

City of Thorp Public Noticed Permit Fact Sheet

General Information

Permit Number:	WI-0025615-10-0
Permittee:	City of Thorp, City Hall, PO Box 334, 300 W Prospect St, Thorp WI 54771-0334
Discharge Location (pre- and post-upgrade):	Thorp Wastewater Treatment Facility, State Highway 29 & Tieman Ave., Thorp, WI 54771 SE1/4 SE1/4, Section 23, T29N, R4W, Town of Thorp, Clark County, WI -the effluent pipe to surface water (Outfall 001) is located on the east bank of the N. Fork of the Eau Claire River, 1/4 mile upstream of Pine Rd.
Receiving Water (pre- and post-upgrade):	the North Fork of the Eau Claire River in the North Fork Eau Claire River Watershed of the Lower Chippewa River Basin in Clark County
StreamFlow (Q _{7,10}):	0.35 cfs
Stream Classification:	Warmwater Sport Fish, Non-public Water Supply
Discharge Type (pre-upgrade):	Existing, fill & draw
Discharge Type (post-upgrade):	Existing, continuous
Annual Average Design Flow (pre-upgrade WWTF):	0.331 MGD
Annual Average Design Flow (post-upgrade WWTF):	0.423 MGD
Significant Industrial Loading?	No
Operator at Proper Grade?	Yes
Approved Pretreatment Program?	N/A

Facility Description

The Thorp Wastewater Treatment Facility (WWTF) treats domestic wastewater from the City of Thorp. The facility treated an average 0.484 million gallons per day (MGD) of domestic wastewater in 2023. The permittee is in the middle of a plant upgrade. The pre-upgrade WWTF had an annual average design flow 0.331 MGD and the post-upgrade facility will have an annual average design flow of 0.423 MGD. The pre-upgrade WWTF, now decommissioned, consisted of a coarse-bubble, three-cell aerated lagoon system and final holding pond that was operated on a fill and draw basis. The post-upgrade WWTF has an influent pump station with fine screening, along with fine-bubble aeration, an ammonia polishing reactor, ultraviolet (UV) treatment for seasonal disinfection and chemical treatment with addition of ferric chloride for phosphorus removal. The “new” holding pond is sectioned into three with one part baffled off as a settling zone and a separate portion of the holding pond to allow for future expansion. The post-upgrade facility has a continuous discharge to the North Fork of the Eau Claire River.

Significant effluent monitoring and/or limit changes in the upcoming permit term are as follows: 1) the addition of annual monitoring for total nitrogen, nitrite + nitrate nitrogen and total Kjeldahl nitrogen, 2) the variable daily maximum ammonia limit table has been expanded to include applicable limits at a lower effluent pH & the limits apply year-round,

3) seasonally variable weekly & monthly avg. ammonia limits are reduced and the variable daily maximum ammonia limit table has been expanded to include applicable limits at a lower effluent pH, 4) the conditional reapproval of a multi-discharger variance (MDV) for phosphorus and the inclusion of the associated schedules to comply with s. 283.16, Wis. Stats. requirements for phosphorus, 5) the daily max. BOD limits have been removed and the weekly & monthly average concentration limits that vary by month have been added, 6) seasonal Escherichia coli (E. coli) monitoring and limits have been added & apply at the permit effective date, 7) addition of dissolved oxygen monitoring & a limit, and 8) addition of copper monitoring. The sample frequency for influent & effluent flow has been changed from “continuous” to “daily” for eDMR reporting purposes. Sample point 601 has been added that requires the permittee monitor the receiving water to support the dissolved-based copper limit calculations. A schedule has been included requiring the permittee submit an updated Land Application Management Plan. Additionally, to quantitate the risk, PFAS sludge sampling has been included in the permit pursuant to ss. NR 214.18(5)(b) and NR 204.06(2)(b)9., Wis. Adm. Code.

Substantial Compliance Determination

Enforcement During Last Permit: Sanitary Sewer Overflows (SSOs) occurred 09/05/2018 and 07/14/2020. The 2018 one occurred due to a large rain event resulting in 5.75” of rain during a short time frame. The second occurred due to a rain event and a tree root plugging the storm sewer. A notice of noncompliance (NON) was sent for this SSO.

After a desk top review of all discharge monitoring reports, land application reports, and compliance schedule items, and an inspection on 11/09/2022, Thorp WWTF has been found to be in substantial compliance with their current permit.

Compliance determination entered by Jenna Monahan on 11/14/2022.

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	Influent: 0.484 MGD (2023)	PRE-UPGRADE: Representative influent samples to the pre-upgrade WWTF shall be collected at the discharge pipe of the final lift station. POST-UPGRADE: Representative influent samples to the post-upgrade WWTF shall be collected at the final lift station.
001	Effluent to N. Forth Eau Claire River: 0.561 MGD (2023)	PRE-UPGRADE: Representative effluent samples from the pre-upgrade WWTF discharge to the North Fork of the Eau Claire (EC) River shall be collected at the discharge control structure located at the holding pond, prior to the holding pond. POST-UPGRADE: Representative effluent samples from the post-upgrade WWTF discharge to the North Fork of the Eau Claire (EC) River shall be collected after UV disinfection.
004	Lagoon Sludge: Sludge removal occurred in 2023 from part of the pre-upgrade ponds and will occur again this permit term to complete the decommissioning of that “old” facility. No sludge removal will	If desludging of any ponds occurs during this permit term, the permittee shall collect a composite sludge sample and monitor for the parameters listed below prior to removal and land application. If the permittee does not desludge any ponds during this permit term, composite sludge samples shall be collected once in 2025 and monitored for List 1, PCBs, Radium-226 and PFOA+PFOS.

Sample Point Designation		
Sample Point Number	Discharge Flow, Units, and Averaging Period	Sample Point Location, Waste Type/Sample Contents and Treatment Description (as applicable)
	likely be necessary at the post-upgrade WWTF ponds this permit term.	Approval of land application sites must be completed prior to sludge removal.
601	Instream Monitoring: New sample point to collect instream data to support the dissolved-based copper limit calculations.	Representative samples shall be taken of the receiving water (North Fork of the Eau Claire River) downstream of the WWTF discharge, after complete mixing of the effluent and receiving water, where equilibrium has been reached.

1 Influent – Monitoring Requirements

Sample Point Number: 701- INFLUENT to WWTF

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

The sample frequency for flow has been changed from “continuous” to “daily” for eDMR reporting purposes.

Explanation of Limits and Monitoring Requirements

Monitoring of influent flow, BOD5 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 Surface Water - Monitoring and Limitations

Sample Point Number: 001- EFFLUENT to N FORK EC RIVER

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow Rate		MGD	Daily	Continuous	
BOD5, Total	Monthly Avg	20 mg/L	3/Week	24-Hr Flow Prop Comp	See section below on variable weekly & monthly average BOD5 limits
BOD5, Total	Weekly Avg	45 mg/L	3/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total	Monthly Avg	30 mg/L	3/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total	Weekly Avg	45 mg/L	3/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 - Variable	mg/L	3/Week	24-Hr Flow Prop Comp	Daily max. limit varies with effluent pH. See ammonia section below for variable daily max. limits.
Nitrogen, Ammonia Variable Limit		mg/L	3/Week	See Table	
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	mg/L	3/Week	24-Hr Flow Prop Comp	See section below on variable weekly average & monthly average ammonia limits.
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	mg/L	3/Week	24-Hr Flow Prop Comp	
E. coli	Geometric Mean - Monthly	126 #/100 ml	Weekly	Grab	Limit & monitoring effective May-Sept
E. coli	% Exceedance	10 Percent	Monthly	Calculated	Limit & monitoring effective May-Sept. See the E. coli Percent Limit section below. Enter the result in the DMR on the last day of the month.
Copper, Total Recoverable		ug/L	Quarterly	24-Hr Flow Prop Comp	
Temperature Maximum	Daily Max	deg F	Continuous	Continuous	See Temperature section below for daily max. &

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Temperature Maximum	Weekly Avg	deg F	Continuous	Continuous	weekly average temp limits that vary by month.
Phosphorus, Total	Monthly Avg	0.5 mg/L	3/Week	24-Hr Flow Prop Comp	This is an interim MDV limit effective throughout the permit term. See the MDV/Phosphorus subsections and phosphorus compliance schedules.
Phosphorus, Total		lbs/month	Monthly	Calculated	Report the total monthly phosphorus discharged in lbs/month on the last day of the month on the DMR. See Standard Requirements for 'Appropriate Formulas' to calculate the Total Monthly Discharge in lbs/month.
Phosphorus, Total		lbs/yr	Annual	Calculated	Report the sum of the total monthly discharges for the calendar year on the Annual report form.
Nitrogen, Total Kjeldahl		mg/L	See Listed Qtr(s)	24-Hr Flow Prop Comp	Monitoring required in specific quarters. See Nitrogen Series Monitoring section for more info. Total Nitrogen shall be calculated as the sum of reported values for Total Kjeldahl Nitrogen and Total Nitrite + Nitrate Nitrogen.
Nitrogen, Nitrite + Nitrate Total		mg/L	See Listed Qtr(s)	24-Hr Flow Prop Comp	
Nitrogen, Total		mg/L	See Listed Qtr(s)	Calculated	

Changes from Previous Permit

1) the addition of annual monitoring for total nitrogen, nitrite + nitrate nitrogen and total Kjeldahl nitrogen, 2) the variable daily maximum ammonia limit table has been expanded to include applicable limits at a lower effluent pH & the limits apply year-round, 3) seasonally variable weekly & monthly avg. ammonia limits are reduced and the variable daily maximum ammonia limit table has been expanded to include applicable limits at a lower effluent pH, 4) the conditional reapproval of a multi-discharger variance (MDV) for phosphorus and the inclusion of the associated schedules to comply with s. 283.16, Wis. Stats. requirements for phosphorus, 5) the daily max. BOD limits have been removed and the weekly & monthly average concentration limits now vary by month, 6) seasonal Escherichia coli (E. coli) monitoring and limits have been added & apply at the permit effective date, 7) addition of dissolved oxygen monitoring & a limit, 8) the sample frequency for flow has been changed from “continuous” to “daily” for eDMR reporting purposes, and 9) addition of copper monitoring.

Explanation of Limits and Monitoring Requirements

The effluent monitoring frequency for all parameters were considered. Monitoring frequencies are based on the size and type of the facility and are established to best characterize effluent quality and variability, to detect events of noncompliance, and to ensure fairness and consistency in permits issued across the state. Requirements in administrative code (NR 108, 205, 210 and 214 Wis. Adm. Code) and Section 283.55, Wis. Stats. were considered, where applicable, when determining the appropriate monitoring frequencies for pollutants that have final effluent limits in effect during this permit term. For more information see the March 22, 2021 version of the Bureau of Water Quality Program Guidance Document “Monitoring Frequencies for Individual Wastewater Permits”. Using the criteria previously stated, the department has determined the only change in monitoring frequency that is needed is changing the flow frequency from continuous to daily for eDMR reporting purposes.

Limits were determined for Thorp’s discharge to the North Fork of the Eau Claire River using chs. NR 102, 104, 105, 106, 207, 210, 212 and 217 of the Wisconsin Administrative Code (where applicable). For additional information on any of the limits see the November 24, 2023 memo from Ben Hartenbower to Holly Heldstab titled “Water Quality-Based Effluent Limitations for Thorp Wastewater Treatment Facility WPDES Permit No. WI-0025615”.

