit Number	Facility Name	Facility Location	Variance Limit [mg/L]
WI-0023469-10-0	City of Brookfield Fox River Water Pollution Control Center	Brookfield, WI	620 mg/L (Dec-April) 590 mg/L (May-Nov)

I. Please attach a map, photographs, or a simple schematic showing the location of the discharge point as well as all variances for the substance currently draining to this waterbody on a separate sheet

J. Is the receiving waterbody on the CWA 303(d) list? If yes, please list the impairments below. ☒ **Yes** ☐ **No** ☐ **Unknown**

River Mile	Pollutant	Impairment
0 – 6.57	Total Phosphorus	Low Dissolved Oxygen
113.99-121.06	PCBs, Total Phosphorus, Total Sediment	Low Dissolved Oxygen, PCBs Contaminated Fish Tissue

***K.* Please list any contributors to the POTW in the following categories:**
May need to contact facility for this information

Food processors (cheese, vegetables, meat, pickles, soy sauce, etc.)	Nature's Path
Metal Plating/Metal Finishing	None
Car Washes	Hometown Super Wash, 7-Eleven
Municipal Maintenance Sheds (salt storage, truck washing, etc.)	Public Works Garage, WWTF Garage
Laundromats	Sussex Laundry

Other presumed commercial or industrial chloride contributors to the POTW	Quad Graphics – Printing Company

L. If the POTW does not have a DNR-approved pretreatment program, is a sewer use ordinance enacted to address the chloride contributions from the industrial and commercial users? If so, please describe.
No DNR-approved pretreatment program due to lack of need per ch. NR 211, Wis. Adm. Code.

Village of Sussex Sewer Use Ordinance (SUO): A SUO for the Village of Sussex was amended (05/12/2015) to address excessive chloride contributions from light industrial/commercial users.
The amended SUO includes installation restrictions for all new homes; outside faucets or other faucets where softened water is not essential must be placed on unsoftened water. This language is also included in the Village's plumbing permit for softener replacements.

Satellite Communities SUOs:
Menomonee Falls: approved similar update to SUO on 10/19/2015
Town of Lisbon: approved similar update to SUO in 2016
Village of Lannon: discussions ongoing, but no recent updates to SUO

Section IV: Pretreatment (complete this section only for POTWs with DNR-Approved Pretreatment Programs. See w:\Variances\Templates and Guidance\Pretreatment Programs.docx)

A. Are there any industrial users contributing chloride to the POTW? If so, please list.
N/A

B. Are all industrial users in compliance with local pretreatment limits for chloride? If not, please include a list of industrial users that are not complying with local limits and include any relevant correspondence between the POTW and the industry (NOVs, industrial SRM updates and timeframe, etc)
N/A

C. When were local pretreatment limits for chloride last calculated?
N/A

D. Please provide information on specific SRM activities that will be implemented during the permit term to reduce the industry's discharge of the variance pollutant to the POTW
N/A

Section V: Public Notice

A. Has a public notice been given for this proposed variance? ☒ Yes ☐ No
B. If yes, was a public hearing held as well? ☒ Yes ☐ No ☐ N/A
C. What type of notice was given?
☒ Notice of variance included in notice for permit ☐ Separate notice of variance
D. Date of public notice: Drafter **Date of hearing:** Drafter
E. Were comments received from the public in regards to this notice or hearing? *(If yes, see notice of final determination)* ☐ Yes ☐ No

Section VI: Human Health

A. Is the receiving water designated as a Public Water Supply? ☐ Yes ☒ No
B. Applicable criteria affected by variance: No human health criteria for chloride
C. Identify any expected impacts that the variance may have upon human health, and include any citations:
None

Section VII: Aquatic Life and Environmental Impact

A. Aquatic life use designation of receiving water: Warm water sport fish community

B. Applicable criteria affected by variance: Chronic toxicity criteria: 395 mg/L

C. Identify any environmental impacts to aquatic life expected to occur with this variance, and include any citations:
The proposed interim limits of 511 mg/L from December – April and 500 mg/L from May – November both result in an instream concentration of around 500 mg/L at the edge of the regulatory mixing zone (mixed with 25 % of 7-Q_{10} and background concentration of 216 mg/L). These edge of mixing zone concentrations only exceed the genus mean chronic value for one species; the Ceriodaphnia (417 mg/L).

