

Permit Fact Sheet

General Information

Permit Number	WI-0070726-10-0
Permittee Name and Address	BNSF Railway Company 3701 East Itasca Street, Superior, WI 54880
Permitted Facility Name and Address	BNSF Railway Company 1835 N 42nd St Superior, WI 54880
Permit Term	October 01, 2026 to September 30, 2031
Discharge Location	001 - A ravine approximately 750 feet southeast of the intersection of E. 10 th Street and 39 th Avenue E. 003 – The outfall shall be along the Nemadji River in a location approved as part of the plan and specification review and approval
Receiving Water	An unnamed tributary to the Nemadji River and the Nemadji River, within the St. Louis and Lower Nemadji Watershed in the Lake Superior Drainage Basin, Douglas County
Stream Flow (Q _{7,10})	Unnamed tributary – 0 cfs; Nemadji River – 32 cfs
Stream Classification	Unnamed tributary – Warm Water Forage Fish community Nemadji River – Warm Water Sport Fish community Both are within the ceded territory, non-public water supply and recreational use
Wild Rice Impacts	Unnamed tributary – No impacts identified. Wild rice has been observed in the off-channel wetlands downstream of the tributary but has not yet been added to the inventory. Nemadji River – No impacts identified. Wild rice has been observed in the off-channel wetlands downstream but has not yet been added to the inventory for the Nemadji River. Allouez Bay downstream has reports of limited wild rice.
Discharge Type	Seasonal discharges

Facility Description

BNSF Railway Company (formerly Burlington Northern and Sante Fe Railroad) operates a taconite trans-shipment facility at Allouez, Wisconsin. The taconite is received by rail and stored on site until it can be shipped out by vessel. Stormwater and dust suppression water runoff from the taconite piles are treated in settling ponds that discharge via Outfall 001 to an unnamed tributary to the Nemadji River. The permittee has indicated that they may choose to work through facility planning, the plan review process and construction to change the outfall location from the unnamed tributary to the Nemadji River to a direct discharge to the Nemadji River. This outfall would be designated as 003 will ultimately replace Outfall 001. Discharges to the receiving water(s) has expanded to year-round to provide operational flexibility, but historically the discharge season has been limited to the warm weather months of April through October.

Stormwater coming into contact with petroleum products is treated by passing through a grit chamber and oil/water separator, then stored in a concrete lagoon until it is directed to the settling ponds that discharge to Outfall 001 or eventually 003.

Grit is stored in the grit chamber and separated oil is stored in an on-site holding tank until hauled to final disposal or recycling. Discharges to surface water only occur during the warm weather months of April through October.

Stormwater discharge from the facility is regulated under Tier 1 Industrial Stormwater requirements. A Stormwater Pollution Prevention Plan (SWPPP) has been created and implemented by the permittee. It identifies the sources of storm

water and non-stormwater contamination to the stormwater drainage system; identifies and prescribes appropriate best management practices to prevent stormwater contamination from occurring and to reduce pollutants in contaminated storm water prior to discharge to a surface water (which can include bringing non-stormwater discharges under the WPDES permit or removing them from the stormwater drainage system) and includes a schedule to ensure that the actions within the SWPPP are carried out and evaluated on a regular basis. There are three stormwater discharge points that have been identified: SW-2 (previously 002) discharges to Allouez Bay. This discharge point was abandoned after construction of a berm to block discharges, but there is the potential to discharge in large precipitation events; SW-3 (previously 003) discharges to wetlands and eventually to Buff Creek; SW-4 (previously 004) discharges to wetlands on the property which eventually reaches Allouez Bay.

Substantial Compliance Determination

Enforcement During Last Permit: There have been minor violations associated with effluent limits, erroneous reporting, and operator certification expiration. However, the facility has taken the necessary steps to correct their actions and nothing further is required.

After a desktop review of the control document, discharge monitoring reports and operator certification records since the previous inspection (6/22/2023) by Eric de Venecia, WDNR, BNSF Railway Company has been found to be in substantial compliance with their current permit.

Compliance determination made by Eric de Venecia on March 11, 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)
001	EFFLUENT – Flows vary depending on rain events. An average of 30 flow days per year occur. Average – 0.738 MGD Maximum – 6.148 MGD (2021-2025 data)	The discharges to Outfall 001 are limited to the combination of treated petroleum contact water from the oil/water separator with stormwater contaminated by taconite bulk storage piles and associated material handling equipment and activities within the catchment area of the treatment pond. Grab samples shall be taken from manhole 001 located on 39th Avenue East.
003	This is a new outfall this permit term.	The discharges to Outfall 003 are limited to the combination of treated petroleum contact water from the oil/water separator with stormwater contaminated by taconite bulk storage piles and associated material handling equipment and activities within the catchment area of the treatment pond. Grab samples shall be taken from the location approved as part of the plan and specification review and approval.
101	IN PLANT – OIL/WATER SEPARATOR - Locomotives are no longer fueled by fixed fueling and track pans have been removed. Flow is from runoff that has potentially contacted petroleum. Flows vary depending on rain events. Discharge events occur on average of 1.5 days per year typically during	Representative grab samples of treated petroleum contact water shall be collected during the discharge season from the manhole located after the concrete storage lagoon prior to discharge to the collection basin.

Sample Point Designation		
Sample Point Number	Discharge Flow, Units, and Averaging Period	Sample Point Location, Waste Type/Sample Contents and Treatment Description (as applicable)
	October. Average - 33,186 gallons per day Maximum – 62,700 gallons (2021-2025 data)	

Water Intake Structure (WIS)

- Location: “36-inch pipe into a concrete caisson located within Dock #5 on Allouez Bay. The top of the 36-in intake pipe is located approximately 4 feet below the mean water level.
- Intake volume: The design volume of the intake structure is approximately 300,000 gpd; Actual flows are approximately 300,000 gpd (The intake is operated continuously, however, when there is no demand the water is directed back into the caisson.)
- Intake flow velocity: 0.48 fps

Since none of the water withdrawn from Allouez Bay is used for cooling, the facility is exempt from the requirements of ch. NR 111, Wis. Adm. Code. In lieu of these requirements, under s. NR 283.31(6), Wis. Stats., a best professional judgment BTA determinations was made using the Department’s 2020 *Guidance for Evaluating Intake Structures Using Best Professional Judgment*. For existing intake structures, the guidance advises that intakes deemed BTA should fulfill at least one of the following eight criteria:

- Each water intake structure has a maximum design intake velocity of 0.5 feet per second (fps) OR a maximum actual intake velocity of 0.5 fps, demonstrated via measured or calculated values which show the maximum intake velocity as water passes through the intake system, measured perpendicular to the opening, does not exceed 0.5 fps at any point up until the first screen of mesh size 3/8” (or equivalent) or less. (The WIS has a maximum design velocity of 0.48 fps). **BNSF fulfills this criterion.**
- The facility operates a closed-cycle recirculating system that only requires make-up water with > 3 cycles of concentration on at least a daily basis. Cycles of concentration can be measured as the ratio of chloride levels in the recirculated water or blowdown relative to the chloride levels in the source water, or makeup water; or the make-up water volume divided by the blowdown volume (provided there aren’t other water losses); or the blowdown water conductivity divided by the make-up water conductivity.
- The facility operates an intake structure that minimizes impingement rates by nature of its location (e.g. offshore velocity cap).
- The facility employs a system of technologies (e.g. wedge-wire screens, barrier nets; acoustic, light, or pH deterrent systems; variable speed pumps, etc.) that minimize impingement mortality rates.
- The facility operates a modified traveling screen in an optimal manner that does not promote re-impingement or predation of returned organisms.
- The facility’s intake withdraws water at > 0.25 fps less than or equal to 16% of the time.
- There is data indicating that the impingement mortality rate has been/will be reduced 80-95% compared to a once-through cooling system with 3/8” traveling screens;
- There is biological data that affirmatively demonstrates that: 1) the source water body does not include threatened or endangered species in the vicinity of the intake, and 2) there are no aquatic life and water quality problems partly or

solely due to the presence or operation of the intake structure. (A review of the area for threatened and endangered species did not find any T&E occurrences of fish.) **BNSF fulfills this criterion.**

And at least one of the following five criteria:

- The total water withdrawn (actual intake flow) is $\leq 5\%$ of the mean annual flow of the river on which the intake is located (if on a river or stream) OR the total quantity of the water withdrawn is restricted to a level necessary to maintain the natural thermal stratification or turnover patterns (where present) except in cases where the disruption is beneficial (if on a lake or reservoir) (Allouez Bay is part of Lake Superior, the maximum volume (300,000 gpd) is removed April through October (warm weather months) and only when water is needed. This amount would not affect the structure of Allouez Bay or Lake Superior.) **BNSF fulfills this criterion.**
- The facility operates at $< 8\%$ capacity utilization rate (with pumps turned off or, if variable frequency drives exist, down substantially during periods of non-operation) or at full capacity only for portions of days during a few months or less on an annual basis. If located in a spawning area, the period of water intake operation should not correspond with times when spawning, peak egg/larval abundance, or larval recruitment is occurring (depending on species present, usually between April – October).
- The facility operates a closed-cycle recirculating system that only requires make-up water with ≥ 3 cycles of concentration on at least a daily basis. Cycles of concentration can be measured as the ratio of chloride levels in the recirculated water or blowdown relative to the chloride levels in the source water, or makeup water; or the make-up water volume divided by the blowdown volume (provided there aren't other water losses); or the blowdown water conductivity divided by the make-up water conductivity.
- The facility utilizes other means such as variable speed pumps, unit retirements, etc. to decrease entrainment rates by greater than or equal to 60% compared to a once-through cooling system with 3/8" traveling screens. Flow rate may be used as a surrogate for entrainment rates when determining percent reduction.
- There is biological data that affirmatively demonstrates that: 1) the source water body does not include threatened or endangered species in the vicinity of the intake, 2) there are no aquatic life and water quality problems partly or solely due to the presence or operation of the intake structure, and 3) the department biologist concurs that operation of the intake during periods of spawning, peak egg/larval abundance, and larval recruitment will not substantially impact populations or prey bases for the fishery. (A review of the area for threatened and endangered species did not find any T&E occurrences of fish. On January 9, 2019, local fish biologist Paul Piszczek said, "Standard permit conditions can be applied to the proposed work, although installing a boom with 1/8 or 1/4-inch mesh several feet away from the intake (essentially creating an exclusive intake area) would, along with the proposed 0.48 ft/sec intake velocity, reduce impingement and entrainment potential. That area may support young-of-year game species as well as smaller forage fishes such as shiners and minnows.") **BNSF fulfills this criterion.**

And the following criterion:

- The facility-wide design intake flow (DIF) for all water intake structures is ≤ 2 MGD (all intake water, cooling and non-cooling, is included in the determination of whether this DIF threshold is met) OR $< 25\%$ of the total water withdrawn is used exclusively for cooling purposes (water from a public water system, treated effluents, process water, gray water, wastewater, reclaimed water, or water used in a manufacturing process before or after it is used for cooling is not considered cooling water for the purposes of this determination) (All intake water provides water for dust suppression, not as cooling water.) **BNSF fulfills this criterion.**

The facility meets the identified criteria above, so the department has concluded that the existing WIS is considered BTA for minimizing entrainment and impingement mortality.

Permit Requirements

1 Inplant - Monitoring and Limitations

1.1 Sample Point Number: 101- OIL/WATER SEPARATOR WATER

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow Rate		gpd	Weekly	Estimated	
Oil & Grease (Hexane)	Daily Max	15 mg/L	Monthly	Grab	
Suspended Solids, Total	Daily Max	40 mg/L	Monthly	Grab	
BETX, Total		ug/L	Annual	Grab	
PAHs		ug/L	Annual	Grab	

Changes from Previous Permit:

In-plant 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.

Monitoring frequency – The previous permit listed a sample frequency of three times a year taken during the months of April, July and October. Monitoring is required only during periods of discharge, due to infrequent effluent discharge events, monitoring during the specified months may not occur. The frequency was changed mid-term to monthly ensuring at least three sample results per year. The frequency of monthly will be used this permit term as well.

Explanation of Limits and Monitoring Requirements

Fixed locomotion fueling no longer occurs at the facility and the track pans that collected petroleum runoff from the fixed fueling area have been removed from the fueling facility. The pan removal has decreased the flow through the oil & water separator, but it will still treat runoff that has the potential to come into contact with petroleum products such as vehicle wash water from the maintenance building, (contained and transported to the head of that process area) and in case there is ever a need to remove contaminated water from the spill containment area surrounding on-site above ground storage tanks.

