Facility Specific Mercury Variance Data Sheet

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

Section I: General Information

A. Name of Permittee: City of Hudson

B. Facility Name: Hudson Wastewater Treatment Facility

C. Submitted by: Wisconsin Department of Natural Resources

D. State: Wisconsin **Substance:** Mercury **Date completed:** June 21, 2022

E. Permit #: WI-0024279-10-0 **WQSTS #:** (EPA USE ONLY)

F. Duration of Variance **Start Date:** August 1, 2022 **End Date:** June 30, 2027

G. Date of Variance Application: February 22, 2022

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

I. Description of proposed variance:

The permittee has applied for a variance from the water quality standard for mercury based on the wildlife criterion of 1.3 ng/L to an interim limit of 6.8 ng/L. The permittee has submitted an application for an alternative mercury effluent limitation (AMEL). The application included a pollutant minimization program (PMP) plan for mercury as required under s. NR 106.145(8), Wis. Adm. Code.

The permittee was granted a variance from the water quality standard for mercury for permit reissuance -08 (effective September 1, 2010) with an interim limit of 22 ng/L. However, for the current permit term, reissuance -09 (effective August 1, 2017), the permit included 6.8 ng/L interim limit, a 5-year compliance schedule that required continued implementation of the permittee's mercury PMP plan, and compliance with the mercury WQBEL of 1.3 ng/L by June 30, 2022. This limit was unattainable within the 5-year time frame and the permittee has applied for a mercury variance for this permit reissuance (-10).

Citation: An alternative mercury effluent limitation under s. NR 106.145, Wis. Adm. Code represents a variance to water quality standards authorized by s. 283.15, Wis. Stats.

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

Name	Email	Phone	Contribution
Phillip Spranger	phillip.spranger@wisconsin.gov	608-516-3700	Permit Drafter Portions
Wale Adesanwo	adebowale.adesanwo@wisconsin.gov	715-864-2914	Compliance Staff Portions
Benjamin Hartenbower	benjamin.hartenbower@wisconsin.gov	715-225-4705	Parts II D-H and J

Section II: Criteria and Variance Information

A. Water Quality Standard from which variance is sought: 1.3 ng/L Wildlife Criterion

B. List other criteria likely to be affected by variance: 1.5 ng/L Human Threshold Criterion

C. Source of Substance: Dental Facilities, Medical Facilities, Academic and Industrial sectors.

D. Ambient Substance Concentration: 1.48 ng/L ☒ **Measured** ☐ **Estimated** ☐ **Default** ☐ **Unknown**

E. If measured or estimated, what was the basis? Include citation.
Background mercury sample from the St. Croix River at St. Croix Falls

F. Average effluent discharge rate: 1.50 MGD **Maximum effluent discharge rate:** 2.88 MGD (2019)

G. Effluent Substance Concentration: 1-day P99 = 8.2 ng/L
30-day P99 = 3.8 ng/L
Avg. = 3.1 ng/L
(11/08/2017 to 09/14/2021)
☐ **Measured** ☐ **Estimated** ☐ **Default** ☐ **Unknown**

H. If measured or estimated, what was the basis? Include Citation. Effluent sampling of mercury for 16 results taken from 11/08/2017 to 09/14/2021

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

J. Statement of HAC: The Department has determined the highest attainable condition of the receiving water is achieved through the application of the variance limit in the permit, combined with a permit requirement that the permittee implement its Mercury PMP. Thus, the HAC at commencement of this variance is 6.8 ng/L, which reflects the greatest mercury reduction achievable with the current treatment processes, in conjunction with the implementation of the permittee's Mercury PMP. The current effluent condition is reflective of on-site optimization measure that have already occurred. This HAC determination is based on the economic feasibility of available compliance options for the Hudson Wastewater Treatment Facility at this time (see Economic Section below). The permittee may seek to renew this variance in the subsequent reissuance of this permit; the Department will reevaluate the HAC in its review of such a request. A subsequent HAC cannot be defined as less stringent than this HAC.

