

Permit Fact Sheet

General Information

Permit Number	WI-0020460-10-0
Permittee Name and Address	Port Washington City 450 N Lake Street, Port Washington, WI 53074
Permitted Facility Name and Address	Port Washington WWTF 450 Lake Street, Port Washington
Permit Term	October 01, 2026 to September 30, 2031
Discharge Location	North of the Port Washington Harbor, approximately 200 yards east of the mouth of Sauk Creek (Lat: 43.21482° N Long: -88.27980° W)
Receiving Water	Lake Michigan of Sheboygan River Basin in Ozaukee County
Stream Flow (Q _{7,10})	0 cfs, 10:1 dilution
Stream Classification	Cold Water Community; Public Water Supply; Recreational Use
Discharge Type	Existing and Continuous
Annual Average Design Flow (MGD)	3.1 MGD
Industrial or Commercial Contributors	Kleen Test Manufacturing and Givaudan
Plant Classification	Advanced; A1 - Suspended Growth Processes; B - Solids Separation; C - Biological Solids/Sludges; P - Total Phosphorus; D - Disinfection; L - Laboratory; SS - Sanitary Sewage Collection System
Approved Pretreatment Program?	N

Facility Description

The City of Port Washington operates an activated sludge wastewater treatment facility. The facility services a population of approximately 12,000 people and accepts domestic holding tank waste, septic tank waste and landfill leachate. Raw wastewater is lifted 20 feet by three large screw pumps where it then passes through ½ inch bar screens. From the screens the wastewater flows through two grit removal units. The screenings and grit material are hauled to a landfill for disposal. Ferrous chloride is added to the wastewater to add in phosphorus removal before flowing to the aeration basins. The wastewater then flows from the aeration basins to two clarifiers. The final effluent undergoes UV disinfection before being discharged to the Port Washington Harbor of Lake Michigan.

There is a blending channel that goes from preliminary treatment, around secondary treatment, to UV disinfection. Blending flow is measured by a magnetic meter.

Liquid, class B sludge is treated by polymer addition, gravity belt thickener, and anaerobic digestion. A 3-grab sludge sample is taken at the sludge pump valve before the hauling truck. Sludge is land applied directly by contract hauler onto DNR approved sites.

BLENDING- The permittee has requested blending approval to continue as part of their permit application. Based on an evaluation of their request and associated documentation, blending is conditionally approved per s. NR 210.12(2), Wis. Adm. Code.

Substantial Compliance Determination

After a desk top review of all discharge monitoring reports, CMARs, land app reports, compliance schedule items, and a site visit on August 8, 2025, this facility has been found to be in substantial compliance with their current permit.

Compliance determination made by Curt Nickels, Compliance Engineer on August 29, 2025.

Sample Point Descriptions

Sample Point Designation		
Sample Point Number	Discharge Flow, Units, and Averaging Period	Sample Point Location, Waste Type/Sample Contents and Treatment Description (as applicable)
701	1.21 MGD (2025)	INFLUENT: 24-hour flow proportional composite samples shall be collected from the influent channel in the upper headworks building prior to bar screen. Flow shall be measured at the parshall flume in the headworks building.
001	1.37 MGD (2025)	EFFLUENT: 24-hour flow proportional composite samples shall be collected in the UV building just prior to UV disinfection. Grab samples and temperature data shall be collected after UV disinfection from the effluent channel. Flow shall be measured via Endress Hauser Transit Time Flow Meter at the final outfall pipe, prior to UV disinfection.
002	265 Tons (2025 Permit Application)	Class B, anaerobically digested liquid sludge. Representative samples shall be collected from the sludge pump valve after thorough mixing of the onsite liquid storage tank and prior to hauling and land application.
101	Last Occurrence: 8/10/2025	BLENDING: Sample point for reporting diverted flow from primary clarifiers during high flow events. Flow bypasses the aeration basins and final clarifiers but receives disinfection prior to discharge. Amount blended is measured by magnetic meter. The permittee shall notify the Department when blending occurs. See 'Blending' requirements in the Standard Requirements section of the permit.
110	N/A	FIELD BLANK: Collect a Mercury field blank using standard sample handling procedures.
120	N/A	Monitor Arsenic in the City Water Intake (Water Supply from Lake Michigan)

Permit Requirements

1 Influent – Monitoring Requirements

1.1 Sample Point Number: 701- INFLUENT PLANT

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow Rate		MGD	Daily	Continuous	
BOD5, Total		mg/L	5/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total		mg/L	5/Week	24-Hr Flow Prop Comp	
Mercury, Total Recoverable		ng/L	Quarterly	24-Hr Flow Prop Comp	See Mercury Monitoring section.

Changes from Previous Permit:

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

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 Inplant - Monitoring and Limitations

2.1 Sample Point Number: 101- BLENDING

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow Rate		MGD	Per Occurrence	Continuous	Blending flow is measured by magnetic flow meter. See Blending Flow section.
Time		hours	Per Occurrence	Calculated	Report the total duration of blending within a given day (12:00am - 11:59pm) in which blending occurs. See Blending Flow section.

Changes from Previous Permit:

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

Explanation of Limits and Monitoring Requirements

Blending – To measure flow diverted around secondary treatment during high flow events when blending occurs. During high flow events, excess flows are routed around the aeration basin and final clarifier and recombined prior to disinfection with fully treated effluent prior to discharge. Monitoring of diverted flows will track the volume of wastewater diverted and inform future efforts to prevent the discharge of partially treated wastewater. This information is required to be submitted on the DMR according to s. NR 210.12(6), Wis. Adm. Code.

2.2 Sample Point Number: 110- 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 Mercury Monitoring section

Changes from Previous Permit:

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

Explanation of Limits and Monitoring Requirements

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

2.3 Sample Point Number: 120- City Water Intake

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Arsenic, Total Recoverable		ug/L	Quarterly	Grab	See sample monitoring and analysis section.

Changes from Previous Permit:

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

Explanation of Limits and Monitoring Requirements

Total Recoverable Arsenic: A strong correlation between background data and facility effluent data suggests that effluent discharge concentrations of arsenic are due to the presence of arsenic in source water. Due to a limited amount of data, untreated drinking water intake and effluent monitoring for total recoverable arsenic is included. A separate sample

point for drinking water intake is included to allow for data reporting and retrieval. Pursuant to s. NR 106.07(6)(a), Wis. Adm. Code, the permittee shall perform effluent monitoring required in the permit using an acceptable analytical methodology for total recoverable arsenic in ch. NR 219, Wis. Adm. Code, which produces the lowest limit of detection and limit of quantification possible.

Data will be used to illustrate the local arsenic cycle and determine if condition of s. NR 106.06(6) (b) 1-5, Wis. Adm. Code, are met. Monitoring will occur quarterly to provide enough information by the next permit reissuance to determine if continued monitoring and/or a water quality-based effluent limit is necessary for total recoverable arsenic. Arsenic samples shall be analyzed using a highly sensitive but acceptable method unless not possible, using the most sensitive approved method.

3 Surface Water - Monitoring and Limitations

3.1 Sample Point Number: 001- EFFLUENT

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow Rate		MGD	Daily	Continuous	
BOD5, Total	Weekly Avg	45 mg/L	5/Week	24-Hr Flow Prop Comp	
BOD5, 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	
Suspended Solids, Total	Monthly Avg	30 mg/L	5/Week	24-Hr Flow Prop Comp	
pH Field	Daily Max	9.0 su	Daily	Grab	
pH Field	Daily Min	6.0 su	Daily	Grab	
Nitrogen, Ammonia (NH3-N) Total	Daily Max	23 mg/L	5/Week	24-Hr Flow Prop Comp	
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	23 mg/L	5/Week	24-Hr Flow Prop Comp	
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	23 mg/L	5/Week	24-Hr Flow Prop Comp	October-March
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	20 mg/L	5/Week	24-Hr Flow Prop Comp	April-May
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	14 mg/L	5/Week	24-Hr Flow Prop Comp	June-September
Fecal Coliform	Geometric Mean - Monthly	400 #/100 ml	2/Week	Grab	October-April
E. coli	Geometric Mean -	126 #/100 ml	2/Week	Grab	May-September

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
	Monthly				
E. coli	% Exceedance	10 Percent	Monthly	Calculated	May-September. See the E. coli Percent Limit section. Enter the result in the DMR on the last day of the month.
Chloride		mg/L	Monthly	24-Hr Flow Prop Comp	Monitoring only in 2030
Mercury, Total Recoverable		ng/L	Quarterly	Grab	Monitoring only. See Mercury Monitoring section.
Arsenic, Total Recoverable		ug/L	Quarterly	24-Hr Flow Prop Comp	Arsenic shall be analyzed with an approved method under NR 219 with the lowest limit of detection. See Sample Analysis section.
PFOS		ng/L	1/ 2 Months	Grab	Monitoring only. See PFOS/PFOA Minimization Plan Determination of Need schedule.
PFOA		ng/L	1/ 2 Months	Grab	Monitoring only. See PFOS/PFOA Minimization Plan Determination of Need schedule.
Phosphorus, Total	Monthly Avg	0.9 mg/L	5/Week	24-Hr Flow Prop Comp	
Phosphorus, Total	6-Month Avg	0.6 mg/L	5/Week	24-Hr Flow Prop Comp	
Temperature Maximum		deg F	3/Week	Continuous	Monitoring only in 2030
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.