Oil & Grease and Suspended Solids - The oil and grease effluent limit is a treatment technology-based limit that reflects the ability of an oil/water separation to easily remove oil and grease. Suspended solids are a concern in the runoff from storage area; it is also a treatment technology-based limit.

BETX and PAHs Monitoring – Acceptable U.S. EPA test methods with limits of detection (LODs) below 750 µg/L for total BETX and 0.1 µg/L for PAHs must be used.

Quarterly inspections of the oil and water separator; periodic removal of accumulated solids and oil & grease; and documentation of recovered waste oil are required. Records must be kept on site.

2 Surface Water - Monitoring and Limitations

2.1 Sample Point Number: 001- COMINGLED DISCHARGE -TRIBUTARY

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow Rate		MGD	Weekly	Estimated	
Suspended Solids, Total	Monthly Avg	20 mg/L	Monthly	Grab	
Suspended Solids, Total	Weekly Avg	30 mg/L	Monthly	Grab	
pH Field	Daily Max	9.0 su	Monthly	Grab	
pH Field	Daily Min	6.0 su	Monthly	Grab	
Phosphorus, Total	Monthly Avg	0.225 mg/L	Monthly	Grab	The interim limit expires 9/30/2030 - See permit section Phosphorus Water Quality-Based Effluent Limitation(s) for more information.
Phosphorus, Total	6-Month Avg	0.075 mg/L	Monthly	Grab	The limit becomes effective 10/1/2030 - See permit section Phosphorus Water Quality-Based Effluent Limitation(s) for more information. Compliance is evaluated every six-months on April 30 and October 31.
Phosphorus, Total	6-Month Avg	0.7 lbs/day	Monthly	Calculated	The limit becomes effective 10/1/2030 - See permit section Phosphorus Water Quality-Based Effluent Limitation(s) for more information. Compliance is evaluated every six-months on April 30 and October 31.
Arsenic, Total Recoverable	Monthly Avg	13 µg/L	Monthly	Grab	The limit becomes effective 10/1/2030. See the permit schedule Copper and Arsenic Pollutant Minimization Program for more information.
Copper, Total Recoverable	Weekly Avg	14 µg/L	Monthly	Grab	The limit becomes effective 10/1/2030. See the permit schedule Copper and

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
					Arsenic Pollutant Minimization Program for more information.
Hardness, Total as CaCO ₃		mg/L	Monthly	Grab	Monitoring shall coincide with metals monitoring.
Cadmium, Total Recoverable		ug/L	Monthly	Grab	Monitoring is required during the 2029 discharge season.
Chlorine, Total Residual		ug/L	Monthly	Grab	Monitoring is required during the 2029 discharge season.
Acute WET		TUa	Annual	Grab	Monitoring is required in 2027 and 2029. See the Whole Effluent Toxicity (WET) testing permit section for more information.
Chronic WET		TUc	Annual	Grab	Annual monitoring through the permit term is required. See the Whole Effluent Toxicity (WET) testing permit section for more information.

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.

- **Discharge Season** – With recent unpredictable weather events and temperature variability, the discharge season to the receiving water has been expanded to year-round which allows for greater operational flexibility. Historically discharges have been limited to the warm weather months of April through October.
- **Receiving Water Classification** - To provide consistency in the application of limits across facilities and to appropriately protect aquatic life, the DNR is systematically reviewing stream classifications for waters that receive discharges from WPDES-permitted facilities. Reviews focus on sites where a permit is scheduled for reissuance and where questions have been identified regarding the appropriate receiving water’s classification. Based on the survey conducted on September 20, 2023 and June 12, 2024, it was determined that calculating limits based on a limited aquatic life (LAL) community is no longer protective of the existing or the attainable aquatic life community. The receiving water has been classified as a Warm Water Forage Fish (WWFF) community and effluent limitations have been recalculated using this updated use designation. For more information on the methods used to review stream classifications and calculate limits see the “Burlington Northern-Santa Fe (BNSF), Unnamed tributary (no WBIC) to Nemadji River (WBIC 2835300)” survey dated February 21, 2025, and the Water Quality-Based Effluent Limits memo.

- **Monitoring frequency** – The previous permit listed a sample frequency of three times a year taken during the months of April, July and October. Monitoring is required only during periods of discharge, due to infrequent effluent discharge events, monitoring during the specified months may not occur. The frequency was changed mid-term to monthly ensuring at least three sample results per year. The frequency of monthly will be used this permit term as well.
- **Phosphorus** – Monitoring will continue this permit term. Based on the change in the receiving water classification limits are applicable this permit term. Final six-month average limits of 0.075 mg/l and 0.7 lbs/day will become effective at the end of the Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus permit schedule. Until that time an interim limit of 0.225 mg/L as a monthly average is effective.
- **Arsenic and Copper** - Based on available data, limits are required to be protective of water quality. The permittee shall implement a Pollution Minimization Program so that the water quality-based effluent limitations for Copper – weekly average of 14 ug/L and Arsenic – monthly average of 13 ug/L can be met by the end of the Outfall 001 - Copper and Arsenic Pollutant Minimization Program schedule.
- **Hardness** – Monitoring is required this permit term and shall coincide with metals monitoring.
- **Cadmium and Chlorine** – Cadmium and Chlorine monitoring is required in 2029 in preparation for the next permit reissuance.
- **Acute and Chronic** – The monitoring frequency for Whole Effluent Toxicity (WET) testing has changed from once during the permit term to twice for Acute testing and annual for Chronic tests.

Explanation of Limits and Monitoring Requirements

Detailed discussions of limits and monitoring requirements can be found in the attached Water Quality-Based Effluent Limitations for the BNSF Railway Company WPDES Permit No. WI-0070726-10-0 memo dated March 7, 2025.

Chlorine – The Limit Memo dated March 7, 2025 recommended a chlorine daily maximum of 19 ug/L and a weekly average of 7.3 ug/L. The Department sent a letter to BNSF Railway Company dated 01/30/2026 regarding the recommended chlorine WQBELs. In response to multiple meetings and discussions with the facility a permit decision was documented in the letter, the daily maximum chlorine limit of 38 µg/L was not recommended during the future permit term. Monthly chlorine monitoring is required for at least 1 year during the discharge season to determine the need to include chlorine limits in future permit reissuances.

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. The department has determined at this time that the facility meets the guidance and no changes in the monitoring frequency is required this permit term.

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 daily maximum and monthly average limits whenever practicable.

2.2 Sample Point Number: 003- COMBINED DISCHARGE - NEMADJI

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow Rate		MGD	Weekly	Estimated	
Suspended Solids, Total	Monthly Avg	20 mg/L	Monthly	Grab	
Suspended Solids, Total	Weekly Avg	30 mg/L	Monthly	Grab	
pH Field	Daily Max	9.0 su	Monthly	Grab	
pH Field	Daily Min	6.0 su	Monthly	Grab	
Phosphorus, Total		mg/L	Monthly	Grab	
Chlorine, Total Residual		mg/L	Monthly	Grab	Monitoring is required during Outfall 003's first discharge season.
Acute WET		TUa	Annual	Grab	Tests are required during Outfall 003's first two discharge seasons. See the Whole Effluent Toxicity (WET) testing permit section for more information.
Chronic WET		TUc	Annual	Grab	Tests are required during Outfall 003's first two discharge seasons. See the Whole Effluent Toxicity (WET) testing permit section for more information.

Changes from Previous Permit

This is a new outfall this permit term. See additional explanation of limits under “Explanation of Limits and Monitoring Requirements” below.

Explanation of Limits and Monitoring Requirements

Detailed discussions of limits and monitoring requirements can be found in the attached Facility Planning Water Quality-Based Effluent Limitations for the BNSF Railway Company WPDES Permit No. WI-0070726 memo dated May 8, 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. The department has determined at this time that the facility meets the guidance.

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 daily maximum and monthly average limits whenever practicable.

3 Tier 1 Industrial Storm Water - Proposed Monitoring and Limitations Changes from Previous Permit

The language for a Stormwater General Permit for Tier 1 Industrial Facilities continues to be included in the individual WPDES permit, combining the two permits.

The permittee has prepared and implemented a Storm Water Pollution Prevention Plan (SWPPP) for the facility grounds. Submittal of an amended SWPPP is required as a compliance schedule.

The permittee shall continue to:

- Evaluate storm water outfalls for storm water contributions to the storm water drainage system. Note: the stormwater outfalls names have been updated SW-2 (previously 002); SW-3 (previously 003); and SW-4 (previously 004)
- Perform and document the results of the Annual Facility Site Compliance Inspection (AFSCI)
- Perform and document quarterly visual inspections of storm water discharge quality at each storm water discharge outfall.

4 Schedules

4.1 Updated Stormwater Pollution Prevention Plan (SWPPP)

Required Action	Due Date
Management Plan: Update the SWPPP plan in accordance with NR 216.27(3) to reflect the current conditions of the facility grounds.	09/30/2027

Explanation of Schedule

Stormwater Pollution Prevention Plan (SWPPP) - A requirement for a Tier 1 Industrial Facility.

4.2 Outfall 001 - Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus

No later than 30 days following each compliance date, the permittee shall notify the Department in writing of its compliance or noncompliance with the required action. If a submittal is part of the required action then a timely submittal fulfills the written notification requirement.

Required Action	Due Date
Operational Evaluation Report: The permittee shall prepare an operational evaluation report and submit it for Department approval. The report shall include an evaluation of collected effluent data, possible source reduction measures, operational improvements or other minor modifications that would enable compliance with the final phosphorus WQBEL (water quality based effluent limit) or some improved level of effluent quality using the existing wastewater treatment system. If the operational evaluation report concludes that the facility can achieve the final phosphorus WQBELs using the existing treatment system with only source reduction measures, operational improvements or minor facility modifications, the report shall contain a schedule for implementation of the improvements or other report recommendations necessary to meet final phosphorus WQBELs. The implementation schedule shall be based on providing compliance with the final phosphorus WQBEL	09/30/2027

as soon as reasonably possible. Once the report is approved by the Department, the permittee shall take the steps called for in the operational evaluation report and follow the schedule of implementation as approved. If the Department approved report concludes that the facility cannot achieve the phosphorus limit with source reduction measures, operational improvements or other minor facility modifications, the permittee shall initiate a Facility Planning Study and comply with the remaining schedule of compliance. Regardless of the conclusion of the operational evaluation report, the report shall also include a plan and implementation schedule for optimizing the treatment plant's removal of phosphorus during the period prior to complying with the WQBELs. Once the operational evaluation report is approved by the Department, the permittee shall proceed with implementation of the optimization plan and follow the schedule of implementation as approved.	
Facility Plan: The permittee shall submit a Facility Plan that evaluates feasible alternatives for meeting the phosphorus WQBELs. Alternatives may include: upgrading wastewater treatment facilities, selecting the Watershed Adaptive Management Option pursuant to s. NR 217.18, Wis. Adm. Code, using Water Quality Trading in conjunction with or in place of facility upgrading, site-specific water quality criteria development, or a variance from water quality standards pursuant to s. 283.15, Stats.	09/30/2028
Final Plans and Specifications: If the facility plan concluded that upgrading of the permittee's wastewater treatment system is necessary to meet final water quality based effluent limits, submit construction plans and specifications for Department approval.	03/31/2029
Construction Progress Report: Submit a progress report on meeting the final WQBEL for phosphorus.	09/30/2029
Complete Construction: Complete construction of wastewater treatment system upgrades. Comply with the final phosphorus limits.	09/30/2030

Explanation of Schedule

Phosphorus - A compliance schedule is included in the permit to provide time for the permittee to investigate options for meeting the effluent water quality-based effluent limits.