MUNICIPAL EFFLUENT LIMITS – In accordance with the federal regulation 40 CFR 122.45(d), and to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Codes, limits in this permit are to be expressed as weekly average and monthly average limits whenever practicable.

BOD₅: Categorical limits and WQBELs are included in the permit as outlined in ch. NR 210, Wis. Adm. Code. The daily mass effluent limitations have been removed in accordance with s. NR 207.12(4)(b), Wis. Adm. Code. Under continuous discharge operations, it is more appropriate for the weekly BOD₅ limitations to be expressed as concentrations. The following weekly average and monthly average concentration limits apply:

Month	Weekly Average	Monthly Average
January	22 mg/L	22 mg/L
February	26 mg/L	26 mg/L
March	44 mg/L	30 mg/L
April	45 mg/L	30 mg/L
May	43 mg/L	30 mg/L
June	15 mg/L	15 mg/L
July	9.8 mg/L	9.8 mg/L
August	8.6 mg/L	8.6 mg/L
September	11 mg/L	11 mg/L
October	20 mg/L	20 mg/L
November	45 mg/L	30 mg/L
December	24 mg/L	24 mg/L

Total Suspended Solids (TSS) & pH: TSS limits are regulated by NR 102.04(1), Wis. Adm. Code. Categorical limits for pH are required per ch. NR 210 (Subchapter II). Chapter NR 102, Wis. Adm. Code ‘Water Quality Standards for Surface Waters’ also specifies requirements for pH for fish and aquatic life streams. Monitoring and limits for total suspended solids (TSS) and pH pollutants correspond to the requirements of the current permit.

Dissolved Oxygen (DO): A dissolved oxygen limit has been added. The DO limits in this permit are based on water quality standards from surface waters classified as fish and aquatic life as specified in s. NR 102.04(4)(a) and (b), Wis. Adm. Code. The WQBEL evaluation calculated the monthly variable BOD₅ limits using an effluent DO of 7.0 mg/L. Therefore, a daily minimum DO limit of 7.0 mg/L is included that the assumptions of the BOD₅ limits calculations are met.

Ammonia: See tables below for daily maximum, weekly average and monthly average ammonia limits. Current acute and chronic ammonia toxicity criteria for the protection of aquatic life are included in Tables 2C and 4B of ch. NR 105, Wis. Adm. Code. Subchapter IV of ch. NR 106 establishes the procedure for calculating water quality based effluent limitations (WQBELs) for ammonia. Daily maximum ammonia limits that vary with effluent pH apply year-round. Weekly average & monthly average limits that vary by month also apply. Samples for ammonia shall be collected at the same time as the pH samples.

DAILY MAXIMUM AMMONIA LIMITS THAT VARY WITH EFFLUENT pH

Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L
6.0 ≤ pH ≤ 6.1	77	7.0 < pH ≤ 7.1	47	8.0 < pH ≤ 8.1	9.9
6.1 < pH ≤ 6.2	76	7.1 < pH ≤ 7.2	42	8.1 < pH ≤ 8.2	8.1
6.2 < pH ≤ 6.3	74	7.2 < pH ≤ 7.3	37	8.2 < pH ≤ 8.3	6.7
6.3 < pH ≤ 6.4	72	7.3 < pH ≤ 7.4	33	8.3 < pH ≤ 8.4	5.5
6.4 < pH ≤ 6.5	70	7.4 < pH ≤ 7.5	28	8.4 < pH ≤ 8.5	4.5
6.5 < pH ≤ 6.6	67	7.5 < pH ≤ 7.6	24	8.5 < pH ≤ 8.6	3.7
6.6 < pH ≤ 6.7	64	7.6 < pH ≤ 7.7	21	8.6 < pH ≤ 8.7	3.1
6.7 < pH ≤ 6.8	60	7.7 < pH ≤ 7.8	17	8.7 < pH ≤ 8.8	2.6
6.8 < pH ≤ 6.9	56	7.8 < pH ≤ 7.9	14	8.8 < pH ≤ 8.9	2.2
6.9 < pH ≤ 7.0	51	7.9 < pH ≤ 8.0	12	8.9 < pH ≤ 9.0	1.9

VARIABLE WEEKLY AVERAGE & MONTHLY AVERAGE AMMONIA LIMITS

Month	Weekly Average	Monthly Average
January	14 mg/L	6.7 mg/L
February	15 mg/L	7.4 mg/L
March	20 mg/L	20 mg/L
April	46 mg/L	46 mg/L
May	23 mg/L	23 mg/L
June	12 mg/L	12 mg/L
July	7.5 mg/L	7.5 mg/L
August	6.8 mg/L	6.8 mg/L
September	7.6 mg/L	7.4 mg/L
October	20 mg/L	17 mg/L
November	41 mg/L	34 mg/L
December	34 mg/L	15 mg/L

Disinfection/E. coli: As part of the facility upgrade and switch to a continuous discharge, a seasonal E coli limit applies May – September. The approved facility plan & specs indicated the installation and use of ultraviolet (UV) light as the disinfection method. 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 new rule requires that WPDES permits for facilities with required disinfection include monitoring for E. coli while facilities are disinfecting during the recreation period, and establish effluent limitations for E. coli established in s. NR 210.06 (2), Wis. Adm Code. 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.

Copper: Calculations performed using effluent data submitted by the permittee indicates the effluent exceeds the calculated weekly copper limit, therefore weekly average total recoverable limits of 13 µg/L and 0.047 lbs/day are required. A monthly average limit of 13 µg/L is also required to meet expression of limits requirements per s. NR 106.07(3) and NR 205.067(7), Wis. Adm. Code. The Village of Thorp requested that dissolved-based copper limits be evaluated pursuant to chs. NR 105 and 106, Wis. Adm. Code. Dissolved based limits were evaluated according to procedures in s. NR 106.06(7)(b), Wis. Adm. Code. This approach resulted in the weekly average copper limit of 20.1 µg/L. The 4-day P₉₉ concentration of 14.1 µg/L is below this calculated limit, therefore limits are not required using the dissolved-based copper calculations.

By using the dissolved based metals calculation approach, sampling of the receiving water (North Fork of the Eau Claire River) is required twice during the permit term to support the site-specific translator for copper. See Sample Point 601 for more information.

Temperature/Thermal: Requirements for temperature are included in NR 102 Subchapter II Water Quality Standards for Temperature and NR 106 Subchapter V Effluent Limitations for Temperature. Thermal discharges must meet the Public Health criterion of 120 degrees F and the Fish & Aquatic Life criteria which are established to protect aquatic communities from lethal and sub-lethal thermal effects. The following limits apply at the permit effective date:

Month	Daily Maximum	Weekly Average
January	53 °F	86 °F
February	55 °F	86 °F
March	59 °F	90 °F
April	64 °F	107 °F
May	71 °F	96 °F
June	79 °F	87 °F
July	83 °F	86 °F
August	87 °F	88 °F
September	75 °F	84 °F
October	64 °F	86 °F
November	58 °F	105 °F
December	53 °F	83 °F

Phosphorus: Phosphorus rules became effective December 1, 2010 per NR 217, Wis. Adm. Code, that required the permittee to comply with water quality based effluent limits (WQBELs) for total phosphorous. The final phosphorus WQBELs (0.225 monthly average and 0.075 & 0.24 lbs/day mg/L 6-month average) were to become effective as scheduled unless a variance was granted. For this permit term, the permittee has re-applied for the Multi-Discharger Variance (MDV) for phosphorus as provided for in s. 283.16, Wis. Stats., and approved by USEPA on February 6, 2017. Thorp’s MDV application was conditionally approved by the DNR on June 6, 2023. The permittee qualifies for the MDV because it is an existing source and a major facility upgrade is needed to comply with the applicable phosphorus WQBELs, thereby creating a financial burden. The new interim monthly average highest attainable condition (HAC) limit of 0.50 mg/L applies at the permit effective date.

Conditions of the MDV require the permittee to optimize phosphorus removal throughout the proposed permit term, comply with interim limits and make annual payments to participating county(s) by March 1 of each year based on the pounds of phosphorus discharged during the previous year in excess of the specified target value. A reopener clause is included in the permit to address the current MDV’s expiration date, as a permit action may be required to update or remove variance provisions if the MDV is altered or unavailable after February 6, 2027.

The “price per pound” value is \$50.00 adjusted for CPI annually during the first quarter as defined by s. 283.16(8)(a)2, Wis. Stats and takes effect for reissued permits with effective dates starting April 1. This may differ from the “price per pound” that is public noticed; however, the “price per pound” is set upon reissuance and is applicable for the entire permit

term. The participating county(s) uses these payments to implement non-point source phosphorus control strategies at the watershed level.

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. 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 quarters:

- 3rd quarter (July – Sept) 2024
- 2nd quarter (April – June) 2025
- 4th quarter (Oct – Dec) 2026
- 1st quarter (Jan – March) 2027
- 3rd quarter (July – Sept) 2028

PFOS and PFOA: NR 106 Subchapter VIII – Permit Requirements for PFOS and PFOA Dischargers became effective on August 1, 2022. Pursuant to s. NR 106.98(3)(b), Wis. Adm. Code, the department evaluated the need for PFOS and PFOA monitoring 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 permit was drafted, the department has determined the permittee does not need to sample for PFOS or PFOA as part of this permit reissuance. The department may re-evaluate the need for sampling at the next permit reissuance if new information becomes available that suggests PFOS or PFOA may be present in the discharge.

Whole Effluent Toxicity (WET): Whole effluent toxicity (WET) testing requirements and limits (if applicable) are determined in accordance with ss. NR 106.08 and NR 106.09 Wis. Adm. Code, as revised in August 2016. (See the current version of the Whole Effluent Toxicity Program Guidance Document and checklist and WET information, guidance and test methods at <http://dnr.wi.gov/topic/wastewater/wet.html>). No WET testing is required because information related to the discharge indicates low to no risk for toxicity.

Mercury: The permit application did not require monitoring for mercury because the Melrose Wastewater Treatment Facility 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 the past five years of sludge characteristics data reveals that all the sample results are within expected analytical ranges and well below the 17 mg/kg level. The concentration in the sludge from 2020 was 0.24 kg/mg, with a maximum reported concentration of 0.24 mg/kg. Therefore, no mercury monitoring is required at Outfall 001.

Chloride: Acute and chronic chloride toxicity criteria for the protection of aquatic life are included in Tables 1 and 5 of ch. NR 105, Wis. Adm. Code. Subchapter VII of ch. NR 106 establishes the procedure for calculating water quality based effluent limitations (WQBELs) for chloride. Effluent chloride concentrations submitted with the permit application indicate low to no risk for toxicity, therefore no effluent limits or monitoring are required.

Sample Point Number: 601- NORTH FORK EAU CLAIRE RIVER

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Suspended Solids, Total		mg/L	See Listed Qtr(s)	Grab	Monitoring required in specific quarters. See below for info.
Copper, Total Recoverable		ug/L	See Listed Qtr(s)	Grab	
Copper Dissolved		ug/L	See Listed Qtr(s)	Grab	

Changes from Previous Permit

This is a new sample point that requires monitoring of the receiving water to further support the estimated dissolved-based copper criteria, or an alternate criteria, used when determining dissolved-based copper limits at surface water Outfall 001. See WQBEL memo referenced above for more information.