D. List any Endangered or Threatened species known or likely to occur within the affected area, and include any citations:
Rusty Patched Bumble Bee (Bombus affinis) – listed endangered

Citation: National Heritage Index (http://dnr.wi.gov/topic/nhi/)

Section VIII: Economic Impact and Feasibility

A. Describe the permittee's current pollutant control technology in the treatment process:

B. What modifications would be necessary to comply with the current limits? Include any citations.
Upgrades to the WWTF to install reverse osmosis (RO) near the end of the treatment process would be needed to comply with the WQBEL of 400 mg/L. Centralized or regional lime softening is not a practical alternative to comply with the WQBEL due to excessive relative cost associated with centralizing well water from multiple wells or providing softening treatment at each well.

C. How long would it take to implement these changes?
Unsure. Neither medication is economically feasible.

D. Estimate the capital cost *(Citation)*: $5,737,500 (Chloride Variance Application)

E. Estimate additional O & M cost *(Citation)*: $1,861,500 (Chloride Variance Application)

F. Estimate the impact of treatment on the effluent substance concentration, and include any citations:
To consistently meet the final water quality-based effluent the current peak effluent concentrations would need to be reduced by approximately 20 %. Treatment at the WWTF would require an upgrade to add a reverse osmosis system near the end of the existing treatment system. If this were pursued the concentration of chloride in the permeate (RO effluent) could be reduced to less than 100 mg/L. However, the RO reject water would still contain the chloride and still requires handling / disposal. Alternatively, a centralized lime softening system for drinking water would eliminate the need for point of use softeners and the associated chloride brine generated during the regeneration/backwash cycle that is ultimately discharged to the wastewater treatment system. Neither option is considered economically feasible.
Proper implementation of SRMs is anticipated to reduce the current effluent chloride concentrations by approximately 5-8 % from current levels over the next five years.

G. Identify any expected environmental impacts that would result from further treatment, and include any citations:
End-of-pipe RO wastewater treatment technology for chloride produces concentrated brine that can be as much or more of an environmental liability than the untreated effluent. Since the concentrated brine cannot be further treated, the only recourse for the disposal of the brine is transfer to another community, which is often not feasible. Appropriate chloride source reduction activities are preferable environmentally to effluent end-of-pipe treatment in most cases, since the end product of treatment (production of a concentrated brine) does not remove the load of chloride from the environment. There would be some impacts based on disposal of brine from RO. These include air pollution impacts from trucking brine and increased chloride impacts at the point where brine is discharged.

H. Is it technically and economically feasible for this permittee to modify the treatment process to reduce the level of the substance in the discharge? ☐ **Yes** ☒ **No** ☐ **Unknown**
Reverse Osmosis treatment of the Village of Sussex WWTF effluent to meet the WQBEL is technically feasible. However, it is not economically feasible. See DNR variance application and screening tool for costs of reverse osmosis. Use of reverse osmosis at the WWTF was evaluated; the resulting total cost for sewer user rates was estimated to result in an average cost to households that would be 8.39% of the MHI. An increase of

this magnitude would cause substantial and wide spread adverse social and economic impacts the area where the discharge is located.
Lime softening treatment of the Village of Sussex's water supply – in lieu of ion-exchange - is technically feasible and would potentially enable the WWTF effluent to meet the chloride WQBEL. However, lime softening is not economically feasible. See the Chloride Variance Economic Eligibility Tool (Lime Softening) screening tool for costs of lime softening. Use of municipal lime softening was evaluated; the resulting cost for sewer user rates was estimated to result in an average cost to households that would be 3.78% of the MHI. An increase of this magnitude would cause substantial and wide spread adverse social and economic impacts the area where the discharge is located.

I. If treatment is possible, is it possible to comply with the limits on the substance? ☒ **Yes** ☐ **No** ☐ **Unknown**

J. If yes, what prevents this from being done? Include any citations.
End of pipe Reverse Osmosis (RO) treatment could reduce effluent chloride concentrations to chronic toxicity criterion. However, attaining the applicable water quality standards specified in chs. NR 102 to 105, Wis. Adm. Code, may cause substantial and widespread adverse social and economic impacts in the community where the discharger is located.