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Acute WET		TUa	See Listed Qtr(s)	24-Hr Flow Prop Comp	Annual in rotating quarters. See 'WET Testing' section.
Chronic WET	Monthly Avg	11 TUc	See Listed Qtr(s)	24-Hr Flow Prop Comp	Annual in rotating quarters. See 'WET Testing' section.

Changes from Previous Permit

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

- **pH** – Monitoring frequency updated.
- **Nitrogen, Ammonia Total** – Monitoring frequency updated.
- **Chloride** – Monitoring in 2030 added.
- **Mercury** – Interim limit and variance conditions removed from the permit.
- **PFOS and PFOA** – Monitoring once every two months is included in the permit in accordance with s. NR 106.98(2)(b), Wis. Adm. Code.
- **Phosphorus, Total** – 6-month average added.

Explanation of Limits and Monitoring Requirements

Detailed discussions of limits and monitoring requirements can be found in the attached water quality-based effluent limits (WQBEL) memo dated April 14, 2026.

Monitoring Frequencies- The Monitoring Frequencies for Individual Wastewater Permits guidance (April 12, 2021) recommends that standard monitoring frequencies be included in individual wastewater permits based on the size and type of the facility, in order to characterize effluent quality and variability, to detect events of noncompliance, and to ensure consistency in permits issued across the state. Guidance and requirements in administrative code were considered when determining the appropriate monitoring frequencies for pollutants that have final effluent limits in effect during this permit term. pH and Ammonia were updated to match the standard for facilities of similar sizes. Monitoring frequencies for other parameters remain at the minimum as Port Washington has good compliance history, little variation, and an actual flow in a category lower than their design flow.

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

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 phosphorus. Current data shows that Port Washington can consistently meet a six-month average limit of 0.6 mg/L, which has been added to the current permit. The six-month average should be averaged during the months of May – October and November – April.

Chloride – Monthly monitoring in 2030 was added to ensure that 11 sample results are available at the next permit issuance to meet the data requirements of s. NR 106.85, Wis. Adm. Code.

Mercury – Port Washington’s actual flow is greater than 1.0 MGD so the mercury influent, effluent and field blank monitoring requirements for Major WWTFs in Subchapter III, NR 106.145, Wis. Adm. Code, apply. Mercury effluent and

field blank data generated during the previous permit term were evaluated for sampling and analysis requirements in accordance with ss. NR 106.145 (9) and (10), Wis. Adm. Code. The 30-day Upper 99th percentile (30-day P99) of effluent results calculated using the procedures in s. NR 106.05(5), Wis. Adm. Code, was less than the calculated limit, so a limit is not necessary (see WQBEL memo). The permit requires Port Washington to continue quarterly influent, field blank and effluent monitoring. The previous variance limit of 3.8 ng/L is no longer needed and has been removed. The permittee's success in implementing a Pollutant Minimization Program designed to minimize mercury influent to the plant shall continue.

PFOS and PFOA – NR 106 Subchapter VIII – Permit Requirements for PFOS and PFOA Dischargers became effective on August 1, 2022. At the first reissuance of a WPDES permit after August 1, 2022, the new rule requires WPDES permits for major municipal dischargers with an average flow rate greater than 1 MGD but less than 5 MGD, at a minimum sample effluent once every two-months for PFOS and PFOA pursuant s. NR 106.98(2)(b), Wis. Adm. Code.

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

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

4 Land Application - Monitoring and Limitations

Municipal Sludge Description						
Sample Point	Sludge Class (A or B)	Sludge Type (Liquid or Cake)	Pathogen Reduction Method	Vector Attraction Method	Reuse Option	Amount Reused/Disposed (Dry Tons/Year)
002	B	Liquid	Anaerobic Digestion	Injection	Land Application	265
Does sludge management demonstrate compliance? Yes						
Is additional sludge storage required? No						
Is Radium-226 present in the water supply at a level greater than 2 pCi/liter? No						
If yes, special monitoring and recycling conditions will be included in the permit to track any potential problems in landapplying sludge from this facility						
Is a priority pollutant scan required? No, flow < 5 MGD						
Priority pollutant scans are required once every 10 years at facilities with design flows between 5 MGD and 40 MGD, and once every 5 years if design flow is greater than 40 MGD.						

4.1 Sample Point Number: 002- ANAEROBIC SLUDGE

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

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
PFAS Dry Wt			Annual	Grab	Perfluoroalkyl and Polyfluoroalkyl Substances based on updated DNR PFAS List. See PFAS Permit Sections for more information.

Changes from Previous Permit:

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

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

Explanation of Limits and Monitoring Requirements

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

PFAS- The presence and fate of PFAS in municipal and industrial sludges is an emerging public health concern. EPA has developed a draft risk assessment to determine future land application rates and released this risk assessment in January of 2025. The department is evaluating this new information. Until a decision is made, the “Interim Strategy for Land Application of Biosolids and Industrial Sludges Containing PFAS” should be followed

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

5 Schedules

5.1 Mercury Pollutant Minimization Program

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;	01/31/2027

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.	
Annual Mercury Progress Report #2: Submit a mercury progress report, related to the pollutant minimization activities for the previous year, as defined above.	01/31/2028
Annual Mercury Progress Report #3: Submit a mercury progress report, related to the pollutant minimization activities for the previous year, as defined above.	01/31/2029
Annual Mercury Progress Report #4: Submit a mercury progress report, related to the pollutant minimization activities for the previous year, as defined above.	01/31/2030
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 permit term 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. 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.	01/31/2031
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 Schedule

A schedule is included in the permit as this is the first permit term for Port Washington following a permit term with a mercury variance. While no mercury limit is required (see WQBEL memo) the permittee must continue to maintain the mercury PMPs.

5.2 PFOS/PFOA Minimization Plan Determination of Need

Required Action	Due Date
Report on Effluent Discharge: Submit a report on effluent PFOS and PFOA concentrations and include an analysis of trends in monthly and annual average PFOS and PFOA concentrations. This analysis should also include a comparison to the applicable narrative standard in s. NR 102.04(8)(d), Wis. Adm. Code. This report shall include all additional PFOS and PFOA data that may be collected including any influent, intake, in-plant, collection system sampling, and blank sample results.	09/30/2027
Report on Effluent Discharge and Evaluation of Need: Submit a final report on effluent PFOS and PFOA concentrations and include an analysis of trends in monthly and annual average PFOS and PFOA concentrations of data collected over the last 24 months. The report shall also provide a comparison on the likelihood of the facility needing to develop a PFOS/PFOA minimization plan. This report shall include all additional PFOS and PFOA data that may be collected including any influent, intake, in-plant, collection system sampling, and blank sample results. The permittee shall also submit a request to the department to evaluate the need for a PFOS/PFOA minimization plan. If the Department determines a PFOS/PFOA minimization plan is needed based on a reasonable potential evaluation, the permittee will be required to develop a minimization plan for Department approval no later than 90 days after written notification was sent from the Department. The Department will modify or revoke and reissue the permit to include PFOS/PFOA minimization plan reporting requirements along with a schedule of compliance to meet WQBELs. Effluent monitoring of PFOS and PFOA shall continue as specified in the permit until the modified permit is issued. If, however, the Department determines there is no reasonable potential for the facility to discharge PFOS or PFOA above the narrative standard in s. NR 102.04(8)(d), Wis. Adm. Code, no further action is required and effluent monitoring of PFOS and PFOA shall continue as specified in the permit.	09/30/2028

Explanation of Schedule

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

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

5.3 Land Application Management Plan

A management plan is required for the land application system.

Required Action	Due Date
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	09/30/2027

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; 9) address contingency plans for adverse weather and odor/nuisance abatement; and 10) include any other pertinent information. Once approved, all land spreading 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

An up-to-date Land Application Management Plan is required that documents how the permittee will manage the land application of biosolids consistent with ch. NR 204, Wis. Adm. Code.