Explanation of Limits and Monitoring Requirements

- 2nd quarter (April-June) 2026
- 3rd quarter (July-Sept) 2027

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
004	B	Liquid	Fecal Coliform	Injection	Land Application	Approx. 23 cubic yards was landspread in July 2023 after desludging occurred from the final holding pond prior to reconstruction into three new ponds. Additional desludging is anticipated during the final decommissioning of the pre-upgrade plant from the pre-upgrade aerated lagoons. No desludging is predicted from the post-upgrade ponds this permit term.
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? Yes. A sample collected on 02/18/2020 from the Thorp water supply has a result of 2.31 pCi/L. Therefore, special monitoring and recycling conditions are included in the permit to track any potential problems in land applying sludge from this facility.						
Is a priority pollutant scan required? No						

Sample Point Number: 004- POND SLUDGE

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Solids, Total		Percent	Once	Composite	
Arsenic Dry Wt	Ceiling	75 mg/kg	Once	Composite	
Arsenic Dry Wt	High Quality	41 mg/kg	Once	Composite	
Cadmium Dry Wt	Ceiling	85 mg/kg	Once	Composite	
Cadmium Dry Wt	High Quality	39 mg/kg	Once	Composite	
Copper Dry Wt	Ceiling	4,300 mg/kg	Once	Composite	
Copper Dry Wt	High Quality	1,500 mg/kg	Once	Composite	
Lead Dry Wt	Ceiling	840 mg/kg	Once	Composite	
Lead Dry Wt	High Quality	300 mg/kg	Once	Composite	

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Mercury Dry Wt	Ceiling	57 mg/kg	Once	Composite	
Mercury Dry Wt	High Quality	17 mg/kg	Once	Composite	
Molybdenum Dry Wt	Ceiling	75 mg/kg	Once	Composite	
Nickel Dry Wt	Ceiling	420 mg/kg	Once	Composite	
Nickel Dry Wt	High Quality	420 mg/kg	Once	Composite	
Selenium Dry Wt	Ceiling	100 mg/kg	Once	Composite	
Selenium Dry Wt	High Quality	100 mg/kg	Once	Composite	
Zinc Dry Wt	Ceiling	7,500 mg/kg	Once	Composite	
Zinc Dry Wt	High Quality	2,800 mg/kg	Once	Composite	
Nitrogen, Total Kjeldahl		Percent	Per Application	Composite	
Nitrogen, Ammonia (NH3-N) Total		Percent	Per Application	Composite	
Phosphorus, Total		Percent	Per Application	Composite	
Phosphorus, Water Extractable		% of Tot P	Per Application	Composite	
Potassium, Total Recoverable		Percent	Per Application	Composite	
PCB Total Dry Wt	Ceiling	50 mg/kg	Once	Composite	
PCB Total Dry Wt	High Quality	10 mg/kg	Once	Composite	
PFOA + PFOS		ug/kg	Once	Calculated	
Radium 226 Dry Wt		pCi/g	Once	Composite	

Changes from Previous Permit:

Change in form submittal – In prior permit reissuances when it has been noted in the application that sludge would not be removed during the permit term, the department required sampling during the second year of the permit term and the sludge characteristic report (3400-049) would be generated only during that year. Due to moving to electronic submittal of forms via Switchboard, forms 3400-049 (“Characteristics Report”), 3400-052 (“Other Methods of Disposal”) and 3400-055 (“Annual Land Application”) will now be generated by the department and the permittee will be required to submit all three reports each year of the permit term. This change was adopted to provide the permittee flexibility because many lagoon desludging projects can be unexpected, are delayed or staggered over multiple years. Additionally, it is used to officially report that no land application of sludge has occurred, and annual submittal of the forms is required per the standard requirements section.

PFAS – Monitoring is required once during the permit term pursuant 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 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 expects to release this risk assessment by the end of 2024. In the interim, the department has developed the “Interim Strategy for Land Application of Biosolids and Industrial Sludges Containing PFAS”.

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

4 Schedules

4.1 Phosphorus Schedule - Continued Optimization

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

Required Action	Due Date
Optimization: The permittee shall continue to implement the optimization plan as previously approved to optimize performance to control phosphorus discharges. Submit a progress report on optimizing removal of phosphorus by the Due Date.	04/01/2025
Progress Report #2: Submit a progress report on optimizing removal of phosphorus.	04/01/2026
Progress Report #3: Submit a progress report on optimizing removal of phosphorus.	04/01/2027
Progress Report #4: Submit a progress report on optimizing removal of phosphorus.	04/01/2028
Progress Report #5: Submit a progress report on optimizing removal of phosphorus.	04/01/2029

Explanation of Continued Optimization Schedule: Per s. 283.16(6)(a), Wis. Stats. the Department may include a requirement that the permittee optimize the performance of a point source in controlling phosphorus discharges, which may be necessary to achieve compliance with multi-discharger variance interim limits. This compliance schedule requires the permittee to continue to implement the optimization plan that was approved during the previous permit term.

4.2 Phosphorus Payment per Pound to County

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

Required Action	Due Date
Annual Verification of Phosphorus Payment to County: The permittee shall make a total payment to the participating county or counties approved by the Department by March 1 of each calendar year.	03/01/2025

<p>The amount due is equal to the following: [(lbs of phosphorus discharged minus the permittee’s target value) times (\$64.75 per pound)] or \$640,000, whichever is less. See the payment calculation steps in the Surface Water section.</p> <p>The permittee shall submit Form 3200-151 to the Department by March 1 of each calendar year indicating total amount remitted to the participating counties to verify that the correct payment was made. The first payment verification form is due by the specified Due Date.</p> <p>Note: The applicable Target Value is 0.2 mg/L as defined by s. 283.16(1)(h), Wis. Stats. The "per pound" value is \$50.00 adjusted for CPI.</p>	
<p>Annual Verification of Payment #2: Submit Form 3200-151 to the Department indicating total amount remitted to the participating counties.</p>	03/01/2026
<p>Annual Verification of Payment #3: Submit Form 3200-151 to the Department indicating total amount remitted to the participating counties.</p>	03/01/2027
<p>Annual Verification of Payment #4: Submit Form 3200-151 to the Department indicating total amount remitted to the participating counties.</p>	03/01/2028
<p>Annual Verification of Payment #5: Submit Form 3200-151 to the Department indicating total amount remitted to the participating counties.</p>	03/01/2029
<p>Continued Coverage: If the permittee intends to seek a renewed variance, an application for the MDV (Multi Discharger Variance) shall be submitted as part of the application for permit reissuance in accordance with s. 283.16(4)(b), Wis. Stats.</p>	
<p>Annual Verification of Payment After Permit Expiration: In the event that this permit is not reissued prior to the expiration date, the permittee shall continue to submit Form 3200-151 to the Department indicating total amount remitted to the participating counties by March 1 each year.</p>	

Explanation of County Payment Schedule: Subsection 283.16(6)(b), Wis. Stats., requires permittees that have received approval for the multi-discharger variance (MDV) to implement a watershed project that is designed to reduce non-point sources of phosphorus within the HUC 8 watershed in which the permittee is located. The permittee has selected the “Payment to Counties” watershed option described in s. 283.16(8), Wis. Stats. Under this option the permittee shall make annual payment(s) to participating county(s) that are calculated based on the amount of phosphorus actually discharged during a calendar year in pounds per year less the amount of phosphorus that would have been discharged had the permittee discharged phosphorus at a target value concentration of 0.2 mg/L. The pounds of phosphorus discharged in excess of the target value is multiplied by a per pound phosphorus charge that will equal \$ 64.75 per pound. This schedule requires the permittee to submit Form 3200-151 to the Department indicating the total amount remitted to the participating county(s).

4.3 Land Application Management Plan

A management plan is required for the land application system.

Required Action	Due Date
<p>Land Application Management Plan Submittal: Submit an update to the management plan to optimize the land application system performance and demonstrate compliance with ch. NR 204, Wis. Adm. Code, by the Due Date. This management plan shall 1) specify information on pretreatment processes (if any); 2) identify land application sites; 3) describe site limitations; 4) address vegetative cover management and removal; 5) specify availability of storage; 6) describe the type of transporting and spreading vehicle(s); 7) specify monitoring procedures; 8) track site loading;</p>	06/30/2024

9) address contingency plans for adverse weather and odor/nuisance abatement; and 10) include any other pertinent information. Once approved, all landspreading activities shall be conducted in accordance with the plan. Any changes to the plan must be approved by the Department prior to implementing the changes.	
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Explanation of Schedule: This schedule requires the submittal of an updated Land Application Management Plan that documents how the permittee will manage the land application of biosolids consistent with ch. NR 204, Wis. Adm. Code.

Special Reporting Requirements

None

Other Comments:

Publishing Newspaper: Thorp Courier, 403 N Washington Street, PO Box 487, Thorp, WI, 54771-0487

Attachments:

Water Quality Based Effluent Limits: November 24, 2023 memo from Ben Hartenbower to Holly Heldstab titled "Water Quality-Based Effluent Limitations for Thorp Wastewater Treatment Facility WPDES Permit No. WI-0025615"

Expiration Date:

March 31, 2029

Justification Of Any Waivers From Permit Application Requirements

None

Prepared By: Holly Heldstab, Wastewater Specialist

Date: March 19, 2024

CORRESPONDENCE/MEMORANDUM

DATE: November 24, 2023

TO: Holly Heldstab– WCR/Eau Claire

FROM: Benjamin Hartenbower – WCR/Eau Claire

SUBJECT: Water Quality-Based Effluent Limitations for the Thorp Wastewater Treatment Facility
WPDES Permit No. WI-0025615

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 Thorp Wastewater Treatment Facility in Clark County. This municipal wastewater treatment facility (WWTF) discharges to the North Fork Eau Claire River, located in the North Fork Eau Claire River Watershed in the Lower Chippewa River Basin. 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						1,2
BOD ₅						3
January			22 mg/L	22 mg/L		
February			26 mg/L	26 mg/L		
March			44 mg/L	30 mg/L		
April			45 mg/L	30 mg/L		
May			43 mg/L	30 mg/L		
June			15 mg/L	15 mg/L		
July			9.8 mg/L	9.8 mg/L		
August			8.6 mg/L	8.6 mg/L		
September			11 mg/L	11 mg/L		
October			20 mg/L	20 mg/L		
November			45 mg/L	30 mg/L		
December			24 mg/L	24 mg/L		
TSS			45 mg/L	30 mg/L		1
pH	9.0 s.u.	6.0 s.u.				1
Dissolved Oxygen		7.0 mg/L				
Ammonia Nitrogen						4
January	Variable		14 mg/L	6.7 mg/L		
February	Variable		15 mg/L	7.4 mg/L		
March	Variable		20 mg/L	20 mg/L		
April	Variable		46 mg/L	46 mg/L		
May	Variable		23 mg/L	23 mg/L		
June	Variable		12 mg/L	12 mg/L		
July	Variable		7.5 mg/L	7.5 mg/L		
August	Variable		6.8 mg/L	6.8 mg/L		
September	Variable		7.6 mg/L	7.4 mg/L		
October	Variable		20 mg/L	17 mg/L		
November	Variable		41 mg/L	34 mg/L		
December	Variable		34 mg/L	15 mg/L		

Bacteria <i>E. coli</i>				126#/100 mL geometric mean		5
Copper			13 µg/L, 0.047 lbs/day	13 µg/L		3,6
Temperature						7
January	53		86			
February	55		86			
March	59		90			
April	64		107			
May	71		96			
June	79		87			
July	83		86			
August	87		88			
September	75		84			
October	64		86			
November	58		105			
December	53		83			
Phosphorus MDV Interim Limit Final WQBEL				0.50 mg/L 0.225 lbs/day	0.075 mg/L, 0.24 lbs/day	8
TKN, Nitrate+Nitrite, and Total Nitrogen						9

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. The variable daily maximum ammonia nitrogen limit table corresponding to various effluent pH values. These limits apply year-round.

Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L
6.0 ≤ pH ≤ 6.1	77	7.0 < pH ≤ 7.1	47	8.0 < pH ≤ 8.1	9.9
6.1 < pH ≤ 6.2	76	7.1 < pH ≤ 7.2	42	8.1 < pH ≤ 8.2	8.1
6.2 < pH ≤ 6.3	74	7.2 < pH ≤ 7.3	37	8.2 < pH ≤ 8.3	6.7
6.3 < pH ≤ 6.4	72	7.3 < pH ≤ 7.4	33	8.3 < pH ≤ 8.4	5.5
6.4 < pH ≤ 6.5	70	7.4 < pH ≤ 7.5	28	8.4 < pH ≤ 8.5	4.5
6.5 < pH ≤ 6.6	67	7.5 < pH ≤ 7.6	24	8.5 < pH ≤ 8.6	3.7
6.6 < pH ≤ 6.7	64	7.6 < pH ≤ 7.7	21	8.6 < pH ≤ 8.7	3.1
6.7 < pH ≤ 6.8	60	7.7 < pH ≤ 7.8	17	8.7 < pH ≤ 8.8	2.6
6.8 < pH ≤ 6.9	56	7.8 < pH ≤ 7.9	14	8.8 < pH ≤ 8.9	2.2
6.9 < pH ≤ 7.0	51	7.9 < pH ≤ 8.0	12	8.9 < pH ≤ 9.0	1.9

5. Bacteria limits apply during the disinfection season of May-September. Additional limit: No more than 10 percent of *E. coli* bacteria samples collected in any calendar month may exceed 410 count/100 mL.
6. If the dissolved based effluent limit calculations are requested in accordance with the procedures in s. NR 106.06(7)(b), Wis. Adm. Code, monitoring conditions in s. NR 106.06(7)(c), Wis. Adm. Code may be included in lieu of weekly and monthly copper limits.

7. A compliance schedule may be included to meet the temperature limits.
8. Under the phosphorus MDV, the highest attainable condition (HAC) limit is 0.50 mg/L. The final WQBELs remain at 0.225 mg/L as a monthly average and 0.075 mg/L as a six-month average, as well as a respective mass limit.
9. 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 (NO₃), nitrite (NO₂), 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 Benjamin Hartenbower at (715) 225-4705 or Benjamin.Hartenbower@wisconsin.gov or Diane Figiel at Diane.Figiel@wisconsin.gov.

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

PREPARED BY:



Benjamin Hartenbower, PE,
Water Resources Engineer

Date: 11/24/2023

E-cc:

Jenna Monahan, Wastewater Engineer – WCR/Eau Claire
Geisa Thielen, Regional Wastewater Supervisor – WCR/Eau Claire
Diane Figiel, Water Resources Engineer – WY/3
Chris Willger, Water Quality Biologist – WCR/Eau Claire
Nate Willis, Wastewater Engineer – WY/3

**Water Quality-Based Effluent Limitations for
the Thorp Wastewater Treatment Facility
WPDES Permit No. WI-0025615**

Prepared by: Benjamin P. Hartenbower

PART 1 – BACKGROUND INFORMATION

Facility Description:

The Thorp Wastewater Treatment Facility is a lagoon system consisting of a three cell aerated lagoon system, plus a final holding pond. It is currently operated as a fill and draw system but is under construction to be modified to operate continuously beginning in spring of 2024. The Switch will be from a coarse bubble, fill and draw lagoon system to a fine bubble aeration and continuous discharge. The planned changes include converting the final holding pond into a three cell system with an influent pump station with fine screen, ammonia polishing reactor, UV treatment, and chemical treatment. Outfall 001 is located on the east bank of the N. Fork of the Eau Claire river 1/4 mile upstream of Pine Rd.

Attachment #3 is a map of the area showing the approximate location of Outfall 001.

Existing Permit Limitations

The current permit, which expired on June 30, 2023, includes the following effluent limitations and monitoring requirements.

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Flow Rate						1,2
BOD ₅	Variable		45 mg/L	30 mg/L		3
TSS			45 mg/L	30 mg/L		1
pH	9.0 s.u.	6.0 s.u.				1
Ammonia Nitrogen	Variable		Variable	Variable		3,4
Fecal Coliform						2
Phosphorus Interim HAC Interim Limit Final WQBEL				0.80 mg/L 0.51 mg/L 0.225 lbs/day	0.075 mg/L, 0.24 lbs/day	5

Footnotes:

1. 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.
2. Monitoring only.

3. Variable mass limits for BOD₅ and Ammonia:

Month	BOD ₅ Limit (lbs/day)	NH ₃ -N Limit (lbs/day)	
	Daily Max	Weekly Avg	Monthly Avg
January	54	120	52
February	62	124	55
March	91	143	-
April	235	355	-
May	82	216	-
June	31	53	-
July	21	41	-
August	18	37	31
September	24	59	49
October	47	174	128
November	115	221	141
December	55	199	98

4. Variable Daily Maximum Ammonia limits:

Effluent pH (s.u.)	NH ₃ -N Limit (mg/L)	Effluent pH (s.u.)	NH ₃ -N Limit (mg/L)
pH ≤ 7.5	No Limit	8.2 < pH ≤ 8.3	9.4
7.5 < pH ≤ 7.6	34*	8.3 < pH ≤ 8.4	7.8
7.6 < pH ≤ 7.7	29*	8.4 < pH ≤ 8.5	6.4
7.7 < pH ≤ 7.8	24*	8.5 < pH ≤ 8.6	5.3
7.8 < pH ≤ 7.9	20*	8.6 < pH ≤ 8.7	4.4
7.9 < pH ≤ 8.0	17	8.7 < pH ≤ 8.8	3.7
8.0 < pH ≤ 8.1	14	8.8 < pH ≤ 8.9	3.1
8.1 < pH ≤ 8.2	11	8.9 < pH ≤ 9.0	2.6

* During the months of May through October if the pH is less than or equal to 7.9 there is no daily maximum limit for NH₃-N. Limits shown in the table above with an asterisk* apply from November through April only.

3. Under the phosphorus MDV, a highest attainable condition (HAC) limit of 0.51 mg/L was effective October 1, 2020.

Receiving Water Information

- Name: The North Fork Eau Claire River
- Waterbody Identification Code (WBIC): 2145400
- 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: USGS for Station 05365707 near Thorp, in the North Fork Eau Claire River

7-Q₁₀ = 0.35 cfs (cubic feet per second)

Harmonic Mean Flow = 4.24 cfs using a drainage area of 51.0 mi².

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
7-Q₁₀ (cfs)	0.72	1.00	2.33	8.41	3.59	1.03	0.54	0.35	0.45	1.05	3.41	0.92
30-Q₅ (cfs)	1.49	1.94	40.10	51.60	13.20	5.66	4.34	2.90	3.04	5.10	10.00	2.95

Attachment #1

- Hardness = 119 mg/L as CaCO₃. This value represents the geometric mean of 9 samples collected in the North Fork Eau Claire River from 09/07/1989 to 05/09/1990.
- % 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 Black River at Hemlock is used for this evaluation because there is no data available for the North Fork Eau Claire River and the Black River is within the same ecological landscape so ambient water quality characteristics are expected to be similar. The numerical values are shown in the tables below. If no data is available, the background concentration is assumed to be negligible and a value of zero is used in the computations. Background data for calculating effluent limitations for ammonia nitrogen are described later.
- Multiple dischargers: The Village of Lublin discharges a dry run tributary to the North Fork Eau Claire River, however they are not in the immediate vicinity and the mixing zones do not overlap. Therefore, the other dischargers do not impact this evaluation.
- Impaired water status: The North Fork Eau Claire River is listed as impaired for Total Phosphorus.

Effluent Information:

- Design Flow Rates(s):
 Annual Average = 0.331 MGD (Million Gallons per Day)
 Annual Average (after upgrade) = 0.423 MGD
 For reference, the actual average flow from October 2018 to August 2023 was 1.145 MGD during discharge events. The overall influent average flow was 0.408 MGD.
- Hardness = 109 mg/L as CaCO₃. This value represents the geometric mean of 4 effluent samples collected from 04/13/2022 to 04/22/2022.
- 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: Aluminum Sulfate
- 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 permit-required monitoring for Ammonia and Phosphorus from July 2018 to August 2023 is used in this evaluation.

Chemical Specific Effluent Data at Outfall 001

Sample Date	Chloride mg/L	Sample Date	Copper µg/L
04/13/2022	68	04/13/2022	11
04/16/2022	82	04/16/2022	13
04/19/2022	86	04/19/2022	12
04/22/2022	56	04/22/2022	14
		04/25/2022	13
		04/28/2022	12
		05/01/2022	12
		05/04/2022	13
		05/07/2022	9
		05/10/2022	9
		05/13/2022	7

Attachment #1

Sample Date	Chloride mg/L	Sample Date	Copper µg/L
mean	73	1-day P ₉₉	17
		4-day P ₉₉	14

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.”.

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

Parameter Averages with Limits

	Average Measurement	Average Mass Discharged
BOD ₅	8 mg/L	58 lbs/day
TSS	6 mg/L	
pH	7.52 s.u.	
Ammonia Nitrogen	2.0 mg/L	17.19 lbs/day
Phosphorus	0.37 mg/L	

**PART 2 – WATER QUALITY-BASED Effluent Limitations
for Toxic Substances – EXCEPT AMMONIA NITROGEN**

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

1. The maximum effluent concentration exceeds the calculated limit (s. NR 106.05(3), Wis. Adm. Code)
2. If 11 or more detected results are available in the effluent, the upper 99th percentile (or P₉₉) value exceeds the comparable calculated limit (s. NR 106.05(4), Wis. Adm. Code)
3. If fewer than 11 detected results are available, the mean effluent concentration exceeds 1/5 of the calculated limit (s. NR 106.05(6), Wis. Adm. Code)

Acute Limits based on 1-Q₁₀

Daily maximum effluent limitations for toxic substances are based on the acute toxicity criteria (ATC), listed in ch. NR 105, Wis. Adm. Code. Previously daily maximum limits for toxic substances were calculated as two times the ATC. However, changes to ch. NR 106, Wis. Code, (September 1, 2016) require the Department to calculate acute limitations using the same mass balance equation as used for other limits along with the 1-Q₁₀ receiving water low flow to determine if more restrictive effluent limitations are needed to protect the receiving stream from discharges which may cause or contribute to an exceedance of the acute water quality standards. The mass balance equation is provided below.

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

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

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-Q₁₀ 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 the Village of Thorp Wastewater Treatment Facility.

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

Daily Maximum Limits based on Acute Toxicity Criteria (ATC)

RECEIVING WATER FLOW = 0.28 cfs, (1-Q₁₀ (estimated as 80% of 7-Q₁₀)), as specified in s. NR 106.06 (3) (bm), Wis. Adm. Code.