K. Variance Limit: 6.8 ng/L (daily maximum) current interim limit

L. Level currently achievable (LCA): 8.2 ng/L (daily maximum) which is equal to the 1-day P99 of reported effluent data from 11/08/2017 to 09/14/2021

M. What data were used to calculate the LCA, and how was the LCA derived? (*Immediate compliance with LCA is required.)*

Section NR 106.145(5), Wis. Adm. Code, specifies that an alternative limitation shall equal the 1-day P99 of the effluent data, and shall be expressed as a daily maximum concentration. 1-day P99 for mercury in the effluent for 16 results taken from 11/08/2017 to 09/14/2021 is 8.2 ng/L

Citation: s. NR 106.145(5), Wis. Adm. Code.

N. Explain the basis used to determine the variance limit (which must be ≤ LCA). Include citation.

The limit is established in accordance with s. NR 106.145(5), Wis. Adm. Code with the variance limit = 1 Day P99. However, an alternative effluent limit for mercury may not be set greater than a previously established alternative mercury effluent limit. The daily maximum limit in the current permit is 6.8 ng/L.

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

Section NR 106.145(1), Wis. Adm. Code, outlines several findings that justify variances for mercury. The Department intended that this provision be generally applicable to all dischargers of mercury, which produce large volumes of effluent with already extremely low mercury concentrations. The Department considers treating to produce effluent at concentrations to meet the limit to be technically and economically infeasible.

Citation: Assessing the Economic Impacts of the Proposed Ohio EPA Water Rules on the Ohio Economy, April 24, 1997, Ohio Environmental Protection Agency, Division of Surface Water and Foster Wheeler Environmental Corporation and DRI/McGraw-Hill in support of Amended and New Rules in OAC Chapters 3745-1, -2, and -33.

Section III: Location Information

A. Counties in which water quality is potentially impacted: Saint Croix and Pierce Counties

B. Receiving waterbody at discharge point: Saint Croix River

C. Flows into which stream/river? Mississippi River **How many miles downstream?** 20 miles

D. Coordinates of discharge point (UTM or Lat/Long): Lat: 44.96607º N / Lon: 92.76024º W

E. What are the designated uses associated with this waterbody?

Fish and Aquatic Life, Warmwater Sport Fish, Public Water Supply, Exceptional Resource Water

F. What is the distance from the point of discharge to the point downstream where the concentration of the substance falls to less than or equal to the chronic criterion of the substance for aquatic life protection?

Ambient mercury concentrations in surface water resulting from the variance will be substantially less than

levels that result in direct toxicity to aquatic organisms. EPA's current chronic aquatic life criterion for mercury is 0.9081 µg/L, which is approximately three orders of magnitude greater than the wildlife criteria (0.0013 µg/L). Wisconsin's criteria are 0.44 µg/L and 0.83 µg/L for chronic and acute toxicity, respectively.

G. Provide the equation used to calculate that distance. See above.

H. Identify all other variance permittees for the same substance which discharge to the same stream, river, or waterbody in a location where the effects of the combined variances would have an additive effect on the waterbody: There are no other WWTFs discharging to the Saint Croix River with mercury variances.

Permit Number	Facility Name	Facility Location	Variance Limit [µg/L]
N/A			

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

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

River Mile	Pollutant	Impairment
0 – 135	PCB	Fish Consumption
0 – 24	Total Phosphorus	Eutrophication, Excess Algae Growth

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

A. Are there any industrial users contributing mercury to the POTW? If so, please list.
N/A – The Hudson Wastewater Treatment Plant has a design flow less than 5 MGD and is therefore not required to implement an industrial pretreatment program.

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

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

D. Please provide information on specific SRM activities that will be implemented during the permit term to reduce the industry's discharge of the variance pollutant to the POTW
N/A – no significant industrial users, but efforts to address Hg discharges from non-significant industrial users are detailed in section IX.