4.3 Outfall 001 - Copper and Arsenic Pollutant Minimization Program

Required Action	Due Date
Plan Development: The permittee shall develop and submit to the Department a plan for a cost-effective pollutant minimization program (PMP) which has as its goal the reduction of copper and arsenic for the purpose of maintaining the effluent at or below the water quality based effluent limitation (Copper – weekly average of 14 ug/L and Arsenic – monthly average of 13 ug/L). The PMP plan shall specify actions to be taken that consist of investigation of treatment technologies and efficiencies, process changes, wastewater reuse or other pollution prevention techniques that are appropriate for that facility, taking account of the permittee's overall treatment strategies, facilities plans and operational circumstances. The plan shall also identify past pollution prevention or minimization efforts implemented by the permittee. The PMP shall also include: 1) An annual review and semi-annual monitoring of potential sources of the pollutant, which may include fish tissue monitoring and other bio-uptake sampling; 2) A control strategy designed to maintain potential sources of the pollutant at levels which will insure compliance with the water quality based effluent limitation; and 3) Implementation schedule to meet the limits as soon as possible. Past documented pollution prevention or treatment may be used to satisfy all or part of this PMP	03/31/2027

requirement.	
NOTE: The Department will notify the permittee of acceptance of or comments on the proposed PMP. If the Department has not notified the permittee within 90 days of the Department's receipt of the PMP, the permittee may assume the PMP has been accepted.	
Status Report: The permittee shall submit to the Department an annual status report that provides: 1) All minimization program monitoring results for the previous year; 2) A list of potential sources of the pollutant; and 3) A summary of all actions taken to reduce or eliminate the identified sources of the pollutant or treatment solutions.	09/30/2027
Annual Status Report: The permittee shall submit to the Department an annual status report.	09/30/2028
Annual Status Report: The permittee shall submit to the Department an annual status report.	09/30/2029
Achieve Compliance: The permittee shall achieve compliance with the water quality-based effluent limits for Copper weekly average for 14 ug/L and Arsenic monthly average of 13 ug/L.	09/30/2030

Explanation of Schedule

Arsenic and Copper - A compliance schedule is included in the permit to work toward compliance with the effluent water quality-based effluent limits.

Attachments

Water Quality-based Effluent Limits (WQBEL) memo dated March 7, 2025

Facility Planning Water Quality-Based Effluent Limitations for the BNSF Railway Company WPDES Permit No. WI-0070726 memo dated May 8, 2026

Justification Of Any Waivers From Permit Application Requirements

No waivers requested or granted as part of this permit reissuance

Prepared By: Sheri A. Snowbank

Wastewater Specialist

Date: July 7, 2026

CORRESPONDENCE/MEMORANDUM**State of Wisconsin**

DATE: March 7, 2025

TO: Sheri Snowbank – NOR/Spooner Service Center

FROM: Michael Polkinghorn – NOR/Rhineland Service Center

SUBJECT: Water Quality-Based Effluent Limitations for the BNSF Railway Company
WPDES Permit No. WI-0070726-10-0

This is in response to your request for an evaluation of the need for water quality-based effluent limitations (WQBELs) using chapters NR 102, 104, 105, 106, 207, 210, 212, and 217 of the Wisconsin Administrative Code (where applicable), for the discharge from the BNSF Railway Company in Douglas County. This industrial facility discharges to an unnamed tributary to the Nemadji River, located in the St. Louis and Lower Nemadji Watershed in the Lake Superior Basin. The evaluation of the permit recommendations is discussed in more detail in the attached report.

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

Outfall 001 – Comingled Discharge

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Flow Rate						1, 2
TSS			30 mg/L	20 mg/L		2
pH	9.0 s.u.	6.0 s.u.				2
Chlorine (Total Residual)	19 µg/L		7.3 µg/L			
Phosphorus						
Interim				0.225 mg/L		3
Final					0.075 mg/L 0.70 lbs/day	
Arsenic (Total Recoverable)				13 µg/L		4
Copper (Total Recoverable)			14 µg/L			4
Cadmium (Total Recoverable)						5
Hardness (Total as CaCO ₃)						6
Acute WET						7, 9
Chronic WET						8, 9

Footnotes:

1. Monitoring whenever the discharge occurs.
2. No changes from the current permit.
3. The monthly average phosphorus WQBEL will serve as the interim limit for the phosphorus compliance schedule and will remain in the permit after the compliance schedule is complete.
4. Additional mass limits would also need to be included in absence of arsenic and copper variances.
5. Monthly monitoring for 1 year is recommended during the reissued permit term.

6. Hardness monitoring is recommended because of the relationship between hardness and daily maximum limits based on acute toxicity criteria.
7. Two acute whole effluent toxicity (WET) tests are recommended during the reissued permit term. According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), a synthetic (standard) laboratory water may be used as the dilution water and primary control in acute WET tests.
8. Annual chronic WET testing is recommended during the reissued permit term. The Instream Waste Concentration (IWC) to assess chronic test results is 100%. According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), chronic testing shall be performed using a dilution series of 100%, 75%, 50%, 25% & 12.5% and the dilution water used in WET tests conducted on Outfall 001 shall be a grab sample collected from the unnamed tributary (UT) upstream of the confluence with Outfall 001. If flow is not present in the UT, then dilution water may be collected from the Nemadji River upstream of the confluence with the UT.
9. Sampling WET concurrently with any chemical-specific toxic substances is recommended. Tests should be done whenever the discharge occurs during April – October during the calendar year, ideally during different months. Tests should continue after the permit expiration date (until the permit is reissued).

Sample Point 101 – Oil/Water Separator Water

Parameter	Daily Maximum	Footnotes
Flow Rate		1
Oil & Grease (Hexane)	15 mg/L	1
TSS	40 mg/L	1
BETX (Total)		1
PAHs		1

Footnotes:

1. No changes from the current permit.

Additional limits to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Codes, are not required due to the non-continuous nature of the discharge.

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

Attachments (3) – Narrative, discharge area map, & thermal table.

PREPARED BY: Michael A. Polkinghorn – Water Resources Engineer

E-cc: Eric de Venecia, Wastewater Engineer – NOR/Superior Service Center
 Michelle BalkLudwig, Regional Wastewater Supervisor – NOR/Spooner Service Center
 Diane Figiel, Water Resources Engineer – WY/3
 Nate Willis, Wastewater Engineer – WY/3
 Madeline Roberts, Regional Stream Biologist – NOR/Spooner Service Center
 Kari Fleming, Environmental Toxicologist – WY/3

Water Quality-Based Effluent Limitations for BNSF Railway Company

WPDES Permit No. WI-0070726-10-0

Prepared by: Michael A. Polkinghorn

PART 1 – BACKGROUND INFORMATION

Facility Description

BNSF Railway Company (formerly Burlington Northern and Sante Fe Railroad) operates a taconite trans-shipment facility at Allouez, Wisconsin. The taconite is received by rail and stored on site until it can be shipped out by vessel. Stormwater and dust suppression water runoff from the taconite piles is treated in settling ponds. Stormwater coming into contact with petroleum products are treated by passing through a grit chamber and oil/water separator (Sample Point 101), and then stored in a concrete lagoon until it is directed to the settling ponds. Grit is stored in the grit chamber and separated oil is stored in an on-site holding tank until hauled to final disposal or recycling. Effluent is discharged on a noncontinuous basis via Outfall 001 to an unnamed tributary (UT) to the Nemadji River, approx. 750 ft southwest of the intersection of E. 10th St. and E. 39th Ave. Discharge events typically occur daily during April – October.

Attachment #2 is a discharge area map of Outfall 001.

Existing Permit Limitations

The current permit, expiring on 03/31/2024, includes the following effluent limitations and monitoring requirements.

Outfall 001 – Comingled Discharge

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Footnotes
Flow Rate					1
TSS			30 mg/L	20 mg/L	2
pH	9.0 s.u.	6.0 s.u.			2
Ammonia Nitrogen					1
Phosphorus					1
Arsenic (Total Recoverable)					1
Chloride					1
Acute WET					1, 3
Chronic WET					1, 3

Footnotes:

1. Monitoring only.
2. These limits are based on the Limited Aquatic Life (LAL) community of the immediate receiving water as described in s. NR 104.02(3)(b), Wis. Adm. Code.

3. One acute and chronic while effluent toxicity (WET) tests were required during the 2022 discharge season. The IWC for chronic WET was 24%.

Sample Point 101 – Oil/Water Separator Water

Parameter	Daily Maximum	Footnotes
Flow Rate		1
Oil & Grease (Hexane)	15 mg/L	2
TSS	40 mg/L	2
BETX (Total)		1
PAHs		1

Footnotes:

1. Monitoring only.
2. These are best professional judgment-based limits as described in subch. 3 of ch. NR 220, Wis. Adm. Code.

Receiving Water Information

- Name: UT to Nemadji River
- Waterbody Identification Code (WBIC): NA for UT and 2835300 for Nemadji River.
- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code:
 - UT from Outfall 001 to confluence with Nemadji River (segment 1): Warm Water Forage Fish (WWFF) community, non-public water supply.
 - Nemadji River: WWSF community, non-public water supply.
 - Cold Water and Public Water Supply criteria are used for bioaccumulating compounds of concern because the discharges are within the Great Lakes basin.
 - The Nemadji River will not be considered any further in this evaluation as the UT has a similar fish and aquatic life classification with less assimilative capacity.
 - Information about the review for determining the biological potential of the UT is discussed in greater detail in the Receiving Water Classification Memorandum (February 2025) and is available in the permit file for BNSF Railway Co. The previous limit evaluation treated the UT as a LAL community. The updated fish and aquatic life classification of the UT based on the recent review will be applied instead in this evaluation.
- Low flows used in accordance with chs. NR 106 and 217, Wis. Adm. Code: Lows flows for the UT are zero. 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.
- Hardness: Effluent hardness is used in place of receiving water because there is no receiving water flow upstream of the discharge.
- % of low flow used to calculate limits in accordance with s. NR 106.06(4)(c)5., Wis. Adm. Code: Not applicable where the receiving water low flows are zero.
- Source of background concentration data: Background concentrations are not included because they do not impact the calculated WQBEL when the receiving water low flows are equal to zero.
- Multiple dischargers: None.
- Impaired water status: There are no known impairments to the UT. The Nemadji River (Stream mi 0 – 38.2) is on the Clean Water Act Section 303(d) list for sediment/TSS impairments.

Effluent Information

- Flow rate:
Maximum calendar annual average = 1.124 million gallons per day (MGD)
For reference, the actual average flow from April 2019 – October 2024 was 0.683 MGD excluding days discharge did not occur.
- Hardness = 147 mg/L as CaCO₃. This value represents the geometric mean of data (n = 4, April 2023) from the permit application.
- Acute dilution factor used in accordance with s. NR 106.06(3)(c), Wis. Adm. Code: Not applicable – this facility does not have an approved Zone of Initial Dilution (ZID).
- Water supply: Allouez Bay and private wells.
- Additives: None.
- Effluent characterization: This facility is categorized as a secondary industry, so the permit application required effluent sample analyses for a limited number of common pollutants, as specified in s. NR 200.065, Table 1, Wis. Adm. Code, primarily metal substances plus hardness and temperature. The current permit required monitoring for ammonia nitrogen, phosphorus, arsenic, and chloride.
- 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.
- Additional cadmium effluent data (n = 1, September 2018) is utilized to better determine the need for cadmium limits in the reissued permit.

Arsenic Effluent Data

Statistics	Conc. (µg/L)
1-day P ₉₉	51.3
4-day P ₉₉	31.2
30-day P ₉₉	19.1
Mean*	13.8
Std	10.3
Sample size	17
Range	<3.5 - 44.9

*“<” means that the pollutant was not detected at the indicated level of detection. The mean concentration was calculated using zero in place of the non-detected results.

Multiple Toxic Substances Effluent Data

Sample Date	Cadmium (µg/L)	Chloride (mg/L)	Copper (µg/L)
09/18/2018	<0.7		
04/06/2023	0.72		
04/20/2022		32.1	
05/25/2022		31.7	
06/23/2022		46.1	
07/21/2022		60.4	
08/23/2022		56.1	
09/08/2022		70.1	

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Sample Date	Cadmium (µg/L)	Chloride (mg/L)	Copper (µg/L)
10/18/2022		59.2	
04/06/2023			5.8
04/13/2023			4.0
04/21/2023			6.5
04/28/2023			<3.1
Mean*	0.36	50.8	4.1

* “<” means that the pollutant was not detected at the indicated level of detection. The mean concentration was calculated using zero in place of the non-detected results.

