Hudson Modified Fact Sheet

General Information

Permit Number:	WI-0024279-10-01
Permittee Name:	City of Hudson
Address:	505 3rd Street
City/State/Zip:	Hudson WI 54016
Discharge Location:	Surface water discharge from treatment facility located at 329 Front Street, Hudson, WI via Outfall 001 located at Lat: 44.96607º N / Lon: 92.76024º W and seepage cells and absorption ponds located in Sections 13, 30, 31 and 32 in T29N, R19W, all in the Town of Hudson in St. Croix County.
Receiving Water:	The St. Croix River in the Willow River Watershed and the Groundwater of the Willow River and Lake St. Croix Watersheds all in the St. Croix River Basin located in St. Croix County.
Stream Flow ($Q_{7,10}$):	1,100 cfs
Stream Classification:	Warm Water Sport Fish Community, Exceptional Resource Water, Public Water Supply
Design Flow	2.2 MGD Annual Average
Significant Industrial Loading?	No, although there are a number of categorical industrial users (United Gear, Saint Croix Gear, Phillips Plastics, GEA Process Engineering Inc., and Empire Manufacturing), none are considered "significant" because they do not contribute an average of 25,000 gallons per day or more of wastewater, or a process waste stream that makes up 5% or more of the average dry weather hydraulic or organic capacity of the treatment plant.
Operator at Proper Grade?	Yes. Hudson needs to have at least one operator certified at the Advanced Level in the following subclasses: A1 – Suspended Growth Processes; B – Solids Separation; C – Biological Solids/Sludges; D – Disinfection; L – Laboratory; P – Total Phosphorus; and SS- Sanitary Sewage Collection System. Two of Hudson's operators are certified at the advanced level in all subclasses, and one is certified in all subclasses except L. At least one operator will need to obtain subclass SS certification by the end of this permit term.
Approved Pretreatment Program?	N/A

Facility Description

The City of Hudson owns and operates a wastewater treatment facility that treats wastewater from the city of Hudson and the Village of North Hudson. Wastewater influent from the collection system enters a Parshall flume followed by fine screening, vortex grit removal, anoxic basins for biological phosphorus removal, activated sludge aeration with chemical (alum) addition for back-up phosphorus removal, final clarification and finally through a UV chamber for seasonal disinfection prior to discharge to the St. Croix River. Sludge is thickened with dissolved air flotation (DAF) and digested anaerobically. All sludge is hauled to the West Central Wisconsin Biosolids Facility for treatment and reuse. The annual average design flow is 2.2 million gallons per day (MGD) and the actual annual average flow in 2023 was 1.3 MGD. The facility accepts domestic and non-domestic wastewater, and landfill

leachate for treatment. A Parshall Flume, a fine screen in a new pretreatment building, and a UV Chamber are operational changes that have occurred during the last issuance.

Changes in permit modification: The Department has determined that sampling of the filter backwash well water for iron and manganese prior to discharge back to groundwater via the seepage basins and seepages ponds is no longer necessary, therefore the requirement has been removed from the permit. Additionally, it was discovered that filter backwash from groundwater well #9 does not discharge to the same seepage cell as groundwater well #8, as originally believed when the permit was reissued in 2022. Therefore, this permit modification separates out the discharge from well #9 to its own sample point, Outfall 009, for recording of flow volume discharged

. Note: significant changes per this modification are shaded in grey in this fact sheet.

Substantial Compliance Determination

Enforcement During Last Permit: A Notice of Noncompliance (NON) letter was sent for a Sanitary Sewer Overflow (SSO). The SSO occurred due to an external party's construction activities. The facility has completed all previously required actions as part of the enforcement process.

After a desk top review and compliance inspection on July 28, 2021, of discharge monitoring reports, CMARs, land application reports, compliance schedule items, and a site visit on March 17, 2021, this facility has been found to be in substantial compliance with their current permit.

Sample Point Designation		
Sample Point Number	**Discharge Flow, Units, and Averaging Period**	**Sample Point Location, WasteType/sample Contents and Treatment Description (as applicable)**
701	1.34 MGD (2023)	Representative influent samples shall be collected after the fine screens.
106	N/A Mercury Field Blank	The field blank shall be collected using standard handling procedures every day that influent and effluent mercury samples are taken.
001	1.30 MGD (2023)	Representative effluent samples shall be collected after UV disinfection and prior to discharge to the St. Croix River.
002	362 dry US Tons (2023)	As long as sludge is shipped to the West Central Wisconsin Biosolids Facility (WCWBF) for disposal, representative sludge grab samples shall be collected once per year and monitored for List 1 parameters and radium-226. Sludge samples shall be collected prior to hauling and test results shall be reported on Form 3400-49 "Waste Characteristics Report". Hauled sludge reports shall be submitted on Form 3400-52 "Other Methods of Disposal or Distribution Report" following each year that sludge is hauled.
004	0.02 MGD (2023)	This discharge is filter backwash from well #3 at the drinking water treatment plant, discharged to the combined storm sewer pond and located at the SE ¼ SW ¼, Section 30, T29N R19W, Town of Hudson.
005	0.02 MGD (2023)	This discharge is filter backwash from well #5 at the drinking water treatment plant, discharged to the combined storm sewer pond located at the NW ¼ SE ¼, Section 13, T29N R19W, Town of Hudson.