Section V: Public Notice

A. Has a public notice been given for this proposed variance? ☒ **Yes** ☐ **No**

B. If yes, was a public hearing held as well? ☒ **Yes** ☐ **No** ☐ **N/A**

C. What type of notice was given?
☒ **Notice of variance included in notice for permit** ☐ **Separate notice of variance**

D. Date of public notice: April 7, 2022 **Date of hearing:** May 24, 2022

E. Were comments received from the public in regards to this notice or hearing? *(Please see Notice of Final Determination for public comments – None related to Mercury Variance)* ☒ **Yes** ☐ **No**

Section VI: Human Health

A. Is the receiving water designated as a Public Water Supply? ☒ **Yes** ☐ **No**

B. Applicable criteria affected by variance: 1.5 ng/L Human Threshold Criterion

C. Identify any expected impacts that the variance may have upon human health, and include any citations:

- The proposed variance will not adversely affect human health directly through the drinking water.
- Wisconsin's fish consumption advisory program is designed to mitigate the effect of any ambient mercury concentration above the 1.5 ng/L water quality criterion for the protection of the fish-consuming human

population by providing advice to the public to guide them on the amount of fish that may be consumed safely.

- Given the lack of wastewater treatment technologies capable of reducing mercury concentrations to achieve a 1.3 ng/L effluent limit, granting a variance in this situation is consistent with protecting the public health, safety and welfare because of the substantial public health and safety benefits of providing wastewater treatment, the continued commitment towards further mercury pollutant minimization, the Wisconsin fish advisory program, and the limited impact of the elevated effluent concentrations given the background mercury concentrations.
- DNR's findings suggest that Hg in walleye from Wisconsin lakes changed in the range of 0.5 to 0.8% per year depending on geographical position in the state during the period of 1982–2005. These trends may reflect geographically differing temporal trends in the amount of Hg deposited to Wisconsin lakes. However, long-term changes in other factors, such as water chemistry, fish growth rates, and lake levels, known to impact Hg bioavailability and accumulation may also be important. (Temporal trends of mercury concentrations in Wisconsin walleye (Sander vitreus), 1982–2005, Paul W. Rasmussen, Candy S. Schrank, Patrick A. Campfield. Ecotoxicology (2007) 16:541–550)

Section VII: Aquatic Life and Environmental Impact

A. Aquatic life use designation of receiving water: Warmwater Sport Fish

B. Applicable criteria affected by variance: 1.3 ng/L Wildlife Criterion

C. Identify any environmental impacts to aquatic life expected to occur with this variance, and include any citations:

Not Likely to Adversely Affect

- Ambient mercury concentrations resulting from the variance will be substantially less than levels that result in direct toxicity to aquatic organisms. EPA's current chronic aquatic life criterion for mercury is 0.9081 µg/L, which is approximately three orders of magnitude greater than the wildlife criteria (0.0013 µg/L). Wisconsin's criteria are 0.44 µg/L and 0.83 µg/L for chronic and acute toxicity, respectively.
    - Hine's emerald dragonfly (Somatochlora hineana, endangered)
    - Higgins' Eye mussel (Lampsilis higgnsii, endangered)
    - Winged Mapleleaf mussel (Quadrula fragosa, endangered)
    - Spectaclecase (Cumberlandia monodonta, threatened)
    - Sheepnose (Plethobasus cyphyus, threatened)

- Low trophic level prey where mercury in prey is unlikely to accumulate to toxic levels in the organism.
    - Piping plover (Charadrius melodus, endangered)
    - Eastern massasauga rattlesnake (Sistrurus catenatus catenatus, threatened)

May Affect, Not Likely to Adversely Affect

- Bald eagle (Haliaeetus leucocephalus, Delisted due to Recovery)