Polycyclic Aromatic Hydrocarbons (PAHs) Effluent Data

Sample Date	Naphthalene (ug/L)	Anthracene (ug/L)	Chrysene (ug/L)	Fluoranthene (ug/L)
10/17/2019	<0.013	<0.010	<0.010	<0.010
10/16/2020	0.12	<0.0080	<0.011	<0.010
10/20/2021	0.012	0.020	0.031	0.050
10/18/2022	<0.014	<0.0046	0.026	0.045
10/26/2023	<0.014	<0.0048	<0.0085	<0.012
Mean*	0.026	0.0040	0.011	0.019

Sample Date	Phenanthrene (ug/L)	Pyrene (ug/L)	Acenaphthene (ug/L)	Benzo(a)anthracene (ug/L)
10/17/2019	<0.0069	<0.0065	<0.012	<0.0080
10/16/2020	<0.010	<0.015	<0.0079	<0.011
10/20/2021	0.035	0.037	<0.0065	<0.0086
10/18/2022	<0.013	0.030	0.020	0.030
10/26/2023	<0.014	<0.0089	<0.0064	<0.0075
Mean*	0.0070	0.013	0.0040	0.0060

Sample Date	Benzo(a)pyrene (ug/L)	Benzo(b)fluoranthene (ug/L)	Benzo(g,h,i)perylene (ug/L)	Benzo(k)fluoranthene (ug/L)
10/17/2019	<0.0057	<0.0088	<0.0095	<0.0066
10/16/2020	<0.0086	<0.0076	<0.0082	<0.0083
10/20/2021	<0.0084	<0.0090	<0.0077	<0.0078
10/18/2022	0.021	0.024	0.021	0.028
10/26/2023	<0.0079	<0.0081	<0.0086	<0.0084
Mean*	0.0042	0.0048	0.0042	0.0056

Sample Date	Dibenz(a,h)anthracene (ug/L)	Fluorene (ug/L)	Indeno(1,2,3-cd)pyrene (ug/L)
10/17/2019	<0.0085	<0.0054	<0.0054
10/16/2020	<0.011	<0.0066	<0.019
10/20/2021	<0.0075	<0.0057	<0.011
10/18/2022	0.022	0.022	0.024
10/26/2023	<0.0078	0.023	<0.010

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Sample Date	Dibenz(a,h)anthracene (ug/L)	Fluorene (ug/L)	Indeno(1,2,3-cd)pyrene (ug/L)
Mean*	0.0044	0.0090	0.0048

* “<” means that the pollutant was not detected at the indicated level of detection. The mean concentration was calculated using zero in place of the non-detected results.

The following table presents the average concentrations and loadings at Outfall 001 and Sample Point 101 from April 2019 – October 2024 for all parameters with limits in the current permit to meet the requirements of s. NR 201.03(6), Wis. Adm. Code:

Parameter Averages with Limits

Outfall/SP	Parameter	Average Measurement
001	pH	8.09 s.u.
	TSS	3.0 mg/L
101	Oil & Grease	<1.3 mg/L
	TSS	4.3 mg/L

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

**PART 2 – WATER QUALITY-BASED EFFLUENT LIMITATIONS
FOR TOXIC SUBSTANCES – EXCEPT AMMONIA NITROGEN**

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

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

Acute Limits based on 1-Q₁₀

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

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

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)

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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 the case for BNSF Railway Co and the limits are set based on the 1-Q₁₀ method.

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

Daily Maximum Limits based on Acute Toxicity Criteria (ATC)

RECEIVING WATER FLOW = 0 cfs

SUBSTANCE	REF. HARD. mg/L	ATC	MAX. EFFL. LIMIT*	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	1-day P ₉₉	1-day MAX. CONC.
Chlorine		19.0	19.0	3.81	58		58
Arsenic		340	340			51.3	44.9
Cadmium	147	16.0	16.0	3.2	0.36		0.72
Chromium	147	2,473	2,473	495	2.8		2.8
Copper	147	22.3	22.3	4.5	4.1		6.5
Zinc	147	169	169	33.7	6.9		6.9
Chloride (mg/L)		757	757	151	50.8		70.1
Naphthalene**		344.26	344.26	68.8	0.026		0.12
Anthracene**		0.353	0.353	0.0706	0.0040		0.020
Fluoranthene**		3.194	3.194	0.639	0.019		0.050
Phenanthrene**		61.25	61.25	12.25	0.0070		0.035
Pyrene**		140	140	28	0.013		0.037
Benzo(a)pyrene**		0.3846	0.3846	0.07692	0.0042		0.021
Fluorene**		58.1	58.1	11.6	0.0090		0.023

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

** The limit for this substance is based on a secondary value. Acute limits are set equal to the secondary value rather than two times or using the 1-Q₁₀ s. NR 106.06(3)(b)2 and s. NR 105.05(2)(f)6, Wis. Adm. Code.

Weekly Average Limits based on Chronic Toxicity Criteria (CTC)

RECEIVING WATER FLOW = 0 cfs

SUBSTANCE	REF. HARD. mg/L	CTC	WEEKLY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	4-day P ₉₉
Chlorine		7.28	7.28	1.46	58	

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SUBSTANCE	REF. HARD. mg/L	CTC	WEEKLY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	4-day P ₉₉
Arsenic		152.2	152.2			31.2
Cadmium	147	3.33	3.33	0.67	0.36	
Chromium	147	181.19	181.19	36.2	2.8	
Copper	147	14.40	14.40	2.88	4.1	
Zinc	147	168.67	168.67	33.7	6.9	
Chloride (mg/L)		395	395	79.0	50.8	
Naphthalene*		19.12	19.12	3.8	0.026	
Anthracene*		0.019	0.019	0.0038	0.0040	
Fluoranthene*		0.914	0.914	0.183	0.019	
Phenanthrene*		3.403	3.403	0.681	0.0070	
Pyrene*		7.78	7.78	1.56	0.013	
Benzo(a)pyrene*		0.0242	0.0242	0.00484	0.0042	
Fluorene*		3.23	3.23	0.646	0.0090	

* The limit for this substance is based on a secondary value.

Monthly Average Limits based on Wildlife Criteria (WC)

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

Monthly Average Limits based on Human Threshold Criteria (HTC)

RECEIVING WATER FLOW = 0 cfs

SUBSTANCE	HTC	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Cadmium	370	370	74.0	0.72
Chromium (+3)	3,818,000	3,818,000	763,600	2.8
Fluoranthene	4,300	4,300	860	0.050
Naphthalene*	1,950	1,950	390	0.026
Anthracene*	1,375.6	1,375.6	275.12	0.0040
Pyrene*	126.2	126.2	25.24	0.013
Benzo(a)pyrene*	0.0184	0.0184	0.00368	0.0042
Fluorene*	193.6	193.6	38.72	0.0090

* The limit for this substance is based on a secondary value.

Monthly Average Limits based on Human Cancer Criteria (HCC)

RECEIVING WATER FLOW = 0 cfs

SUBSTANCE	HCC	MO'LY AVE. LIMIT	30-day P ₉₉
Arsenic	13.3	13.3	19.1

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 only one

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

Poly Aromatic Hydrocarbons (PAHs) Limits

Point source wastewater discharges containing PAH compounds are regulated using the performance-based limitation. The 2019 guidance document *PAH Group of 10 Calculation Using Toxicity Equivalent Factors* specifies the following performance-based limits:

PAH Performance-based Limits	
Compound	Limit (µg/L)
Benzo(a)pyrene	0.1
Naphthalene	70
Group of 10 PAHs	0.1

The following compounds are regulated together as the group of 10 PAHs:

1. Benzo(a)anthracene
2. Benzo(b)fluoranthene
3. Benzo(k)fluoranthene
4. Benzo(g,h,i)perylene
5. Chrysene
6. Dibenzo(a,h)anthracene
7. Fluoranthene
8. Indeno(1,2,3-cd)pyrene
9. Phenanthrene
10. Pyrene

Benzo(a)pyrene is the most toxic of the PAH compounds. Because of this, the toxicity for the other compounds are calculated relative to benzo(a)pyrene with a Toxicity Equivalent Factor (TEF). The TEFs are used in the summation of the PAH group of 10 compounds concentrations. To calculate the concentration of the PAH group of 10, multiply the concentration of each PAH compound by the corresponding TEF value and sum the results. The table below summarized the TEFs for each of the 10 compounds.

PAHs TEFs	
Compounds	TEF
Benzo(a)anthracene	0.1
Benzo(b)fluoranthene	0.1
Benzo(g,h,i)perylene	0.01
Benzo(k)fluoranthene	0.01
Chrysene	0.001
Dibenzo(a,h)anthracene	1
Fluoranthene	0.001
Indeno(1,2,3-cd)pyrene	0.1
Phenanthrene	0.001
Pyrene	0.001

The PAH concentrations for this permit term are summarized below, all compounds are in µg/L:

PAHs Adjusted Mean

Compounds	Mean	TEF	Adjusted Mean
Benzo(a)anthracene	0.0060	0.1	0.00060
Benzo(b)fluoranthene	0.0048	0.1	0.00048
Benzo(g,h,i)perylene	0.0042	0.01	0.000042
Benzo(k)fluoranthene	0.0056	0.01	0.000056
Chrysene	0.011	0.001	0.000011
Dibenzo(a,h)anthracene	0.0044	1	0.0044
Fluoranthene	0.019	0.001	0.000019
Indeno(1,2,3-cd)pyrene	0.0048	0.1	0.00048
Phenanthrene	0.0070	0.001	0.0000070
Pyrene	0.013	0.001	0.000013
Total PAHs = 0.0061			
Compounds	Mean		
Benzo(a)pyrene	0.0042		
Naphthalene	0.012		

Based on the data from the current permit, there is not reasonable potential to exceed the limits for Benzo(a)pyrene, Naphthalene, or the group of 10 PAHs. **Therefore, performance-based limits are not recommended during the reissued permit term.**

In the current permit, monitoring PAHs is required. **This is recommended to continue in the reissued permit to determine if limits are needed in the next permit.**

Conclusions and Recommendations

Based on a comparison of the effluent data and calculated effluent limitations, **effluent limitations are required for arsenic, chlorine, copper, anthracene, and benzo(a)pyrene.** Limits and monitoring recommendations are made in the paragraphs below:

Arsenic – Considering available effluent data from April 2019 – October 2024, the 30-day P₉₉ concentration is 19.1 µg/L. This concentration is greater than the calculated arsenic WQBEL based on HCC; **therefore, the monthly average limit of 13 µg/L is recommended during the reissued permit term. In the absence of an arsenic variance, mass limits would also be required.**

Cadmium – Considering available effluent data from September 2018 – April 2023, the mean effluent concentration is 0.36 µg/L. This concentration is below the calculated cadmium WQBELs; **therefore, cadmium limits are not recommended during the reissued permit term. Monthly monitoring for 1 year is recommended during the reissued permit term** due to the likelihood of reasonable potential being demonstrated when a single sample is compared to 1/5th of the calculated weekly average cadmium WQBEL.

Chlorine – Considering available effluent data from April 2023, the mean effluent concentration is 58 µg/L. This concentration is greater than the calculated total residual chlorine WQBELs based on ATC and CTC; **therefore, the daily maximum limit of 19 µg/L and the weekly average limit of 7.3 µg/L is recommended during the reissued permit term.**

Copper – Considering available effluent data from April 2013, the mean effluent concentration is 4.1 µg/L. This concentration is greater than the 1/5th of the calculated copper WQBEL based on the CTC; **therefore, the weekly average limit of 14 µg/L is recommended during the reissued permit term. In the absence of a copper variance, mass limits would also be required.**

Quarterly hardness monitoring is also recommended because of the relationship between hardness and daily maximum limits based on ATC.

PAHs – Considering available effluent data from October 2019 – October 2023, the mean effluent concentrations of anthracene and benzo(a)pyrene are 0.0040 and 0.0042 µg/L respectively. The anthracene concentration is greater than 1/5th of the calculated anthracene WQBEL based on CTC; therefore the weekly average limit of 0.019 µg/L would be needed during the reissued permit term. Similarly the benzo(a)pyrene concentration is greater than 1/5th of the calculated benzo(a)pyrene WQBEL based on HTC; therefore the monthly average limit of 0.018 µg/L would be needed during the reissued permit term.

There are a couple reasons why the PAH limits are not recommended in the permit at this time. First, the PAHs are sampled at an interior sample point (SP 101) after the oil/water separator but before the waste stream joins with the treated stormwater in the settling ponds. This would not be considered representative of the discharge from Outfall 001 as the effluent concentration of PAHs measured at Outfall 001 would be expected to be lower than at SP 101 due to dilution within the system. Second, oil/water separator wastewater is generated and discharged during 1x day/yr. Because this discharge duration is expected to always be less than 4x consecutive days/wk, it does not meet the assumed toxicity conditions for chronic toxicity, wildlife, human threshold, and human cancer water quality criteria and secondary values. **Due to these considerations, anthracene and benzo(a)pyrene limits are not recommended during the reissued permit term. PAH monitoring is recommended to continue during the reissued permit term for SP 101** and will be considered in the future at Outfall 001 should the discharge of PAHs from SP 101 increases to 4x consecutive days/wk.