SUBSTANCE	REF. HARD. mg/L	ATC	MEAN BACK-GRD.	MAX. EFFL. LIMIT**	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	1-day P99	1-day MAX. CONC.
Arsenic		339.8		485.2	97	<1.0		
Cadmium	109	11.41	0.009	16.3	3.3	<2		
Chromium	109	1938.74	0.622	2767.9	553.6	<6		
Copper	109	16.87	1.265	23.5			17.3	14
Lead	109	116.48	0.178	166.2	33.2	<1		
Nickel	109	505.69		722	144.4	<8		
Zinc	109	130.07	1.710	185	37	14		
Chloride		757		1081	216	73		86

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

Attachment #1

Weekly Average Limits based on Chronic Toxicity Criteria (CTC)

RECEIVING WATER FLOW = 0.09 cfs (¼ of the 7-Q₁₀), as specified in s. NR 106.06 (4) (c), Wis. Adm. Code

SUBSTANCE	REF. HARD. mg/L	CTC	MEAN BACK-GRD.	WEEKLY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	4-day P99
Arsenic		152.2		172.5	34.5	<1.0	
Cadmium	119	2.82	0.009	3.2	0.6	<2	
Chromium	119	152.26	0.622	172.5	34.5	<6	
Copper	119	12.01	1.265	13.4			14.1
Lead	119	33.11	0.178	37.5	7.5	<1	
Nickel	119	60.44		68.5	13.7	<8	
Zinc	119	140.07	1.710	158.6	31.7	14	
Chloride		395		448	90	73	

Monthly Average Limits based on Wildlife Criteria (WC)

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

Monthly Average Limits based on Human Threshold Criteria (HTC)

RECEIVING WATER FLOW = 1.06 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	0.009	969	194	<2
Chromium	3818000	0.622	10004130	2000826	<6
Lead	140	0.178	366.5	73.3	<1
Nickel	43000		112671	22534	<8

Monthly Average Limits based on Human Cancer Criteria (HCC)

RECEIVING WATER FLOW = 1.06 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		34.8	7.0	<1.0

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, limits are required for Copper.

Copper – Considering available effluent data from the current permit term (October 2018 to August 2023), the 30-day P₉₉ concentration is 12.3 µg/L, the 4-day P₉₉ concentration is 14.1 µg/L, and the 1-day P₉₉ concentration is 17.3 µg/L, with a maximum concentration of 14.0 µg/L. The effluent exceeds the calculated weekly limit, therefore concentration and mass limits, as well as monthly monitoring, are required.

The weekly mass limitation of 0.047 lbs/day is based on the concentration limit and the annual average flow of 0.423 MGD (13.4 µg/L * 0.423 MGD * 8.34/1000) in accordance with s. NR 106.07(2)(c), Wis. Adm. Code.

Sections NR 106.07(3) and NR 205.067(7), Wis. Adm. Code require WPDES permits contain weekly average and monthly average limitations for municipal dischargers whenever practicable and necessary to protect water quality. **Therefore a monthly average limit of 13 µg/L would be required** to meet expression of limits requirements in addition to the weekly average limits.

Dissolved-based limits may be evaluated for the Thorp Wastewater Treatment Facility pursuant to chs. NR 105 and 106, Wis. Adm. Code. Consideration of dissolved-based limits will be according to procedures in s. NR 106.06(7)(b), Wis. Adm. Code.

Information required for the calculation of dissolved-based limits includes the conversion factors from ss. NR 105.05(5) (for acute criteria), or NR 105.06(8) (for chronic criteria), Wis. Adm. Code. Background data is also required to translate the dissolved criteria into a site-specific number (the “translator”) from which a total recoverable limit may be calculated based on the fraction of the discharged metal which would be dissolved in the receiving water. To perform this translation the following background data is required:

$$\text{Translator} = \frac{M_{tr}}{M_d}$$

Where:

M_d: Dissolved metals concentration in the receiving water (µg/L)

M_{Tr}: Total Recoverable metals concentration in the receiving water (µg/L)

Unfortunately, there is not this type of metals data available for the receiving water for the Thorp Wastewater Treatment Facility effluent. However, the nearest site with such data is in a nearby basin, namely Dill Creek at Colby. Use of a data from nearby basins may be considered per s. NR 106.06(4)(e)1, Wis. Adm. Code. There are data on total recoverable and dissolved copper such that translators may be estimated at the site:

Background Dissolved Copper Data

Date	Total Recoverable Copper (µg/L)	Dissolved Copper (µg/L)	Translator
05/20/2003	5.64	2.15	2.62
10/09/2003	7.88	5.77	1.37
05/20/2004	3.68	2.60	1.42
10/20/2004	4.56	3.97	1.15
		Geomean	1.55

Multiplying the translator, the conversion factor from ch. NR 105, Wis. Adm. Code, and the applicable criterion will give an indication of the amount of “relief” potentially available to the recommended permit limits if the dissolved fraction is considered from the available data:

$$\text{Translated Criteria} = \text{NR 105 Criterion} * \text{Conversion Factor} * \text{Translator}$$

$$\text{Dissolved-Based CTC (Copper)} = 12.01 \mu\text{g/L} * 0.960 * 1.55 = 17.9 \mu\text{g/L}$$

Using the dissolved-based approach for copper limits, the weekly average copper limit would be 20.1 µg/L. The 4-day P₉₉ concentration of 14.1 µg/L is below this calculated limit, therefore limits would not be required if the permittee requests dissolved-based copper limits.

The permittee can collect on-site information to support either the estimated dissolved-based criteria or some alternate criteria. The following monitoring would be recommended for copper at or near the Thorp Wastewater Treatment Facility outfall:

- At least two rounds of monitoring of total suspended solids and both total recoverable and filterable copper in the receiving water would be needed. This information would be used to further verify a site-specific translator for each metal. The monitoring (grab sampling) should take place at a point downstream that is representative of mixed receiving water and effluent, where chemical equilibrium has been reached.

PFOS and PFOA – The need for PFOS and PFOA monitoring is evaluated in accordance with s. NR 106.98, Wis. Adm. Code. Based on the annual design flow and lack of nondomestic contributions, it is unlikely that the effluent will contain PFOS or PFOA. **Therefore, monitoring is not recommended.** If information becomes available that indicates PFOS or PFOA may be present in the effluent, the monitoring requirements may change.

Mercury – The permit application did not require monitoring for mercury because the Thorp Wastewater Treatment Facility 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). A review of the past five years 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 2020 was 0.24 mg/kg, with a maximum reported concentration of 0.24 mg/kg. Therefore, no mercury monitoring is recommended at Outfall 001.

**PART 3 – WATER QUALITY-BASED Effluent Limitations
for CONVENTIONAL POLLUTANTS**

In establishing Biochemical Oxygen Demand (BOD₅) limitations, the primary intent is to prevent a lowering of dissolved oxygen levels in the receiving water below water quality standards as specified in ss. NR 102.04(4)(a) and (b), Wis. Adm. Codes. The 26-lb method is the most frequently used approach for calculating BOD₅ limits when resources are not available to develop a detailed water quality model. This simplified model was developed in the 1970's by the Wisconsin Committee on Water Pollution on the Fox, Wisconsin, Oconto, and Flambeau Rivers. Further studies throughout the 1970's proved this model to be relatively accurate. The model has since then been used by the Department on many occasions when resources are not available to perform a site-specific model. The "26" value stems from the following equation:

$$\frac{26 \text{ lbs/day}}{\text{ft}^3/\text{sec}} * \frac{1 \text{ day}}{86,400 \text{ sec}} * \frac{454,000 \text{ mg}}{\text{lb}} * \frac{1 \text{ ft}^3}{28.32 \text{ L}} = 4.8 = 2.4 * 2 \text{ mg/L}$$

The 4.8 has been calculated by taking 2.4 which is the number one receives when converting 26 lbs of BOD/day/cfs into mg/L, multiplied by 2.0 which is the change in the DO level. A typical background DO level for Wisconsin waters is 7 mg/L, so a 2 mg/L decrease is allowed in order to meet the 5 mg/L standard for warm water streams. The above relationship is temperature dependent and an appropriate temperature correction factor is applied. The 26-lb method is based on a typical 24°C summer value for warm water streams. Adjustments for temperature and other receiving water classifications are made using the following equations:

$$k_t = k_{24} (0.967^{(T-24)})$$

Where k_{24} = 26 lbs of BOD/day/cfs

Calculations based on Full Assimilative Capacity at 7Q10 Conditions:

$$\text{Limitation (mg/L)} = 2.4(DO_{\text{stream}} - DO_{\text{std}}) \left(\frac{7Q_{10} + Q_{\text{eff}}(1-f)}{Q_{\text{eff}}} \right) (0.967^{(T-24)})$$

Where:

Q_{eff} = effluent design flow = 0.423 MGD

DO_{stream} = in stream dissolved oxygen concentration after mixing

DO_{std} = dissolved oxygen criteria from s. NR 102.04(4) = 5.0 mg/L

7- Q_{10} = the monthly 7- Q_{10} (cfs)

T = receiving water temperature from s. NR 102.25, Wis. Adm. Code

Weekly BOD Limits (January – June)

BOD Effluent Limitations (26 LB Method)		Jan	Feb	Mar	Apr	May	Jun
Background Information:	7-Q ₁₀ (cfs)	0.72	1.00	2.33	8.41	3.59	1.03
	River Temperature (°C)	0.6	1.1	3.3	8.9	14.4	18.9
Dissolved Oxygen mg/L:	Effluent	7.00	7.00	7.00	7.00	7.00	7.00
	Background	7.00	7.00	7.00	7.00	7.00	7.00
	Mix DO	7.00	7.00	7.00	7.00	7.00	7.00
	Criteria	5.00	5.00	5.00	5.00	5.00	5.00
Weekly Ave BOD Effluent Limitations	Concentration Limits (mg/L)	22	26	44	110	43	15
	Mass (lbs/d)	78	92	154	389	151	52

Weekly BOD Limits (July - December)

BOD Effluent Limitations (26 LB Method)		Jul	Aug	Sep	Oct	Nov	Dec
Background Information:	7-Q ₁₀ (cfs)	0.54	0.35	0.45	1.05	3.41	0.92
	River Temperature (°C)	20.6	19.4	15.6	10.0	4.4	1.7
Dissolved Oxygen mg/L:	Effluent	7.00	7.00	7.00	7.00	7.00	7.00
	Background	7.00	7.00	7.00	7.00	7.00	7.00
	Mix DO	7.00	7.00	7.00	7.00	7.00	7.00
	Criteria	5.00	5.00	5.00	5.00	5.00	5.00
Weekly Ave BOD Effluent Limitations	Concentration Limits (mg/L)	9.8	8.6	11	20	57	24
	Mass (lbs/d)	35	30	38	71	203	86

Sections NR 106.07(3) and NR 205.067(7), Wis. Adm. Code require WPDES permits contain weekly average and monthly average limitations for municipal dischargers whenever practicable and necessary to protect water quality. Therefore, to meet expression of limits requirements **monthly average limits should be set equal to the calculated weekly averages.**

Antidegradation

Under continuous discharge operations, it is more appropriate for the weekly BOD₅ limitations to be expressed as concentrations. The current daily maximum mass limits may be removed in accordance with s. NR 207.12(4)(b), Wis. Adm. Code.

Final BOD Limits

	Weekly Average mg/L	Monthly Average mg/L
January	22	22
February	26	26
March*	44	30
April*	45	30
May *	43	30
June	15	15
July	9.8	9.8
August	8.6	8.6
September	11	11
October	20	20
November*	45	30
December	24	24

*Weekly average limits cannot exceed 45 mg/L and monthly average limits cannot exceed 30 mg/L to meet the requirements s. NR 210.05, Wis. Adm. Code.