Attachments

Water Quality Based Effluent Limits dated 4/14/2026

Justification Of Any Waivers From Permit Application Requirements

No waivers requested or granted as part of this permit reissuance

Prepared By: Marissa Fleege Wastewater Specialist

Date: 6/18/2026

Date Modified Post Fact Check: 7/28/2026

Date Modified Post Public Notice:

CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: 04/14/2026

TO: Marissa Fleege – SER

FROM: Nicole Krueger – SER *Nicole Krueger*

SUBJECT: Water Quality-Based Effluent Limitations for Port Washington Wastewater Treatment Facility
WPDES Permit No. WI-0020460-10

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 Port Washington Wastewater Treatment Plant in Ozaukee County. This municipal wastewater treatment facility (WWTF) discharges to Lake Michigan. 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			45 mg/L	30 mg/L		1
TSS			45 mg/L	30 mg/L		1
pH	9.0 s.u.	6.0 s.u.				1
Ammonia Nitrogen						3
April – May	23 mg/L		23 mg/L	20 mg/L		
June – September	23 mg/L		23 mg/L	14 mg/L		
October – March	23 mg/L		23 mg/L	23 mg/L		
Bacteria						1,4
Fecal Coliform				400 #/100 mL		
October – April				geometric mean		
<i>E. coli</i>				126 #/100 mL		
May – September				geometric mean		
Chloride						5
Mercury						2,6
Arsenic						1,2,7
PFOS and PFOA						8
Phosphorus				0.9 mg/L	0.6 mg/L	
Temperature						1,2
TKN, Nitrite+Nitrate, and Total Nitrogen						1,9
Acute WET						10,11
Chronic WET				11 TUc		10,11

Footnotes:

1. No changes from the current permit.
2. Monitoring only.

3. Additional limits to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Codes, are included in bold.
4. Bacteria limits apply year round. Additional limit: No more than 10 percent of *E. coli* bacteria samples collected in any calendar month may exceed 410 count/100 mL.
5. Monitoring at a frequency to ensure that 11 samples are available at the next permit issuance.
6. A pollutant minimization program is recommended to continue for mercury.
7. Monitoring of the untreated drinking water intake (water supply from Lake Michigan) is also recommended. Samples should be evaluated using a highly sensitive method.
8. PFOS and PFOA monitoring is recommended at a frequency of once every two months in accordance with s. NR 106.98(2), Wis. Adm. Code.
9. As recommended in the Department's October 1, 2019 Guidance for Total Nitrogen Monitoring in Wastewater Permits, quarterly total nitrogen monitoring is recommended for all municipal major permittees. Sections 283.37(5) and 283.55(1)(e), Wis. Stats, and ss. NR 200.065(1)(g) and NR 200.065(1)(h), Wis. Adm. Codes, provide the authority to request this monitoring during the permit term. Total Nitrogen is the sum of nitrate (NO₃), nitrite (NO₂), and total Kjeldahl nitrogen (TKN) (all expressed as N).
10. Annual acute and chronic WET testing is recommended. The Instream Waste Concentration (IWC) to assess chronic test results is 9%. According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), chronic testing shall be performed using a dilution series of 100%, 30%, 10%, 3% & 1%. The primary control water used in chronic WET tests conducted on Outfall 001 shall be a grab sample collected from Lake Michigan.
11. Sampling WET concurrently with any chemical-specific toxic substances is recommended. Tests should be done in rotating quarters, to collect seasonal information about this discharge. Testing should continue after the permit expiration date (until the permit is reissued).

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

Attachments (4) – Narrative, Outfall Map, 2021 Ammonia Calculations, & Thermal Tables

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Attachment #1
**Water Quality-Based Effluent Limitations for
Port Washington Wastewater Treatment Facility**

WPDES Permit No. WI-0020460-10

Prepared by: Nicole Krueger

PART 1 – BACKGROUND INFORMATION

Facility Description

The City of Port Washington operates an activated sludge wastewater treatment facility with a 3.1 MGD annual average design flow. The treatment facility services a population of approximately 12,000 people with two industrial contributors. Port Washington's wastewater treatment facility also accepts domestic holding tank waste, septic tank waste and landfill leachate. Raw wastewater is lifted 20 feet by three large screw pumps where it then passes through ½ inch bar screens. From the screens the wastewater flows through two grit removal units. The screenings and grit material are hauled to a landfill for disposal. Ferrous chloride is added to the wastewater to add in phosphorus removal before flowing to the aeration basins. The wastewater then flows from the aeration basins to two clarifiers. The final effluent undergoes UV disinfection before being discharged to the Port Washington Harbor of Lake Michigan.

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

Existing Permit Limitations

The current permit, expiring on March 31, 2026, includes the following effluent limitations and monitoring requirements.

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Footnotes
Flow Rate					1
BOD ₅			45 mg/L	30 mg/L	2,3
TSS			45 mg/L	30 mg/L	2,3
pH	9.0 s.u.	6.0 s.u.			2
Ammonia Nitrogen					4
April – May	23 mg/L		23 mg/L	20 mg/L	
June – September	23 mg/L		23 mg/L	14 mg/L	
October – March	23 mg/L		23 mg/L	23 mg/L	
Bacteria					
Fecal Coliform				400 #/100 mL	5
October – April				geometric mean	
<i>E. coli</i>				126 #/100 mL	5,6
May – September				geometric mean	
Mercury	3.8 ng/L				7
Phosphorus				0.9 mg/L	
Arsenic					1
TKN, Nitrite+Nitrate, and Total Nitrogen					1

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Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Footnotes
Acute WET					8
Chronic WET				11 TUc	8

Footnotes:

1. Monitoring only.
2. These limitations are not being evaluated as part of this review. Because the water quality criteria (WQC), reference effluent flow rates, and receiving water characteristics have not changed, limitations for these water quality characteristics do not need to be re-evaluated at this time.
3. These limits are based on the Cold Water (CW) community of the receiving water as described in s. NR 210.05(1), Wis. Adm. Code.
4. 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.
5. Bacteria limits are effective year round. The *E. coli* limits became effective 05/01/2025.
6. Additional limit: No more than 10 percent of *E. coli* bacteria samples collected in any calendar month may exceed 410 count/100 mL.
7. This is an alternative limit for the mixing zone phase out exemption.
8. Annual acute and chronic WET testing is required in the current permit. The IWC for chronic WET was 9%.

Receiving Water Information

- Name: Lake Michigan
- Waterbody Identification Code (WBIC): 20
- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code: Cold Water (CW) community, public water supply.
- Flow: A ten-to-one dilution ratio will be used for calculating effluent limitations based on chronic or long-term impacts, in accordance with s. NR 106.06(4)(b)2, Wis. Adm. Code, because the receiving water does not exhibit a unidirectional flow at the point of discharge.
- Hardness = 136 mg/L as CaCO₃. This value represents the geometric mean of data from 08/24/2021 – 06/04/2024 from chronic WET testing.
- Source of background concentration data: Metals data from Lake Michigan is used for this evaluation. 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: PWGS discharges noncontact cooling water to Lake Michigan approximately 500 feet south of the municipality's outfall. This outfall is considered in the evaluation of temperature limits but will not impact the limits for any of the other pollutants.
- Impaired water status: Lake Michigan is 303(d) listed as impaired for mercury and PCBs.

Effluent Information

- Design flow rate(s):
Annual average = 3.1 million gallons per day (MGD)
For reference, the actual average flow from 05/01/2021 – 02/28/2026 was 1.35 MGD.
- Hardness = 290 mg/L as CaCO₃. This value represents the geometric mean of four samples collected in March 2025 which were reported on the permit application.
- Acute dilution factor used in accordance with s. NR 106.06(3)(c), Wis. Adm. Code: Not applicable – this facility does not have an approved Zone of Initial Dilution (ZID).

Attachment #1

- Wastewater source: Domestic wastewater with 2 industrial contributors: Kleen Test Products and Givaudan.
- Water supply: Municipality waterworks from Lake Michigan.
- Additives: Port Washington has included 1 additive in the permit application that has the potential to be present in Outfall 001. These additives are listed below:
 - Kemira PIX-201 – ferrous chloride: phosphorus removal
 - An additive review is not necessary for any additives where either the toxicity is well documented and understood, can be controlled by a WQBEL, or are not believed to be present in the discharge. This is the case upon initial review of the listed additives. Therefore, an additive review is not needed at this time.
- Effluent characterization: This facility is categorized as a major municipal, so the permit application required effluent sample analyses for all the “priority pollutants” except for the Dioxins and Furans as specified in s. NR 200.065, Table 1, Wis. Adm. Code. The permit-required monitoring for ammonia, phosphorus, mercury, and arsenic is used in this evaluation.
- Effluent data for substances for which a single sample was analyzed is shown in the tables in Part 2, in the column titled “MEAN EFFL. CONC.”. Otherwise, substances with multiple effluent data are shown in the tables below or in their respective parts in this evaluation.