Bald eagles consume fish and waterfowl from surface waters, which puts them at risk of exposure to toxic levels of mercury due to bioaccumulation of mercury in their prey organisms. However, despite the potential for exposure, ambient surface water data show that in recent decades, mercury levels have not increased and bald eagle populations have continued to grow. This indicates that current ambient concentrations of mercury and mercury concentrations in prey organisms do not appear to be limiting recovery of bald eagle populations in Wisconsin. Although this variance will allow permitted dischargers additional time to identify and control sources of mercury in their discharges, the pollutant minimization component of the variances should result in a net reduction in the amount of mercury discharged to Wisconsin surface waters from permitted point sources, further reducing any risk to bald eagles. In addition, the pollutant minimization programs encourage other pollution prevention efforts, which has a beneficial indirect effect of reducing the use and production of products and processes that use or contribute mercury to the environment. These efforts will also benefit bald eagles.

D. List any Endangered or Threatened species known or likely to occur within the affected area, and include any citations:

Because mercury is pervasive, persistent and bio accumulating in the environment we considered all species listed for the entire state of Wisconsin. The following is Federally Endangered, Threatened, Proposed, and Candidate Species in Wisconsin from U.S. Fish and Wildlife Service, Region 3, April 2015

MAMMALS

Canada lynx (T)
Gray wolf (E)
Northern long-eared bat (T)
BIRDS
Piping plover (E and CH)
Red Knot (T)
Whooping crane - (NEP)
REPTILE
Eastern massasauga rattlesnake (T)
INSECTS
Hine's emerald dragonfly (E)
Karner blue butterfly (E)
Poweshiek skipperling (E and PCH)
Rusty patched bumble bee (E)
CLAMS (Freshwater mussels, Unionids)
Higgins' eye pearlymussel (E)
Sheepnose mussel (E)
Snuffbox mussel (E)
Spectaclecase mussel (E)
Winged mapleleaf mussel (E)
SNAILS
Iowa Pleistocene snail (E)

Citation: U.S. Fish & Wildlife Service – Environmental Conservation Online System (http://www.fws.gov/endangered/) and National Heritage Index (http://dnr.wi.gov/topic/nhi/)

Section VIII: Economic Impact and Feasibility

A. Describe the permittee's current pollutant control technologies in the treatment process:
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 over the past five years was 1.50 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.

B. What modifications would be necessary to comply with the current limits? Include any citations.
The Department did not evaluate what actions or modifications or other changes would be needed to meet limits based on the water quality standard. As discussed below, the Department considers treating to produce effluent at concentrations to meet the limit to be technically and economically infeasible.

Citation: Assessing the Economic Impacts of the Proposed Ohio EPA Water Rules on the Ohio Economy, April 24, 1997, Ohio Environmental Protection Agency, Division of Surface Water and Foster Wheeler Environmental Corporation and DRI/McGraw-Hill in support of Amended and New Rules in OAC Chapters 3745-1, -2, and -33.

C. Identify any expected environmental impacts that would result from further treatment, and include any citations:
See above.

D. Is it technically and economically feasible for this permittee to modify the treatment process to reduce the level of the substance in the discharge? ☐ **Yes** ☒ **No** ☐ **Unknown**

The Department considers treating to produce effluent at concentrations to meet the limit to be technically and economically infeasible.

Citation: Assessing the Economic Impacts of the Proposed Ohio EPA Water Rules on the Ohio Economy, April 24, 1997, Ohio Environmental Protection Agency, Division of Surface Water and Foster Wheeler Environmental Corporation and DRI/McGraw-Hill in support of Amended and New Rules in OAC Chapters 3745-1, -2, and -33.

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

F. If yes, what prevents this from being done? Include any citations.
See above.

G. List any alternatives to current practices that have been considered, and why they have been rejected as a course of action, including any citations:
Since the Department considers treating to produce effluent at concentrations to meet the limit to be technically and economically infeasible the implementation of a mercury PMP is the environmentally preferable approach to reducing mercury concentrations in the effluent.

