

## Permit Fact Sheet

### General Information

Permit Number:	WI-0021768-10-0	
Permittee Name:	City of Seymour	
Address:	445 Municipal Drive	
City/State/Zip:	Seymour WI 54165	
Discharge Location:	South bank of Black Creek north of wastewater treatment facility approximately 0.25 miles upstream of the CTH G crossing (44.51855°N, 88.34075°W)	
Receiving Water:	Black Creek (Shioc Watershed) in the Wolf River Basin, Outagamie County (WBIC 317100)	
StreamFlow (Q <sub>7,10</sub> ):	7-Q <sub>10</sub> = 0.04 cubic feet per second (cfs) 7-Q <sub>2</sub> = 0.07 cfs	
Stream Classification:	Limited Forage Fish (LFF) community, non-public water supply	
Discharge Type:	Continuous	
	Monthly Maximum	0.875 million gallons per day (MGD)
	Annual Average	0.578 MGD
Significant Industrial Loading?	Yes, Emmi Roth USA Inc. blue cheese production facility located at 124 E Bronson Road	
Operator at Proper Grade?	Yes. Seymour Wastewater Treatment Facility is an advanced level facility requiring an operator certified in Subclass A1 (Suspended Growth Processes), B (Solids Separation), C (Biological Solids/Sludges), P (Total Phosphorus, and SS (Sanitary Sewage Collection System). John Schoen, Certified Operator, is an Advanced Level, Operator-In-Charge, certified in all subclasses listed above.	
Approved Pretreatment Program?	Not applicable.	

### Facility Description

The City of Seymour owns and operates a tertiary treatment advanced WWTF. Facility treatment units include preliminary treatment with screening and grit removal, extended aeration activated sludge, final clarification, tertiary sand filtration and phosphorus removal with aluminum chloride (Alum) chemical addition. Waste activated sludge (WAS) is aerobically digested in the extended aeration system and the resulting liquid is held in an onsite sludge storage vessel. The stored sludge is ultimately land applied on department approved site. Proposed facility upgrades include new screening, new grit removal, expansion of the extended aeration activated sludge treatment, new chemical enhanced tertiary

filtration, and solids storage expansion. Effluent is discharged on a continuous basis via Outfall 001 to the south bank of Black Creek, approximately 0.25 mi upstream of the County Highway G crossing.

## Substantial Compliance Determination

**Enforcement During Last Permit:** A Notice of Noncompliance was issued in August 2019 for failure to submit required reports under the schedule to comply with final effluent limits for phosphorus. The facility has completed all previously required actions as part of the enforcement process.

After a desk top review of all discharge monitoring reports, CMARs, land app reports, compliance schedule items, and a site visit on January 3, 2024 this facility has been found to be in substantial compliance with their current permit.

**Compliance determination entered by Barti Oumarou on January 23, 2024.**

## Fact Sheet Organization

This fact sheet identifies changes in permit conditions that the department has made when reissuing the City of Seymour WPDES permit. This fact sheet contains all content required under s. NR 201, Wis. Adm. Code, as applicable. The permit remains in effect until the permit is either revoked and reissued, modified, or reissued. The tables and sections that follow were taken from the permit and are numbered in this fact sheet as they are numbered in the permit. Changes to monitoring requirements, limits, and/or schedules are shaded. For complete explanations of derived effluent limitations including water quality-based effluent limitations, please refer to the attached technical memorandum: Water Quality-Based Effluent Limits Technical Memorandum for Seymour Wastewater Treatment Facility dated October 4, 2023.

Sample Point Designation		
Sample Point Number	Discharge Flow, Units, and Averaging Period	Sample Point Location, WasteType/sample Contents and Treatment Description (as applicable)
701		INFLUENT: Representative samples shall be collected from the automatic sampling device drawing samples after the raw sewage pumps immediately following screening and grit removal.
001		EFFLUENT: Representative samples shall be collected from the discharge weir of the former chlorine contact chamber.
003		LIQUID SLUDGE: Representative samples of the aerobically digested liquid sludge shall be collected from the sludge storage tank after complete mixing.

## 1 Influent – Monitoring Requirements

### Sample Point Number: 701- INFLUENT

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow Rate		MGD	Continuous	Continuous	

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
BOD5, Total		mg/L	3/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total		mg/L	3/Week	24-Hr Flow Prop Comp	

### Changes from Previous Permit:

Monitoring requirements were re-evaluated for the proposed permit term and no changes were required in this permit section. Sampling requirements and frequencies are the same as the previous permit. Effluent flow is not measured. It is assumed to be representative of the influent flow as the hydraulic residence time in the treatment plant is short.

### Explanation of Limits and Monitoring Requirements:

Characterization of the influent strengths and volumes coming into the treatment plant is required under s. NR 210.04, Wis. Adm. Code. through minimally monitoring for flow, BOD5, Total, and Total Suspended Solids. 24-hr composite sampling three times per week is adequate to characterize the influent quality for this facility.

## 2 Surface Water - Monitoring and Limitations

### Sample Point Number: 001- EFFLUENT

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
BOD5, Total	Daily Max	30 mg/L	3/Week	24-Hr Flow Prop Comp	
BOD5, Total	Monthly Avg	15 mg/L	3/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total	Daily Max	30 mg/L	3/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total	Monthly Avg	20 mg/L	3/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total	Monthly Avg	92 lbs/day	3/Week	Calculated	Limit effective immediately. See 'Upper Fox Wolf Total Maximum Daily Load (TMDL) Calculations' and 'TMDL Limitations for Total Suspended Solids' subsections.
Suspended Solids, Total	Weekly Avg	130 lbs/day	3/Week	Calculated	Limit effective immediately. See 'Upper Fox Wolf Total Maximum

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
					Daily Load (TMDL) Calculations' and 'TMDL Limitations for Total Suspended Solids' subsections.
Suspended Solids, Total		lbs/yr	Monthly	Calculated	Calculate the 12-month rolling sum of total monthly mass of phosphorus discharged and report on the last day of the month on the DMR.
pH Field	Daily Max	9.0 su	5/Week	Grab	
pH Field	Daily Min	6.0 su	5/Week	Grab	
Dissolved Oxygen	Daily Min	4.0 mg/L	5/Week	Grab	
Nitrogen, Ammonia (NH3-N) Total	Daily Max	10 mg/L	Weekly	24-Hr Flow Prop Comp	Effective year-round.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	6.6 mg/L	Weekly	24-Hr Flow Prop Comp	Limit effective January through February each year.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	6.7 mg/L	Weekly	24-Hr Flow Prop Comp	Limit effective during March.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	5.7 mg/L	Weekly	24-Hr Flow Prop Comp	Limit effective April through May.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	4.6 mg/L	Weekly	24-Hr Flow Prop Comp	Limit effective during July.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	4.7 mg/L	Weekly	24-Hr Flow Prop Comp	Limit effective during August.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	5.8 mg/L	Weekly	24-Hr Flow Prop Comp	Limit effective September through October and June.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	12 mg/L	Weekly	24-Hr Flow Prop Comp	Limit effective during November.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	11 mg/L	Weekly	24-Hr Flow Prop Comp	Limit effective during December.
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	2.8 mg/L	Weekly	24-Hr Flow Prop Comp	Limit effective January through February
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	3.3 mg/L	Weekly	24-Hr Flow Prop Comp	Limit effective during March.
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	2.3 mg/L	Weekly	24-Hr Flow Prop Comp	Limit effective April through May.

<b>Monitoring Requirements and Limitations</b>					
<b>Parameter</b>	<b>Limit Type</b>	<b>Limit and Units</b>	<b>Sample Frequency</b>	<b>Sample Type</b>	<b>Notes</b>
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	2.4 mg/L	Weekly	24-Hr Flow Prop Comp	Limit effective June through July and September through October.
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	2.3 mg/L	Weekly	24-Hr Flow Prop Comp	Limit effective during August.
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	6.6 mg/L	Weekly	24-Hr Flow Prop Comp	Limit effective during November.
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	5.3 mg/L	Weekly	24-Hr Flow Prop Comp	Limit effective during December.
Phosphorus, Total		mg/L	3/Week	24-Hr Flow Prop Comp	Monitoring only. See 'Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus' schedule in permit.
Phosphorus, Total	6-Month Avg	0.96 lbs/day	3/Week	Calculated	Limit effective immediately. See 'Upper Fox Wolf Total Maximum Daily Load (TMDL) Calculations' and 'TMDL Limitations for Total Phosphorus' subsections in permit.
Phosphorus, Total	Monthly Avg	2.9 lbs/day	3/Week	Calculated	Limit effective immediately. See 'Upper Fox Wolf Total Maximum Daily Load (TMDL) Calculations' and 'TMDL Limitations for Total Phosphorus' subsections in permit.
E. coli	Geometric Mean - Monthly	126 #/100 ml	Weekly	Grab	Monitoring and limit effective per the 'Effluent Limitations for E. coli' schedule in permit.
E. coli	% Exceedance	10 Percent	Monthly	Calculated	Monitoring and limit effective per the 'Effluent Limitations for E. coli' schedule in permit. See the 'E. coli Percent Limit' section below. Enter the result in the DMR on the last day of the month.