Copper Effluent Data

Sample Date	Copper (µg/L)	Sample Date	Copper (µg/L)	Sample Date	Copper (µg/L)
03/10/2025	3.7	03/25/2025	8.1	04/07/2025	20.5
03/13/2025	7.4	03/28/2025	14.9	04/09/2025	10.4
03/18/2025	5.3	03/31/2025	14.2	04/11/2025	10.7
03/21/2025	8.6	04/03/2025	19.6		
1-day P ₉₉ = 29.7 µg/L					
4-day P ₉₉ = 19.1 µg/L					

Chloride data from the most recent three permit applications are summarized here in order to have at least 11 available samples to calculate P₉₉'s:

Chloride Effluent Data

Sample Date	Chloride (mg/L)	Sample Date	Chloride (mg/L)	Sample Date	Chloride (mg/L)
01/07/2015	545	03/16/2020	238	03/10/2025	358
01/13/2015	492	03/24/2020	278	03/13/2025	524
01/15/2015	494	03/31/2020	232	03/18/2025	339
04/08/2015	426	04/07/2020	791	03/25/2025	423
1-day P ₉₉ = 921 mg/L					
4-day P ₉₉ = 644 mg/L					

Arsenic Data

	Arsenic µg/L
1-day P ₉₉	1.50
4-day P ₉₉	1.04
30-day P ₉₉	0.75
Mean*	0.61

Attachment #1

	Arsenic µg/L
Std	0.27
Sample size	18
Range	<11 – 1.58

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

Mercury Data

	Mercury ng/L
1-day P ₉₉	2.54
4-day P ₉₉	1.64
30-day P ₉₉	1.19
Mean	0.97
Std	0.47
Sample size	18
Range	0.34 – 2.2

The following table presents the average concentrations and loadings at Outfall 001 from 05/01/2021 – 02/28/2026 for all parameters with limits in the current permit to meet the requirements of s. NR 201.03(6), Wis. Adm. Code:

Parameters with Effluent Limits

	Average Measurement
BOD ₅	9.5 mg/L
TSS	6.6 mg/L
pH field	6.9 s.u.
Ammonia Nitrogen	1.55 mg/L*
Fecal Coliform	19.7 #/100 mL**
<i>E. coli</i>	44.0 #/100 mL**
Phosphorus	0.52 mg/L
Mercury	0.97 ng/L

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

** The average measurement for bacteria is calculated as a geometric mean. Values reported below the LOD are replaced with a value of 1 for the calculation of the geometric mean.

**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. Adm. 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.

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

Where:

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

Q_s = 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).

Q_e = 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

C_s = 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 not the case for Port Washington, and the limits are set based on two times the acute toxicity criteria.

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

Daily Maximum Limits based on Acute Toxicity Criteria (ATC)

10:1 dilution

SUBSTANCE	REF. HARD.* mg/L	ATC	MEAN BACK- GRD.	MAX. EFFL. LIMIT**	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	1-day P ₉₉	1-day MAX. CONC.
Arsenic		340	1.34	680				1.50
Cadmium	290	14.8	0.01	29.6	5.91	<0.15		
Chromium	290	4312	0.49	825	1725	1.4		
Copper	290	42.4	0.44	84.7			29.7	20.5
Lead	290	299	0.05	598	120	<0.24		
Mercury (ng/L)***		830	0.33	830			2.54	2.2
Nickel	268	1080		2161	432	8.9		
Zinc	290	305	0.39	611	122	29.2		

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SUBSTANCE	REF. HARD.* mg/L	ATC	MEAN BACK- GRD.	MAX. EFFL. LIMIT**	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	1-day P ₉₉	1-day MAX. CONC.
Chloride (mg/L)		757		1514			921	791

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

** The 2 × ATC method of limit calculation yields a more restrictive limit than 10:1 dilution

*** A mixing zone is not allowed for discharges of bioaccumulating compounds of concern (BCCs) in the Great Lakes system as described in s. NR 106.06(2)(br), Wis. Adm. Code.

Weekly Average Limits based on Chronic Toxicity Criteria (CTC)

10:1 dilution

SUBSTANCE	REF. HARD. mg/L	CTC	MEAN BACK- GRD.	WEEKLY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	4-day P ₉₉
Arsenic		148	1.34	1615			1.04
Cadmium	136	3.13	0.01	34.3	6.9	<0.15	
Chromium	136	111	0.49	1215	243	1.4	
Copper	136	13.5	0.44	144			19.1
Lead	136	37.7	0.05	414	82.8	<0.24	
Mercury (ng/L)*		440	0.33	440			1.64
Nickel	136	67.7		745	149	8.9	
Zinc	136	158	0.39	1729	346	29.2	
Chloride (mg/L)		395		4345			644

* A mixing zone is not allowed for discharges of bioaccumulating compounds of concern (BCCs) in the Great Lakes system as described in s. NR 106.06(2)(br), Wis. Adm. Code.

Monthly Average Limits based on Wildlife Criteria (WC)

10:1 dilution

SUBSTANCE	WC	MEAN BACK- GRD.	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	30-day P ₉₉
Mercury (ng/L)*	1.3	0.33	1.3			1.19

* A mixing zone is not allowed for discharges of bioaccumulating compounds of concern (BCCs) in the Great Lakes system as described in s. NR 106.06(2)(br), Wis. Adm. Code.

Monthly Average Limits based on Human Threshold Criteria (HTC)

10:1 dilution

SUBSTANCE	HTC	MEAN BACK- GRD.	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	30-day P ₉₉
Antimony	5.6		62	12.3	0.29	
Cadmium	4.4	0.01	48	9.7	<0.15	
Chromium (+3)	100	0.49	1095	219	1.4	
Lead	10	0.05	110	21.9	<0.24	
Mercury (ng/L)*	1.5	0.33	1.5			1.19

Attachment #1

Nickel	100	1100	220	8.9
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* A mixing zone is not allowed for discharges of bioaccumulating compounds of concern (BCCs) in the Great Lakes system as described in s. NR 106.06(2)(br), Wis. Adm. Code.

Monthly Average Limits based on Human Cancer Criteria (HCC)

10:1 dilution

SUBSTANCE	HCC	MEAN BACK- GRD.	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Arsenic	0.2	1.34	0.2		0.75

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

Conclusions and Recommendations

Based on a comparison of the effluent data and calculated effluent limitations, effluent limitations are required for arsenic. Limits and/or monitoring recommendations are made in the paragraphs below:

Chloride – Considering available effluent data from the most recent three permit applications, the 1-day P₉₉ chloride concentration is 921 mg/L, and the 4-day P₉₉ of effluent data is 644 mg/L.

These effluent concentrations are below the calculated WQBELs for chloride, therefore no effluent limits are needed. **Chloride monitoring is recommended to ensure that 11 sample results are available at the next permit issuance to meet the data requirements of s. NR 106.85, Wis. Adm. Code.**

Arsenic – The 30-day P₉₉ is 0.75 µg/L, which is above the human cancer criteria of 0.2 µg/L. The current permit requires city water intake and effluent monitoring of arsenic, shown in the table below.

Arsenic Data

	City Water Intake µg/L		Effluent Arsenic µg/L
08/04/2021	0.87	08/04/2021	0.67
11/09/2021	0.79	11/09/2021	0.48
01/10/2022	0.89	01/10/2022	0.34
05/03/2022	0.82	05/03/2022	0.77
08/02/2022	0.82	08/08/2022	0.50
11/08/2022	1.00	11/08/2022	0.61
01/10/2023	0.82	01/10/2023	0.52
05/09/2023	0.70	05/09/2023	0.64
09/13/2023	0.89	09/13/2023	0.66
11/07/2023	0.82	12/06/2023	<11
02/12/2024	0.85	02/12/2024	0.54
05/07/2024	0.76	05/07/2024	0.49

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	City Water Intake µg/L		Effluent Arsenic µg/L
08/14/2024	0.92	08/14/2024	0.85
12/03/2024	0.72	12/03/2024	0.70
03/04/2025	0.76	03/04/2025	1.58
05/06/2025	0.75	05/06/2025	0.51
08/12/2025	0.71	08/12/2025	0.60
11/04/2025	1.12	11/04/2025	0.56
Average	0.83	Average	0.61

Section NR 106.06(6), Wis. Adm. Code, allows a facility to demonstrate that a pollutant present in intake water, which is passed through the facility and discharged does not cause, have the reasonable potential to cause, or contribute to the excursion of water quality criteria in the receiving water. The demonstration has five conditions, all of which must be met:

1. The permittee withdraws 100 percent of its intake water containing the substance from the same body of water into which the discharge is made;
2. The permittee does not contribute any additional mass of the substance to the wastewater;
3. The permittee does not alter the substance chemically or physically in a manner that would cause adverse water quality impacts to occur that would not occur if the pollutants were left in-stream;
4. The permittee does not increase the concentration at the edge of the mixing zone, or at the point of discharge if a mixing zone is not allowed, as compared to the concentration in the intake water, unless the increased concentration does not cause or contribute to an excursion above an applicable water quality standard; and
5. The timing and location of the discharge would not cause adverse water quality impacts to occur that would not occur if the identified intake pollutant were left instream.