Sample Point Designation		
Sample Point Number	**Discharge Flow, Units, and Averaging Period**	**Sample Point Location, WasteType/sample Contents and Treatment Description (as applicable)**
006	0.05 MGD (2023)	This discharge is filter backwash from well #6 at the drinking water treatment plant, discharged to an onsite seepage cell located at the NW ¼ SW ¼, Section 31, T29N R19W, Town of Hudson.
007	0.037 MGD (discharge from well #8 in 2023)	This discharge is filter backwash from well #8 at the drinking water treatment plant, discharged to an onsite seepage cell located at the SE ¼ SW ¼, Section 32, T29N R19W, Town of Hudson.
008	0.03 MGD (2023)	This discharge is filter backwash from well #10 at the drinking water treatment plant, discharged to an onsite seepage cell located at the SE ¼ NW ¼, Section 33, T29N R19W, Town of Hudson.
009	0.036 MGD (discharge from well #9 2023)	This discharge is filter backwash from well #9 at the drinking water treatment plant, discharged to an onsite seepage cell located at the SE ¼ SW ¼, Section 32, T29N R19W, Town of Hudson.

1 Influent –Monitoring

Sample Point Number: 701- INFLUENT AFTER FINE SCREENS

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Daily	Continuous	
$CBOD_5$		mg/L	5/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total		mg/L	5/Week	24-Hr Flow Prop Comp	
BOD_5, Total		mg/L	Monthly	24-Hr Flow Prop Comp	
Mercury, Total Recoverable		ng/L	Quarterly	24-Hr Flow Prop Comp	See section 1.2.1.1 of the permit for mercury monitoring requirements.

Changes from Previous Permit:

Influent monitoring for $CBOD_5$ at a frequency of 5/Week is now required. The monitoring frequency for BOD_5 was reduced from 5/Week to Monthly. Even though there are no effluent monitoring requirements or limits for BOD_5 in the permit, influent BOD_5 monitoring is required because it is an important operational parameter and is needed to complete the Compliance Maintenance Annual Reports (CMAR).

Explanation of Limits and Monitoring Requirements

Effluent monitoring frequencies for TSS and BOD_5 are evaluated in Section 3 below in the Explanation of Limits and Monitoring Requirements for surface water discharge limitations. For the reasons explained below the TSS and BOD_5 effluent monitoring frequencies are retained at 5/Week as is the case in the current permit. Influent monitoring frequencies for these parameters are set equal to the effluent monitoring frequencies.

Flow and Total Suspended Solids: Monitoring of influent flow and total suspended solids (TSS) is required by s. NR 210.04(2), Wis. Adm. Code, to assess wastewater strengths and volumes and to demonstrate the percent removal requirement for TSS in s. NR 210.05(1)(b)3, Wis. Adm. Code, and in the Standard Requirements section of the permit.

$CBOD_5$: Upon the permittee's request the Department previously substituted $CBOD_5$ effluent monitoring and limits for BOD_5 effluent monitoring and limits pursuant to s. NR 210.07(4), Wis. Adm. Code, and therefor $CBOD_5$ influent monitoring is required to demonstrate the percent removal requirement for that parameter required by s. NR 210.05(1)(d)3, Wis. Adm. Code. The $CBOD_5$ monitoring frequency is set equal to the $CBOD_5$ effluent monitoring frequency.

Mercury: Quarterly monitoring for influent mercury is included in the proposed permit pursuant to s. NR 106.145, Wis. Adm. Code, because Hudson is a major municipal discharger.

2 In-plant - Monitoring and Limitations

Sample Point Number: 106- MERCURY FIELD BLANK

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Mercury, Total Recoverable		ng/L	Quarterly	Blank	See section 2.2.1.1 of the permit for mercury monitoring requirements.

Changes from Previous Permit:

None.

Explanation of Limits and Monitoring Requirements

Monitoring of mercury field blanks are required per ss. NR 106.145 (9) and (10), Wis. Adm. Code. The permittee shall collect a mercury field blank for each set of mercury samples (a set of samples may include a combination of influent, effluent or other samples all collected on the same day). The permittee shall report results of influent and effluent samples and field blanks to the Department on Discharge Monitoring Reports. The monitoring frequency for mercury field blanks is quarterly to coincide with the quarterly monitoring requirements for influent and effluent mercury monitoring.