PFOS and PFOA – The need for PFOS and PFOA monitoring is evaluated in accordance with s. NR 106.98(2), Wis. Adm. Code. While there is a PFOS fish consumption advisory in Lake Superior, the Department has determined that the type of wastewater generated from this operation and the intermittent nature of the discharge does not warrant monitoring. **Therefore, PFOS and PFOA monitoring is not recommended during the reissued permit term.** The Department may re-evaluate the need for sampling at the next permit reissuance if new information becomes available that suggests PFOS or PFOA may be present in the discharge.

PART 3 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR CONVENTIONAL POLLUTANTS

The TSS limits in the current permit are based on the protection of the LAL community of the immediate receiving water as described in s. NR 104.02(3)(b), Wis. Adm. Code. Because this classification is recommended to be changed to a WWFF community based on the recent receiving water reclassification, these limits and the need for BOD₅ limits will be reevaluated at this time.

BOD₅ & DO

In establishing BOD₅ limitations, the primary intent is to prevent a lowering of dissolved oxygen levels in

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

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

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

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

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

Calculations based on Full Assimilative Capacity at 7-Q₁₀ Conditions:

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

Where:

Q_{eff} = effluent flow = 1.124 MGD

DO_{stream} = background dissolved oxygen = 7.0 mg/L

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

7-Q₁₀ = 0 cfs

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

Because no dilution is available in the receiving water, the calculated limits would be the lowest that the Department typically gives to facilities per standing policy. These effluent limitations are 5.0 mg/L during May – October and 10 mg/L during November – April, expressed as weekly average limits. A dissolved oxygen limit of 7.0 mg/L as a daily minimum is also recommended. This is consistent with the assumed dissolved oxygen effluent concentration in the calculation of the BOD₅ limitations. Mass limits for BOD₅ are not required because the receiving water will be effluent dominated.

The facility submitted a nondetectable BOD₅ sample of <4.0 mg/L (04/06/2023). In this case, the effluent from Outfall 001 is not expected to have any sources of BOD₅ given the composition of stormwater and dust suppression water runoff. **Therefore, BOD₅ and dissolved oxygen limits are not recommended during the reissued permit term.**

Total Suspended Solids (TSS)

Total suspended solids (TSS) effluent limits are regulated via narrative standards described in NR

102.04(1), Wis. Adm. Code. TSS effluent limits are included whenever BOD₅ WQBELs are needed and are set equal to the BOD₅ limits but no lower than 10 mg/L per Department policy. **Because BOD₅ WQBELs are not recommended, TSS limits are also not recommended during the reissued permit term.**

The current permit contains TSS limits based on the protection of the LAL community of the immediate receiving water as described in s. NR 104.02(3)(b), Wis. Adm. Code. **These limits are required to continue during the reissued permit term unless the antibacksliding requirements of subch. II of NR 207, Wis. Adm. Code, are met.**

pH

The current permit has the daily minimum and daily maximum limit range of 6.0 – 9.0 s.u. which are categorical limits for a discharge to an LAL community receiving water. These existing pH limits will control the discharge to meet the pH water quality standards as described in s. NR 102.04(4)(c), Wis. Adm. Code. **Therefore, the pH limits are recommended to continue during the reissued permit term.**

PART 4 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR AMMONIA NITROGEN

The State of Wisconsin promulgated revised water quality standards for ammonia nitrogen in ch. NR 105, Wis. Adm. Code, effective March 1, 2004 which includes criteria based on both acute and chronic toxicity to aquatic life. Given the fact that the BNSF Railway Co does not currently have ammonia nitrogen limits, the need for limits is evaluated at this time.

Effluent ammonia nitrogen samples (n = 7, April 2022 – October 2022) ranged from <0.015 – 0.015 mg/L. Based on this effluent data, there is no reasonable potential to exceed the most stringent ammonia nitrogen limits that would be calculated. **Therefore, ammonia nitrogen limits and monitoring are not recommended during the reissued permit term.**

PART 5 – PHOSPHORUS

Technology-Based Effluent Limit

Subchapter II of Chapter NR 217, Wis. Adm. Code, requires industrial facilities that discharge greater than 60 pounds of total phosphorus per month to comply with a 12-month rolling average limit of 1.0 mg/L, or an approved alternative concentration limit.

Because BNSF Railway Co does not currently have an existing technology-based limit, the need for this limit in the reissued permit is evaluated. The data demonstrates that the annual monthly average phosphorus loading is less than 60 lbs/month, in accordance with s. NR 217.04(1)(a)2, Wis. Adm. Code. **Therefore, a technology-based limit is not recommended during the reissued permit term.** In addition, the need for a WQBEL for phosphorus must be considered.

Annual Average Mass Total Phosphorus Loading

Month	Average Phosphorus Concentration (mg/L)	Average Effluent Flow (MGD)	Calculated Mass (lbs/month)
April 2024	0.074	1.69	31
July 2024	0.055	0.38	5.3
Oct. 2024	0.05	0.080	1.0
Average =			13

Total P (lbs/month) = Monthly average conc. (mg/L) × monthly average flow (MGD) × 30 days/month × 8.34 (lbs/gal)

Water Quality-Based Effluent Limits (WQBEL)

Revisions to administrative rules regulating phosphorus took effect on December 1, 2010. These rule revisions include additions to s. NR 102.06, Wis. Adm. Code, which establish phosphorus standards for surface waters. Subchapter III of NR 217, Wis. Adm. Code, establishes procedures for determining WQBELs for phosphorus, based on the applicable standards in ch. NR 102, Wis. Adm. Code.

Section NR 102.06(3)(a), Wis. Adm. Code, specifically names river segments for which a phosphorus criterion of 0.100 mg/L applies. For other stream segments that are not specified in s. NR 102.06(3)(a), Wis. Adm. Code, s. NR 102.06(3)(b), Wis. Adm. Code, specifies a phosphorus criterion of 0.075 mg/L. The phosphorus criterion of 0.075 mg/L applies for the UT.

The conservation of mass equation is described in s. NR 217.13(2)(a), Wis. Adm. Code, for phosphorus WQBELs and includes variables of water quality criterion (WQC), receiving water flow rate (Qs), effluent flow rate (Qe), and upstream phosphorus concentrations (Cs) provided below.

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

Where:

WQC = 0.075 mg/L for the UT.

Qs = 100% of the 7-Q₂ of 0 cfs

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

Qe = effluent flow rate = 41.124 MGD = 1.739 cfs

f = the fraction of effluent withdrawn from the receiving water = 0

The effluent limit is set equal to criteria because the receiving water flow is equal to zero.

Effluent Data

The following table summarizes effluent total phosphorus monitoring data from April 2019 – October 2024.

Total Phosphorus Effluent Data

Statistics	Conc. (mg/L)
1-day P ₉₉	0.13
4-day P ₉₉	0.099
30-day P ₉₉	0.080
Mean	0.071

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Std	0.02
Sample size	16
Range	0.047 - 0.12

Reasonable Potential Determination

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

Limit Expression

According to s. NR 217.14(2), Wis. Adm. Code, because the calculated WQBEL is less than or equal to 0.3 mg/L, **the effluent limit of 0.075 mg/L may be expressed as a 6-month average.** If a concentration limitation expressed as a 6-month average is included in the permit, **a monthly average concentration limitation of 0.225 mg/L, equal to three times the WQBEL calculated under s. NR 217.13, Wis. Adm. Code shall also be included in the permit.** The 6-month average should typically be averaged during the months of May – October and November – April but an 8-month averaging period may be used corresponding to months the discharge occurs (April – October).

Mass Limits

A mass limit is also required, pursuant to s. NR 217.14(1)(a), Wis. Adm. Code, because Lake Superior is an Outstanding Resource Water (ORW) and a lake, approx. 1.4 mi downstream of Outfall 001. **This final mass limit shall be $0.075 \text{ mg/L} \times 8.34 \times 1.124 \text{ MGD} = 0.70 \text{ lbs/day}$ expressed as a 6-month average.**

Interim Limit

An interim limit is required per s. NR 217.17, Wis. Adm. Code, when a compliance schedule is needed in the permit to meet the WQBEL. The interim limit should reflect a concentration that the facility is able to meet without investing in additional “temporary” treatment, but also should prevent backsliding from current conditions. **Therefore, it is recommended that the interim limit be set equal to the monthly average WQBEL of 0.225 mg/L for permit reissuance along with requirements for optimization of phosphorus removal.** This value is chosen over other values because the facility would have been in compliance with this concentration 100% of the time during the current permit term in conjunction with not requiring the facility to install or optimize treatment to treat to concentrations below the applicable phosphorus water quality standard on a monthly basis.

PART 6 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR THERMAL

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

In accordance with s. NR 106.53(2)(b), Wis. Adm. Code, the highest daily maximum flow rate for a calendar month is used to determine the acute (daily maximum) effluent limitation. In accordance with s. NR 106.53(2)(c), Wis. Adm. Code, the highest 7-day rolling average flow rate for a calendar month is

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used to determine the sub-lethal (weekly average) effluent limitation. Because the receiving water flow is zero, temperature limits are set equal to thermal water quality criteria.

The table below summarizes the maximum temperatures reported from the permit application. The complete temperature limit calculations are included as Attachment #3.

Monthly Temperature Effluent Data & Limits

Month	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Weekly Maximum	Daily Maximum	Weekly Average Effluent Limitation	Daily Maximum Effluent Limitation
	(°F)	(°F)	(°F)	(°F)
APR	35.4	35.4	55	79
MAY			65	82
JUN			76	84
JUL			81	85
AUG			81	84
SEP			73	82
OCT			61	80

Reasonable Potential

Permit limits for temperature are recommended based on the procedures in s. NR 106.56, Wis. Adm. Code.

- An acute limit for temperature is recommended for each month in which the representative daily maximum effluent temperature for that month exceeds the acute WQBEL. The representative daily maximum effluent temperature is the greater of the following:
 - (a) The highest recorded representative daily maximum effluent temperature
 - (b) The projected 99th percentile of all representative daily maximum effluent temperatures
- A sub-lethal limitation for temperature is recommended for each month in which the representative weekly average effluent temperature for that month exceeds the weekly average WQBEL. The representative weekly average effluent temperature is the greater of the following:
 - (a) The highest weekly average effluent temperature for the month.
 - (b) The projected 99th percentile of all representative weekly average effluent temperatures for the month

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

Although effluent temperature data is not available for Outfall 001 during May – October, the combination of the stormwater and dust suppression water runoff composition and the detention time of both the lagoon and settling pond is likely to produce temperatures similar to ambient conditions. The difference in temperature between the April sample and the respective weekly average limit supports this

assumption with a differential approx. 20 °F. **Therefore, temperature limits and monitoring are not recommended during the reissued permit term.**

PART 7 – WHOLE EFFLUENT TOXICITY (WET)

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

- Acute tests predict the concentration that causes lethality of aquatic organisms during a 48 to 96-hour exposure. To assure that a discharge is not acutely toxic to organisms in the receiving water, WET tests must produce a statistically valid 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). Because the receiving water flow is zero, the IWC of 100% is used for the WET evaluation.
- The previous limit evaluation (January 2019) calculated an IWC of 24% based on the receiving water flow of the Nemadji River. The point of WET WQSs application is now applied at the UT due to the change in the immediate receiving water classification.
- 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.

Therefore, only WET tests conducted from June 2005 to present are shown in the table below:

WET Data History

Date Test Initiated	Acute Results LC ₅₀ %				Chronic Results IC ₂₅ %				Footnotes or Comments
	<i>C. dubia</i>	Fathead minnow	Pass or Fail?	Used in RP?	<i>C. dubia</i>	Fathead Minnow	Pass or Fail?	Use in RP?	
06/20/2017	>100	>100	Pass	Yes					
06/21/2022	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
10/30/2024	>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.

$$\text{Acute Reasonable Potential} = [(TUa \text{ effluent}) (B)(AMZ)]$$

$$\text{Chronic Reasonable Potential} = [(TUc \text{ effluent}) (B)(IWC)]$$

According to s. NR 106.08(6)(d), Wis. Adm. Code, TUa and TUc 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 an acute WET limit is not required.**

Chronic Reasonable Potential = 0 < 1.0, **reasonable potential is not shown, and a chronic WET limit is not required.**

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 = 100%. 15 Points
Historical Data	Three tests used to calculate RP. No tests failed.	One test used to calculate RP. No tests failed.