**Monitoring Requirements and Limitations**

<b>Parameter</b>	<b>Limit Type</b>	<b>Limit and Units</b>	<b>Sample Frequency</b>	<b>Sample Type</b>	<b>Notes</b>
Arsenic, Total Recoverable		ug/L	Quarterly	24-Hr Flow Prop Comp	Monitoring only. See 'Total Metal Analyses' subsection in permit.
Zinc, Total Recoverable		ug/L	Monthly	24-Hr Flow Prop Comp	Monitoring only from October 2027 through September 2028.. See 'Total Metal Analyses' subsection in permit.
Chloride		mg/L	4/Month	24-Hr Flow Prop Comp	Monitoring only on four consecutive days each calendar month.
Temperature Maximum		deg F	Daily	Continuous	See 'Effluent Temperature Monitoring' subsection in permit.
Nitrogen, Total Kjeldahl		mg/L	Quarterly	24-Hr Flow Prop Comp	See 'Nitrogen Series Monitoring' subsection in permit.
Nitrogen, Nitrite + Nitrate Total		mg/L	Quarterly	24-Hr Flow Prop Comp	See 'Nitrogen Series Monitoring' subsection in permit.
Nitrogen, Total		mg/L	Quarterly	Calculated	See 'Nitrogen Series Monitoring' subsection in permit. Total Nitrogen = Total Kjeldahl N (mg/L) + (Nitrite + Nitrate Nitrogen) (mg/L)
PFOS		ng/L	1/ 2 Months	Grab	Monitoring only. See permit subsections 'PFOS/PFOA Sampling and Reporting Requirements' and 'PFOS/PFOA Minimization Plan Determination of Need' and permit schedule 'PFOS/PFOA Minimization Plan Determination of Need'.
PFOA		ng/L	1/ 2 Months	Grab	Monitoring only. See permit subsections 'PFOS/PFOA Sampling and Reporting Requirements' and 'PFOS/PFOA

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
					Minimization Plan Determination of Need' and permit schedule 'PFOS/PFOA Minimization Plan Determination of Need'.
Acute WET		TUa	See Listed Qtr(s)	24-Hr Flow Prop Comp	See 'Whole Effluent Toxicity (WET) Testing' subsection in permit.
Chronic WET		TUc	See Listed Qtr(s)	24-Hr Flow Prop Comp	See 'Whole Effluent Toxicity (WET) Testing' subsection in permit.

**Changes from Previous Permit:**

**Phosphorus, Total** – Final mass based limits were added to the permit consistent with the wastewater allocations in the approved Upper Fox Wolf Total Maximum Daily Loads (TMDL) study.

**E. coli** – Final E. coli limits were added and will go into effect April 30, 2028 as listed in the corresponding schedule in the permit.

**Arsenic, Total Recoverable** – Quarterly monitoring for arsenic, total recoverable has been added to the permit.

**Zinc, Total Recoverable** – Quarterly monitoring for zinc, total recoverable has been added to the permit.

**Chloride** – Monitoring for chloride has been added to the permit at four times per month (4/month) with individual representative samples collected in consecutive days each month.

**Temperature Maximum** – Daily temperature monitoring has been added to the permit.

**Total Nitrogen Series** – Monitoring for Kjeldahl, Nitrogen and Nitrite + Nitrate Total in rotating quarters along with the calculated Total Nitrogen result has been added to the permit.

**PFOS and PFOA** – Monthly monitoring is included in the permit in accordance with s. NR 106.98(2)(a), Wis. Adm. Code.

**Acute and Chronic Whole Effluent Toxicity (WET)** – WET Testing has been added to the permit at 2 times over the permit term for Acute WET and 3 times over the permit term for Chronic WET.

**Explanation of Limits and Monitoring Requirements:**

**Monitoring frequencies** - Section NR 205.066(1) Wis. Adm. Code allows sampling frequency to be set on a case-by-case basis. The permittee demonstrates a history of consistent compliance with existing permit limits. Data submitted during the previous permit term continues to show consistent compliance with permit limitations, and the set monitoring frequencies are consistent with requirements of state code. The current monitoring frequencies for all parameters shall continue this permit term. If performance levels begin to vary during the permitted term, the department may re-evaluate current sampling frequencies and implement more frequent monitoring via permit modification or at permit reissuance.

**BOD<sub>5</sub>, pH, and Dissolved Oxygen** - Standard municipal wastewater requirements for BOD<sub>5</sub>, total suspended solids, dissolved oxygen, and pH are included based on ch. NR 210, Wis. Adm. Code ‘Sewage Treatment Works’ requirements

for discharges to fish and aquatic life streams. Chapter NR 102, Wis. Adm. Code ‘Water Quality Standards for Surface Waters’ also specifies requirements for pH for fish and aquatic life streams.

**Nitrogen, Ammonia (NH<sub>3</sub>-N) Total** - Current acute and chronic ammonia toxicity criteria for the protection of aquatic life are included in Table 2C and Table 4B of ch. NR 105, Wis. Adm. Code (effective March 1, 2004). Subchapter IV of ch. NR 106 establishes procedures for calculating water quality-based effluent limitations (WQBELs) for ammonia (effective March 1, 2004).

Revisions to ch. NR 106, Wis. Adm. Code, in September 2016 aligned Wisconsin’s WQBELs with 40 CFR § 122.45(d), which specifies that effluent limits for continuous dischargers must be expressed as weekly and monthly averages for publicly owned treatment works, unless shown to be impracticable. Because a daily maximum ammonia limit is necessary for Seymour Wastewater Treatment Facility, weekly and monthly average limits are also included and are based on downstream protection of the designated uses for Black Creek.

**Total Maximum Daily Load (TMDL) Derived Limits** - Wasteload allocations (WLA) specified in TMDLs are expressed as WQBELs (water quality based effluent limits). The derived WQBELs are consistent with the assumptions and requirements of the approved Upper Fox and Wolf River Basins TMDL. The **Total Suspended Solids** WLA for this facility is 22,807 lbs/yr, and the **Total Phosphorus** WLA for this facility is 300 lbs/yr. These values are found in Appendix H and Appendix I of the EPA-approved “Total Maximum Daily Loads for Total Phosphorus in the Upper Fox and Wolf River Basins (UFW TMDL)” report dated February 2020. This total WLA is expressed as weekly and monthly averages in the permit as recommended in the *TMDL Development and Implementation Guidance: Integrating the WPDES and Impaired Waters Programs* (April 2020) to be consistent with the assumptions and requirements of the TMDL.

**E. coli** - Revisions to bacteria surface water quality criteria to protect recreational uses and accompanying E. coli WPDES permit implementation procedures became effective May 1, 2020. The administrative code rule changes included the following actions: revised the bacteria water quality criteria from fecal coliform to E. coli to protect recreation in ch. NR 102, Wis. Adm. Code.; removed fecal coliform criteria for certain individual waters from ch. NR 104, Wis. Adm. Code.; revised permit requirements for publicly and privately owned sewage treatment works in ch. NR 210, Wis. Adm. Code.; and, updated approved analytical methods for bacteria in ch. NR 219, Wis. Adm. Code. The requirement to protect recreational use applies to all surface waters of the state, including wetlands, regardless of the receiving water’s water quality classification under s. NR 104.02(3), Wis. Adm. Code. Based on available information, it was determined that effluent disinfection is needed to limit risk to human and animal health downstream of the discharge. The department identifies risks to human and animal health through evaluating the factors under s. NR 210.06(3), Wis. Adm. Code, when determining when disinfection is needed. It is important to note that the risk to human health is based on the protection of the designated use of the waterbody to support recreation, and not evaluated based on premise that no person is thought to be recreating in the waterbody downstream. Removal of this designated use (and the bacteria criteria to protect it) would require a Use Attainability Analysis (UAA) under federal law. Situations where disinfection may not be required include treatment systems with detention times exceeding 180 days or where the receiving water provides enough dilution where bacteria concentrations attributable to the effluent are not reasonably expected to exceed criteria in the receiving water or wetland. These situations are not applicable to the permittee’s discharge or to the receiving water.

**Arsenic, Total Recoverable and Zinc, Total Recoverable** – Procedures for determining the necessity for inclusion of limits for toxic substances under s. NR 106.05 Wis. Adm. Code allow for comparing the upper 99<sup>th</sup> percentile of the available discharge concentrations of a substance to the applicable limit. Since at least 11 detected results are needed for this approach, quarterly monitoring over the permit term is included.

**Chloride** – The effluent’s 4-day P99 (the upper 99<sup>th</sup> percentile projected to occur over a 4-day period from a given dataset) over the last permit term is 397 mg/L. This is just under the calculated weekly average limit of 399 mg/L. Because the daily concentrations are close to exceeding this limit, the permit requires continued chloride monitoring in the effluent. Further, samples are to be collected on four consecutive days each month as this provides a dataset with weekly averages that are less influenced by spikes in daily values.



**Temperature** – Daily temperature monitoring has been added to the permit as the facility presently measures effluent temperature continuously. Data collected over the permit term will be used in consideration of the next dissipative cooling request at permit reissuance.

**Total Nitrogen Series** - The Department has included effluent monitoring for Total Nitrogen in the permit through the authority under §§ 283.55(1)(e), Wis. Stats., which allows the department to require the permittee to submit information necessary to identify the type and quantity of any pollutants discharged from the point source, and through s. NR 200.065(1)(h), Wis. Adm. Code, which allows for this monitoring to be collected during the permit term. Quarterly effluent monitoring for Total Nitrogen is included in the permit because of the potential for higher nitrogen loading resulting from higher flows (major facilities), higher concentrations, or both. More information on the justification to include total nitrogen monitoring in wastewater permits can be found in the “Guidance for Total Nitrogen Monitoring in Wastewater Permits” dated October 1, 2019.