3 Surface Water - Monitoring and Limitations

Sample Point Number: 001- EFFLUENT AFTER UV DISINFECTION

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Daily	Continuous	
$CBOD_5$	Monthly Avg	25 mg/L	5/Week	24-Hr Flow Prop Comp	
$CBOD_5$	Weekly Avg	40 mg/L	5/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total	Monthly Avg	30 mg/L	5/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total	Weekly Avg	45 mg/L	5/Week	24-Hr Flow Prop Comp	
pH Field	Daily Min	6.0 su	Daily	Grab	
pH Field	Daily Max	9.0 su	Daily	Grab	
E. coli	Geometric Mean - Monthly	126 #/100 ml	2/Week	Grab	Limit effective May through September annually.
E. coli	% Exceedance	10 Percent	Monthly	Calculated	Limit effective May through September annually. See section 3.2.1.2 of the permit for the *E. coli* percent limit calculation. Enter the result in the DMR on the last day of the month.
Phosphorus, Total	Monthly Avg	1.0 mg/L	5/Week	24-Hr Flow Prop Comp	
Phosphorus, Total	Monthly Avg	22 lbs/day	5/Week	Calculated	This limit is derived from and consistent with the Lake St. Croix Total Maximum Daily Load Waste Load Allocation for total phosphorus. See section 3.2.1.3 of the permit.
Phosphorus, Total		lbs/month	Monthly	Calculated	Calculate the total monthly discharge of phosphorus and report on the last day of the month on the DMR. See section 3.2.1.3 of the permit

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
					for appropriate formulas for effluent calculations.
Phosphorus, Total		lbs/yr	Monthly	Calculated	Calculate the 12-month rolling sum of total monthly mass of phosphorus discharged and report on the last day of the month on the DMR. See section 3.2.1.3 of the permit for appropriate formulas for effluent calculations.
Nitrogen, Ammonia (NH3-N) Total	Daily Max	29 mg/L	5/Week	24-Hr Flow Prop Comp	
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	29 mg/L	5/Week	24-Hr Flow Prop Comp	
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	29 mg/L	5/Week	24-Hr Flow Prop Comp	
Mercury, Total Recoverable	Daily Max	6.8 ng/L	Quarterly	Grab	This is an interim effluent limitation. See permit sections 3.2.1.4 for mercury monitoring requirements, 3.2.1.5 for mercury variance information and 6.1 for the mercury schedule.
Acute WET	Daily Max	1.0 TUa	See Listed Qtr(s)	24-Hr Flow Prop Comp	See section 3.2.1.6 of the permit for Whole Effluent Toxicity (WET) testing dates and WET requirements.
Nitrogen, Total Kjeldahl		mg/L	Quarterly	24-Hr Flow Prop Comp	
Nitrogen, Nitrite + Nitrate Total		mg/L	Quarterly	24-Hr Flow Prop Comp	
Nitrogen, Total		mg/L	Quarterly	Calculated	Total Nitrogen shall be calculated as the sum of reported values for Total Kjeldahl Nitrogen and Total Nitrite + Nitrate Nitrogen.

Changes from Previous Permit

- Effluent Flow Rate monitoring has been added.
- Monitoring and limitations for Total Residual Chlorine have been removed from the permit because the permittee now uses Ultraviolet light for disinfection instead of a chlorination/dechlorination process.
- Fecal coliform monitoring and limits have been replaced with *Escherichia coli (E. coli)* monitoring and limits. *E. coli* monitoring is required at the permit effective date and *E. coli* limits of 126 #/100 ml as a monthly geometric mean and 410 #/100 ml as a daily maximum that may not be exceeded more than 10 percent of the time in any calendar month will apply during the months of May through September annually to protect recreational uses. The (bacteria) *E. coli* monitoring frequency has been increased from Weekly to 2/Week.
- The daily maximum, weekly average and monthly average limitations for ammonia decreased from 34 mg/L to 29 mg/L. The permit contains a compliance schedule for the permittee to meet the new, more stringent ammonia limits.
- The monitoring frequency for ammonia has been increased from Weekly to 5/Week.
- An Acute Whole Effluent Toxicity limit of 1.0 TUa has been added.
- The permittee has applied for a variance from the water quality standard for mercury of 1.3 ng/L based on the wildlife criterion. The US EPA approved the variance on August 9, 2022.

Explanation of Limits and Monitoring Requirements

Monitoring Frequency Evaluation

Monitoring frequencies for parameters that have final effluent limits in effect during this permit term were evaluated taking into consideration the size and type of the facility, and whether the monitoring occurs frequently enough to characterize effluent quality and variability, to detect events of noncompliance, and to ensure fairness and consistency in permits issued across the state. Monitoring frequency decisions are based on requirements in s. NR 205.066(1), Wis. Adm. Code, (decisions are case-by-case) and considering the factors in s. NR 210.04 (a) through (e), Wis. Adm. Code, along with recommendations provided in the Monitoring Frequencies for Individual Wastewater Permits guidance (April 12, 2021).

The monitoring frequencies for applicable parameters in Hudson's proposed permit have been evaluated, and, with the exception of bacteria (*E. coli*) and Ammonia (both discussed below), were retained based on the following considerations:

- <u>Actual vs. Design Flow Comparison:</u> Actual average flow (1.50 MGD) remains below the annual average design flow (2.2 MGD).
- <u>Influent Sources:</u> The plant receives primarily domestic waste from the collection system and very small amounts of landfill leachate and industrial process water relative to the design capacity of the facility.
- <u>Effluent Variability:</u> Treatment processes used at the plant have proven effective, achieving pollutant removal requirements per s. NR 210.05(1), Wis. Adm. Code, on a consistent basis. The facility consistently meets effluent limits, maintains permit compliance, and does not have a history of plant upsets.