	Acute	Chronic
	0 Points	0 Points
Effluent Variability	Little variability, no violations or upsets, consistent operations. 0 Points	Same as acute. 0 Points
Receiving Water Classification	WWFF community. 5 Points	Same as acute. 5 Points
Chemical-Specific Data	Reasonable potential for chlorine limits based on ATC; multiple substances detected. Additional Compounds of Concern: BTEX and PAH substances detected. 10 Points	Reasonable potential for chlorine and copper limits based on CTC; multiple substances detected. Additional Compounds of Concern: BTEX and PAH substances detected. 11 Points
Additives	None. 0 Points	None. 0 Points
Discharge Category	Process wastewater. 5 Points	Same as acute. 5 Points
Wastewater Treatment	Primary treatment only. 8 Points	Same as acute. 8 Points
Downstream Impacts	No impacts known. 0 Points	Same as acute. 0 Points
Total Checklist Points:	28 Points	44 Points
Recommended Monitoring Frequency (from Checklist):	Three acute tests recommended.	Annual chronic tests recommended.
Limit Required?	No.	No.
TRE Recommended? (from Checklist)	No.	No.

- The WET Checklist completed in SWAMP (and summarized above) recommends 3x acute tests and annual chronic tests during the reissued permit term. Those recommendations are driven primarily by the IWC, chemical-specific data, and partial lack of wastewater treatment. The number of WET tests recommended during the reissued permit term have been adjusted accordingly based on the following reason(s):
 - The effluent characterization of this discharge is not considered complex or high strength where secondary level wastewater treatment is not necessary. Therefore, the acute toxicity concern of this category is reduced.
- After consideration of the guidance provided in the Department's WET Program Guidance Document (2022) and other information described above, **2x acute and annual chronic WET tests are recommended in the reissued permit.** Tests should be done whenever the discharge occurs during April – October during the calendar year, ideally during different months. Tests should continue after the permit expiration date (until the permit is reissued).

BNSF Railway Co Outfall 001 Discharge Area



Temperature Limits for Receiving Waters with Unidirectional Flow

(calculation using default ambient temperature data)

Facility:	BNSF Railway Co		7-Q10:	0	cfs	Temp Dates	NA	04/05/19
Outfall(s):	001	2/12/2025	Dilution:	NA		Start:	NA	
Date Prepared:			f:	0		End:	NA	10/28/24
Design Flow (Qe):	1.124	MGD	Stream type: Small warm water sport or forage fish					
Storm Sewer Dist.	0	ft	Qs:Qe ratio:	0.0	:1	Calculation Needed? YES		

Month	Water Quality Criteria			Receiving Water Flow Rate (Qs) (cfs)	Representative Highest Effluent Flow Rate (Qe)			f	Representative Highest Monthly 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)	
APR	48	55	79	0	6.148	6.148	0	0	35.4	35.4	55	79
MAY	58	65	82	0	6.148	6.148	0	0			65	82
JUN	66	76	84	0	6.148	6.148	0	0			76	84
JUL	69	81	85	0	1.294	1.294	0	0			81	85
AUG	67	81	84	0	0.632	0.816	0	0			81	84
SEP	60	73	82	0	1.877	1.877	0	0			73	82
OCT	50	61	80	0	1.293	1.293	0	0			61	80

CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: May 8, 2026

TO: TBD

FROM: Michael Polkinghorn – NOR/Rhineland Service Center



SUBJECT: Facility Planning Water Quality-Based Effluent Limitations for the BNSF Railway Company
WPDES Permit No. WI-0070726

This is in response to your request for an evaluation of the need for water quality-based effluent limitations (WQBELs) for facility planning using chapters NR 102, 104, 105, 106, 207, 210, 212, and 217 of the Wisconsin Administrative Code (where applicable) for the discharge from the BNSF Railway Company in Douglas County. This industrial facility discharges to an unnamed tributary to the Nemadji River, located in the St. Louis and Lower Nemadji Watershed in the Lake Superior Basin. The evaluation of the permit recommendations is discussed in more detail in the attached report.

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

Outfall 001 – Comingled Discharge

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Footnotes
Flow Rate					1
TSS			30 mg/L	20 mg/L	1
pH	9.0 s.u.	6.0 s.u.			1
Chlorine (Total Residual)					2
Phosphorus					3
Acute WET					4, 6
Chronic WET					5, 6

Footnotes:

1. No changes from the March 2025 WQBEL Evaluation.
2. Monthly chlorine monitoring is required for at least 1 year during the April – October discharge season to determine the need for chlorine limits at a following permit reissuance.
3. Phosphorus monitoring is recommended to continue to determine the need of phosphorus limits in a future permit.
4. Two acute whole effluent toxicity (WET) tests are recommended during a future permit term. According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), a synthetic (standard) laboratory water may be used as the dilution water and primary control in acute WET tests.
5. Two chronic WET tests are recommended during a future permit term. The Instream Waste Concentration (IWC) to assess chronic test results is 18%. 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 the Nemadji River upstream of the confluence of Outfall 001.

6. Sampling WET concurrently with any chemical-specific toxic substances is recommended. Tests should be done whenever the discharge occurs during April – October during the calendar year, ideally during different months.

Sample Point 101 – Oil/Water Separator Water

Parameter	Daily Maximum	Footnotes
Flow Rate		1
Oil & Grease (Hexane)	15 mg/L	1
TSS	40 mg/L	1
BETX (Total)		1
PAHs		1

Footnotes:

1. No changes from the current permit.

Additional limits to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Codes, are not required due to the non-continuous nature of the discharge.

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

Attachments (2) – Narrative & discharge area map.

PREPARED BY: Michael A. Polkinghorn – Water Resources Engineer

E-cc: Eric de Venecia, Wastewater Engineer – NOR/Superior Service Center
Michelle BalkLudwig, Regional Wastewater Supervisor – NOR/Spooner Service Center
Diane Figiel, Water Resources Engineer – WY/3

Water Quality-Based Effluent Limitations for BNSF Railway Company

WPDES Permit No. WI-0070726

Prepared by: Michael A. Polkinghorn

PART 1 – BACKGROUND INFORMATION

Facility Description

BNSF Railway Company (formerly Burlington Northern and Sante Fe Railroad) operates a taconite trans-shipment facility at Allouez, Wisconsin. The taconite is received by rail and stored on site until it can be shipped out by vessel. Stormwater and dust suppression water runoff from the taconite piles is treated in settling ponds. Stormwater coming into contact with petroleum products are treated by passing through a grit chamber and oil/water separator (Sample Point 101), and then stored in a concrete lagoon until it is directed to the settling ponds. Grit is stored in the grit chamber and separated oil is stored in an on-site holding tank until hauled to final disposal or recycling. Effluent is discharged on a noncontinuous basis via Outfall 001 to an unnamed tributary (UT) to the Nemadji River, approx. 750 ft southwest of the intersection of E. 10th St. and E. 39th Ave. Discharge events typically occur daily during April – October.

BNSF Railway has requested facility planning limits for their discharge, which proposes to move Outfall 001 to directly discharge to the Nemadji River, approx. 175 ft downstream of where the UT confluent with the Nemadji River. Upon initial review of the effluent limitations and monitoring requirements in the current permit, multiple parameters could potentially change in comparison to this request. Attachment #2 is a discharge area map of Outfall 001.

Subchapter I of NR 207, Wis. Adm. Code, requires any outfall that meets the definitions of a new or increased discharge to a high quality water to satisfy antidegradation requirements before the discharge can commence. In this case a point source is proposed to be relocated so whether this meets the definition of a new discharge must be evaluated. The relocation of Outfall 001 is approx. 175 ft downstream of where the UT confluent with the Nemadji River. At this distance the relocated outfall is believed to be within the original mixing zone of the effluent to the Nemadji River with respect to downstream impacts from the existing discharge location of Outfall 001. Therefore, Outfall 001 is not a new discharge as described under s. NR 207.021(4)(b)2, Wis. Adm. Code, and antidegradation requirements are not applicable at this time.

The following effluent limitations and monitoring requirements recommended by the March 2025 WQBEL Evaluation for the 10th permit reissuance, are included below for informational purposes:

Outfall 001 – Comingled Discharge

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Flow Rate						1
TSS			30 mg/L	20 mg/L		2
pH	9.0 s.u.	6.0 s.u.				2

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Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Chlorine (Total Residual)	19 µg/L		7.3 µg/L			
Phosphorus						
Interim				0.225 mg/L		
Final					0.075 mg/L 0.70 lbs/day	
Arsenic (Total Recoverable)				13 µg/L		
Copper (Total Recoverable)			14 µg/L			
Cadmium (Total Recoverable)						1
Hardness (Total as CaCO ₃)						1
Acute WET						3
Chronic WET						3

Footnotes:

1. Monitoring only.
2. These limits are based on the Limited Aquatic Life (LAL) community of the immediate receiving water as described in s. NR 104.02(3)(b), Wis. Adm. Code.
3. The 10th permit issuance requires 2x acute and annual chronic whole effluent toxicity (WET) testing. The IWC for chronic WET tests is 100%.

Receiving Water Information

- Name: Nemadji River
- Waterbody Identification Code (WBIC): 2835300
- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code: Warm Water Sport Fish (WWSF) community, non-public water supply and recreational use. Cold Water and Public Water Supply criteria are used for bioaccumulating compounds of concern, because the discharge is within the Great Lakes basin.
- Low flows used in accordance with chs. NR 106 and 217, Wis. Adm. Code: The following 7-Q₁₀ and 7-Q₂ values are from USGS for the Nemadji River at South Superior (SW ¼, SE ¼, Sec. 1, T48N-R14W):
 - 7-Q₁₀ = 32 cubic feet per second (cfs)
 - 7-Q₂ = 49 cfs
 - Harmonic Mean Flow = 124 cfs
- Hardness = 102 mg/L as CaCO₃. This value represents the geometric mean of data (n = 76, January 1974 – March 1998) from the Nemadji River taken upstream at the CTH C bridge.
- % of low flow used to calculate limits in accordance with s. NR 106.06(4)(c)5., Wis. Adm. Code: 25%. 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.
- Source of background concentration data: Metals data from the Nemadji River at County Highway C (SWIMS ID: 163003) is used for this evaluation. The numerical values are shown in the tables below.

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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 phosphorus are described later in this evaluation.

- Multiple dischargers: Superior Sewage Disposal System and Enbridge Energy LP both discharge to the Nemadji River. They are not in the immediate vicinity and the mixing zones do not overlap. Therefore, the other dischargers do not impact this evaluation.
- Impaired water status: The Nemadji River (Stream mi 0 – 38.2) is on the Clean Water Act Section 303(d) list for sediment/TSS impairments.

Effluent Information

- Flow rate(s):
Maximum calendar annual average (2024) = 1.124 million gallons per day (MGD)
For reference, the actual average flow from 2025 was 0.775 MGD.
- Hardness = 194 mg/L as CaCO₃. This value represents the geometric mean (n = 6, June 2017 – October 2024) from the permit application monitoring and WET testing.
- Acute dilution factor used in accordance with s. NR 106.06(3)(c), Wis. Adm. Code: Not applicable – this facility does not have an approved Zone of Initial Dilution (ZID).
- Water supply: Allouez Bay and private wells.
- Additives: None.
- Effluent characterization: This facility is categorized as a secondary industry, so the permit application required effluent sample analyses for a limited number of common pollutants, as specified in s. NR 200.065, Table 1, Wis. Adm. Code, primarily metal substances plus hardness and temperature. The current permit required monitoring for ammonia nitrogen, phosphorus, arsenic, and chloride.
- 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.

Arsenic Effluent Data

Statistics	Conc. (µg/L)
1-day P ₉₉	51.3
4-day P ₉₉	31.2
30-day P ₉₉	19.1
Mean*	13.8
Std	10.3
Sample size	17
Range	<3.5 - 44.9

*“<” means that the pollutant was not detected at the indicated level of detection. The mean concentration was calculated using zero in place of the non-detected results.

Multiple Toxic Substances Effluent Data

Sample Date	Cadmium (µg/L)	Chloride (mg/L)	Copper (µg/L)
09/18/2018	<0.7		
04/06/2023	0.72		
04/20/2022		32.1	

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Sample Date	Cadmium (µg/L)	Chloride (mg/L)	Copper (µg/L)
05/25/2022		31.7	
06/23/2022		46.1	
07/21/2022		60.4	
08/23/2022		56.1	
09/08/2022		70.1	
10/18/2022		59.2	
04/06/2023			5.8
04/13/2023			4.0
04/21/2023			6.5
04/28/2023			<3.1
Mean*	0.36	50.8	4.1

* "<" means that the pollutant was not detected at the indicated level of detection. The mean concentration was calculated using zero in place of the non-detected results.