All conditions are met for Port Washington, so arsenic limits are not recommended in the reissued permit. **Monitoring of the untreated drinking water intake (water supply from Lake Michigan) and effluent should be continued in the reissued permit** so the conditions described in s. NR 106.06(6), Wis. Adm. Code can be supported in the next issuance. Samples should be evaluated using a highly sensitive method so that reasonable potential can be determined at the next issuance.

Mercury – The WQBEL for total recoverable mercury is set equal to the most stringent criterion of 1.3 ng/L, according to s. NR 106.06(6), Wis. Adm. Code.

The current permit requires monthly monitoring of the influent and effluent for total recoverable mercury. A total of 52 effluent sampling results are available from 08/10/2021 – 11/04/2025 for total recoverable mercury. The average concentration was 0.97 ng/L, and the maximum was 2.2 ng/L. Because the 30-day P₉₉ of available data (1.19 ng/L) is less than the most stringent WQBEL of 1.3 ng/L, **no WQBEL for mercury is required for permit reissuance.**

Port Washington currently has an alternative mercury effluent limit of 3.8 ng/L based on the 1-day P₉₉ from the previous WQBEL evaluation. They had requested an exception to the mixing zone phase-out for mercury per 40 CFR, Part 132, Appendix F, Procedure 3 C. 6. Over the current permit term, Port Washington has decreased their effluent mercury through source reduction measures and no longer have

reasonable potential for a WQBEL. Therefore, they are no longer eligible for an alternative effluent limit and the daily maximum limit is recommended to be removed. **It's recommended that PMPs continue in the reissued permit so that the effluent loading does not increase.**

Mercury monitoring is recommended for permit reissuance to determine if mercury limits are needed in the next reissuance.

Antidegradation and Antibacksliding

Since current treatment capability and PMP/SRM measures are expected to remain in place, the removal of the daily maximum mercury alternative limit will not increase the concentration, level, or loading of mercury to Lake Michigan. Therefore, antidegradation would not be applicable. To be consistent with antibacksliding requirements, the current limit may be removed in accordance with s. NR 207.12(4)(b), Wis. Adm. Code.

PFOS and PFOA – The need for PFOS and PFOA monitoring is evaluated in accordance with s. NR 106.98(2), Wis. Adm. Code. Available monitoring sample data from Port Washington Waterworks (PWS ID: 24600543) is provided in the table below:

Water Supply PFAS Data			
Sample Date	Sample ID	PFOS (ng/L)	PFOA (ng/L)
06/22/2022	626928001	1.77	ND
01/17/2023	CB00538-01	2.1	2.3
04/11/2023	CB03508-01	1.9	1.8
Average		1.92	1.37

The limited data above shows the municipal water supply is above 1/5th of the applicable PFOS criteria but below 1/5th of the applicable PFOA criteria. Based on the effluent flow rate and known levels of PFOS/PFOA in the source water, **PFOS and PFOA monitoring is recommended at a once every two months frequency.**

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

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

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

Daily Maximum Limits based on Acute Toxicity Criteria (ATC)

Daily maximum limitations are based on acute toxicity criteria in ch. NR 105, Wis. Adm. Code, which are a function of the effluent pH and the receiving water classification. The 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 = 0.275 and B = 39.0 for a Cold-Water Category 1 fishery, and
 pH (s.u.) = that characteristic of the effluent.

The effluent pH data was examined as part of this evaluation. A total of 1259 sample results were reported from 05/04/2021 – 02/27/2026. The maximum reported value was 7.5 s.u. (Standard pH Units). The effluent pH was 7.4 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 7.5 s.u. The mean plus the standard deviation multiplied by a factor of 2.326, an estimate of the upper ninety ninth percentile for a normally distributed dataset, is 7.5 s.u. Therefore, a value of 7.5 s.u. is believed to represent the maximum reasonably expected pH, and therefore most appropriate for determining daily maximum limitations for ammonia nitrogen. Substituting a value of 7.5 s.u. into the equation above yields an ATC = 13 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	27
1-Q ₁₀	146

The 2×ATC method yields the most stringent limits for Port Washington.

This limit is greater than the current daily maximum limit of 23 mg/L. If Port Washington would like to request an increase to the existing permit limits an assessment of their effluent data consistent with the requirements of ss. NR 207.04(1)(a) and (c), Wis. Adm. Code, must be provided. This evaluation is on a parameter by parameter basis and includes consideration of operations, maintenance and temporary upsets. Without a demonstration of need for a higher limit in accordance with s. NR 207.04, Wis. Adm. Code, the current limits must be continued in the reissued permit. The highest reported value was 42 mg/L. However, this was reported during a blending event due to an extreme rain event, so the effluent wastewater was only partially treated and not representative of normal conditions. All other data reported during the permit term was less than the current daily maximum limit of 23 mg/L. The Department would be unable to increase the limit due to the lack of need as shown via the antidegradation rule (ch. NR 207, Wis. Adm. Code). **No changes are recommended for the daily maximum limit.**

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

The weekly and monthly average ammonia nitrogen limits calculation from the previous memo do not change because there have been no changes in the effluent and receiving water flow rates. The calculations from the previous WQBEL memo are shown in Attachment #3.

Effluent Data

The following table evaluates the statistics based upon ammonia data reported from 05/03/2021 – 02/26/2026. Data reported during the extreme rainfall event in August 2025 was not included in this evaluation because it is not representative of normal treatment conditions.

Ammonia Nitrogen Effluent Data

Ammonia Nitrogen mg/L	April - May	June - September	October - March
1-day P ₉₉	9.13	7.02	7.65
4-day P ₉₉	4.97	3.80	4.19
30-day P ₉₉	2.39	1.98	2.32
Mean*	1.35	1.23	1.54
Std	1.98	1.46	1.57
Sample size	78	171	248
Range	<0.11 - 13.6	<0.11 - 8.8	<0.11 - 12.8

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

Reasonable Potential

The permit currently has daily maximum, weekly average, and monthly average limits year-round. 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.

Conclusions and Recommendations

In summary, after rounding to two significant figures, the following ammonia nitrogen limitations are recommended. No mass limitations are recommended in accordance with s. NR 106.32(5), Wis. Adm. Code. Limits to meet the requirements in s. NR 106.07, Wis. Adm. Code, are denoted in bold text.

Final Ammonia Nitrogen Limits

	Daily Maximum mg/L	Weekly Average mg/L	Monthly Average mg/L
April & May	23	23	20
June – September	23	23	14
October – March	23	23	23

PART 4 – PHOSPHORUS

The current permit has a monthly average phosphorus limit of 0.9 mg/L.

Technology-Based Effluent Limit

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

Since Port Washington has a monthly average phosphorus limit in effect that is more stringent than 1.0 mg/L, the need for a TBEL will not be considered further.

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(5)(b) specifies that a total phosphorus criterion of 7 µg/L (0.007 mg/L) applies for the open and nearshore water of Lake Michigan. For direct discharges to Lake Michigan such as Port Washington, s. NR 217.13(4), Wis. Adm. Code, states that the Department shall set effluent limits consistent with nearshore or whole lake models approved by the Department. In the absence of an approved model, **a WQBEL of 0.6 mg/L as a six-month average is recommended.**