The department has determined that an increase in the monitoring frequency for the following parameters is warranted:

Bacteria – Hudson has been monitoring for bacteria (fecal coliform) Weekly during the current permit term, which is less than the minimum recommended monitoring frequency of 2/Week for major municipal dischargers in guidance. While Hudson has not had any exceedances of bacteria (fecal coliform) limits during the current permit term, effluent monitoring results over the past three disinfection seasons were highly variable. Additionally, there is little history on the efficacy of the new ultra-violet disinfection system. The monitoring frequency for bacteria (*E. coli*) has been increased to the minimum recommended monitoring frequency of 2/Week in the proposed permit.

Ammonia – Hudson has been monitoring for ammonia Weekly during the current permit term, which is less than the minimum recommended monitoring frequency in guidance of 5/Week for major municipal dischargers. While Hudson has

not had any exceedances of ammonia limits in the past four years, effluent monitoring results were highly variable. The average of the daily maximum and weekly average results are 22.5 mg/L, which is 66% of the daily maximum and weekly average discharge limits of 34 mg/L. Daily maximum and weekly average results exceeded 50% of the discharge limit of 34 mg/L 78% of the time and exceeded 80% of the limits over 30% of the time. Additionally, based on Acute WET test results ammonia is still a potential source of effluent toxicity. Increased ammonia monitoring will allow the department to obtain additional data that can be correlated with acute WET toxicity. The monitoring frequency for ammonia has been increased from Weekly to 5/Week in the proposed permit.

If the permittee believes the facility should be eligible for a reduced monitoring frequency for either of these parameters based on performance during the permitted term, they may request a reduction with their next permit application.

Categorical Limits

$CBOD_5$ – Pursuant to s. NR 210.05(1)(d), Wis. Adm. Code, the permittee has requested the substitution of $CBOD_5$ effluent limitations for BOD_5 limitations. The permittee has demonstrated that the conditions in s. NR 210.07(4), Wis. Adm. Code, for making this substitution have been met and the Department concurs. Limitations for $CBOD_5$ are established in s. NR 210.05(1)(d), Wis. Adm. Code.

$CBOD_5$ and Total Suspended Solids (TSS) – Limitations for $CBOD_5$ and TSS are established in s. NR 210.05(1), Wis. Adm. Code, where the receiving water is classified as fish and aquatic life in s. NR 102.04 (3), Wis. Adm. Code.

pH – Section NR 210.05(2)(c), Wis. Adm. Code, requires that effluent pH shall be within the range of 6.0 s.u. (standard pH units) and 9.0 s.u.

Water Quality Based Limits (WQBELs), Whole Effluent Toxicity (WET) Requirements and Disinfection

Refer to the WQBEL memo for the detailed calculations, prepared by the Water Quality Bureau dated February 10, 2022 used for this reissuance.

Disinfection/UV – Section NR 104.22(1), Wis. Adm. Code, establishes that the standards for public water supply shall be met in the St. Croix River downstream from the north line of Polk County. The Hudson wastewater treatment facility discharges to this stretch of the St. Croix River and the need for year-round disinfection to protect this public water supply was evaluated. Considering the factors enumerated in s. NR 210.06(3), Wis. Adm. Code, a determination has been made that a public water supply intake is not located within 20 miles downstream of the permittee's wastewater outfall and year-round disinfection is not required. However, considering other factors in s. NR 210.06(3), Wis. Adm. Code, (proximity to a swimming beach and high levels of human contact recreational activities) Hudson is required to disinfect its effluent during the months of May through September to protect recreational uses. Ultraviolet light is used to disinfect the effluent prior to discharge.

***E. coli* –** Revisions to bacteria surface water quality criteria to protect recreational uses and accompanying *E. coli* WPDES permit implementation procedures became effective May 1, 2020. The new rule requires that WPDES permits for facilities with required disinfection include monitoring for *E. coli* while facilities are disinfecting during the recreation period. Section NR 210.06 (2), Wis. Adm Code, establishes effluent limitations for *E. coli* of 126 #/100 ml as a monthly geometric mean and 410 #/100 ml as a daily maximum that may not be exceeded more than 10 percent of the time in any calendar month. An analysis of effluent *E. coli* monitoring performed at the Hudson wastewater treatment facility from May 2021 to September 2021 shows that Hudson can comply with the *E. coli* limits that will apply on the permit effective date. The monitoring frequency for bacteria (*E. coli*) has been increased from Weekly to 2/Week. See the "Monitoring Frequency Evaluation" under the "Explanation of Limits and Monitoring Requirements" table for Outfall 001 for the rationale for increasing the monitoring frequency for bacteria (*E. coli*).

Disinfection Period - Hudson's current permit requires seasonal disinfection to protect recreational uses in and on the St. Croix River during the recreational season (May 1 through September 30 annually). The February 10, 2022 WQBEL memo used for this reissuance recommended year-round effluent disinfection because s. NR 104.22(1), Wis. Adm. Code, states in part that: "The standards for public water supply shall be met [in the St. Croix River] downstream from the north line of Polk county." Hudson's discharge to the St. Croix River is downstream of the north line of Polk County. However,

decisions on disinfection requirements are based s. NR 210.06(1)(b), Wis. Adm. Code, which provides that disinfection shall be required "Year-round to protect public drinking water supplies."