Annual tests are scheduled in the following rotating quarters: October – December 2024; January – March 2025; April – June 2026; July – September 2027; and October – December 2028

**PFOS and PFOA** - NR 106 Subchapter VIII – Permit Requirements for PFOS and PFOA Dischargers became effective on August 1, 2022. At the first reissuance of a WPDES permit after August 1, 2022, the new rule requires WPDES permits for municipal dischargers with an average flow rate less than 1 MGD, to be evaluated on a case-by-case basis to determine if monitoring is required pursuant to s. NR 106.98(2)(c), Wis. Adm. Code. The department evaluated the need for PFOS and PFOA monitoring taking into consideration the presence of potential PFOS or PFOA industrial wastes, remediation sites and other potential sources of PFOS or PFOA. Based on information available at the time the proposed permit was drafted, it was identified that source water has known levels of PFOS/PFOA.

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

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

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

### 3 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)
003	B	Liquid	Fecal Coliform testing	Injection when land applied	Land Application	471
Does sludge management demonstrate compliance? Yes.						
Is additional sludge storage required? Yes. Additional storage to meet 180 day requirement is in						

**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)
planning.						
Is Radium-226 present in the water supply at a level greater than 2 pCi/liter? No.						
If yes, special monitoring and recycling conditions will be included in the permit to track any potential problems in landapplying sludge from this facility						
Is a priority pollutant scan required? No.						
Priority pollutant scans are required once every 10 years at facilities with design flows between 5 MGD and 40 MGD, and once every 5 years if design flow is greater than 40 MGD.						

**Sample Point Number: 003- LIQUID SLUDGE**

**Monitoring Requirements and Limitations**

Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Solids, Total		Percent	Annual	Composite	
Arsenic Dry Wt	Ceiling	75 mg/kg	Annual	Composite	
Arsenic Dry Wt	High Quality	41 mg/kg	Annual	Composite	
Cadmium Dry Wt	Ceiling	85 mg/kg	Annual	Composite	
Cadmium Dry Wt	High Quality	39 mg/kg	Annual	Composite	
Copper Dry Wt	Ceiling	4,300 mg/kg	Annual	Composite	
Copper Dry Wt	High Quality	1,500 mg/kg	Annual	Composite	
Lead Dry Wt	Ceiling	840 mg/kg	Annual	Composite	
Lead Dry Wt	High Quality	300 mg/kg	Annual	Composite	
Mercury Dry Wt	Ceiling	57 mg/kg	Annual	Composite	
Mercury Dry Wt	High Quality	17 mg/kg	Annual	Composite	
Molybdenum Dry Wt	Ceiling	75 mg/kg	Annual	Composite	
Nickel Dry Wt	Ceiling	420 mg/kg	Annual	Composite	
Nickel Dry Wt	High Quality	420 mg/kg	Annual	Composite	
Selenium Dry Wt	Ceiling	100 mg/kg	Annual	Composite	
Selenium Dry Wt	High Quality	100 mg/kg	Annual	Composite	
Zinc Dry Wt	Ceiling	7,500 mg/kg	Annual	Composite	

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Zinc Dry Wt	High Quality	2,800 mg/kg	Annual	Composite	
Radium 226 Dry Wt		pCi/g	Annual	Composite	
Nitrogen, Total Kjeldahl		Percent	Annual	Composite	
Nitrogen, Ammonium (NH4-N) Total		Percent	Annual	Composite	
Phosphorus, Total		Percent	Annual	Composite	
Phosphorus, Water Extractable		% of Tot P	Annual	Composite	
Potassium, Total Recoverable		Percent	Annual	Composite	
PCB Total Dry Wt	Ceiling	50 mg/kg	Once	Composite	Once in 2025. See 'Sludge Analysis for PCBs' section in permit.
PCB Total Dry Wt	High Quality	10 mg/kg	Once	Composite	Once in 2025. See 'Sludge Analysis for PCBs' section in permit.
PFOA + PFOS		ug/kg	Annual	Calculated	Report the sum of PFOS and PFAS. See PFAS Permit Sections for more information.

### Changes from Previous Permit:

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

### Explanation of Limits and Monitoring Requirements

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

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

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

**Water Extractable Phosphorus** - Water extractable phosphorus (WEP) is the coefficient for determining plant available phosphorus from measured total phosphorus. In Wisconsin, the Penn State Method is utilized and is expressed in percent. While a total P may be significant, the WEP may show that only a small percentage of the P is available to plants because of factors such as treatment processes and chemical addition that “tie-up” phosphorus limiting the amount of phosphorus that is plant available. As part of the Wisconsin’s nutrient management plan (NMP) requirements, the accounting of all fertilizers must be included over the NMP cycle. The fertilizer value of the waste needs to be communicated to the farmer and accounted for in the NMP.

## 4 Schedules

### 4.1 Effluent Limitations for E. coli

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

Required Action	Due Date
<b>Preliminary Compliance Alternatives Evaluation:</b> The permittee shall submit a preliminary engineering design report regarding future compliance with final E. coli effluent limits.	12/31/2024
<b>Submit Facility Plan:</b> The permittee shall submit a Facility Plan per s. NR 110.09, Wis. Adm. Code. The permittee may submit an abbreviated facility plan if the Department determines that the modifications are minor.	04/30/2025
<b>Final Plans and Specifications:</b> The permittee shall submit final construction plans to the Department for approval pursuant to ch. NR 108, Wis. Adm. Code, specifying treatment plant upgrades that must be constructed to achieve compliance with final E. coli limitations and a schedule for completing construction of the upgrades by the complete construction date specified below.	03/31/2026
<b>Treatment Plant Upgrade to Meet Limitations:</b> The permittee shall initiate bidding, procurement, and/or construction of the project. The permittee shall obtain approval of the final construction plans and schedule from the Department pursuant to s. 281.41, Stats., prior to initiating activities defined as construction under ch. NR 108, Wis. Adm. Code. Upon approval of the final construction plans and schedule by the Department pursuant to s. 281.41, Stats., the permittee shall construct the treatment plant upgrades in accordance with the approved plans and specifications.	09/30/2026
<b>Construction Upgrade Progress Report:</b> The permittee shall submit a progress report on construction upgrades.	09/30/2027
<b>Complete Construction:</b> The permittee shall complete construction of wastewater treatment system upgrades.	03/31/2028
<b>Achieve Compliance:</b> The permittee shall achieve compliance with final E. coli limitations.	04/30/2028

### 4.2 PFOS/PFOA Minimization Plan Determination of Need

Required Action	Due Date
<b>Report on Effluent Discharge:</b> 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.	03/31/2025

<p>This report shall include all additional PFOS and PFOA data that may be collected including any influent, intake, in-plant, collection system sampling, and blank sample results.</p>	
<p><b>Report on Effluent Discharge and Evaluation of Need:</b> Submit a final report on effluent PFOS and PFOA concentrations and include an analysis of trends in monthly and annual average PFOS and PFOA concentrations of data collected over the last 24 months. The report shall also provide a comparison on the likelihood of the facility needing to develop a PFOS/PFOA minimization plan.</p> <p>This report shall include all additional PFOS and PFOA data that may be collected including any influent, intake, in-plant, collection system sampling, and blank sample results.</p> <p>The permittee shall also submit a request to the department to evaluate the need for a PFOS/PFOA minimization plan.</p> <p>If the Department determines a PFOS/PFOA minimization plan is needed based on a reasonable potential evaluation, the permittee will be required to develop a minimization plan for Department approval no later than 90 days after written notification was sent from the Department. The Department will modify or revoke and reissue the permit to include PFOS/PFOA minimization plan reporting requirements along with a schedule of compliance to meet WQBELs. Effluent monitoring of PFOS and PFOA shall continue as specified in the permit until the modified permit is issued.</p> <p>If, however, the Department determines there is no reasonable potential for the facility to discharge PFOS or PFOA above the narrative standard in s. NR 102.04(8)(d), Wis. Adm. Code, no further action is required and effluent monitoring of PFOS and PFOA shall continue as specified in the permit.</p>	<p>03/31/2026</p>

**Explanation of Schedules:**

**Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus** – The facility is in facility planning for a major treatment plant upgrade. This schedule is continued from the last permit. The final limit effective date of October 1, 2026 remains unchanged.

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

**PFOS/PFOA Minimization Plan Determination of Need** - As stated above, NR 106 Subchapter VIII – Permit Requirements for PFOS and PFOA Dischargers became effective on August 1, 2022. S. NR 106.98, Wis. Adm. Code, specifies steps to generate data in order to determine the need for reducing PFOS and PFOA in the discharge. Data generated per the effluent monitoring requirements will be used to determine the need for developing a PFOS/PFOA minimization plan. As part of the schedule, the permittee is required to submit two annual Reports on Effluent Discharge.

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

**Special Reporting Requirements:**

No special reporting requirements are included

**Attachments:**

Water Quality Based Effluent Limits for Seymour Wastewater Treatment Facility Technical Memorandum prepared by Mike Polkinghorn and dated October 4, 2023

**Expiration Date:**

March 31, 2029

## **Justification Of Any Waivers From Permit Application Requirements:**

No permit application requirement waivers were requested or granted.

**Prepared By: Bryan Hartsook, Wastewater Field Supervisor**

**Date: For Fact Check January 23, 2024**

# CORRESPONDENCE/MEMORANDUM

DATE: October 4, 2023

TO: Sarah Adkins – NER/Oshkosh Service Center

FROM: Michael Polkinghorn – NOR/Rhineland Service Center *Michael Polkinghorn*

SUBJECT: Water Quality-Based Effluent Limitations for the Seymour Wastewater Treatment Facility  
WPDES Permit No. WI-0021768-10-0

This is in response to your request for an evaluation of the need for water quality-based effluent limitations (WQBELs) using Chapters NR 102, 104, 105, 106, 207, 210, 212, and 217 of the Wisconsin Administrative Code (where applicable), for the discharge from the Seymour Wastewater Treatment Facility in Outagamie County. This municipal wastewater treatment facility (WWTF) discharges to the Black Creek, located in the Shioc River Watershed in the Wolf River Basin. This discharge is included in the Upper Fox and Wolf Rivers Basin Total Maximum Daily Load (UFWRB TMDL) as approved by EPA on 02/27/2020. The evaluation of the permit recommendations is discussed in more detail in the attached report.