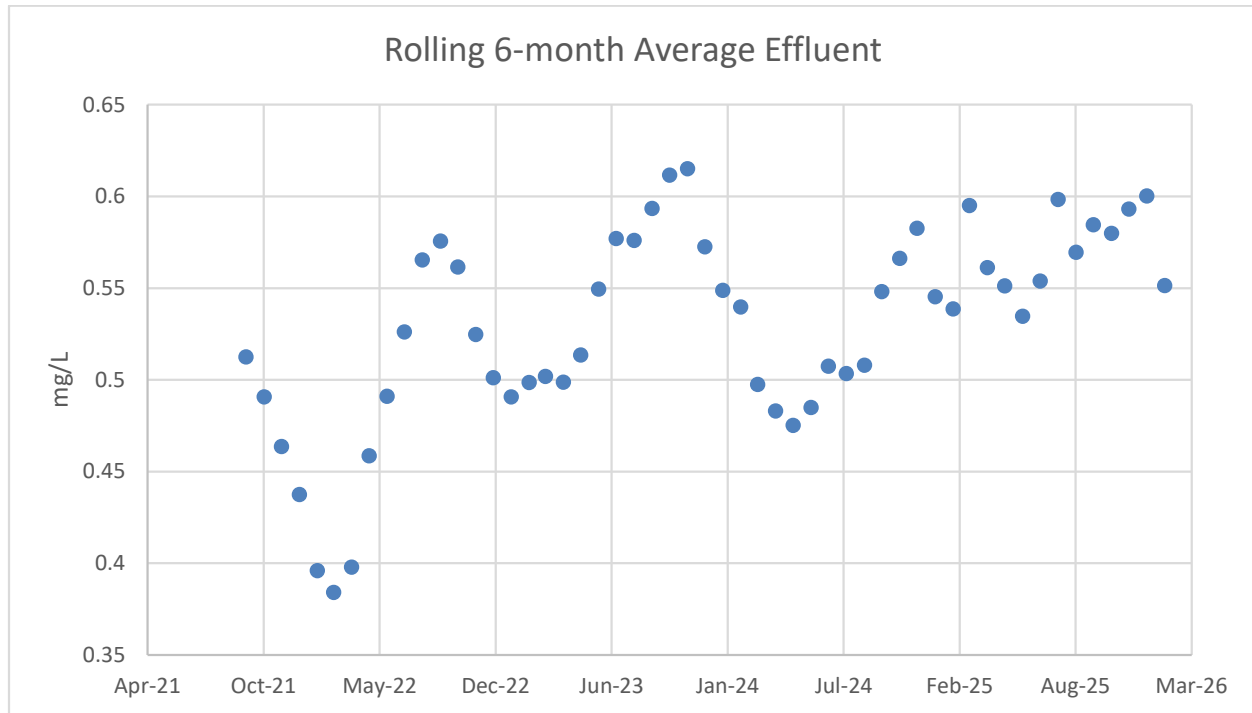
Effluent Data

The following table summarizes effluent total phosphorus monitoring data from 05/02/2021 – 02/26/2026.

Total Phosphorus Effluent Data

	Phosphorus mg/L
1-day P ₉₉	1.34
4-day P ₉₉	0.87
30-day P ₉₉	0.64
Mean	0.52
Std	0.25
Sample size	1259
Range	0.02 - 4.83

The rolling 6-month average effluent results are graphed below:



There were two incidences of rolling six-month averages that exceeded 0.6 mg/L during the current permit term. The data shows that Port Washington can consistently meet the six-month average limit of 0.6 mg/L, and it is recommended in the reissued permit. The six-month average should be averaged during the months of May – October and November – April. **A short compliance schedule may be included in the reissued permit as well.**

PART 5 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR THERMAL

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

In accordance with s. NR 106.53(2)(b), Wis. Adm. Code, the highest daily maximum flow rate for a calendar month is used to determine the acute (daily maximum) effluent limitation. In accordance with s. NR 106.53(2)(c), Wis. Adm. Code, the highest 7-day rolling average flow rate for a calendar month is used to determine the sub-lethal (weekly average) effluent limitation. These values were based off actual flow reported from 05/01/2021 – 02/28/2026.

The table below summarizes the maximum temperatures reported during monitoring from 01/01/2024 – 12/30/2024.

Monthly Temperature Effluent Data & Limits

Month	Port Washington WWTF (3.1 MGD)		Calculated Effluent Limit		PWGS (473 MGD)	
	Representative Highest Monthly Effluent Temperature				Representative Highest Monthly Effluent Temperature	
	Weekly Maximum (°F)	Daily Maximum (°F)	Daily Maximum Effluent Limitation (°F)	Daily Maximum Effluent Limitation (°F)	Weekly Maximum (°F)	Daily Maximum (°F)
JAN	52	52	44	72	67	70
FEB	51	52	47	70	66	72
MAR	52	52	53	72	68	70
APR	55	56	60	71	68	75
MAY	54	56	66	73	74	79
JUN	64	64	71	74	79	81
JUL	69	70	72	75	87	91
AUG	72	72	70	76	91	113
SEP	72	73	65	75	90	106
OCT	68	70	58	75	82	85
NOV	65	65	49	73	71	75
DEC	57	57	45	72	66	69

The Port Washington WWTF discharge is to the Port Washington harbor. Wisconsin Electric – Port Washington Generating Station (“PWGS”) (Permit No. WI-0000922) discharges approximately 400 to 500 feet southeast of the WWTP outfall so the thermal plumes overlap. The thermal tables for Port Washington WWTF and PWGS are shown in Attachment #4.

Shown in the summary table above, the effluent temperature from PWGS is greater than the effluent temperature from Port Washington. The average flow rate from PWGS at 473 MGD (03/01/2021 – 02/28/2026) is over 150 times greater than Port Washington’s flow rate of 3.1 MGD. And the effluent temperatures from PWGS are significantly higher than those at Port Washington. These comparisons suggest that the effluent from PWGS has a greater thermal effect in the harbor compared to Port Washington. If Port Washington were to have temperature limits in their permit, they would be unable to perform a dissipative cooling study because of the existence of PWGS’s discharge to the harbor.

PWGS currently has an alternate effluent limit (AEL) for temperature per s. NR 106.74, Wis. Adm. Code. In June 2012, “Port Washington Generating Station Thermal Impact Assessment in Support of an Alternative Effluent Limitation” (updated in 2020) was submitted to request an alternative thermal limitation. This report suggests that “no prior appreciable harm” to the biological community is expected to occur in Port Washington Harbor or Lake Michigan as a result of the current thermal discharge from PWGS and that the alternate effluent thermal limitation was approved for the facility. The modeled and measured thermal plume in the harbor includes the area where Outfall 001 discharges from Port Washington.

Based on the reasons above, **no effluent limits are recommended for temperature. Monitoring is recommended to continue in the reissued permit to compare to the PWGS temperature data in the future.**

PART 6 – WHOLE EFFLUENT TOXICITY (WET)

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

- Acute tests predict the concentration that causes lethality of aquatic organisms during a 48 to 96-hour exposure. To assure that a discharge is not acutely toxic to organisms in the receiving water, WET tests must produce a statistically valid LC₅₀ (Lethal Concentration to 50% of the test organisms) greater than 100% effluent, according to s. NR 106.09(2)(b), Wis. Adm Code.
- Chronic tests predict the concentration that interferes with the growth or reproduction of test organisms during a seven-day exposure. To assure that a discharge is not chronically toxic to organisms in the receiving water, WET tests must produce a statistically valid IC₂₅ (Inhibition Concentration) greater than the instream waste concentration (IWC), according to s. NR 106.09(3)(b), Wis. Adm Code. The IWC is an estimate of the proportion of effluent to total volume of water (receiving water + effluent). The **IWC of 9%**, shown in the WET Checklist summary below, was calculated according to the following equation, as specified in s. NR 106.03(6), Wis. Adm Code:

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

The IWC is 9% based on dilution of 10 parts lake water to 1-part effluent, as specified in s. NR 106.06(4)(b)2, Wis. Adm. Code, or a factor of 1 in 11 to calculate the IWC.

- According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), a synthetic (standard) laboratory water may be used as the dilution water and primary control in acute WET tests, unless the use of different dilution water is approved by the Department prior to use. The primary control water must be specified in the WPDES permit.
- According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), receiving water must be used as the dilution water and primary control in chronic WET tests, unless the use of different dilution water is approved by the Department prior to use. The dilution water used in WET tests conducted on Outfall 001 shall be a grab sample collected from the receiving water location, upstream and out of the influence of the mixing zone and any other known discharge. The specific receiving water location must be specified in the WPDES permit.
- Shown below is a tabulation of all available WET data for Outfall 001. Efforts are made to ensure that decisions about WET monitoring and limits are made based on representative data, as specified in s. NR 106.08(3), Wis. Adm Code. Data which is not believed to be representative of the discharge was not included in reasonable potential calculations. The table below differentiates between tests used and not used when making WET determinations. Significant changes were made to WET test methods in 2004 and these changes were assumed to be fully implemented by certified labs by no later than June 2005. Data prior to July 1, 2005 has been excluded from the reasonable potential evaluation.