To make a determination on the need for year-round disinfection to protect a public drinking water supply the Department must consider the factors in s. NR 210.06(3), Wis. Adm. Code, in particular s. NR 210.06(3)(b), Wis. Adm. Code. The Department's determination on the need for year-round disinfection shall be based on the "Proximity of the wastewater outfall to public drinking water supply intakes. At a minimum, whenever a drinking water intake is within a radius of 5 miles of a wastewater outfall in a lake or impoundment or within 20 miles downstream of a wastewater outfall on a flowing surface water, disinfection shall be provided." There is not a public drinking water supply intake within 20 miles downstream of Hudson's discharge and therefore year-round disinfection is not required.

Phosphorus – Phosphorus requirements are based on the Phosphorus Rules that became effective December 1, 2010 as detailed in chapters NR 102 Water Quality Standards and NR 217 Effluent Standards and Limitations for Phosphorus of the Wisconsin Administrative Code. Chapter NR 217, Wis. Adm. Code, addresses point source dischargers of phosphorus to surface waters. The code categorically limits municipal dischargers of more than 150 pounds of phosphorus per month to 1.0 mg/L as a monthly average unless an alternative limit is approved. Hudson discharge more than 150 pounds of phosphorus per month and has a phosphorus limit of 1.0 mg/L as a monthly average in its current permit so this limit should be included in the reissued permit.

Phosphorus Limits Based on the Lake St. Croix Total Maximum Daily Load (TMDL) - Hudson is located within the Lake St. Croix TMDL area. The Lake St. Croix TMDL Wasteload Allocation (WLA) for total phosphorus was approved by the U.S. Environmental Protection Agency in August 2012. The TMDL assigned a total phosphorus WLA of 5,936 lbs/yr and 16.3 lbs/day to the City of Hudson Wastewater Treatment Facility. The total phosphorus mass limitation of 22 lbs/day as a monthly average is a water quality based effluent limit derived consistent with the assumptions and requirements of the Lake St. Croix TMDL.

The permit requires Hudson to calculate and report the total monthly discharge of phosphorus in pounds per month (monthly average concentration [mg/L] x total flow for the month [MG/month] x 8.34) and the 12-Month Rolling Sum of Total Monthly Discharge of phosphorus in pounds per year (the sum of the most recent 12 consecutive months of Total Monthly Discharges). The 12-Month Rolling Sum of Total Monthly Discharge of phosphorus in pounds per year can be compared directly with the annual WLA to determine compliance with the TMDL.

Ammonia – 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 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. An evaluation of effluent pH results from August 2017 to November 2021 determined that the maximum reasonably expected pH of Hudson's effluent is 7.70 s.u. (standard pH units) resulting an acute toxicity of 14.44 mg/L. Due to the amount of dilution available in the St. Croix River (the ratio of the 7-Q10 river flow to effluent flow = 323:1) the 2 X Acute Toxicity Criteria method was used to calculate a daily maximum ammonia limit of 29 mg/L. The weekly and monthly average ammonia nitrogen limits calculated for the previous permit (34 mg/L for both the weekly and monthly average limits) do not change because there have been no changes in the effluent and receiving water flow rates. However, revisions to ch. NR 106, Wis. Adm. Code, require that if a daily maximum limitation is determined necessary to protect water quality, a weekly and monthly average limitation shall also be included in the permit and set equal to the daily maximum limit unless a more restrictive limit is already determined necessary to protect water quality. The weekly and monthly average limits from the previous permit are less restrictive than the daily maximum ammonia limit calculated for this reissuance and therefore the monthly and weekly average limits have been set equal to the daily maximum limit of 29 mg/L. The reissued permit will include a compliance schedule that requires the permittee to comply with the new, more stringent, ammonia limits in this permit as soon as possible but no later than the date specified in the schedule.

Mercury – Requirements for mercury are included in s. NR 106.145, Wis. Adm. Code. The permittee has submitted an application for a variance from the mercury water quality criterion of 1.3 ng/L based on wildlife criterion (the most stringent criterion for this substance). The application included an updated Mercury Pollutant Minimization (PMP) plan. The U.S. EPA approved this variance request on August 9, 2022 and an alternative mercury effluent limitation of 6.8 ng/L

expressed as a daily maximum will be effective throughout the permit term. The reissued permit will include requirements that the permittee maintain mercury effluent levels at or below 6.8 ng/L, implement the "City of Hudson Mercury PMP (Revised March 17, 2022)" and submit annual progress reports on mercury PMP activities and trends in mercury concentrations discharged.

Whole Effluent Toxicity – Whole effluent toxicity (WET) testing requirements and limits (if applicable) are determined in accordance with ss. NR 106.08 and NR 106.09 Wis. Adm. Code, as revised August 2016. (See the current version of the Whole Effluent Toxicity Program Guidance Document and checklist and WET information, guidance and test methods at http://dnr.wi.gov/topic/wastewater/wet.html). The need for Acute and Chronic WET testing at the Hudson wastewater treatment plant was evaluated in the February 10, 2022 WQBEL memo. This analysis determined that there was reasonable potential for the permittee's discharge to cause acute toxicity in the St. Croix River and that a WET limit expressed as 1.0 TUa as a daily maximum should be included in the permit. A minimum of annual acute WET monitoring is required because federal regulations in 40 CFR Part 122.44(i) require that monitoring occur at least once per year when an acute WET limit is present. Chronic WET testing is usually not recommended where the ratio of the 7-Q^{10} river flow to the effluent flow exceeds 100:1. For this permittee, that ratio is approximately 323:1. With this amount of dilution, there is believed to be little potential for chronic toxicity effects in the St. Croix River associated with the permittee's discharge.