Based on our review, the following recommendations are made on a chemical-specific basis at Outfall 001:

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes	
Flow Rate						1	
BOD <sub>5</sub>	30 mg/L			15 mg/L		1, 2	
TSS	30 mg/L		130 lbs/day	20 mg/L 92 lbs/day		1, 2, 3	
pH	9.0 s.u.	6.0 s.u.				1, 2	
Dissolved Oxygen		4.0 mg/L				1, 2	
Ammonia Nitrogen	10 mg/L					1	
Year round							
January – February			6.6 mg/L	2.8 mg/L			
March			6.7 mg/L	3.3 mg/L			
April – May			5.7 mg/L	2.3 mg/L			
June			5.8 mg/L	2.4 mg/L			
July			4.6 mg/L	2.4 mg/L			
August			4.6 mg/L	2.3 mg/L			
September – October			5.8 mg/L	2.4 mg/L			
November			12 mg/L	6.6 mg/L			
December	11 mg/L	5.3 mg/L					
Phosphorus						1, 3	
Interim				0.6 mg/L			
Final				2.9 lbs/day	0.96 lbs/day		
Arsenic (Total Recoverable)						4	
Chloride						5	
PFOS and PFOA						6	
Zinc (Total Recoverable)						7	

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
TKN, Nitrate+Nitrite, and Total Nitrogen						8
Temperature						9
Acute WET						10, 12
Chronic WET						11, 12

Footnotes:

1. No changes from the current permit.
2. These concentration limits are based on the Limited Forage Fish (LFF) community of the immediate receiving water as described in s. NR 104.02(3)(a), Wis. Adm. Code.
3. The TSS and phosphorus mass limits are based on the UFWRB TMDL to address TSS and phosphorus water quality impairments within the TMDL area. The TMDL was approved by EPA in February 2020. There is a phosphorus compliance schedule to meet the final phosphorus limits by 10/01/2026.
4. Quarterly monitoring is recommended during the reissued permit term to better determine the need for arsenic limits at the next permit reissuance.
5. Four-day consecutive samples per month is recommended during the reissued permit term to better determine the need for chloride limits.
6. Once every two months monitoring is required in accordance with s. NR 106.98(2), Wis. Adm. Code.
7. Monthly monitoring is recommended for 1 year during the reissued permit term to better determine the need for zinc limits at the next permit reissuance.
8. As recommended in the Department's October 1, 2019 Guidance for Total Nitrogen Monitoring in Wastewater Permits, annual total nitrogen monitoring is recommended for all minor municipal permittees. Total nitrogen is the sum of nitrate (NO<sub>3</sub>), nitrite (NO<sub>2</sub>), and total Kjeldahl nitrogen (TKN) (all expressed as N).
9. Monthly temperature monitoring is recommended for 1 year during the reissued permit term but weekly monitoring is recommended during October and November. The monitoring will provide updated effluent temperature data to determine the need for limits at the next permit issuance and supporting information for an updated DC request.
10. Three acute whole effluent toxicity (WET) tests are recommended during the reissued permit term. 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.
11. Twice per year chronic WET testing is recommended during the reissued permit term. 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 Black Creek upstream of the confluence with Outfall 001.
12. 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). If a satisfactory phosphorus chemical SOP is established and implemented at the facility prior to permit reissuance, then WET testing can be reduced to 2x acute and 3x chronic tests in the reissued permit.



Please consult the attached report for details regarding the above recommendations. If there are any questions or comments, please contact Michael Polkinghorn at (715) 360-3379 or Michael.Polkinghorn@wisconsin.gov and Diane Figiel at Diane.Figiel@wisconsin.gov.

Attachments (5) – Narrative, discharge area map, weekly/monthly average ammonia nitrogen limit calculation, annual mass TSS loading table, and thermal table.

PREPARED BY: Michael A. Polkinghorn, E.I.T. – Water Resources Engineer

E-cc: Barti Oumarou, Wastewater Engineer – NER/Oshkosh Service Center  
Heidi Schmitt-Marquez, Regional Wastewater Supervisor – NER/Green Bay Service Center  
Diane Figiel, P.E., Water Resources Engineer – WY/3  
Eric Evensen, Regional Stream Biologist – NER/Green Bay Service Center  
Kari Fleming, Environmental Toxicologist – WY/3  
Laura Dietrich, Wastewater Specialist – WY/3

**Water Quality-Based Effluent Limitations for  
Seymour Wastewater Treatment Facility**

**WPDES Permit No. WI-0021768-10-0**

Prepared by: Michael A. Polkinghorn, E.I.T.

**PART 1 – BACKGROUND INFORMATION**

**Facility Description**

The City of Seymour owns and operates a tertiary treatment advanced WWTF. Facility treatment units include preliminary treatment with screening and grit removal, extended aeration activated sludge, final clarification, tertiary sand filtration and phosphorus removal with aluminum chloride (Alum) chemical addition. Waste activated sludge (WAS) is aerobically digested in the extended aeration system and the resulting liquid is held in an onsite sludge storage vessel. The stored sludge is land applied on Department approved sites. Proposed facility upgrades include new screening, new grit removal, expansion of the extended aeration activated sludge treatment, new chemical enhanced tertiary filtration, and solids storage expansion. Effluent is discharged on a continuous basis via Outfall 001 to the south bank of Black Creek, approximately 0.25 mi upstream of the County Highway G crossing.

Disinfection of the effluent is not required at this time. It should be noted that recreational use surveys and other information may be re-evaluated in the future to ensure the conditions of s. NR 210.06(3), Wis. Adm. Code, are being met. This re-evaluation could result in requiring disinfection of the effluent at that time.

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

**Existing Permit Limitations**

The current permit, expired on 09/30/2022, 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 <sub>5</sub>	30 mg/L			15 mg/L		2, 4
TSS	30 mg/L		130 lbs/day	20 mg/L 92 lbs/day		2, 3, 4
pH	9.0 s.u.	6.0 s.u.				2, 4
Dissolved Oxygen		4.0 mg/L				2, 4
Ammonia Nitrogen	10 mg/L					
Year round						
January – February			6.6 mg/L	2.8 mg/L		
March			6.7 mg/L	3.3 mg/L		
April – May			5.7 mg/L	2.3 mg/L		
June			5.8 mg/L	2.4 mg/L		

Attachment #1

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
July			4.6 mg/L	2.4 mg/L		
August			4.6 mg/L	2.3 mg/L		
September – October			5.8 mg/L	2.4 mg/L		
November			12 mg/L	6.6 mg/L		
December			11 mg/L	5.3 mg/L		
Phosphorus						
Interim				0.6 mg/L		3
Final				2.9 lbs/day	0.96 lbs/day	
Temperature						1

Footnotes:

1. Monitoring only.
2. These concentration limits are based on the Limited Forage Fish (LFF) community of the immediate receiving water as described in s. NR 104.02(3)(a), Wis. Adm. Code.
3. The TSS and phosphorus mass limits are based on the UFWRB TMDL to address TSS and phosphorus water quality impairments within the TMDL area. The TMDL was approved by EPA in February 2020. There is a phosphorus compliance schedule to meet the final phosphorus limits by 10/01/2026.
4. These limitations are not being evaluated as part of this review. Because the water quality criteria (WQC), reference effluent flow rates, and receiving water characteristics have not changed, limitations for these water quality characteristics do not need to be re-evaluated at this time.

**Receiving Water Information**

- Name: Black Creek
- Waterbody Identification Code (WBIC): 317100
- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code:
  - o Limited Forage Fish community (LFF) as listed in s. NR 104.07 Table 5 Row 48, non-public water supply. Cold Water and Public Water Supply criteria are used for bioaccumulating compounds of concern, because the discharge is within the Great Lakes basin. The LFF classification is from Outfall 001 to the confluence with the Shioc River approximately 11.5 mi downstream.
  - o The Black Creek has a modeled natural community of “Cool-Warm Headwater” at the point of discharge found in Surface Water Data Viewer. This classification is only considered for the Instream Waste Concentration (IWC) calculation and WET-based decisions and is not used in the calculation of effluent limits.
- Low Flows used in accordance with chs. NR 106 and 217, Wis. Adm. Code: The following 7-Q<sub>10</sub> and 7-Q<sub>2</sub> values are from USGS for Station W25 or SE ¼, SW ¼, Section 29, T24N – R18E where Outfall 001 is located.
  - 7-Q<sub>10</sub> = 0.04 cubic feet per second (cfs)
  - 7-Q<sub>2</sub> = 0.07 cfs
  - 90-Q<sub>10</sub> = 0.06 cfs
  - Harmonic Mean Flow = 0.96 cfs using a drainage area of 22.9 mi<sup>2</sup>

The Harmonic Mean has been estimated based on average flow and the 7-Q<sub>10</sub> using an equation from U. S. EPA's *Technical Support Document for Water Quality-Based Toxics Control* (March 1991, EPA/505/2-90-001, pgs. 88-89).

Attachment #1

- Low Flows used in accordance with chs. NR 106 and 217, Wis. Adm. Code: The following 7-Q<sub>10</sub> and 7-Q<sub>2</sub> values are representative of the Shioc River (WBIC: 316800) from USGS for Station W22 – NE ¼, SW ¼, Section 7, T24N – R17E, approximately 8.1 miles upstream of its confluence with Black Creek. These are used in the ammonia nitrogen limits evaluation.