As there is little or no dilution available under low flow conditions, **a dissolved oxygen limit of 7.0 mg/L as a daily minimum** is also recommended. This is consistent with the assumed dissolved oxygen effluent concentration in the calculation of the BOD₅ limitations.

**PART 4 – 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 limits. These limits are re-evaluated at this time due to the following changes:

- Subchapter IV of ch. NR 106, Wis. Adm. Code allows limits based on available dilution instead of limits set to twice the acute criteria.
- Section NR 106.07(3), Wis. Adm. Code requires weekly and monthly average limits for municipal treatment plants.
- The maximum expected effluent pH has changed

Daily Maximum Limits based on Acute Toxicity Criteria (ATC):

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

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

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 526 sample results were reported from October 2018 to August 2023. The maximum reported value was 7.90 s.u. (Standard pH Units). The effluent pH was 7.90 s.u. or less 99% of the time. The 1-day P₉₉, calculated in accordance with s. NR 106.05(5), Wis. Adm. Code, is 8.07 s.u. The mean plus the standard deviation multiplied by a factor of 2.33, an estimate of the upper ninety ninth percentile for a normally distributed dataset, is 8.06 s.u. Therefore, a value of 8.07 s.u. is believed to represent the maximum reasonably expected pH, and therefore most appropriate for determining daily maximum limitations for ammonia nitrogen. Substituting a value of 8.07 s.u. into the equation above yields an ATC = 7.36 mg/L.

Daily Maximum Ammonia Nitrogen Effluent Limitations Calculation Method

In accordance with s. NR 106.32(2), Wis. Adm. Code daily maximum ammonia limitations are calculated using the the 1-Q₁₀ 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-Q₁₀ (estimated as 80 % of 7-Q₁₀) and the 2×ATC approach are shown below.

Daily Maximum Ammonia Nitrogen Determination

	Ammonia Nitrogen Limit mg/L
2×ATC	14.72
1-Q ₁₀	10.00

The 1-Q₁₀ method yields the most stringent limits for the Thorp Wastewater Treatment Facility.

The current permit has variable daily maximum effluent limits based on effluent pH. Presented below is a table of daily maximum limitations corresponding to various effluent pH values. This table has been updated using the more stringent 1-Q₁₀ limits.

Daily Maximum Ammonia Nitrogen Limits – WWSF/WWFF

Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L
6.0 ≤ pH ≤ 6.1	77	7.0 < pH ≤ 7.1	47	8.0 < pH ≤ 8.1	9.9
6.1 < pH ≤ 6.2	76	7.1 < pH ≤ 7.2	42	8.1 < pH ≤ 8.2	8.1
6.2 < pH ≤ 6.3	74	7.2 < pH ≤ 7.3	37	8.2 < pH ≤ 8.3	6.7
6.3 < pH ≤ 6.4	72	7.3 < pH ≤ 7.4	33	8.3 < pH ≤ 8.4	5.5
6.4 < pH ≤ 6.5	70	7.4 < pH ≤ 7.5	28	8.4 < pH ≤ 8.5	4.5
6.5 < pH ≤ 6.6	67	7.5 < pH ≤ 7.6	24	8.5 < pH ≤ 8.6	3.7
6.6 < pH ≤ 6.7	64	7.6 < pH ≤ 7.7	21	8.6 < pH ≤ 8.7	3.1
6.7 < pH ≤ 6.8	60	7.7 < pH ≤ 7.8	17	8.7 < pH ≤ 8.8	2.6
6.8 < pH ≤ 6.9	56	7.8 < pH ≤ 7.9	14	8.8 < pH ≤ 8.9	2.2
6.9 < pH ≤ 7.0	51	7.9 < pH ≤ 8.0	12	8.9 < pH ≤ 9.0	1.9

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

The ammonia limit calculation also warrants evaluation of weekly and monthly average limits based on chronic toxicity criteria for ammonia, since those limits relate to the assimilative capacity of the receiving water.

Weekly average and monthly average limits for ammonia nitrogen are based on chronic toxicity criteria in ch. NR 105, Wis. Adm. Code.

The 30-day chronic toxicity criterion (CTC) for ammonia in waters classified as Warm Water Sport Fish Community is calculated by the following equation, according to subchapter IV of NR 106, Wis. Adm. Code.

$$CTC = E \times \{ [0.0676 \div (1 + 10^{(7.688 - pH)})] + [2.912 \div (1 + 10^{(pH - 7.688)})] \} \times C$$

Where:

pH = the pH (s.u.) of the receiving water,

E = 0.854,

C = the minimum of 2.85 or $1.45 \times 10^{(0.028 \times (25 - T))}$ – (Early Life Stages Present), or

C = $1.45 \times 10^{(0.028 \times (25 - T))}$ – (Early Life Stages Absent), and

T = the temperature (°C) of the receiving water – (Early Life Stages Present), or

T = the maximum of the actual temperature (°C) and 7 - (Early Life Stages Absent)

The 4-day criterion is equal to the 30-day criterion multiplied by 2.5. The 4-day criteria are used in a mass-balance equation with the 7-Q₁₀ (4-Q₃, if available) to derive weekly average limitations. And the 30-day criteria are used with the 30-Q₅ (estimated as 85% of the 7-Q₂ if the 30-Q₅ is not available) to derive monthly average limitations. The stream flow value is further adjusted to temperature; 100% of the flow is used if the Temperature ≥ 16 °C, 25% of the flow is used if the Temperature < 11 °C, and 50% of the flow is used if the Temperature ≥ 11 °C but < 16 °C.

Attachment #1

Section NR 106.32 (3), Wis. Adm. Code, provides a mechanism for less stringent weekly average and monthly average effluent limitations when early life stages (ELS) of critical organisms are absent from the receiving water. This applies only when the water temperature is less than 14.5 °C, during the winter and spring months. Burbot, an early spawning species, are believed to be present in North Fork Eau Claire River. So “ELS Absent” criteria apply from October through December, and “ELS Present” criteria will apply from January through September for a WWSF classification.

The “default” basin assumed values are used for temperature and background ammonia concentrations, because minimum ambient data is available. The values for pH are based on data collected from the North Fork Eau Claire River. These values are shown in the table below, with the resulting criteria and effluent limitations.

Weekly and Monthly Ammonia Nitrogen Limits – WWSF/WWFF (January - June)

		Jan	Feb	Mar	Apr	May	Jun
Effluent Flow	Qe (MGD)	0.423	0.423	0.423	0.423	0.423	0.423
	7-Q ₁₀ (cfs)	0.72	1.00	2.33	8.41	3.59	1.03
Background Information	30-Q ₅ (cfs)	1.49	1.94	40.10	51.60	13.20	5.66
	Ammonia (mg/L)	0.21	0.21	0.21	0.07	0.07	0.04
	Temperature (°C)	0.56	1.11	3.33	8.89	14.44	18.89
	pH (s.u.)	7.50	7.50	7.50	7.50	8.00	8.00
	% of Flow used	25	25	25	25	50	100
	Reference Weekly Flow (cfs)	0.18	0.25	0.58	2.10	1.80	1.03
	Reference Monthly Flow (cfs)	0.37	0.49	10.03	12.90	6.60	5.66
	Criteria mg/L	4-day Chronic					
Early Life Stages Present		10.91	10.91	10.91	10.91	6.08	4.59
Early Life Stages Absent		17.71	17.71	17.71	15.68	6.11	4.59
30-day Chronic							
Early Life Stages Present		4.36	4.36	4.36	4.36	2.43	1.84
Early Life Stages Absent		7.09	7.09	7.09	6.27	2.45	1.84
Effluent Limitations mg/L	Weekly Average						
	Early Life Stages Present	14	15	20	46	23	12
	Early Life Stages Absent						
	Monthly Average						
	Early Life Stages Present	6.7	7.4	68	89	26	17
	Early Life Stages Absent						
Effluent Limitations lbs/day	Weekly Average						
	Early Life Stages Present	49	53	72	161	80	41
	Early Life Stages Absent						
	Monthly Average						
	Early Life Stages Present	24	26	240	314	93	61
	Early Life Stages Absent						
Current Limitations lbs/day	Weekly Average	120	124	143	355	216	53
	Monthly Average	52	55				

Weekly and Monthly Ammonia Nitrogen Limits – WWSF/WWFF (July - December)

		Jul	Aug	Sept	Oct	Nov	Dec
Effluent Flow	Qe (MGD)	0.423	0.423	0.423	0.423	0.423	0.423
Background Information	7-Q ₁₀ (cfs)	0.54	0.35	0.45	1.05	3.41	0.92
	30-Q ₅ (cfs)	4.34	2.90	3.04	5.10	10.00	2.95
	Ammonia (mg/L)	0.04	0.04	0.06	0.06	0.06	0.21
	Temperature (°C)	20.56	19.44	15.56	10.00	4.44	1.67
	pH (s.u.)	8.00	8.00	8.00	7.50	7.50	7.50
	% of Flow used	100	100	50	25	25	25
	Reference Weekly Flow (cfs)	0.54	0.35	0.23	0.26	0.85	0.23
	Reference Monthly Flow (cfs)	4.34	2.90	1.52	1.28	2.50	0.74
Criteria mg/L	4-day Chronic						
	Early Life Stages Present	4.12	4.43	5.69	10.91	10.91	10.91
	Early Life Stages Absent	4.12	4.43	5.69	14.60	17.71	17.71
	30-day Chronic						
	Early Life Stages Present	1.65	1.77	2.28	4.36	4.36	4.36
	Early Life Stages Absent	1.65	1.77	2.28	5.84	7.09	7.09
Effluent Limitations mg/L	Weekly Average						
	Early Life Stages Present	7.5	6.8	7.6			
	Early Life Stages Absent				20	41	24
	Monthly Average						
	Early Life Stages Present	12	9.4	7.4			
Early Life Stages Absent				17	34	15	
Effluent Limitations lbs/day	Weekly Average						
	Early Life Stages Present	26	24	27			
	Early Life Stages Absent				72	144	84
	Monthly Average						
	Early Life Stages Present	43	33	26			
	Early Life Stages Absent				60	120	52
Current Limitations lbs/day	Weekly Average	41	37	59	174	221	199
	Monthly Average		31	49	128	141	98

Effluent Data

The following table evaluates the statistics based upon ammonia data reported from , with those results being compared to the calculated limits to determine the need to include ammonia limits in the Thorp Wastewater Treatment Facility permit.

Attachment #1

Ammonia Nitrogen Effluent Data

Ammonia Nitrogen mg/L	
1-day P ₉₉	4.90
4-day P ₉₉	3.30
30-day P ₉₉	2.40
Mean	2.00
Std	0.90
Sample size	229
Range	0.1 - 4.9

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

The permit currently has daily, weekly, and monthly ammonia limits. 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.

Antidegradation

Under continuous discharge operations, it is more appropriate for the weekly and monthly average ammonia limits to be expressed as concentrations. The calculated mass values that correspond to the concentration based ammonia limits are more restrictive than the current mass limits. Therefore the change to concentration limits would not constitute an increased discharge as defined in ch. NR 207, Wis. Adm. Code.

Conclusions and Recommendations

In summary, the following ammonia nitrogen limitations are recommended.

Final Ammonia Nitrogen Limits

	Daily Maximum mg/L	Weekly Average mg/L	Monthly Average mg/L
January	Variable	14	6.7
February	Variable	15	7.4
March	Variable	20	20
April	Variable	46	46
May	Variable	23	23
June	Variable	12	12
July	Variable	7.5	7.5
August	Variable	6.8	6.8
September	Variable	7.6	7.4
October	Variable	20	17
November	Variable	41	34
December	Variable	34	15

PART 5 – 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 the Thorp Wastewater Treatment Facility permit requires 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 required disinfection season.