K. List any alternatives to current practices that have been considered, and why they have been rejected as a course of action, including any citations:
Reverse Osmosis (RO)-not economically feasible (8.39% of MHI)
Regional Lime Softening Treatment- not economically feasible (3.78% of MHI)

Section IX: Compliance with Water Quality Standards

A. Describe all activities that have been, and are being, conducted to reduce the discharge of the substance into the receiving stream. This may include existing treatments and controls, consumer education, promising centralized or remote treatment technologies, planned research, etc. Include any citations.
Implementation of the source reduction measure (SRM) plan last established in 2019 for previous permit reissuance that includes source investigation, public education, and outreach, etc.

B. Describe all actions that the permit requires the permittee to complete during the variance period to ensure reasonable progress towards attainment of the water quality standard. Include any citations.

The permit contains a variance to the water quality-based effluent limit (WQBEL) for chloride granted in accordance with s. NR 106.83(2), Wis. Adm. Code. As conditions of this variance, the permittee shall (a) maintain effluent quality at or below the interim effluent limitation specified in the permit, (b) implement the chloride source reduction measures specified below, (c) follow the approved Source Reduction Plan and (d) perform the actions listed in the compliance schedule. (See the permit Schedules section):

Chloride Source Reduction Measures:

Education

- Have water softener brochure available at Village Hall and Satellite Communities kiosk
- Continue to provide softener info on Website
- Include water softener info in Village newsletter
- Educate DPW drivers on salt/brine use, efficient application and cleanup procedures
- Include letters with utility bills to stress reduction of water softener discharges
- Have an informational Booth at National Night Out event

Chloride Source Identification Efforts

- Continue to sample and monitor Commercial, Industrial, hauled wastes customers for high chloride discharges (Includes low and high volume water users)
- Identify and Address I/I problems
- Gather data on the amount of softeners in use in the Village, and what type (time vs DIR)

- Contact largest water users, including public school and apartments. Emphasize softener regeneration optimization, and use softened water connections where only needed. Encourage installation of a brine reclamation system
- Continue the use of salt brine in de-icing operations and cleanup of spilled salt on DPW garage floor

Regulations

- Investigate Ordinance mandating DIR for new and replacement water softeners for satellite communities
- Offer a residential water softener replacement/optimization incentive program

Prevention

- Identify proper placement of public snow piles to prevent snowmelt runoff from draining to the storm sewer

Section X: Compliance with Previous Permit *(Variance Reissuances Only)*

A. Date of previous submittal: January 10, 2020 **Date of EPA Approval:** January 22, 2020

B. Previous Permit #: WI-0020559-08 **Previous WQSTS #:** (EPA USE ONLY)

C. Effluent substance concentration: 1day p99 = 650 mg/L; 4-day p99 = 553 mg/L **Variance Limit:** 511 mg/L (December – April) and 500 mg/L (May – November)

D. Target Value(s): 460 mg/L **Achieved?** ☐ **Yes** ☒ **No** ☐ **Partial**

E. For renewals, list previous steps that were to be completed. Show whether these steps have been completed in compliance with the terms of the previous variance permit. Attach additional sheets if necessary.

Condition of Previous Variance	Compliance
Continue to provide education to residents and businesses on the effects of excessive chloride use and the role of water softeners and road salt application by providing information at the Village Hall, satellite community kiosks, village website, and in the village newsletter. Include letters with utility mailings to encourage reduction of water softener discharges	☒ **Yes** ☐ **No**
Bring awareness to residents on the effects of excessive chloride use by providing an information booth at National Night Out event. Evaluate success of event for future improvements.	☒ **Yes** ☐ **No**
Continue to educate village staff on responsible salt and brine use, efficient application, and cleanup procedures.	☒ **Yes** ☐ **No**
Continue to sample and monitor commercial, industrial, and hauled wastes for high chloride discharges, including low and high-volume water users.	☒ **Yes** ☐ **No**
Continue to take actions that prevent chloride from reaching the sewer system. Find and correct inflow and infiltration issues by lining Silver Spring and Main Street pipe, repairing manholes and following CMOM guidelines.	☒ **Yes** ☐ **No**
Continue brine application for anti-icing during winter road conditions.	☒ **Yes** ☐ **No**
Identify proper placement for snow piles to prevent snowmelt and runoff from draining to the sewer system	☒ **Yes** ☐ **No**
Gather data on water softener use in the Village, including number of users and type (time or Demand	☒ **Yes** ☐ **No**