7-Q<sub>10</sub> = 0.13 cfs

7-Q<sub>2</sub> = 0.46 cfs

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
7-Q <sub>10</sub> (cfs)	0.22	0.24	0.38	6.3	2.3	0.55	0.22	0.15	0.21	0.39	0.77	0.35
7-Q <sub>2</sub> (cfs)	0.97	0.94	2.2	15	9.3	4.6	1.1	0.69	1.3	2.5	4.6	2.2

- Hardness = 501 mg/L as CaCO<sub>3</sub>. This value represents the geometric mean of data (n = 5) of historic WET testing data from August 1994 – April 1998.
- % 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 the Wolf River at New London is used for this evaluation because there is no data available for the Black Creek. The Wolf River is within the same ecological landscape so ambient water quality characteristics are expected to be similar. The numerical values are shown in the tables below. If no data is available, the background concentration is assumed to be negligible and a value of zero is used in the computations.
- Multiple dischargers: The Black Creek WWTF discharges approximately 7.7 mi downstream of Outfall 001. This distance is too far for mixing zones to overlap, however, a wasteload allocation between the two facilities has been evaluated for ammonia nitrogen.
- Impaired water status: The Black Creek (stream miles 0 – 16) is on the Clean Water Act (CWA) Section 303(d) list for a degraded biological community caused by total phosphorus. The Shioc River (stream miles 0 – 27.96) approximately 11.5 mi downstream of Outfall 001 is also on the CWA Section 303(d) list for high phosphorus caused by total phosphorus. Both waterbodies are included in the UFWRB TMDL for phosphorus and TSS impairments within the TMDL area.

**Effluent Information**

- Design flow rate(s):  
Annual average = 0.578 million gallons per day (MGD)  
For reference, the actual average flow from October 2017 – May 2023 was 0.559 MGD.
- Hardness = 333 mg/L as CaCO<sub>3</sub>. This value represents the geometric mean of data (n = 4, February 2022 – March 2022) from the permit application.
- Acute dilution factor used in accordance with s. NR 106.06(3)(c), Wis. Adm. Code: Not applicable – this facility does not have an approved zone of initial dilution (ZID).
- Water source: Domestic wastewater with one industrial contributor. Emmi Roth produces cheese and discharges high strength wastewater to the facility. Water supply is from the City of Seymour Sewer Utility.
- Total Phosphorus Wasteload Allocation: 300 lbs/year, 0.8 lbs/day (See page 10 of Appendix H of the *Total Maximum Daily Loads for Total Phosphorus and Total Suspended Solids Upper Fox and Wolf Basins Report*, February 27, 2020).
- TSS Wasteload Allocation: 22,807 lbs/year, 62 lbs/day (See page 10 of Appendix I of the *Total Maximum Daily Loads for Total Phosphorus and Total Suspended Solids Upper Fox and Wolf Basins Report*, February 27, 2020).

Attachment #1

- Additives: Alum for chemical phosphorus removal.
- Effluent characterization: This facility is categorized as a minor municipality, so the permit application required effluent sample analyses for a limited number of common pollutants, as specified in s. NR 200.065, Table 1, Wis. Adm. Code, primarily metal substances plus chloride and hardness. The facility also conducted additional chloride monitoring not required by the permit or application from December 2020 – May 2023.
- 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.

**Arsenic & Zinc Effluent Data**

Sample Date	Arsenic (µg/L)	Zinc (µg/L)
03/03/2022	29	116
07/02/2023	<14	13
07/06/2023	<14	23
07/09/2023	<14	13
07/13/2023	<14	19
07/16/2023	<14	16
07/20/2023	<14	21
07/23/2023	<14	44
07/27/2023	<14	31
07/30/2023	<14	8.9
08/03/2023	22	19
Mean	0.46	
1-day P <sub>99</sub>		148
4-day P <sub>99</sub>		81

**Chloride Effluent Data**

Statistics	Conc. (mg/L)
1-day P <sub>99</sub>	485
4-day P <sub>99</sub>	397
30-day P <sub>99</sub>	347
Mean	321
Std	60
Sample size	208
Value Range	188 - 531
Date Range	12/01/2020 – 05/30/2023

**Copper Effluent Data**

Sample Date	Conc. (µg/L)	Sample Date	Conc. (µg/L)	Sample Date	Conc. (µg/L)
02/06/2022	17	02/20/2022	16	03/06/2022	12
02/10/2022	16	02/24/2022	18	03/10/2022	16
02/13/2022	18	02/27/2022	17	03/13/2022	19
02/17/2022	16	03/03/2022	16		
1-day P <sub>99</sub> = 21 µg/L					

The following table presents the average concentrations and loadings at Outfall 001 from October 2017 – May 2023 for all parameters with limits in the current permit to meet the requirements of s. NR 201.03(6), Wis. Adm. Code:

**Parameter Averages with Limits**

Parameter	Average Measurement*	Average Mass Discharged
BOD <sub>5</sub>	1.6 mg/L	
TSS	3.6 mg/L	8.9 lbs/day
pH field	7.2 s.u.	
Dissolved Oxygen	9.0 mg/L	
Ammonia Nitrogen	0.32 mg/L	
Phosphorus	0.21 mg/L	

\*Any results below the level of detection (LOD) for a parameter 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 99<sup>th</sup> percentile (or P<sub>99</sub>) 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<sub>10</sub>**

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<sub>10</sub> receiving water low flow to determine if more restrictive effluent limitations are needed to protect the receiving stream from discharges which may cause or contribute to an exceedance of the acute water quality standards. The mass balance equation is provided below.

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

Where:

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

Q<sub>s</sub> = average minimum 1-day flow which occurs once in 10 years (1-day Q<sub>10</sub>)

if the 1-day Q<sub>10</sub> flow data is not available = 80% of the average minimum 7-day flow which occurs once in 10 years (7-day Q<sub>10</sub>).

Q<sub>e</sub> = Effluent flow (in units of volume per unit time) as specified in s. NR 106.06(4)(d), Wis.

Attachment #1

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<sub>10</sub> 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 Seymour WWTF and the limits are set based on the 1-Q<sub>10</sub> low flow method.

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

**Daily Maximum Limits based on ATC**

RECEIVING WATER FLOW = 0.03 cfs, (1-Q<sub>10</sub> (estimated as 80% of 7-Q<sub>10</sub>)), 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 <sub>99</sub>	1-day MAX. CONC.
Arsenic		340		352	70	0.46		29
Cadmium	333	41.0	0.077	42	8.5	<0.3		<0.3
Chromium	301	4,446	0.691	4,605	921	1.8		1.8
Copper	333	48.3	0.955	50			21	19
Lead	333	342	0.247	355	71	4.2		4.2
Nickel	268	1,080		1,119	224	8.3		8.3
Zinc	333	345	1.8	357			148	116
Chloride (mg/L)		757	13.9	784			485	531

\* 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<sub>10</sub> flow rates yields a more restrictive limit than the 2 × ATC method of limit calculation.

**Weekly Average Limits based on Chronic Toxicity Criteria (CTC)**

RECEIVING WATER FLOW = 0.01 cfs (¼ of the 7-Q<sub>10</sub>), 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 <sub>99</sub>
Arsenic		152		154	31	0.46	
Cadmium	175	3.82	0.077	3.9	0.77	<0.3	
Chromium	301	326	0.691	329	66	1.8	
Copper	495	40.7	0.955	41			19
Lead	356	95.5	0.247	97	19	4.2	
Nickel	268	120		122	24	8.3	
Zinc	333	345	1.8	349			81
Chloride (mg/L)		395	13.9	399			397

Attachment #1

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

**Monthly Average Limits based on Wildlife Criteria (WC)**

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

**Monthly Average Limits based on Human Threshold Criteria (HTC)**

RECEIVING WATER FLOW = 0.2 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	0.077	469	94	<0.3
Chromium	3,818,000	0.691	4,843,558	968,712	1.8
Lead	140	0.247	178	36	4.2
Nickel	43,000		54,550	10,910	8.3

**Monthly Average Limits based on Human Cancer Criteria (HCC)**

RECEIVING WATER FLOW = 0.2 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		17	3.4	0.46

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 effluent limits are needed for 1 substance based on HCC, determination of the cumulative cancer risk is not needed per s. NR 106.06(8), Wis. Adm. Code.

**Conclusions and Recommendations**

Based on a comparison of the effluent data and calculated effluent limitations, effluent limitations are not recommended for any toxic substances. Monitoring recommendations are made in the paragraphs below:

Arsenic – Considering available effluent data from the current permit term (March 2022 – August 2023), the mean effluent concentration is 0.46 µg/L. These effluent concentrations are below the calculated arsenic WQBELs; therefore, **arsenic limits are not recommended during the reissued permit term.** Due to the probability of less than 11 samples producing a mean effluent concentration less than 1/5<sup>th</sup> of the monthly average limit based on HCC (3.4 mg/L) and the presence of high arsenic detects, **quarterly arsenic monitoring is recommended during the reissued permit term to better determine the need for arsenic limits at the next permit reissuance.**

Chloride – Considering available effluent data from the current permit term (December 2020 – May 2023), the 1-day P<sub>99</sub> chloride concentration is 485 mg/L, the 4-day P<sub>99</sub> chloride concentration is 397 mg/L, with a daily maximum of 531 mg/L. These effluent concentrations are below the calculated chloride WQBELs; therefore, **chloride limits are not recommended during the reissued permit term.** The 4-day P<sub>99</sub> value was close to exceeding the calculated weekly average chloride WQBEL of 399 mg/L. The previous limit evaluation (February 2014) had shown there was reasonable potential with the



calculated weekly average chloride WQBEL demonstrated but recommended additional monitoring due to the lack of 4-day consecutive samples and multiple suspectable high chloride samples. **Therefore, 4-day consecutive samples per month is recommended during the reissued permit term to better determine the need for chloride limits.**