Effluent Data

The Thorp Wastewater Treatment Facility has monitored effluent *E. coli* from May 2023 and a total of 3 results are available. A geometric mean of 126 counts/100 mL was never exceeded, with a maximum monthly geometric mean of 100 counts/100 mL. Effluent data never exceeded 410 counts/100 mL. The maximum reported value was 100 counts/100 mL. Based on this effluent data it appears that the facility can meet new *E. coli* limits and a compliance schedule is not needed in the reissued permit.

PART 6 – 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 the North Fork Eau Claire River.

Attachment #1

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.

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

Where:

WQC = 0.075 mg/L for the North Fork Eau Claire River.

Qs = 100% of the 7-Q₂

Cs = background concentration of phosphorus in the receiving water pursuant to s. NR 217.13(2)(d), Wis. Adm. Code

Qe = effluent flow rate = 0.423 MGD = 0.654 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 using the procedures specified in s. NR 102.07(1)(b) to (c), Wis. Adm. Code. The median shall be calculated with at least one year of data using samples collected once per month during the period of May through October. 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.

The following data were considered in estimating the background phosphorus concentration:

SWIMS ID	10010381
Station Name	Monitoring station 3 at Center Rd.
Waterbody	North Fork Eau Claire River
Sample Count	6
First Sample	05/12/2015
Last Sample	10/13/2015
Mean	0.169 mg/L
Median	0.161 mg/L

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 water quality-based effluent limitation 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.”

The impaired water listing of the North Fork Eau Claire River also points towards the notion that effluent phosphorus limits equal to the water quality criterion are needed to prevent the discharge from contributing to further impairment of the receiving water. The Guidance for Implementing Wisconsin’s Phosphorus Water Quality Standards for Point Source Discharges (2020) suggests setting effluent limits equal to the criterion in the absence of an EPA approved total maximum daily load for discharges of phosphorus to phosphorus impaired waters.

Effluent Data

The following table summarizes effluent total phosphorus monitoring data from October 2018 to August 2023.

	Phosphorus mg/L
1-day P ₉₉	0.65
4-day P ₉₉	0.50
30-day P ₉₉	0.41
Mean	0.37
Std	0.10
Sample size	229
Range	0.19 - 0.91

Reasonable Potential Determination

Since the 30-day P₉₉ of reported effluent total phosphorus data is greater than the calculated WQBEL, the discharge has reasonable potential to cause or contribute to an exceedance of the water quality criterion. Therefore, a WQBEL is required.

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

Because the discharge is to a surface water that is to or upstream of a phosphorus impaired water, a mass limit is also required, pursuant to s. NR 217.14(1)(a), Wis. Adm. Code. This final mass limit shall be $0.075 \text{ mg/L} \times 8.34 \times 0.423 \text{ MGD} = 0.26 \text{ lbs/day}$ expressed as a six-month average.

Multi-Discharge Variance Interim Limit

With the permit application, the City of Thorp has re-applied for the phosphorus multi-discharger variance (MDV). Conditions of the phosphorus MDV require the facility to comply with an interim phosphorus limit in lieu of meeting the final WQBEL. The recommended interim limit during the 2nd permit under MDV approval, pursuant to s. 283.16 (7), Wis. Stats., is 0.50 mg/L as a monthly average.

**PART 7 – 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 influent flow reported from October 2018 to August 2023.

Monthly Temperature Effluent Data & Limits

Month	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Weekly Maximum	Daily Maximum	Weekly Average Effluent Limitation	Daily Maximum Effluent Limitation
	(°F)	(°F)	(°F)	(°F)
JAN			53	86
FEB			55	86
MAR			59	90
APR			64	107
MAY			71	96
JUN			79	87
JUL			83	86
AUG			87	88
SEP			75	84
OCT			64	86
NOV			58	105
DEC			53	83

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

In accordance with s. NR 106.56(12), Wis. Adm. Code, when representative effluent temperature data is not available at the time of permit reissuance, the proposed permit shall include effluent temperature monitoring (for at least one year), WQBELs for temperature, and a compliance schedule to meet the temperature limits.

The following general options are available for a facility to explore potential relief from the temperature limits:

- Effluent monitoring data: Verification or additional effluent monitoring (flow and/or temperature) may be appropriate if there were questions on the representativeness of the current effluent data.
- Monthly low receiving water flows: Contract with USGS to generate monthly low flow estimates for the receiving water to be used in place of the annual low flow.
- Mixing zone studies: A demonstration of rapid and complete mixing may allow for the use of a mixing zone other than the default 25%.
- Dissipative cooling demonstration: Effluent limitations based on sub-lethal criteria may be adjusted based on the potential for heat dissipation from municipal treatment plants as described in s. NR 106.59(4), Wis. Adm. Code.
- Collection of site-specific ambient temperature: default background temperatures for streams in Wisconsin, so actual data from the direct receiving water may provide for relaxed thermal limits but only if the site-specific temperatures are lower than the small stream defaults used in the above tables
- A variance to the water quality standard: This is typically considered to be the least preferable and most complex option as it requires the evaluation of the other alternatives.

These options are explained in additional detail in the August 15, 2013 Department *Guidance for Implementation of Wisconsin's Thermal Water Quality Standards*
<http://dnr.wi.gov/topic/surfacewater/documents/ThermalGuidance2edition8152013.pdf>

PART 8 – 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)*.

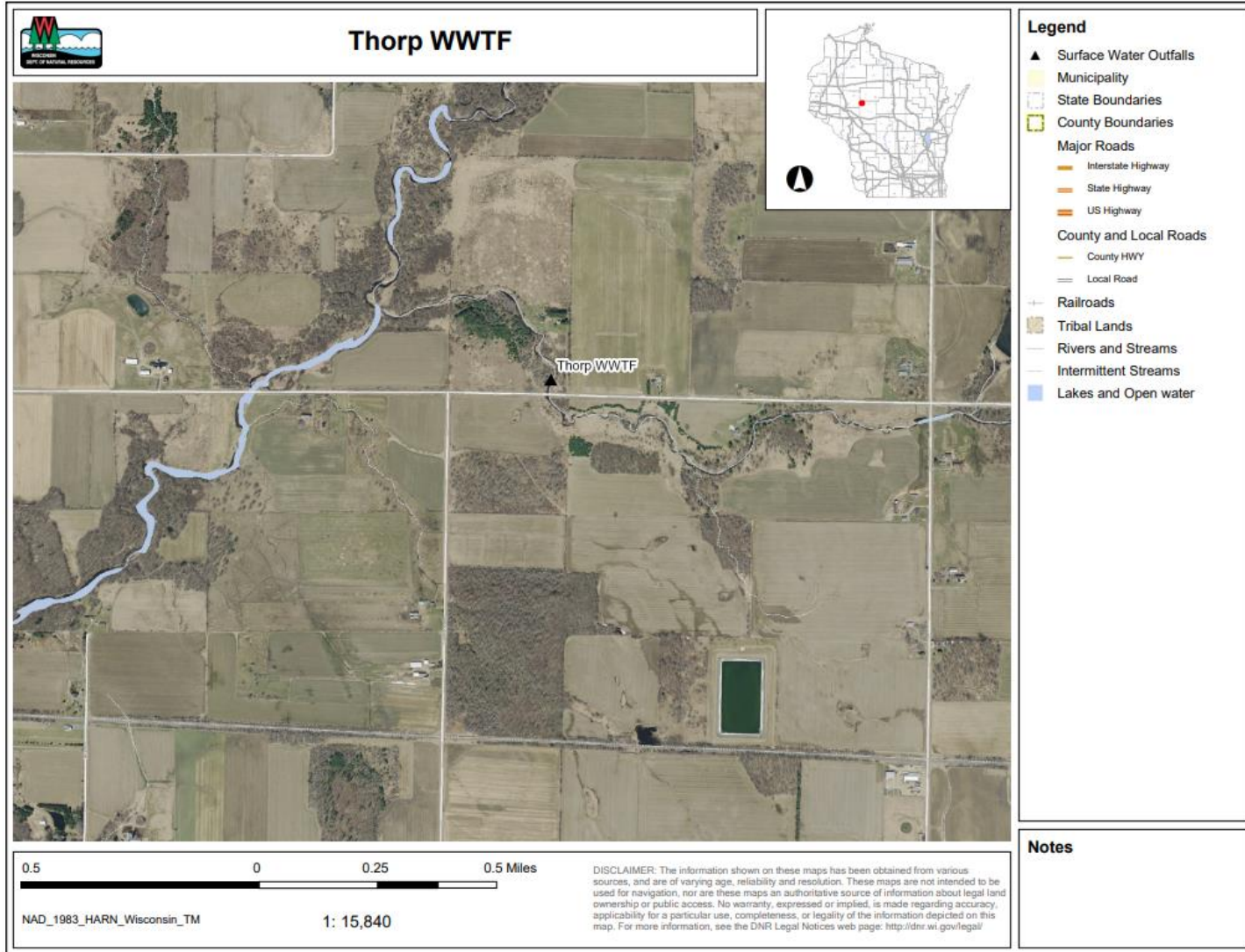
Guidance in Chapter 1.11 of the WET Guidance Document (WET Testing of Minor Municipal Discharges) was consulted. This is a minor municipal discharge (< 1.0 MGD) comprised solely of domestic wastewater, with no history of WET failures and no toxic compounds detected at levels of concern. No WET testing is recommended at this time because of the low risk in effluent toxicity.

Temperature limits for receiving waters with unidirectional flow

(calculation using default ambient temperature data)

Facility:	Thorp WWTF	7-Q₁₀:	0.35	cfs	Temp Dates		Flow Dates	
Outfall(s):	701	Dilution:	25%		Start:	N/A	07/01/18	
Date Prepared:	10/13/2023	f:	0		End:	N/A	08/31/23	
Design Flow (Q_e):	0.423 MGD	Stream type:	Small warm water sport or forage fish community					
Storm Sewer Dist.	0 ft	Q_s:Q_e ratio:	0.1	:1				
		Calculation Needed?	YES					

Month	Water Quality Criteria			Receiving Water Flow Rate (Q _s) (cfs)	Representative Highest Effluent Flow Rate (Q _e)		f	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	T _a (default) (°F)	Sub-Lethal WQC (°F)	Acute WQC (°F)		7-day Rolling Average (Q _{esl}) (MGD)	Daily Maximum Flow Rate (Q _{ea}) (MGD)		Weekly Average (°F)	Daily Maximum (°F)	Weekly Average Effluent Limitation (°F)	Daily Maximum Effluent Limitation (°F)
JAN	33	49	76	0.18	0.451	0.496	0			53	86
FEB	34	50	76	0.25	0.528	0.688	0			55	86
MAR	38	52	77	0.58	0.772	1.170	0			59	90
APR	48	55	79	2.10	1.072	1.530	0			64	107
MAY	58	65	82	0.90	0.636	1.000	0			71	96
JUN	66	76	84	0.26	0.563	0.961	0			79	87
JUL	69	81	85	0.14	0.656	1.140	0			83	86
AUG	67	81	84	0.49	0.700	1.370	0			87	88
SEP	60	73	82	0.11	0.531	0.891	0			75	84
OCT	50	61	80	0.26	0.558	0.797	0			64	86
NOV	40	49	77	0.85	0.537	0.726	0			58	105
DEC	35	49	76	0.23	0.523	0.893	0			53	83



Notice: This checklist is meant to be a tool to help Department of Natural Resources (DNR) staff review municipal and industrial multi-discharger variance (MDV) applications (Forms 3200-149 and 3200-150). Personal information collected will be used for administrative purposes and may be provided to requesters to the extent required by Wisconsin's Open Records Law (ss. 19.31-19.39, Wis. Stats.).