Polycyclic Aromatic Hydrocarbons (PAHs) Effluent Data

Sample Date	Naphthalene (ug/L)	Anthracene (ug/L)	Chrysene (ug/L)	Fluoranthene (ug/L)
10/17/2019	<0.013	<0.010	<0.010	<0.010
10/16/2020	0.12	<0.0080	<0.011	<0.010
10/20/2021	0.012	0.020	0.031	0.050
10/18/2022	<0.014	<0.0046	0.026	0.045
10/26/2023	<0.014	<0.0048	<0.0085	<0.012
Mean*	0.026	0.0040	0.011	0.019

Sample Date	Phenanthrene (ug/L)	Pyrene (ug/L)	Acenaphthene (ug/L)	Benzo(a)anthracene (ug/L)
10/17/2019	<0.0069	<0.0065	<0.012	<0.0080
10/16/2020	<0.010	<0.015	<0.0079	<0.011
10/20/2021	0.035	0.037	<0.0065	<0.0086
10/18/2022	<0.013	0.030	0.020	0.030
10/26/2023	<0.014	<0.0089	<0.0064	<0.0075
Mean*	0.0070	0.013	0.0040	0.0060

Sample Date	Benzo(a)pyrene (ug/L)	Benzo(b)fluoranthene (ug/L)	Benzo(g,h,i)perylene (ug/L)	Benzo(k)fluoranthene (ug/L)
10/17/2019	<0.0057	<0.0088	<0.0095	<0.0066
10/16/2020	<0.0086	<0.0076	<0.0082	<0.0083
10/20/2021	<0.0084	<0.0090	<0.0077	<0.0078
10/18/2022	0.021	0.024	0.021	0.028
10/26/2023	<0.0079	<0.0081	<0.0086	<0.0084
Mean*	0.0042	0.0048	0.0042	0.0056

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Sample Date	Dibenz(a,h)anthracene (ug/L)	Fluorene (ug/L)	Indeno(1,2,3-cd)pyrene (ug/L)
10/17/2019	<0.0085	<0.0054	<0.0054
10/16/2020	<0.011	<0.0066	<0.019
10/20/2021	<0.0075	<0.0057	<0.011
10/18/2022	0.022	0.022	0.024
10/26/2023	<0.0078	0.023	<0.010
Mean*	0.0044	0.0090	0.0048

* "<" means that the pollutant was not detected at the indicated level of detection. The mean concentration was calculated using zero in place of the non-detected results.

PART 2 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR TOXIC SUBSTANCES – EXCEPT AMMONIA NITROGEN

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

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

Acute Limits based on 1-Q₁₀

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

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

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 BNSF Railway Company, 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 ($\mu\text{g/L}$), except for hardness and chloride (mg/L).

Daily Maximum Limits based on Acute Toxicity Criteria (ATC)

RECEIVING WATER FLOW = 26 cfs, (1-Q₁₀ (estimated as 80% of 7-Q₁₀)), as specified in s. NR 106.06(3)(bm), Wis. Adm. Code.

SUBSTANCE	REF. HARD. mg/L	ATC	MAX. EFFL. LIMIT*	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	1-day P ₉₉	1-day MAX. CONC.
Chlorine		19.0	38.1	7.61	58		58
Arsenic		340	679.6			51.3	44.9
Cadmium	194	22.0	44.1	8.8	0.36		0.72
Chromium	194	3103	6,205	1241	2.8		2.8
Copper	194	29.0	58.0	11.6	4.1		6.5
Zinc	194	203	429.8	86.0	6.9		6.9
Chloride (mg/L)		757	1,514	303	50.8		70.1
Naphthalene**		344.26	344.26	68.8	0.026		0.12
Anthracene**		0.353	0.353	0.0706	0.0040		0.020
Fluoranthene**		3.194	3.194	0.639	0.019		0.050
Phenanthrene**		61.25	61.25	12.25	0.0070		0.035
Pyrene**		140	140	28	0.013		0.037
Benzo(a)pyrene**		0.3846	0.3846	0.07692	0.0042		0.021
Fluorene**		58.1	58.1	11.6	0.0090		0.023

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

** The limit for this substance is based on a secondary value. Acute limits are set equal to the secondary value rather than two times or using the 1-Q₁₀ s. NR 106.06(3)(b)2 and s. NR 105.05(2)(f)6, Wis. Adm. Code.

Weekly Average Limits based on Chronic Toxicity Criteria (CTC)

RECEIVING WATER FLOW = 8.0 cfs (1/4 of the 7-Q₁₀), as specified in s. NR 106.06(4)(c), Wis. Adm. Code

SUBSTANCE	REF. HARD.* mg/L	CTC	MEAN BACK- GRD.	WEEKLY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	4-day P ₉₉
Chlorine		7.28		40.76	8.15	58	
Arsenic		152.2	7.9	816			31.2
Cadmium	102	2.50	0.27	12.7	2.6	0.36	
Chromium	102	134.27	3.6	735	147	2.8	
Copper	102	10.53	4.6	38	7.6	4.1	
Zinc	102	122.48	41	498	100	6.9	
Chloride (mg/L)		395	2.6	2,200	440	50.8	
Naphthalene*		19.12		107	21.4	0.026	
Anthracene*		0.019		0.11	0.021	0.0040	
Fluoranthene*		0.914		5.1	1.0	0.019	

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SUBSTANCE	REF. HARD.* mg/L	CTC	MEAN BACK- GRD.	WEEKLY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	4-day P ₉₉
Phenanthrene*		3.403		19	3.8	0.0070	
Pyrene*		7.78		44	8.7	0.013	
Benzo(a)pyrene*		0.0242		0.14	0.027	0.0042	
Fluorene*		3.23		18	3.6	0.0090	

* The limit for this substance is based on a secondary value.

Monthly Average Limits based on Wildlife Criteria (WC)

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

Monthly Average Limits based on Human Threshold Criteria (HTC)

RECEIVING WATER FLOW = 31 cfs (¼ of Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

SUBSTANCE	HTC	MEAN BACK- GRD.	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Cadmium	370	0.27	6,959	1,392	0.72
Chromium	3,818,000	3.6	71,864,021	14,372,804	2.8
Fluoranthene	4,300		80,937	16,187	0.050
Naphthalene*	1,950		36,704	7,341	0.026
Anthracene*	1,375.6		25,892	5,178	0.0040
Pyrene*	126.2		2,375	475	0.013
Benzo(a)pyrene*	0.0184		0.35	0.069	0.0042
Fluorene*	193.6		3,644	729	0.0090

* The limit for this substance is based on a secondary value.

Monthly Average Limits based on Human Cancer Criteria (HCC)

RECEIVING WATER FLOW = 31 cfs (¼ of Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

SUBSTANCE	HCC	MEAN BACK- GRD.	MO'LY AVE. LIMIT	30-day P ₉₉
Arsenic	13.3	7.9	110	19.1

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.

Poly Aromatic Hydrocarbons (PAHs) Limits

Point source wastewater discharges containing PAH compounds are regulated using the performance-based limitation. The 2019 guidance document *PAH Group of 10 Calculation Using Toxicity Equivalent Factors* specifies the following performance-based limits:

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PAH Performance-based Limits

Compound	Limit (µg/L)
Benzo(a)pyrene	0.1
Naphthalene	70
Group of 10 PAHs	0.1

The following compounds are regulated together as the group of 10 PAHs:

1. Benzo(a)anthracene
2. Benzo(b)fluoranthene
3. Benzo(k)fluoranthene
4. Benzo(g,h,i)perylene
5. Chrysene
6. Dibenzo(a,h)anthracene
7. Fluoranthene
8. Indeno(1,2,3-cd)pyrene
9. Phenanthrene
10. Pyrene

Benzo(a)pyrene is the most toxic of the PAH compounds. Because of this, the toxicity for the other compounds are calculated relative to benzo(a)pyrene with a Toxicity Equivalent Factor (TEF). The TEFs are used in the summation of the PAH group of 10 compounds concentrations. To calculate the concentration of the PAH group of 10, multiply the concentration of each PAH compound by the corresponding TEF value and sum the results. The table below summarized the TEFs for each of the 10 compounds.

PAHs TEFs

Compounds	TEF
Benzo(a)anthracene	0.1
Benzo(b)fluoranthene	0.1
Benzo(g,h,i)perylene	0.01
Benzo(k)fluoranthene	0.01
Chrysene	0.001
Dibenzo(a,h)anthracene	1
Fluoranthene	0.001
Indeno(1,2,3-cd)pyrene	0.1
Phenanthrene	0.001
Pyrene	0.001

The PAH concentrations for this permit term are summarized below, all compounds are in µg/L:

PAHs Adjusted Mean

Compounds	Mean	TEF	Adjusted Mean
Benzo(a)anthracene	0.0060	0.1	0.00060
Benzo(b)fluoranthene	0.0048	0.1	0.00048
Benzo(g,h,i)perylene	0.0042	0.01	0.000042
Benzo(k)fluoranthene	0.0056	0.01	0.000056
Chrysene	0.011	0.001	0.000011
Dibenzo(a,h)anthracene	0.0044	1	0.0044
Fluoranthene	0.019	0.001	0.000019

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Indeno(1,2,3-cd)pyrene	0.0048	0.1	0.00048
Phenanthrene	0.0070	0.001	0.0000070
Pyrene	0.013	0.001	0.000013
Total PAHs = 0.0061			
Compounds	Mean		
Benzo(a)pyrene	0.0042		
Naphthalene	0.012		

Based on the data from the current permit, there is no reasonable potential to exceed the limits for Benzo(a)pyrene, Naphthalene, or the group of 10 PAHs. **Therefore, performance-based limits are not recommended during the reissued permit term.**

In the current permit, monitoring PAHs is required. **This is recommended to continue in the reissued permit to determine if limits are needed in the next permit.**

Conclusions and Recommendations

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

Chlorine – Considering available effluent data from April 2023, the mean effluent concentration is 58 µg/L. This concentration is greater than the calculated total residual chlorine WQBELs based on ATC and CTC; therefore, the daily maximum limit of 38 µg/L would be recommended during a future permit term. The weekly average limit of 41 µg/L is not recommended as the daily maximum limit is more stringent.

The Department sent a letter to BNSF Railway Company dated 01/30/2026 regarding the above chlorine WQBELs originally recommended in the March 2025 WQBEL Evaluation in response to multiple meeting and discussions with the facility. To reiterate and be consistent with the permit decisions made in the letter, **the daily maximum chlorine limit of 38 µg/L is not recommended during a future permit term. Monthly chlorine monitoring is required for at least 1 year during the April – October discharge season to determine the need for chlorine limits at a following permit reissuance.**

PART 3 – LIMITATIONS FOR BOD₅, TSS, & DO

BOD₅ & DO

In establishing BOD₅ limitations, the primary intent is to prevent a lowering of dissolved oxygen levels in the receiving water below water quality standards as specified in ss. NR 102.04(4)(a) and (b), Wis. Adm. Codes. The 26-lb method (13-lb method for cold water community streams) is the most frequently used approach for calculating BOD₅ limits when resources are not available to develop a detailed water quality model. This simplified model was developed in the 1970's by the Wisconsin Committee on Water Pollution on the Fox, Wisconsin, Oconto, and Flambeau Rivers. Further studies throughout the 1970's proved this model to be relatively accurate. The model has since then been used by the Department on many occasions when resources are not available to perform a site-specific model. The "26" value stems from the following equation:

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

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

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

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

Calculations based on Full Assimilative Capacity at 7-Q₁₀ Conditions:

$$WA \text{ Limit } \left(\frac{mg}{L} \right) = 2.4 * (DO_o - DO_{std}) * \frac{7Q_{10} + Q_e * (1 - f)}{Q_e} * 0.967^{T-24}$$

Where:

Q_e = effluent flow = 1.124 MGD

DO_{stream} = background dissolved oxygen = 7.0 mg/L

DO_{eff} = 5.0 mg/L

DO_{std} = dissolved oxygen criteria from s. NR 102.04(4), Wis. Adm. Code = 5 mg/L

7-Q₁₀ = 32 cfs

f = 0

DO_o = Initial mixed river DO = $\frac{DO_{eff} * Q_e + DO_{stream} * (7 - Q_{10} - Q_e * f)}{Q_e * (1 - f) + 7 - Q_{10}} = 6.9 \text{ mg/L}$

T = Receiving water temperatures from s. NR 102.25, Wis. Adm. Code.