Zinc – Considering available effluent data from the current permit term (March 2022 – August 2023), the 1-day and 4-day P<sub>99</sub> concentrations are 148 and 81 µg/L respectively. These effluent concentrations are below the calculated zinc WQBELs; therefore, **zinc limits are not recommended during the reissued permit term.** Due to the probability of less than 11 samples producing a mean effluent concentration less than 1/5<sup>th</sup> of the daily maximum and weekly average limits, **monthly zinc monitoring is recommended for 1 year during the reissued permit term to better determine the need for zinc limits at the next permit reissuance.**

Mercury – The permit application did not require monitoring for mercury because the Seymour WWTF is categorized as a minor facility as defined in s. NR 200.02(8), Wis. Adm. Code. In accordance with s. NR 106.145(3)(a)3, Wis. Adm. Code, a minor municipal discharger shall monitor, and report results of influent and effluent mercury monitoring once every three months if, “there are two or more exceedances in the last five years of the high-quality sludge mercury concentration of 17 mg/kg specified in s. NR 204.07(5), Wis. Adm. Code.” A review of sludge characteristics data reveals that all the sample results are within expected analytical ranges and well below the 17 mg/kg level. The average concentration in the sludge from March 2018 – April 2022 was 0.81 mg/kg, with a maximum reported concentration of 2.5 mg/kg. **Therefore, mercury monitoring is not recommended during the reissued permit term.**

PFOS and PFOA – The need for PFOS and PFOA monitoring is evaluated in accordance with s. NR 106.98(2), Wis. Adm. Code. Based on the type of discharge, the effluent flow rate, the types of indirect dischargers contributing to the collection system, and the known levels of PFOS/PFOA in the source water, **PFOS and PFOA monitoring is recommended at a once every two months frequency during the reissued permit term.**

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

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

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

#### **Daily Maximum Limits based on Acute Toxicity Criteria (ATC)**

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

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

Where:

Attachment #1

A = 0.411 and B = 58.4 for a LFF community, and  
pH (s.u.) = that characteristic of the effluent.

The effluent pH data was examined as part of this evaluation. A total of 1,449 sample results were reported from . The maximum reported value was 7.80 s.u. (Standard pH Units). The effluent pH was 7.70 s.u. or less 99% of the time. The 1-day P<sub>99</sub>, calculated in accordance with s. NR 106.05(5), Wis. Adm. Code, is 7.58 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 7.57 s.u. Therefore, a value of 7.70 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 7.70 s.u. into the equation above yields an ATC = 14.4 mg/L.

**Daily Maximum Ammonia Nitrogen Effluent Limitations Calculation Method**

In accordance with s. NR 106.32(2), Wis. Adm. Code daily maximum ammonia limitations are either set equal to the limit based on the 1-Q<sub>10</sub> 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<sub>10</sub> (estimated as 80 % of 7-Q<sub>10</sub>) and the 2×ATC approach are shown below:

**Daily Maximum Ammonia Nitrogen Determination**

	Ammonia Nitrogen Limit mg/L
2×ATC	29
1-Q <sub>10</sub>	15

The 1-Q<sub>10</sub> low flow method yields the most stringent limits for the Seymour WWTF.

This limit is greater than the current daily maximum limit of 10 mg/L. If Seymour WWTF would like to request an increase to the existing permit limits an assessment of their effluent data consistent with the requirements of ss. NR 207.04(1)(a) and (c), Wis. Adm. Code, must be provided. This evaluation is on a parameter by parameter basis and includes consideration of operations, maintenance and temporary upsets. Without a demonstration of need for a higher limit in accordance with s. NR 207.04, Wis. Adm. Code, the current limits must be continued in the reissued permit. An initial review of effluent ammonia nitrogen data shows the facility had exceeded the current daily maximum limit twice on 02/09/2020 (14 mg/L) and 12/27/2020 (12 mg/L) and has otherwise been in compliance from October 2017 – May 2023. The Department would be unable to increase the limit due to the lack of need as described in the antibacksliding and antidegradation requirements in ch. NR 207, Wis. Adm. Code. **Therefore, the daily maximum limit of 10 mg/L applied year round is recommended to continue during the reissued permit term.**

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

Weekly average and monthly average limits for ammonia nitrogen are based on chronic toxicity criteria in ch. NR 105, Wis. Adm. Code, and relate to the assimilative capacity of the receiving water. The Facility Planning Memorandum (June 2021) had recalculated the applicable weekly average and monthly average ammonia nitrogen limits for the City of Seymour in response to the annual average design flow potentially increasing to 0.694 MGD. The updated limits were also based on the water quality protection

Attachment #1

of both the Black Creek and Shioc River on a 12-month basis from the increased discharge from the City of Seymour only, as it was also determined that factoring in the Black Creek WWTF’s discharge was unnecessary due to the distance between the discharges in Black Creek and the underestimation of the Shioc River’s flow information. These updated limits are included as attachment #3.

The June 2021 evaluation determined all of the updated weekly average and monthly average ammonia nitrogen limits based on an effluent flow of 0.694 MGD were all less stringent than the same limits in the current permit. The current annual average design flow of 0.578 MGD would result in weekly average and monthly average limits less stringent than both sets of limits. In both bases, the Department would be unable to increase those limits due to the lack of need as described in the antibrackling and antidegradation requirements in ch. NR 207, Wis. Adm. Code. In addition, where there are existing ammonia nitrogen limits in the permit, the limits must be retained regardless of reasonable potential, consistent with s. NR 106.33(1)(b), Wis. Adm. Code:

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

**Therefore, the 12-month based weekly average and monthly average ammonia nitrogen limits in the current permit are recommended to continue during the reissued permit term.**

The overall effluent ammonia nitrogen data from October 2017 – May 2023 is shown in the table below for informational purposes:

Statistics	Conc. (mg/L)
1-day P <sub>99</sub>	4.9
4-day P <sub>99</sub>	2.8
30-day P <sub>99</sub>	1.2
Mean	0.32
Std	2.1
Sample size	887
Range	<0.01 – 14

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

**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.

For the Seymour WWTF, these limits would be required during May – September or potentially additional months depending on site-specific receiving water uses.

The Department is in process of completing guidance for implementing disinfection requirements to municipal discharges based on an updated interpretation of the conditions of s. NR 210.06(3), Wis. Adm. Code. This may require some municipal facilities to disinfect their discharge that are currently not required to do so based on the historic interpretation of the conditions of s. NR 210.06(3), Wis. Adm. Code. **Currently for the Seymour WWTF, disinfection of the effluent is not required based on the conditions of s. NR 210.06(3), Wis. Adm. Code, but should potentially be accounted for in a future permit for facility planning purposes.**

## PART 5 – PHOSPHORUS & TSS

### Technology-Based Effluent Limit – Phosphorus

Subchapter II of Chapter NR 217, Wis. Adm. Code, requires municipal wastewater treatment facilities that discharge greater than 150 pounds of total phosphorus per month to comply with a monthly average limit of 1.0 mg/L, or an approved alternative concentration limit.

The Seymour WWTF has an interim monthly average phosphorus limit of 0.6 mg/L in the current permit and is more stringent than the potential monthly average limit of 1.0 mg/L. **Therefore, a technology-based phosphorus limit is not recommended during the reissued permit term.**

### TMDL Limits – Phosphorus

The UFWRB TMDL established a phosphorus waste load allocation (WLA) for the Seymour WWTF of 300 lbs/yr and 0.8 lbs/day. The monthly average limit of 2.9 lbs/day and the 6-month average limit of 0.96 lbs/day was determined in the WQBEL Addendum (June 2021). The multiplier of 1.17 was chosen utilizing the parameters of calculating a 6-month average limit, CV = 0.6, and a 3 samples per week effluent monitoring scheme as described in the Department guidance document, “*TMDL Development and Implementation Guidance: Integrating the WPDES and Impaired Waters Programs Edition No. 3*”.

The TMDL-based phosphorus WQBELs would be re-evaluated if the annual WLA is not being met as described in the prior stated guidance. This is done by comparing the sum of the most recent 12 consecutive months of total monthly phosphorus mass discharges directly against the annual WLA. **Because the Seymour WWTF has a compliance schedule to meet the final phosphorus WQBELs by 10/01/2026, the TMDL-based phosphorus WQBELs will not be re-evaluated at this time.**

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

### Interim Limits – Phosphorus

An interim limit is needed when a compliance schedule is included in the permit to meet the TMDL limits. This limit should reflect a value which the facility is able to currently meet; however, it should also consider the receiving water quality, keeping the water from further impairment.

The current permit has an interim monthly average limit of 0.6 mg/L as recommended in the WQBEL

Attachment #1

addendum (June 2021). Per Department policy, if the final phosphorus WQBEL(s) are mass-based, then an interim concentration-based limit for the compliance schedule should not be set lower than 1.0 mg/L as a monthly average, equal to the technology-based limit of 1.0 mg/L for municipal discharges. This decision is made to prevent scenarios where a facility may add or increase the level of phosphorus treatment when it may not be needed to meet the final mass limit(s), which may already be met with the current phosphorus concentrations with the actual effluent flows. **Therefore, the interim monthly average limit of 0.6 mg/L is recommended to continue during the reissued permit term.**

Concentration and mass-based effluent phosphorus data during October 2021 – May 2023, starting from the beginning of the modified permit, are shown in the table below for informational purposes. The difference in sample sizes is because the Seymour WWTF ceased reporting mass phosphorus data past December 2022:

**Phosphorus Effluent Data**

Statistics	Conc. (mg/L)	Mass (lbs/day)
1-day P <sub>99</sub>	0.79	3.4
4-day P <sub>99</sub>	0.44	1.9
30-day P <sub>99</sub>	0.25	1.1
Mean	0.17	0.70
Std	0.16	0.70
Sample Size	260	195
Range	0.03 - 2.1	0 - 5

**TMDL Limits – TSS**

The UFWRB TMDL established a TSS waste load allocation (WLA) for the Seymour WWTF of 22,807 lbs/yr and 62 lbs/day. The weekly average limit of 130 lbs/day and the monthly average limit of 92 lbs/day was determined in the WQBEL Addendum (June 2021). The multipliers of 2.07 and 1.47 were chosen utilizing the parameters of CV = 0.6, a 3 samples per week effluent monitoring scheme, and calculating weekly average and monthly average limits respectively, as described in the Department guidance document, “*TMDL Development and Implementation Guidance: Integrating the WPDES and Impaired Waters Programs Edition No. 3*”.