Permittee Name
 City of Thorp

WPDES Permit Number
WI- 0 | 0 | 2 | 5 | 6 | 1 | 5

County
 Clark

1. Did the point source apply for the MDV at the appropriate time?	<input checked="" type="radio"/> Yes <input type="radio"/> No. <i>STOP- facility not eligible at this time.</i>	See Questions 1-3.
2. This operation is (check one):	<input type="radio"/> New or relocated outfall. <i>STOP- facility not eligible.</i> <input checked="" type="radio"/> Existing outfall	See Questions 5-6.
3. Is the point source is located in an MDV eligible area?	<input checked="" type="radio"/> Yes <input type="radio"/> No. <i>STOP- facility not eligible.</i>	Apply County information to Appendix H. Additional information provided in Q7 on municipal form & Q7-8 on industrial form.
4. The secondary indicator score for the county (counties) the discharge is located is:	3	See Appendices A-F. If the score is less than 2, stop; the facility is not eligible. See Q23 on municipal form & Q28 on industrial form.
5. Is a major facility upgrade required to comply with phosphorus limits?	<input checked="" type="radio"/> Yes <input type="radio"/> No. <i>STOP- facility not eligible.</i>	See Q8 on municipal form/Q9 on industrial form.
6. List the months where phosphorus limits cannot be achieved during the permit term:	<input checked="" type="checkbox"/> All <input checked="" type="checkbox"/> Jan <input checked="" type="checkbox"/> Apr <input checked="" type="checkbox"/> Jul <input checked="" type="checkbox"/> Oct <input checked="" type="checkbox"/> Feb <input checked="" type="checkbox"/> May <input checked="" type="checkbox"/> Aug <input checked="" type="checkbox"/> Nov <input checked="" type="checkbox"/> Mar <input checked="" type="checkbox"/> Jun <input checked="" type="checkbox"/> Sep <input checked="" type="checkbox"/> Dec	Consider checking with limit calculator. If this does not match information in application, the application should be updated prior to approval.

7. What is the current effluent level achievable?

Outfall Number(s) 001	Conc. (mg/L) 0.38	Method for calculation: <input checked="" type="radio"/> 30-day P99 <input type="radio"/> Other, specify: _____	Does this concur with application? <input type="radio"/> Yes <input checked="" type="radio"/> No, why not: Application used different dataset	DNR staff should verify the effluent concentration value(s) provided. See Q11 on municipal form & Q12 on industrial form.
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8. What is the appropriate interim limitation(s) for the permit term?
 0.4 mg/L as a monthly average, consistent with s. 283.16(7), Wis. Stats.
 Target value = 0.2 mg/L.

Provide Rationale:
 Effluent phosphorus data from the past three years (4/1/2020 - 3/31/2023, n=120) yields a 30-day P99 value of 0.38 mg/L. This value represents a level currently achievable. A schedule is not likely to be necessary.

Note: See description in Section 2.02 of the MDV implementation guidance. Interim limitations should reflect the "highest attainable condition" for the permittee in question pursuant to s. 283.16(7), Wis. Stat.

<p>9. <i>For Industries Only</i>- Where does the phosphorus in the effluent come from? (check all that apply)</p>	<p><input type="checkbox"/> Process <input type="checkbox"/> Additive Usage <input type="checkbox"/> Water supply</p> <p><i>Can intake credits be given or can the facility use an alternative water supply?</i></p> <p><input type="radio"/> Not feasible <input type="radio"/> Possibly, but further analysis needed <input type="radio"/> Not evaluated at this time</p>	<p><i>See Q14-15 & 19 on industrial form. If the answer is "possibly" or "not evaluated", the schedule section of the MDV permit should contain a requirement to perform this analysis.</i></p>
<p>10. Has this facility optimized?</p>	<p><input checked="" type="radio"/> Yes <input type="radio"/> In progress <input type="radio"/> No</p>	<p><i>See Q14 on municipal form & Q16 & 20 on industrial form. Facility must optimize and operate at an optimize treatment level (s. 283.16(6)(a), Wis. Stat.)If no will need compliance schedule.</i></p>
<p>11. Has a facility plan/compliance alternative plan been completed for the facility?</p>	<p><input checked="" type="radio"/> Yes <input type="radio"/> In progress <input type="radio"/> No</p>	<p><i>See Q15 on municipal form & Q17 on industrial form.</i></p>
<p>12. What is the projected cost for complying with phosphorus?</p> <p style="text-align: right;">Source:</p>	<p>\$ <u>8,651,160.00</u></p> <p>MDV Application</p>	<p><i>Facility must submit site-specific compliance costs. If cost projections are used from EIA, the permittee must certify that these costs are reasonable for the facility in question. See "projected compliance costs" in Section 2.02 of the MDV Implementation Guidance for details.</i></p>

Comments on planning efforts:

The City of Thorp submitted a 3rd year report in March 2015 which covered an evaluation of current operation, physical improvements and watershed projects to meet the final limits. This evaluation concluded that a new membrane bioreactor (MBR) plant would be required as a treatment plant upgrade. Tertiary treatment evaluated in 2015 is generally still applicable, as no major advancements in tertiary treatment have occurred in ~8 years.

<p>13. Are adaptive management and water quality trading viable?</p>	<p><input type="radio"/> Yes <input type="radio"/> Perhaps. Additional analysis required. <input checked="" type="radio"/> No</p>	<p><i>See Q18-21 on municipal form & Q22-25 on industrial form. If additional analyses required, the applicant may need to complete this analysis during the MDV permit term.</i></p>
<p>14. Has the point source met the appropriate primary screener?</p>	<p><input checked="" type="radio"/> Yes <input type="radio"/> No. <i>STOP- facility not eligible.</i></p>	<p><i>See Q4 of this form in addition to the "eligibility" guidance in Section 2.01 of the MDV Implementation Guidance.</i></p>

Comments on economic demonstration:

The 3rd year report estimated a brand new MBR plant at a capital cost of \$9.8M. This is very expensive and considered not feasible by the Department as there are other technologies available that would not required a full facility upgrade. Therefore, the cost estimate provided with the MDV application was used for evaluation. The MDV application evaluated covering the existing holding pond and adding disc filters. This has a capital cost of \$8.6M. This is still higher than the DOA determination of \$2.92M. Additionally, other lagoon facilities have less expensive estimates as part of the site-specific evaluation. At this time, the Department does feel that the site-specific costs are on the high side and may not be representative.

However, the secondary indicator of 3 for Clark County requires tertiary treatment to increase user rates to >1% of the MHI. Currently, annual residential user rates are \$630/yr or 1.84% of the MHI (\$34,078), meaning the City of Thorp meets the primary screener already. Using the lower DOA cost estimates and a Clean Water Fund Loan reduced interest rate of 1.122%, the user rates would increase to \$874/yr to 2.56% of the MHI.

15. What watershed option was selected?

- County project option. *Complete Section 5.*
- Binding, written agreement with the DNR to construct a project or implement a watershed plan. *Complete Section 4.*
- Binding, written agreement with another person that is approved by the DNR to construct a project or implement a watershed plan. *Complete Section 4.*

Section 4. Watershed Plan Review

16. MDV Plan Number:

Note: This is for tracking purposes. Contact Statewide Phosphorus Implementation Coordinator for the plan number.

17. Did the point source complete Form 3200-148?

- Yes
- No

18. Is the project area in the same HUC 8 watershed as the point of discharge?

- Yes
- No. *STOP- Watershed plan must be updated.*

19. What is the annual offset required?

See Section 2.03 of the MDV implementation guidance. If this value is different from the offset target provided in form 3200-148, the watershed plan should be amended.

20. Does the plan ensure that the annual load is offset annually?

- Yes
- No. *STOP- Watershed plan must be updated.*

21. Are projects occurring on land owned/operated by a CAFO or within a permitted MS4 boundary?

- Yes. *Work with appropriate DNR staff to ensure projects are not working towards other permit compliance.*
- No.

22. Are other funding sources being used as part of the MDV watershed project?

- Yes. *Work with appropriate DNR staff to ensure that funding sources can be appropriately used in the plan area.*
- No.

23. Do you have any concerns about the watershed project?

Note: Coordinate with other DNR staff as appropriate.

- Yes. *STOP- Watershed plan must be updated.*
- No.

Comments:

Section 5. Payment to the County(ies)

24. At this time, the appropriate per pound payment is:

\$ 62.65

See "Payment Calculator" document at

[licentralwater\WQWT PROJECTS\WY CW Phosphorus\MDV.](#)

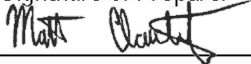
Section 6. Determination

Based on the available information, the MDV application is:

- Approved
- Request for more information
- Denied

Save

Additional Justification (if needed):

Certification	
Preparer Name Matt Claucherty	Title Water Resources Management Specialist
Signature of Preparer 	Date 6/26/2023

A copy of this completed checklist should be saved in SWAMP, and a notification of the decision should be sent to the Phosphorus Implementation Coordinator.



6/26/2023

Richard Wnek, Mayor
300 W. Prospect Street
Thorp, WI 54771

Subject: Conditional approval of a multi-discharger phosphorus variance
Receiving Stream: North Fork Eau Claire River in Clark County
Permittee: WPDES WI-0025615 – City of Thorp

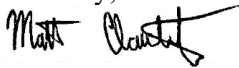
Dear Mr. Wnek:

In accordance with s. 283.16 of the Wisconsin Statutes, you have requested coverage under Wisconsin's multi-discharger phosphorus variance for the City of Thorp Wastewater Treatment Facility in an application dated 12/29/2022. Wisconsin's multi-discharger phosphorus variance was approved by EPA on February 6, 2017. Coverage under the multi-discharger phosphorus variance may only be granted to an existing source that demonstrates a major facility upgrade is necessary to achieve phosphorus compliance and the upgrade will result in economic hardship as defined in the federally approved variance. The water quality criterion for which you are seeking a variance is contained in s. NR 102.06, Wis. Adm. Code.

After review of the application materials, the Department is tentatively approving coverage under the phosphorus multi discharger variance because the applicant has demonstrated that a major facility upgrade would be required to comply with the phosphorus water quality based effluent limitation, and the applicant meets the economic hardship eligibility criteria delineated in the federally approved variance. In addition, the permitted facility has agreed to comply with the interim limitations that will be included in the WPDES permit, and has agreed to reduce the amount of phosphorus entering surface waters by making payments to the counties pursuant to s. 283.16(6)(b)1., Wis. Stats.

Public comment on this decision will be solicited at the time of permit reissuance after which a final decision will be made. The Department appreciates your attention and interest in Wisconsin's multi-discharger phosphorus variance. Should you have further questions regarding this matter, please contact me at (608) 400 – 5596.

Sincerely,



Matt Claucherty, MDV Point Source Coordinator
Bureau of Water Quality

e-cc Brent Leech, City of Thorp
 Jenna Monahan, WDNR
 Holly Heldstab, WDNR
 Tim Elkins, EPA Region 5
 Micah Bennett, EPA Region 5