Acute WET testing is required in the following quarters: 4th Quarter (October – December) 2022; 3rd Quarter (July – September) 2023; 2nd Quarter (April – June) 2024; 1st Quarter (January – March) 2025; and 3rd Quarter (July – September) 2026

Total Nitrogen Monitoring (NO2+NO3, TKN and Total N) – Based on the "Guidance for Total Nitrogen Monitoring in WPDES Permits" dated October 2012, quarterly effluent monitoring for Total Nitrogen is required for municipal major treatment facilities. The Department has included effluent monitoring for Total Nitrogen in the permit through the authority under s. 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.

Toxic Compounds – Water quality criteria for toxic and organoleptic substance are included in ch. NR 105, Wis. Adm. Code. Chapter NR 106, Wis. Adm. Code, establishes the procedures for calculating water quality based effluent limitations (WQBWELs) for these substances. This facility is categorized as a major municipal discharger so the permit application required effluent sample analyses for all of the "priority pollutants" in ch. NR 215, Wis. Adm. Code, except for the Dioxins and Furans, plus Chloride and Hardness. Water quality based effluent limits (WQBELs) were calculated for each detected pollutant using the procedures in s. NR 106, Wis Adm. Code, and compared to results of effluent sampling. With the exception of ammonia and mercury (discussed above) there was no reasonable potential for the permittee's discharge to exceed any of the calculated WQBELs and limits for these pollutants are not needed for this permit reissuance.

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. Due to the amount of upstream flow available for dilution in the limit calculation (the ratio of 7-Q^{10} river flow to the effluent flow >20:1), the lowest calculated limitation is 120° F (s. NR 106.55(6)(a), Wis. Adm. Code). There is no reasonable potential for the calculated limitation to be exceeded at this facility. Neither a limit nor routine monitoring is included in the reissued permit.

4 Land Treatment –Monitoring and Limitations

Sample Point Number: 004- Well #3 Filter Backwash; 005- Well # 5 Filter Backwash; 006- Well #6 Filter Backwash; 007- Well #8 Filter Backwash, 008- Well #10 Filter Backwash, and 009- Well #9 Filter Backwash

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Per Occurrence	Total Daily	
~~Iron Dissolved~~		~~ug/L~~	~~Monthly~~	~~Grab~~	
~~Manganese Dissolved~~		~~ug/L~~	~~Monthly~~	~~Grab~~	

Changes from Previous Permit Term:

Land treatment outfalls for groundwater discharges of filter backwash from iron and manganese treatment processes used by the City of Hudson Water Utility to purify water for the City's municipal public water supply have been added to the City of Hudson Wastewater Treatment Facility's WPDES permit. The City of Hudson Water Utility operates five iron and manganese filters. Backwash from the filters is discharged to three on-site seepage basins and three storm water seepage ponds conveyed via storm sewer. The permit requires monitoring of flow rate during periods of discharge.

Changes in permit modification: The Department has determined that the monitoring of the well water for iron and manganese prior to discharge back to the groundwater via the seepage basins and seepages ponds is no longer necessary, therefore the requirements have been removed from the permit. It was discovered that filter backwash from groundwater well #9 does not discharge to the same seepage cells as groundwater well #8, as originally believed when the permit was reissued in 2022. Therefore, this permit modification separates out the discharge from well #9 to its own sample point, (Outfall 009) for recording of flow volume discharged.

Explanation of Limits and Monitoring Requirements

Refer to the Ground Water Evaluation Report prepared by the Water Quality Bureau dated November 10, 2020 (Modified February 8, 2021) used for this reissuance. Requirements for land treatment of municipal wastewater are determined in accordance with ch. NR 206, Wis. Adm. Code.

The discharge from the City of Hudson Water Utility of iron and manganese filter backwash to seepage basins was previously covered under General Permit No. WI-0046540-05-0, "Potable Water Treatment & Conditioning". This general permit was reissued September 23, 2019, effective January 1, 2020, and section 1.2 of the reissued permit, "Discharges Not Covered", was expanded to exclude "Discharges from water treatment processes that significantly concentrate metals and have a reasonable potential to exceed… groundwater standards in ch. NR 140, Wis. Adm. Code" from coverage under the reissued permit. Levels of dissolved iron and dissolved manganese in the filter backwash discharged to groundwater exceed the ch. NR 140 preventive action limits of 25 ug/L dissolved iron and 150 ug/L dissolved manganese at each well and their filter backwash discharge.

Covering the discharge of the water utility's filter backwash under the Wastewater Treatment Facility's individual WPDES permit allows the Department to regulate these discharges by conducting groundwater evaluations at each permit reissuance to assess the necessity of effluent limits and the need for groundwater monitoring, and to apply preventive action limits and enforcement standards at the point of standards application if necessary.