The TMDL-based TSS WQBELs will be re-evaluated if the annual WLA is not being met as described in the prior stated guidance. This is done by comparing the sum of the most recent 12 consecutive months of total monthly phosphorus mass discharges directly against the annual WLA. In this case, the most recent sum of 7,427 lbs/yr (June 2022 – May 2023) and the prior 8 sums are all less than the annual WLA of 22,807 lbs/yr. This information is shown in a table included as attachment #4. **Therefore, the Seymour WWTF is meeting their annual TSS WLA and the current TMDL-based TSS WQBELs are recommended to continue in the reissued permit.**

Concentration and mass-based effluent TSS data during October 2021 – May 2023, starting from the beginning of the modified permit, are shown in the table below for informational purposes. The difference in sample sizes is because the Seymour WWTF ceased reporting mass TSS data past December 2022:

**TSS Effluent Data**

Statistics	Conc. (mg/L)	Mass (lbs/day)
1-day P <sub>99</sub>	18	68

Attachment #1

4-day P <sub>99</sub>	10	37
30-day P <sub>99</sub>	5.4	17
Mean	3.3	8.9
Std	4.0	17
Sample Size	262	195
Range	<2 - 42	0 - 90.2

**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 October 2021 – May 2023, starting from the beginning of the modified permit term.

The table below summarizes the maximum temperatures; October and November data are from 2021 – 2022, and December – September data are from April 2013 – March 2014. The table also shows the calculated temperature limits. The complete temperature limit calculations are included as attachment #5.

**Monthly Temperature Effluent Data & Limits**

Month	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Weekly Maximum	Daily Maximum	Weekly Average Effluent Limitation	Daily Maximum Effluent Limitation
	(°F)	(°F)	(°F)	(°F)
JAN	47	48	54	78
FEB	46	47	54	79
MAR	47	47	57	80
APR	51	55	63	81
MAY	60	63	70	84
JUN	68	69	77	85
JUL	73	74	81	86
AUG	74	75	79	86
SEP	72	74	73	85
<b>OCT</b>	<b>73</b>	<b>74</b>	<b>63</b>	<b>83</b>
<b>NOV</b>	<b>65</b>	<b>66</b>	<b>54</b>	<b>80</b>

Attachment #1

Month	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Weekly Maximum	Daily Maximum	Weekly Average Effluent Limitation	Daily Maximum Effluent Limitation
	(°F)	(°F)	(°F)	(°F)
DEC	54	55	54	79

**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 limits would be required in October and November.

The DC study (November 2019) conducted by the Seymour WWTF had been reviewed and approved by the Department in April 2020 and was implemented in the modified permit by the previous WQBEL Addendum (June 2021). The November sub lethal temperature criterion of 54 °F was met approximately 20 feet downstream from the confluence of Outfall 001 with the Black River with an adequate zone of free passage for fish and aquatic life. Thermal impacts to the Black River by the Seymour WWTF have been shown to be minimal in November and is considered representative of expected thermal impacts during October. **Therefore, temperature limits are not recommended during the reissued permit term.**

**Monthly temperature monitoring is recommended for 1 year during the reissued permit term but weekly monitoring is recommended during October and November.** The monitoring will provide updated effluent temperature data to determine the need for limits at the next permit issuance and supporting information for an updated DC request.

**Future WPDES Permit Reissuance**

Dissipative cooling requests must be re-evaluated every permit reissuance. The permittee is responsible for submitting an updated DC request prior to permit reissuance. Such a request must either include:

- a) A statement by the permittee that there have been no substantial changes in operation of, or thermal loadings to, the treatment facility and the receiving water; or
- b) New information demonstrating DC to supplement the information used in the previous DC determination. If significant changes in operation or thermal loads have occurred, additional DC data must be submitted to the Department.

### 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<sub>50</sub> (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<sub>25</sub> (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:

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

Where:

$Q_e$  = annual average flow = 0.578 MGD = 0.894 cfs.

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

$Q_s$  = 1/4 of the 7-Q<sub>10</sub> = 0.04 cfs ÷ 4 = 0.01 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.



Attachment #1

- The Seymour WWTF had multiple acute and chronic WET tests done historically during August 1994 – April 1998. These WET tests are not considered representative of the discharge. 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. Therefore, the WET tests performed during August 1994 – April 1998 will not be used to make WET-related decisions in this evaluation.

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>.

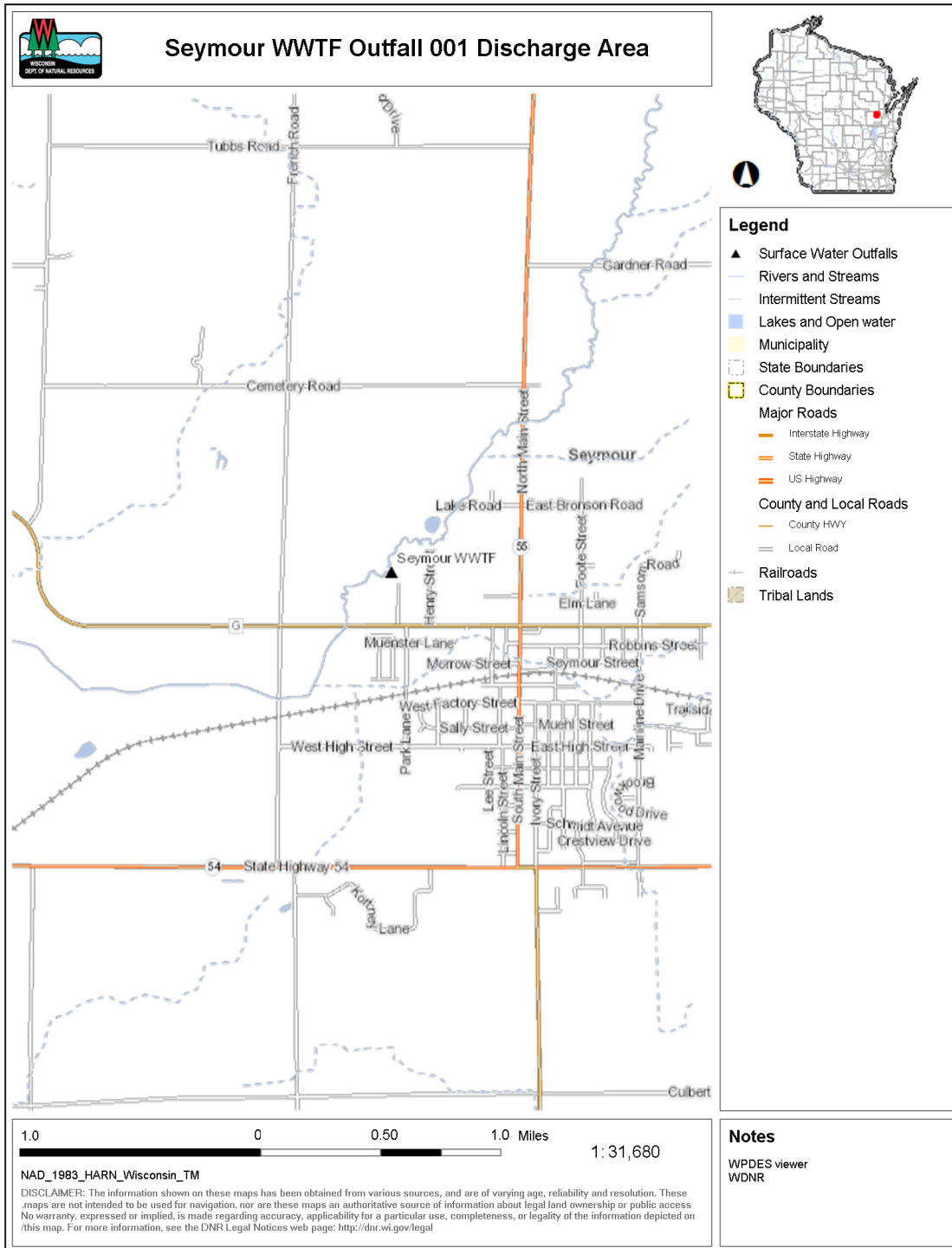
**WET Checklist Summary**

	<b>Acute</b>	<b>Chronic</b>
<b>AMZ/IWC</b>	Not applicable. <b>0 Points</b>	IWC = 99%. <b>15 Points</b>
<b>Historical Data</b>	No representative acute tests within last 5 years. <b>5 Points</b>	No representative chronic tests within last 5 years. <b>5 Points</b>
<b>Effluent Variability</b>	Little variability, no violations or upsets, consistent WWTF operations. <b>0 Points</b>	Same as acute. <b>0 Points</b>
<b>Receiving Water Classification</b>	“Cool-Warm Headwater” natural community. <b>5 Points</b>	Same as acute. <b>5 Points</b>
<b>Chemical-Specific Data</b>	No reasonable potential for limits for based on ATC; ammonia nitrogen limit carried over from the current permit. Arsenic, chromium, copper, lead, nickel, and chloride detected. No additional compounds of concern. <b>3 Points</b>	No reasonable potential for limits based on CTC; ammonia nitrogen limit carried over from the current permit. Arsenic, chromium, copper, lead, nickel, and chloride detected. No additional compounds of concern. <b>3 Points</b>
<b>Additives</b>	One water quality conditioners (Alum ) added. Permittee has proper P chemical SOPs in place: No. <b>16 Points</b>	All additives used more than once per 4 days. <b>16 Points</b>
<b>Discharge Category</b>	One industrial contributor. <b>5 Points</b>	Same as acute. <b>5 Points</b>
<b>Wastewater Treatment</b>	Secondary or better. <b>0 Points</b>	Same as acute. <b>0 Points</b>
<b>Downstream Impacts</b>	No impacts known. <b>0 Points</b>	Same as acute. <b>0 Points</b>
<b>Total Checklist Points:</b>	<b>34 Points</b>	<b>49 Points</b>

## Attachment #1

	Acute	Chronic
<b>Recommended Monitoring Frequency (from Checklist):</b>	Three acute tests recommended.	2x/yr chronic tests recommended.
<b>Limit Required?</b>	No.	No.
<b>TRE Recommended? (from Checklist)</b>	No.	No.