Section IX: Compliance with Water Quality Standards

A. Describe all activities that have been, and are being, conducted to reduce the discharge of the substance into the receiving stream. This may include existing treatments and controls, consumer education, promising centralized or remote treatment technologies, planned research, etc. Include any citations.
The permittee continues to focus on mercury source reduction at dental, medical and educational sectors, and industrial facilities in its service area and continues to survey these potential sources to assure that best management practices (BMPs) for reducing mercury discharges to the sanitary sewer system are being implemented. Residential participation in mercury recycling through annual St. Croix County Clean Sweep events is encouraged. All mercury containing products at City facilities are properly disposed of through E-Cycling.

In an effort to further reduce mercury levels in the influent to the plant one third of the sewers in the collection system are flushed annually. All tanks at the treatment plant are being cleaned out and sludge build-up is removed. Major sewers and pipes in the collection system near the treatment plant are being replaced. These activities are intended to remove buildup of mercury in the conveyance system that may have accumulated over time. The existing secondary treatment system is being optimized to improve overall treatment efficiency, which may also help reduce mercury in the plants effluent.

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

1) Monitor influent, effluent, and field blanks for mercury quarterly throughout the permit term.
2) Maintain mercury effluent concentrations at or below the interim limitation of 6.8 ng/L.
3) Implement the City of Hudson Mercury Pollutant Minimization Program Plan (Revision March 17, 2022).

Activities included in the City of Hudson's mercury pollutant minimization program (PMP) plan include:

- Maintain current inventories of known potential sources of mercury in the city such as medical, dental and educational facilities and identify new sources in these sectors.
- Periodic site visits and contacts at least once a year with the sectors above to verify that all best management practices are being implemented and that "no mercury" policies are in place.
- Maintain contact with the industries in the city (United Gear, Saint Croix Gear, Phillips Plastics, GEA Process Engineering Inc., and Empire Manufacturing) to verify that best management practices for mercury management are followed.
- Publicize St. Croix County Clean Sweep events (through social media, newspaper, radio, local TV) to encourage the public to participate and properly recycle or dispose of mercury containing products.
- Remove mercury buildup in the collection system through pipe rehabilitation projects and sewer flushing 1/3 of the collection system annually.
- Sample key locations within the sewer collection system, such as lift stations and gravity interceptors, for mercury to identify locations in the city that may be contributing elevated levels of mercury.
- If monitoring identifies areas in the city that contribute elevated concentrations of mercury, attempt to identify and contact potential unknown sources of mercury in those areas and, as necessary, conduct additional collection system monitoring to further pinpoint the source.
- Contact or visit the source(s).

- Implement plan to work with identified sources of mercury to reduce and or eliminate the use of mercury containing products or other mercury sources.

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

A. Date of previous submittal: January 13, 2010 **Date of EPA Approval:** N/A

B. Previous Permit #: WI-0024279-09-0 **Previous WQSTS #:** (EPA USE ONLY)

Note: Hudson was granted a mercury variance for permit reissuance -08. However, the previous permit (reissuance –09) included a 5-year compliance schedule that required compliance with the mercury WQBEL by June 30, 2022.

Variance Limit: N/A – Interim limit of 6.8 ng/L with compliance schedule.

C. Effluent substance concentration: 3.8 ng/L (30-day P99 2017 – 2021)

D. Target Value(s): N/A **Achieved?** ☐ **Yes** ☐ **No** ☐ **Partial**

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

NOTE: The actions listed below were performed as part of the previous permit's compliance schedule actions.

PMP Actions Condition of Previous Permit	Compliance
Maintain mercury effluent concentrations at or below interim limit of 6.8 ng/L	☒ **Yes** ☐ **No**
Implement mercury PMP Plan	☒ **Yes** ☐ **No**
Submit annual progress reports (2018 through 2022)	☒ **Yes** ☐ **No**
	☐ **Yes** ☐ **No**