The Department assessed the geology and hydrogeology in the area of Hudson's groundwater discharge sites and the need for a groundwater monitoring system in the November 10, 2020 (Modified February 8, 2021) Groundwater Evaluation

Report and determined that the discharges appear to pose no potential impacts to groundwater or risk to human health. The evaluation does not recommend a groundwater monitoring system or discharge limits for iron and manganese. However, monitoring the individual discharges for flow, iron and manganese was recommended based on the requirements of the previous coverage under a General Permit. Upon re-evaluation the department has determined that the iron and manganese sampling can be discontinued due to a lack of environmental threat. These recommendations will be reevaluated at the next permit reissuance.

5 Land Application - Monitoring and Limitations

Municipal Sludge Description						
Sample Point	**Sludge Class (A or B)**	**Sludge Type (Liquid or Cake)**	**Pathogen Reduction Method**	**Vector Attraction Method**	**Reuse Option**	**Amount Reused/Disposed (Dry Tons/Year)**
002	B	Liquid	All sludge generated is hauled to the West Central Wisconsin Biosolids Facility for treatment and reuse			330 dry US tons
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 The Hudson Water Works has monitored its public water supply for Radium-226 from 1983 through 2020. Measured Radium-226 results exceeded 2 pCi/liter in 28 of the 55 samples taken over that timeframe with a range of 0 (non-detect) to 5.2 pCi/liter. If yes, special monitoring and recycling conditions will be included in the permit to track any potential problems in landapplying sludge from this facility.						
Is a priority pollutant scan required? No Priority pollutant scans are required at facilities with design flows between greater than 5 MGD (Hudson's annual average design flow is 2.2 MGD).						

Sample Point Number: 002- BEFORE HAULING TO WCWBF

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

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Lead Dry Wt	Ceiling	840 mg/kg	Annual	Grab	
Lead Dry Wt	High Quality	300 mg/kg	Annual	Grab	
Mercury Dry Wt	Ceiling	57 mg/kg	Annual	Grab	
Mercury Dry Wt	High Quality	17 mg/kg	Annual	Grab	
Molybdenum Dry Wt	Ceiling	75 mg/kg	Annual	Grab	
Nickel Dry Wt	Ceiling	420 mg/kg	Annual	Grab	
Nickel Dry Wt	High Quality	420 mg/kg	Annual	Grab	
Selenium Dry Wt	Ceiling	100 mg/kg	Annual	Grab	
Selenium Dry Wt	High Quality	100 mg/kg	Annual	Grab	
Zinc Dry Wt	Ceiling	7,500 mg/kg	Annual	Grab	
Zinc Dry Wt	High Quality	2,800 mg/kg	Annual	Grab	
Radium 226 Dry Wt		pCi/g	Annual	Grab	

Changes from Previous Permit:

None

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).)

The Hudson wastewater treatment facility hauls all sludge generated at the facility to the West Central Wisconsin Biosolids Facility for treatment and reuse and is not required to monitor its sludge for vector attraction reduction (List 3) or pathogen control (List 4) or PCBs unless the facility decides to land apply its own sludge. Annual monitoring is required for metals (List 1) and Radium-226. Due to the presence of Radium-226 in the City's groundwater supplies at levels in excess of 2 pico curies per liter (pCi/liter), annual monitoring of the facilities sludge for Radium-226 is required.

6 Compliance Schedules

6.1 Mercury Pollutant Minimization Program (PMP)

As a condition of the variance to the water quality based effluent limitation for mercury granted in accordance with s. NR 106.145(6), Wis. Adm. Code, the permittee shall perform the following actions.

Required Action	Due Date
Annual Mercury Progress Reports: Submit an annual mercury progress report related to the pollutant minimization activities for the previous year. The annual mercury progress report shall: Indicate which mercury pollutant minimization activities or activities outlined in the Pollutant Minimization Program Plan have been implemented and state which, if any, activities from the Pollutant Minimization Program Plan were not pursued and why; Include an assessment of whether each implemented pollutant minimization activity appears to be effective or ineffective at reducing pollutant discharge concentrations and identify actions planned for the upcoming year; Identification of barriers that have limited program effectiveness and adjustments to the program that will be implemented during the next year to help address these barriers; Include an analysis of trends in total effluent mercury concentrations based on mercury sampling; and Include an analysis of how influent and effluent mercury varies with time and with significant loading of mercury. The first annual mercury progress report is to be submitted by the Due Date.	02/15/2023
Annual Mercury Progress Report #2: Submit a mercury progress report, related to the pollutant minimization activities for the previous year, as defined above.	02/15/2024
Annual Mercury Progress Report #3: Submit a mercury progress report, related to the pollutant minimization activities for the previous year, as defined above.	02/15/2025
Annual Mercury Progress Report #4: Submit a mercury progress report, related to the pollutant minimization activities for the previous year, as defined above.	02/15/2026
Final Mercury Report: Submit a final report documenting the success in reducing mercury concentrations in the effluent, as well as the anticipated future reduction in mercury sources and mercury effluent concentrations. The report shall: Summarize mercury pollutant minimization activities that have been implemented during the current permit term and state which, if any, activities from the Pollutant Minimization Program Plan were not pursued and why; Include an assessment of which pollutant minimization activities appear to have been effective or ineffective. Evaluate any needed changes to the pollutant reduction strategy accordingly; Identification of barriers that have limited program effectiveness and adjustments to the program that will be implemented during the next variance term (if applicable) to help address these barriers; Include an analysis of trends in mercury concentrations based on sampling and data during the current permit term; and Include an analysis of how influent and effluent mercury varies with time and with significant loadings of mercury.	12/31/2026