Attachment #1
WET Data History

Date Test Initiated	Acute Results LC ₅₀ %				Chronic Results IC ₂₅ %			
	<i>C. dubia</i>	Fathead minnow	Pass or Fail?	Used in RP?	<i>C. dubia</i>	Fathead Minnow	Pass or Fail?	Use in RP?
07/07/2005	>100	>100	Pass	Yes	>100	>100	Pass	Yes
10/19/2006	>100	>100	Pass	Yes	>100	>100	Pass	Yes
10/23/2012	>100	>100	Pass	Yes	>100	>100	Pass	Yes
08/20/2013	>100	>100	Pass	Yes	>100	>100	Pass	Yes
06/14/2016	>100	>100	Pass	Yes	>100	>100	Pass	Yes
03/21/2017	>100	>100	Pass	Yes	18	>100	Pass	Yes
07/31/2018	>100	>100	Pass	Yes	>100	>100	Pass	Yes
10/22/2019	>100	>100	Pass	Yes	>100	>100	Pass	Yes
06/09/2020	>100	>100	Pass	Yes	>100	>100	Pass	Yes
08/24/2021	>100	>100	Pass	Yes	>100	>100	Pass	Yes
03/22/2022	>100	>100	Pass	Yes	>100	>100	Pass	Yes
10/10/2023	>100	>100	Pass	Yes	>100	>100	Pass	Yes
06/04/2024	>100	>100	Pass	Yes	>100	>100	Pass	Yes

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

Acute Reasonable Potential = [(TU_a effluent) (B)(AMZ)]

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

According to s. NR 106.08(6)(d), Wis. Adm. Code, TU_a and TU_c effluent values are equal to zero whenever toxicity is not detected (i.e. when the LC₅₀, IC₂₅ or IC₅₀ ≥ 100%).

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

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

Chronic WET Limit Parameters

TU _c (maximum) 100/IC ₂₅	B (multiplication factor from s. NR 106.08(6)(c), Wis. Adm. Code, Table 4)	IWC
100/18 = 5.56	6.2 Based on 1 detect	9%

$$[(TU_c \text{ effluent}) (B)(IWC)] = 3.1 > 1.0$$

Therefore, reasonable potential is shown for chronic WET limits using the procedures in s. NR 106.08(6), Wis. Adm. Code, and representative data from 07/07/2005 – 06/04/2024.

Expression of WET limits

Chronic WET limit = $[100/IWC] TU_c = 11 TU_c$ expressed as a monthly average

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

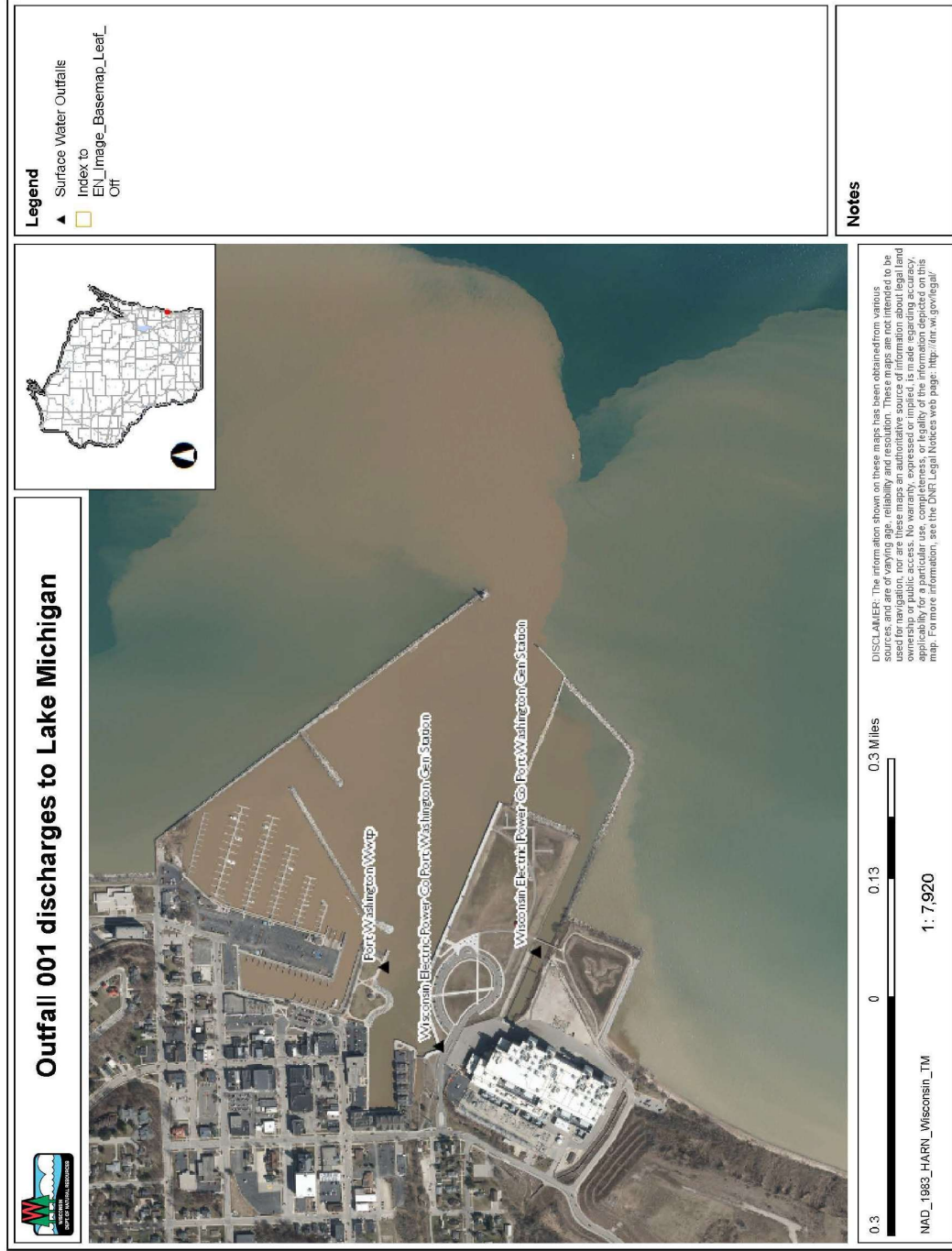
WET Checklist Summary

	Acute	Chronic
AMZ/IWC	Not Applicable. 0 Points	IWC = 9%. 0 Points
Historical Data	13 tests used to calculate RP. No tests failed. 0 Points	13 tests used to calculate RP. 0 tests failed. 0 Points
Effluent Variability	Little variability, no violations or upsets, consistent WWTF operations. 0 Points	Same as Acute. 0 Points
Receiving Water Classification	Coldwater community. 5 Points	Same as Acute. 5 Points
Chemical-Specific Data	No reasonable potential for limits based on ATC; Ammonia nitrogen limit carried over from the current permit. Arsenic, chromium, copper, mercury, nickel, zinc, chloride, and ammonia detected. Additional Compounds of Concern: Antimony 5 Points	No reasonable potential for limits based on CTC; Ammonia nitrogen limit carried over from the current permit. Arsenic, chromium, copper, mercury, nickel, zinc, chloride, and ammonia detected. Additional Compounds of Concern: Antimony 5 Points
Additives	1 Water Quality Conditioner (ferrous chloride) added. Permittee has proper P chemical SOPs in place: Yes 1 Point	Additive is used more than once per 4 days. 1 Point
Discharge Category	2 Industrial Contributors. 6 Points	Same as Acute. 6 Points
Wastewater Treatment	Secondary or better. 0 Points	Same as Acute. 0 Points

Attachment #1

	Acute	Chronic
Downstream Impacts	No impacts known 0 Points	Same as Acute. 0 Points
Total Checklist Points:	17 Points	16 Points
Recommended Monitoring Frequency (from Checklist):	1x yearly	1x yearly
Limit Required?	No	Yes Limit = 11 TU _c
TRE Recommended? (from Checklist)	No	No

- After consideration of the guidance provided in the Department's *WET Program Guidance Document* (2022) and other information described above, annual acute and chronic WET tests are recommended in the reissued permit. Sampling WET concurrently with any chemical-specific toxic substances is recommended. Tests should be done in rotating quarters, to collect seasonal information about this discharge. Testing should continue after the permit expiration date (until the permit is reissued).
- According to the requirements specified in s. NR 106.08, Wis. Adm. Code, a chronic WET limit is required. The chronic WET limit shall be expressed as 11 TU_c as a monthly average in the effluent limits table of the permit.
- A minimum of annual chronic monitoring is required because a chronic WET limit is required. Federal regulations in 40 CFR Part 122.44(i) require that monitoring occur at least once per year when a limit is present.
- A minimum of annual acute and chronic monitoring is recommended because Port Washington is a major municipal discharger with a design flow greater than 1.0 MGD. Federal regulations at 40 CFR Part 122.21(j) require at least 4 acute and chronic WET tests with each permit application on samples collected since the previous reissuance. Therefore, annual monitoring is recommended in the permit term, so that data will be available for the next permit application.



Attachment #3
2021 Ammonia Limits Calculations

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 = 0.275 and B = 39.0 for a Cold-Water Category 1 fishery, and
pH (s.u.) = that characteristic of the effluent.