Initiated Regeneration). Update the "Cross Connection Survey" and gather data by issuing annually.	
Contact the Village's largest water users, including: public schools, apartment buildings, industries, and any new users. Emphasize water softener regeneration optimization, responsible use of softened water connections, or installation of brine reclamation systems	☒ **Yes** ☐ **No**
Explore adoption of a local regulation in the Village of Lannon to require bypass of water softener systems where softening is not essential, such as outside hose-bib use for landscape irrigation. Contact the Village of Lannon, provide examples, and advance discussions as needed.	☐ **Yes** ☐ **No**
Explore adoption of a local regulation to require Demand Initiated Regeneration (DIR) water softeners for new installations and replacements and present to Village Board. Discuss potential adoption of regulations with satellite communities.	☐ **Yes** ☐ **No**
Investigate feasibility of a residential water softener inspection and optimization program. The program may include incentives for residents, encourage participation of water softener companies and contractors, and notification of residents. If the program is determined feasible, the permittee shall develop and begin implementation of the program.	☐ **Yes** ☐ **No**

Village of Sussex Chloride Source Reduction Measures (SRM) Action Plan_*Last Updated February 12, 2025*

For mid-2025 through mid-2030 WPDES Permit : WI-0020559-09-0

SRM Activities	1st Year	2nd Year	3rd Year	4th Year	5th Year
Education					
Continue providing educational information to residents on the Village website, newsletters, flyers, utility bills and social media	Review/update material and develop social media material. Consider hosting of hyperlinks to external resources.	Ongoing and post material on social media	Ongoing	Review/update material	Ongoing
Educate DPW drivers on salt/brine use, efficient application and cleanup procedures. Include basic deicing performance metrics in annual reports.	Training for possible new hires and refresher for experienced DPW employees	Ongoing	Training for possible new hires and refresher for experienced DPW employees	Ongoing	Ongoing
Include letters with utility bills to stress reduction of water softener discharges	Send out Letter	Send out Letter	Send out letter	Send out letter	Review
Set up an Informational Booth at National Night Out	Attend event and investigate ways for more participation	Attend event	Evaluate event booth success if more events should have booths	Attend Event and other events if successful	Review
Chloride Source Identification Efforts					
Continue to sample and monitor Commercial, Industrial, hauled wastes consumers for high chloride discharges (Includes low and high-volume water users)	Conduct a base sampling program and test new commercial properties within Village limits	Ongoing	Expand sampling to satellite communities to locate possible sources	Ongoing	Ongoing
Identify and Address I/I problems with road programs	2025 Road Program Inspections	2025 road Program Construction	2027 Road Program Inspections	2027 Road Program Construction	Follow CMOM guidelines
Gather data on the number of softeners in use in the Village, and what type (time vs DIR)	Gather data for Annual Report and disperse informational flyer on optimization for softeners	Ongoing	Ongoing	Ongoing	Ongoing

Contact the largest water users, including public schools and apartments to establish/maintain dialogue regarding chloride. Emphasize softener regeneration optimization and use softened water connections where only needed. Encourage installation of a brine reclamation system or other reduction methods such as softened/unsoftened water blending valves	Survey and hold discussions with car washes, laundromat(s), and large users regarding chloride. Communicate findings and any follow up items for voluntary reductions in annual reports.	Survey and hold discussions with other users such as apartment complexes regarding chloride. Communicate findings and any follow up items for voluntary reductions in annual reports.	Revisit / continue discussion with large users. Communicate findings and any follow up items.	Seek discussion with any other users. Communicate findings and any follow up items.	Seek discussion with any new users. Communicate findings and any follow up items.
Continue the use of salt brine in de-icing operations and cleanup of spilled salt on DPW garage floors	Ongoing	Ongoing	Ongoing	Ongoing	Ongoing
Regulations					
Offer a residential water softener optimization incentive program	Program Started in 2023. Continue and promote on social media/utility bills and website	Continue if funds are still available. Evaluate program success and strategize how to better promote and implement program	Possibly continue program if funds are still available	Evaluate program success and reallocate funds if possible.	Possibly continue program if funds are still available
Investigate possible chloride surcharge for large water users	Investigation/data collection	Investigation/data collection	Investigation/data collection. Begin process of developing possible chloride surcharge if significant voluntary reduction is not achieved.	Continue process of developing possible chloride surcharge if significant voluntary reduction is not achieved.	Begin implementation of possible chloride surcharge if significant voluntary reduction is not achieved.
Prevention					
Identify proper placement of snow piles to prevent snowmelt runoff from draining to the storm sewer	Ongoing	Ongoing	Ongoing	Ongoing	Ongoing