If the permittee intends to reapply for a mercury variance per s. NR 106.145, Wis. Adm. Code, for the reissued permit, a detailed Pollutant Minimization Program Plan outlining the pollutant minimization activities proposed for the upcoming permit term shall be submitted along with the final report. An updated pollutant minimization plan shall: Include an explanation of why or how each pollutant minimization activity will result in reduced discharge of the target pollutant; Evaluate any new available information on pollutant sources, timing, and concentration to update the mass balance assumptions and expected sources of the pollutant, and Identify any information needs that would help to better determine pollutant sources and make plans to collect that information.	
Annual Mercury Reports After Permit Expiration: In the event that this permit is not reissued by the date the permit expires, the permittee shall continue to submit annual mercury reports for the previous year following the due date of Annual Mercury Progress Reports listed above. Annual Mercury Progress reports shall include the information as defined above.	

Explanation of Mercury PMP Compliance Schedule

Submittal of mercury progress reports is a requirement of receiving a variance from mercury water quality standards. The permittee must report PMP activities implemented each year and assess the success of these activities in reducing mercury discharged to the environment. The reports shall include an analysis of mercury effluent data to show progress towards meeting the unvaried mercury water quality standard of 1.3 ng/L based on Wildlife Criterion. An interim mercury limit of 6.8 ng/L as a daily maximum will be in effect throughout the permit term.

6.2 Ammonia Effluent Limits & Facility Modifications

This compliance schedule requires the permittee to achieve compliance by the specified date.

Required Action	Due Date
Report on Effluent Discharges: Submit a report on effluent discharges of total ammonia nitrogen with conclusions regarding compliance.	06/01/2023
Action Plan or Facility Plan Amendment: Submit an action plan or facility plan amendment for treatment facility modifications for complying with the effluent limitation(s) as needed.	09/30/2023
Plans and Specifications: Submit plans and specifications for treatment facility modifications as needed.	03/31/2024
Initiate Actions: Initiate actions identified in the action plan or facility plan amendment.	09/30/2025
Progress Report: Submit a progress report summarizing actions taken to date.	09/30/2026
Complete Actions: Complete actions necessary to achieve compliance with the effluent limitation(s) for ammonia nitrogen.	03/31/2027

Explanation of Ammonia Effluent Limits & Facility Modifications Compliance Schedule

The water quality based effluent limits for ammonia recommended for this permit reissuance decreased (are more stringent) than those in the current permit. The ammonia limits in the current permit are 34 mg/L as a daily maximum, weekly average and monthly average. The ammonia limits recommended for this permit reissuance are 29 mg/L as daily maximum, weekly average and monthly average. Section NR 106.37, Wis. Adm. Code, authorizes the Department to "determine and specify a reasonable compliance schedule in the permit if the permittee is unable to meet the ammonia effluent limits". Such a compliance schedule must meet the requirements of s. NR 106.117, Wis. Adm. Code, including

that the schedule shall require compliance with the water quality based effluent limitations "as soon as possible" but no later than the date specified in the schedule for compliance (March 31, 2027). An analysis of the past four years of ammonia effluent results reported by the Hudson wastewater treatment facility indicates that the new daily maximum and weekly average ammonia limitation of 29 mg/L would have been exceeded 27 times over that time period and exceeded 29 mg/L as a monthly average four times. Ammonia discharge concentrations exceeded 80% of the 29 mg/L daily maximum and weekly average limit over 30% of the time.

The length of the schedule is appropriate because based on the analysis above it does not appear that Hudson will be able to consistently meet the new ammonia limits with source reduction measures, operational improvements or other minor facility modifications. It is highly likely that construction of ammonia treatment processes will be required to meet the new more stringent limits and the schedule provides a reasonable amount of time for facility planning and other actions to complete actions necessary to achieve compliance with the effluent limitations for ammonia.

Special Reporting Requirements

Annual Mercury Progress Reports and reports and plans required by the Ammonia Effluent Limits & Facility Modifications schedule.

Comments: Publishing newspaper- Hudson Star-Observer, Hudson, WI

Attachments:

Water Quality Based Effluent Limits (WQBEL) – February 22, 2022

NR 140 Groundwater Evaluation Report – November 10, 2020 (Modified February 8, 2021)

Hudson Mercury Variance Data Sheet – March 3, 2022

Proposed Expiration Date:

June 30, 2027

Justification Of Any Waivers from Permit Application Requirements

None granted.

Originally prepared by: Phillip Spranger, Wastewater Specialist, August 24, 2022

Modified by: Holly Heldstab, Wastewater Specialist, September 9, 2024