The effluent pH data was examined as part of this evaluation. A total of 1149 sample results were reported from 01/01/2016 to 05/31/2020. The maximum reported value was 7.7 s.u. (Standard pH Units). The effluent pH was 7.5 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 7.6 s.u. and the mean plus the standard deviation multiplied by a factor of 2.33, an estimate of the upper ninety ninth percentile for a normally distributed dataset, is 7.5 s.u. Therefore, a value of 7.6 s.u. is believed to represent the maximum reasonably expected pH, and therefore most appropriate for determining daily maximum limitations for ammonia nitrogen. Substituting a value of 7.6 s.u. into the equation above yields an ATC = 11.4 mg/L and an effluent limit of 23 mg/L based on 2 times the ATC.

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

Weekly and monthly average limits based on chronic toxicity criteria for ammonia are also calculated to determine the weekly and monthly average limits to meet the requirements of s. NR 106.07(3), Wis. Adm. Code.

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 for a Cold-Water Community is calculated by the following equation, according to subchapter IV of NR 106, Wis. Adm. Code.

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

Where:

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

E = 0.854,

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

T = the temperature (°C) of the receiving water

The 4-day criterion is equal to the 30-day criterion multiplied by 2.5. The 4-day criteria are used to derive weekly average limitations, and the 30-day criteria are used to derive monthly average limitations, both by a mass-balance using a ten-to-one dilution ratio.

Since minimal ambient data is available, the “default” basin assumed values are used for Temperature, pH and background ammonia concentrations, shown in the table below, with the resulting criteria and effluent limitations.

Attachment #3

		Spring	Summer	Winter
		April & May	June – Sept.	Oct. - March
Effluent Flow	Qe (MGD)	3.1	3.1	3.1
Background Information	Ammonia (mg/L)	0.04	0.05	0.105
	Average Temperature (°C)	11	16	4
	Maximum Temperature (°C)	13	18	9
	pH (s.u.)	8.18	8.25	8.05
	Dilution factor	10	10	10
Criteria mg/L	4-day Chronic	4.63	3.35	5.65
	30-day Chronic	1.85	1.34	2.26
Effluent Limits mg/L	Weekly Average	50.5	36.4	61.1
	Monthly Average	20.0	14.3	23.8

Effluent Data

The following table evaluates the statistics based upon ammonia data reported from 01/01/2016 to 05/31/2020, with those results being compared to the calculated limits to determine the need to include ammonia limits in the Port Washington WWTP permit for the respective month ranges. That need is determined by calculating 99th upper percentile (or P₉₉) values for ammonia during each of the month ranges and comparing the daily maximum values to the daily maximum limit. Based on this comparison, limits are not required for any month.

Ammonia Nitrogen mg/L	April - May	June - September	October - March
1-day P ₉₉	6.9	6.0	22.5
4-day P ₉₉	3.7	3.3	13.0
30-day P ₉₉	1.80	1.72	5.62
Mean	1.01	1.08	2.57
Std	1.48	1.25	5.31
Sample size	87	138	234
Range	0.1 – 11.6	0.1 – 7.4	0.1 – 58.3

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.

Expression of Limits:

Revisions to ch. NR 106, Wis. Adm. Code, in September 2016 aligned Wisconsin's WQBELs with 40 CFR § 122.45(d), which specifies that effluent limits for continuous dischargers must be expressed as weekly and monthly averages for publicly owned treatment works and as daily maximums and monthly averages for all other dischargers, unless shown to be impracticable. Because a daily maximum ammonia limit is necessary for Port Washington WWTP, weekly and monthly average limits are also required under this code revision.

Attachment #3

The methods for calculating limitations for municipal treatment facilities to conform to 40 CFR 122.45(d) are specified in s. NR 106.07(3), Wis. Adm. Code, and are as follows:

Whenever 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 average limits for each season are equal to the daily maximum limit of 23 mg/L because the calculated weekly average limits are higher than the calculated daily maximum limit. The monthly average limit for October – March is also set equal to the daily maximum limit of 23 mg/L because the calculated monthly average limit is higher than the calculated daily maximum limit. The monthly limit recommended for April & May is the calculated limit of 20 mg/L and the monthly limit recommended for June – September is the calculated limit of 14 mg/L.

Conclusions and Recommendations:

In summary, after rounding to two significant figures, the following ammonia nitrogen limitations are recommended. No mass limitations are recommended in accordance with s. NR 106.32(5), Wis. Adm Code.

	Daily Maximum mg/L	Weekly Average mg/L	Monthly Average mg/L
April & May	23	23	20
June – September	23	23	14
October – March	23	23	23

Temperature limits for receiving waters without unidirectional flow
(calculation using default ambient temperature data)

Facility:	Port Washington WWTF	Lake Type:	Lake Michigan waters - Sc	Temp Dates	01/01/24	Flow Dates	05/01/21
Outfall(s):	001	Discharge Type:	Great Lakes harbor discharge	Start:	12/30/24	End:	02/28/26
Date Prepared:	3/23/2026	Maximum area of mixing zone allowed (coefficient "A"):					
Design Flow (Qe):	3.1 MGD	15,708 ft ²					

Month	Water Quality Criteria			Representative Highest Effluent Flow Rate (Qe)		B e ^{-a} (for SL-WQBEL)	e ^{-a} (for A-WQBEL)	Representative Highest Effluent Temperature		Calculated Effluent Limit	
	Ta (default) (°F)	Sub-Lethal WQC (°F)	Acute WQC (°F)	7-day Rolling Average (Qesl) (MGD)	Daily Maximum Flow Rate (Qea) (MGD)			Weekly Average (°F)	Daily Maximum (°F)	Weekly Average Effluent Limitation (°F)	Daily Maximum Effluent Limitation (°F)
JAN	35	43	69	2.57	2.91	0.405	0.919	52	52	44	72
FEB	34	46	69	2.69	7.38	0.405	0.922	51	52	47	70
MAR	37	52	70	3.03	4.27	0.405	0.931	52	52	53	72
APR	43	59	70	3.72	6.53	0.405	0.943	55	56	60	71
MAY	48	65	72	3.14	5.69	0.405	0.933	54	56	66	73
JUN	54	70	73	3.36	5.83	0.405	0.937	64	64	71	74
JUL	59	71	74	2.06	2.66	0.405	0.900	69	70	72	75
AUG	63	70	76	4.87	8.95	0.555	0.948	72	72	70	76
SEP	60	64	74	1.74	2.58	0.555	0.861	72	73	65	75
OCT	53	57	73	1.53	2.49	0.405	0.867	68	70	58	75
NOV	45	49	71	1.87	2.98	0.405	0.890	65	65	49	73
DEC	38	44	70	2.11	3.44	0.405	0.902	57	57	45	72

Temperature limits for receiving waters without unidirectional flow

(calculation using default ambient temperature data)

Facility:

PWGS

Outfall(s):

001

Date Prepared:

3/23/2026

Design Flow (Qe):

473 MGD

Lake Type:

Lake Michigan waters - Sci

Discharge Type:

Great Lakes harbor discharge

Temp Dates

03/01/21

Start:

03/01/21

Flow Dates

03/01/21

End:

02/28/26

Maximum area of mixing zone allowed
(coefficient "A"):

15,708

ft²

Month	Water Quality Criteria			Representative Highest Effluent Flow Rate (Qe)		B		e ^{-a}		Representative Highest Effluent Temperature		Calculated Effluent Limit	
	Ta (default)	Sub-Lethal WQC	Acute WQC	7-day Rolling Average (Qesl)	Daily Maximum Flow Rate (Qea)		e ^{-a} (for SL-WQBEL)	e ^{-a} (for A-WQBEL)	Weekly Average	Daily Maximum	Weekly Average Effluent Limitation	Daily Maximum Effluent Limitation	
													(°F)
JAN	35	43	69	434.70	519.80	0.405	1.000	1.000	67	70	43	69	
FEB	34	46	69	351.72	351.76	0.405	0.999	0.999	66	72	46	69	
MAR	37	52	70	399.93	609.25	0.405	0.999	1.000	68	70	52	70	
APR	43	59	70	353.25	353.31	0.405	0.999	0.999	68	75	59	70	
MAY	48	65	72	697.21	731.19	0.405	1.000	1.000	74	79	65	72	
JUN	54	70	73	738.33	767.94	0.405	1.000	1.000	79	81	70	73	
JUL	59	71	74	740.54	764.21	0.405	1.000	1.000	87	91	71	74	
AUG	63	70	76	740.48	746.95	0.555	1.000	1.000	91	113	70	76	
SEP	60	64	74	718.92	749.62	0.555	1.000	1.000	90	106	64	74	
OCT	53	57	73	719.31	753.01	0.405	1.000	1.000	82	85	57	73	
NOV	45	49	71	703.70	706.08	0.405	1.000	1.000	71	75	49	71	
DEC	38	44	70	368.68	461.28	0.405	0.999	1.000	66	69	44	70	