- After consideration of the guidance provided in the Department's WET Program Guidance Document (2022) and other information described above **3x acute and 2x/yr 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). **If a satisfactory phosphorus chemical SOP is established and implemented at the facility prior to permit reissuance, then WET testing can be reduced to 2x acute and 3x chronic tests in the reissued permit.**



Attachment #3

Calculated Weekly/Monthly Average Ammonia Nitrogen WQBELs (June 2021 Facility Planning Memo)

Black Creek (LFF)		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
<b>Effluent Flow</b>	Qe (MGD)	0.694	0.694	0.694	0.694	0.694	0.694	0.694	0.694	0.694	0.694	0.694	0.694
<b>Background Information</b>	7-Q <sub>10</sub> (cfs)	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
	7-Q <sub>2</sub> (cfs)	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
	Ammonia (mg/L)	0.033	0.064	0.088	0.023	0.022	0.029	0.024	0.014	0.013	0.014	0.0088	0.023
	Average Temperature (°C)	3	4	6	10	15	18	21	20	17	13	8	4
	Maximum Temperature (°C)	3	4	6	10	15	18	21	20	17	13	8	4
	pH (s.u.)	7.9	7.9	7.9	8.09	8.09	8.09	8.08	8.08	8.08	8.06	8.06	8.06
	% of Flow used	25	25	25	25	50	100	100	100	100	50	25	25
	Reference Weekly Flow (cfs)	0.01	0.01	0.01	0.01	0.02	0.04	0.04	0.04	0.04	0.02	0.01	0.01
Reference Monthly Flow (cfs)	0.01	0.01	0.01	0.01	0.03	0.06	0.06	0.06	0.06	0.03	0.01	0.01	
<b>Criteria mg/L</b>	4-day Chronic												
	Early Life Stages Present	8.88	8.88	8.88	6.76	6.76	6.76	6.86	6.86	6.86	7.07	7.07	7.07
	Early Life Stages Absent	34.21	34.21	34.21	21.46	15.55	13.00	11.03	11.43	13.68	18.77	25.91	27.24
	30-day Chronic												
	Early Life Stages Present	3.55	3.55	3.55	2.70	2.70	2.70	2.74	2.74	2.74	2.83	2.83	2.83
Early Life Stages Absent	13.68	13.68	13.68	8.58	6.22	5.20	4.41	4.57	5.47	7.51	10.36	10.90	
<b>Effluent Limitations mg/L</b>	Weekly Average												
	Early Life Stages Present					6.7	6.7	6.8	6.8	6.8			
	Early Life Stages Absent	34	34	34	22						19	26	27
	Monthly Average												
	Early Life Stages Present					2.6	2.4	2.4	2.4	2.4			
Early Life Stages Absent	14	14	14	8.6						7.5	10	11	

Shioc Creek (WWSF)		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
<b>Effluent Flow</b>	Qe (MGD)	0.694	0.694	0.694	0.694	0.694	0.694	0.694	0.694	0.694	0.694	0.694	0.694
<b>Background Information</b>	7-Q <sub>10</sub> (cfs)	0.22	0.24	0.38	6.3	2.3	0.55	0.22	0.15	0.21	0.39	0.77	0.35
	7-Q <sub>2</sub> (cfs)	0.97	0.94	2.2	15	9.3	4.6	1.1	0.69	1.3	2.5	4.6	2.2
	Ammonia (mg/L)	0.033	0.064	0.088	0.023	0.022	0.029	0.024	0.014	0.013	0.014	0.0088	0.023
	Average Temperature (°C)	1	1	3	9	14	19	21	19	16	10	4	2

## Attachment #3

Shioc Creek (WWSF)		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	Maximum Temperature (°C)	1	1	3	9	14	19	21	19	16	10	4	2
	pH (s.u.)	7.37	7.37	7.37	8.06	8.06	8.06	8.18	8.18	8.18	7.88	7.88	7.88
	% of Flow used	25	25	25	25	50	100	100	100	50	25	25	25
	Reference Weekly Flow (cfs)	0.055	0.060	0.10	1.6	1.2	0.55	0.22	0.15	0.11	0.10	0.19	0.088
	Reference Monthly Flow (cfs)	0.21	0.20	0.47	3.2	4.0	3.9	0.94	0.59	0.55	0.53	0.98	0.47
<b>Criteria mg/L</b>	4-day Chronic												
	Early Life Stages Present	12.10	12.10	12.10	5.57	5.57	4.20	3.14	3.37	4.33			
	Early Life Stages Absent										9.61	11.66	11.66
	30-day Chronic												
	Early Life Stages Present	4.84	4.84	4.84	2.23	2.23	1.68	1.25	1.35	1.73			
Early Life Stages Absent										3.84	4.67	4.67	
<b>Effluent Limitations mg/L</b>	Weekly Average												
	Early Life Stages Present	13	13	13	14	12	6.3	3.8	3.8	4.8			
	Early Life Stages Absent										10	14	13
	Monthly Average												
	Early Life Stages Present	5.8	5.7	6.9	8.8	10	7.7	2.3	2.1	2.6			
Early Life Stages Absent										5.7	8.9	6.7	

## Attachment #4

**Annual Mass TSS Loading**

Month-Year	Mass TSS (lbs/month)	12-month Rolling Sum (lbs/yr)
October 2021	31	
November 2021	107	
December 2021	483	
January 2022	214	
February 2022	315	
March 2022	788	
April 2022	533	
May 2022	130	
June 2022	0	
July 2022	19	
August 2022	278	
September 2022	152	3,050
October 2022	27	3,045
November 2022	402	3,340
December 2022	370	3,227
January 2023	916	3,929
February 2023	649	4,264
March 2023	1,825	5,301
April 2023	1,598	6,367
May 2023	1,189	7,427

### Temperature Limits for Receiving Waters with Unidirectional Flow

(calculation using default ambient temperature data)

<b>Facility:</b>	Seymour WWTF	<b>7-Q<sub>10</sub>:</b>	0.04 cfs	<b>Temp Dates</b>	<b>Flow Dates</b>
<b>Outfall(s):</b>	001	<b>Dilution:</b>	25%	<b>Start:</b>	10/01/21
<b>Date Prepared:</b>	6/27/2023	<b>f:</b>	0	<b>End:</b>	11/30/22
<b>Design Flow (Q<sub>e</sub>):</b>	0.578 MGD	<b>Stream type:</b>	Limited forage fish community		
<b>Storm Sewer Dist.</b>	0 ft	<b>Q<sub>s</sub>:Q<sub>e</sub> ratio:</b>	0.01 :1		
		<b>Calculation Needed?</b>	YES		

Month	Water Quality Criteria			Receiving Water Flow Rate (Q <sub>s</sub> ) (cfs)	Representative Highest Effluent Flow Rate (Q <sub>e</sub> )		f	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	T <sub>a</sub> (default)	Sub-Lethal WQC	Acute WQC		7-day Rolling Average (Q <sub>esl</sub> ) (MGD)	Daily Maximum Flow Rate (Q <sub>ea</sub> ) (MGD)		Weekly Average	Daily Maximum	Weekly Average Effluent Limitation	Daily Maximum Effluent Limitation
	(°F)	(°F)	(°F)		(MGD)	(MGD)		(°F)	(°F)	(°F)	(°F)
JAN	37	54	78	0.04	0.680	0.775	0	47	48	54	78
FEB	39	54	79	0.04	0.557	0.642	0	46	47	54	79
MAR	43	57	80	0.04	1.316	2.200	0	47	47	57	80
APR	50	63	81	0.04	1.627	2.020	0	51	55	63	81
MAY	59	70	84	0.04	0.956	1.267	0	60	63	70	84
JUN	64	77	85	0.04	0.523	0.643	0	68	69	77	85
JUL	69	81	86	0.04	0.448	0.525	0	73	74	81	86
AUG	68	79	86	0.04	0.778	1.462	0	74	75	79	86
SEP	63	73	85	0.04	0.779	1.175	0	72	74	73	85
<b>OCT</b>	55	63	83	0.04	0.386	0.446	0	<b>73</b>	74	<b>63</b>	83
<b>NOV</b>	46	54	80	0.04	0.604	0.749	0	<b>65</b>	66	<b>54</b>	80
DEC	40	54	79	0.04	0.526	0.619	0	54	55	54	79