The table below shows the calculated weekly average BOD₅ WQBELs during April – September when the discharge occurs. Monthly receiving water temperatures from s. NR 102.25, Wis. Adm. Code, are averaged over each time period:

Weekly Average BOD₅ WQBELs

Parameter	April – September
Effluent Flow (MGD)	1.124
River Flow 7-Q ₁₀ (cfs)	32
River Temperature (°F)	61
River Temperature (°C)	16
Effluent DO (mg/L)	5.0
Background DO (mg/L)	7.0
Mix DO (mg/L)	6.9
DO Criterion (mg/L)	5.0
f	0
Concentration Limits (mg/L)	177
Mass Limits (lbs/day)	1.070

The facility submitted a nondetectable BOD₅ sample of <4.0 mg/L (04/06/2023). In this case, the effluent from Outfall 001 is not expected to have any sources of BOD₅ given the composition of stormwater and dust suppression water runoff. **Therefore, BOD₅ and dissolved oxygen limits are not recommended during a future permit term.**

Total Suspended Solids (TSS)

Total suspended solids (TSS) effluent limits are regulated via narrative standards described in NR 102.04(1), Wis. Adm. Code. TSS effluent limits are included whenever BOD₅ WQBELs are needed and are set equal to the BOD₅ limits but no lower than 10 mg/L per Department policy. **Because BOD₅ WQBELs are not recommended, TSS limits are also not recommended during a future permit term.**

The current permit contains TSS limits based on the protection of the previously classified LAL community of the unnamed tributary as described in s. NR 104.02(3)(b), Wis. Adm. Code. **These limits are required to continue during the reissued permit term unless the antibacksliding requirements of subch. II of NR 207, Wis. Adm. Code, are met.**

pH

The current permit has the daily minimum and daily maximum limit range of 6.0 – 9.0 s.u. which are categorical limits for a discharge to an LAL community receiving water. These existing pH limits will control the discharge to meet the pH water quality standards as described in s. NR 102.04(4)(c), Wis. Adm. Code. **Therefore, the pH limits are recommended to continue during a future permit term.**

PART 4 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR AMMONIA NITROGEN

The State of Wisconsin promulgated revised water quality standards for ammonia nitrogen in ch. NR 105, Wis. Adm. Code, effective March 1, 2004 which includes criteria based on both acute and chronic toxicity to aquatic life. Given the fact that the BNSF Railway Co does not currently have ammonia nitrogen limits, the need for limits is evaluated at this time.

Effluent ammonia nitrogen samples (n = 7, April 2022 – October 2022) ranged from <0.015 – 0.015 mg/L. Based on this effluent data, there is no reasonable potential to exceed the most stringent ammonia nitrogen limits that would be calculated. **Therefore, ammonia nitrogen limits and monitoring are not recommended during a future permit term.**

PART 5 – PHOSPHORUS

Technology-Based Effluent Limit

Subchapter II of Chapter NR 217, Wis. Adm. Code, requires industrial facilities that discharge greater than 60 pounds of total phosphorus per month to comply with a 12-month rolling average limit of 1.0 mg/L, or an approved alternative concentration limit.

Because BNSF Railway Co does not currently have an existing technology-based limit, the need for this limit in the reissued permit is evaluated. The data demonstrates that the annual monthly average

phosphorus loading is less than 60 lbs/month, in accordance with s. NR 217.04(1)(a)2, Wis. Adm. Code. **Therefore, a technology-based limit is not recommended during the reissued permit term.** In addition, the need for a WQBEL for phosphorus must be considered.

Annual Average Mass Total Phosphorus Loading

Month	Average Phosphorus Concentration (mg/L)	Average Effluent Flow (MGD)	Calculated Mass (lbs/month)
April 2024	0.074	1.69	31
July 2024	0.055	0.38	5.3
Oct. 2024	0.05	0.080	1.0
Average =			13

Total P (lbs/month) = Monthly average conc. (mg/L) × monthly average flow (MGD) × 30 days/month × 8.34 (lbs/gal)

Water Quality-Based Effluent Limits (WQBEL)

Revisions to administrative rules regulating phosphorus took effect on December 1, 2010. These rule revisions include additions to s. NR 102.06, Wis. Adm. Code, which establish phosphorus standards for surface waters. Subchapter III of NR 217, Wis. Adm. Code, establishes procedures for determining WQBELs for phosphorus, based on the applicable standards in ch. NR 102, Wis. Adm. Code.

Section NR 102.06(3)(a), Wis. Adm. Code, specifically names river segments for which a phosphorus criterion of 0.100 mg/L applies. For other stream segments that are not specified in s. NR 102.06(3)(a), Wis. Adm. Code, s. NR 102.06(3)(b), Wis. Adm. Code, specifies a phosphorus criterion of 0.075 mg/L. The phosphorus criterion of 0.075 mg/L applies for Nemadji River.

Lake Superior, approx. 1.4 mi downstream of Outfall 001, has a phosphorus criterion of 0.005 mg/L as described in s. NR 102.06(5)(a), Wis. Adm. Code. This criterion will not be used in the evaluation of the need for phosphorus limits since Outfall 001 do not discharge directly to Lake Superior and there is no approved nearshore/whole lake model currently to translate the criterion to an applicable limit.

The conservation of mass equation is described in s. NR 217.13(2)(a), Wis. Adm. Code, for phosphorus WQBELs and includes variables of water quality criterion (WQC), receiving water flow rate (Qs), effluent flow rate (Qe), and upstream phosphorus concentrations (Cs) provided below.

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

Where:

WQC = 0.075 mg/L for Nemadji River

Qs = 100% of the 7-Q₂ of 49 cfs

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

Qe = effluent flow rate = 1.124 MGD = 1.739 cfs

f = the fraction of effluent withdrawn from the receiving water = 0

Section NR 217.13(2)(d), Wis. Adm. Code, specifies that the background phosphorus concentration used in the limit calculation formula shall be calculated as a median using the procedures specified in s. NR 102.07(1)(b) to (c), Wis. Code. All representative data from the most recent 5 years shall be used, but data from the most recent 10 years may be used if representative of current conditions.

Section NR 217.13(2)(d), Wis. Adm. Code, states that the determination of upstream concentrations shall be evaluated at each permit reissuance. A review of all available in stream total phosphorus data stored in the Surface Water Integrated Monitoring System database shows a background concentration of 0.054 mg/L using background data from the Nemadji River at Woodlawn Road Bridge (SWIMS Station ID: 10037076, n = 6, May 2015 – October 2015). Substituting a median value of 0.054 mg/L into the limit calculation equation above, the calculated limit is 0.68 mg/L.

Effluent Data

The following table summarizes effluent total phosphorus monitoring data from April 2019 – October 2024.

Total Phosphorus Effluent Data	
Statistics	Conc. (mg/L)
1-day P ₉₉	0.13
4-day P ₉₉	0.099
30-day P ₉₉	0.080
Mean	0.071
Std	0.02
Sample size	16
Range	0.047 - 0.12

Reasonable Potential Determination

The discharge does not have reasonable potential to cause or contribute to an exceedance of the water quality criterion because the 30-day P₉₉ of reported effluent total phosphorus data is less than the calculated WQBEL. **Therefore, a phosphorus WQBEL is not required in a future permit.**

Phosphorus monitoring is recommended to continue to determine the need of phosphorus limits in a future permit.

PART 6 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR THERMAL

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

In accordance with s. NR 106.53(2)(b), Wis. Adm. Code, the highest daily maximum flow rate for a calendar month is used to determine the acute (daily maximum) effluent limitation. In accordance with s. NR 106.53(2)(c), Wis. Adm. Code, the highest 7-day rolling average flow rate for a calendar month is used to determine the sub-lethal (weekly average) effluent limitation. The effluent flows used from April 2019 – October 2024.

The table below summarizes the maximum temperatures reported from the permit application. The complete temperature limit calculations are included as Attachment #3.

Monthly Temperature Effluent Data & Limits

Month	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Weekly Maximum	Daily Maximum	Weekly Average Effluent Limitation	Daily Maximum Effluent Limitation
	(°F)	(°F)	(°F)*	(°F)
APR	35.4	35.4	61	105
MAY			71	102
JUN			84	99
JUL			NA	120
AUG			NA	120
SEP			109	120
OCT			105	120

* NA denotes “not applicable” when the calculated weekly average limit is greater than or equal to 120 °F.

Reasonable Potential

Permit limits for temperature are recommended based on the procedures in s. NR 106.56, Wis. Adm. Code.

- An acute limit for temperature is recommended for each month in which the representative daily maximum effluent temperature for that month exceeds the acute WQBEL. The representative daily maximum effluent temperature is the greater of the following:
 - (a) The highest recorded representative daily maximum effluent temperature
 - (b) The projected 99th percentile of all representative daily maximum effluent temperatures
- A sub-lethal limitation for temperature is recommended for each month in which the representative weekly average effluent temperature for that month exceeds the weekly average WQBEL. The representative weekly average effluent temperature is the greater of the following:
 - (a) The highest weekly average effluent temperature for the month.
 - (b) The projected 99th percentile of all representative weekly average effluent temperatures for the month

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

Although effluent temperature data is not available for Outfall 001 during May – October, the combination of the stormwater and dust suppression water runoff composition and the detention time of both the lagoon and settling pond is likely to produce temperatures similar to ambient conditions. The difference in temperature between the April sample with the respective, most stringent weekly average limit, supports this assumption. **Therefore, temperature limits and monitoring are not recommended during a future permit term.**

PART 7 – WHOLE EFFLUENT TOXICITY (WET)

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

- Acute tests predict the concentration that causes lethality of aquatic organisms during a 48 to 96-hour exposure. To assure that a discharge is not acutely toxic to organisms in the receiving water, WET tests must produce a statistically valid 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 ensure 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 18%, shown in the WET Checklist summary below, was calculated according to the following equation, as specified in s. NR 106.03(6), Wis. Adm Code:

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

Where:

Q_e = annual average flow = 1.124 MGD = 1.739 cfs

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

Q_s = 1/4 of the 7- Q_{10} = 32 cfs $\div$ 4 = 8.0 cfs

- According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), a synthetic (standard) laboratory water may be used as the dilution water and primary control in acute WET tests, unless the use of different dilution water is approved by the Department prior to use. The primary control water must be specified in the WPDES permit.
- According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), receiving water must be used as the dilution water and primary control in chronic WET tests, unless the use of different dilution water is approved by the Department prior to use. The dilution water used in WET tests conducted on Outfall 001 shall be a grab sample collected from the receiving water location, upstream and out of the influence of the mixing zone and any other known discharge. The specific receiving water location must be specified in the WPDES permit.
- 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. Therefore, only WET tests conducted from June 2005 to present are shown in the table below:

WET Data History

Date Test Initiated	Acute Results LC ₅₀ %				Chronic Results IC ₂₅ %				Footnotes or Comments
	<i>C. dubia</i>	Fathead minnow	Pass or Fail?	Used in RP?	<i>C. dubia</i>	Fathead Minnow	Pass or Fail?	Use in RP?	
06/20/2017	>100	>100	Pass	Yes					
06/21/2022	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
10/30/2024	>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.

$$\text{Acute Reasonable Potential} = [(TUa \text{ effluent}) (B)(AMZ)]$$

$$\text{Chronic Reasonable Potential} = [(TUC \text{ effluent}) (B)(IWC)]$$

According to s. NR 106.08(6)(d), Wis. Adm. Code, TUa and TUC 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 an acute WET limit is not required.**

Chronic Reasonable Potential = 0 < 1.0, **reasonable potential is not shown, and a chronic WET limit is not required.**

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 = 18%. 0 Points
Historical Data	Three tests used to calculate RP. No tests failed. 0 Points	One test used to calculate RP. No tests failed. 0 Points

Attachment #1

	Acute	Chronic
Effluent Variability	Little variability, no violations or upsets, consistent operations. 0 Points	Same as acute. 0 Points
Receiving Water Classification	WWSF community. 5 Points	Same as acute. 5 Points
Chemical-Specific Data	Reasonable potential for chlorine limits based on ATC; multiple substances detected. Additional Compounds of Concern: BTEX and PAH substances detected. 10 Points	Reasonable potential for chlorine based on CTC; multiple substances detected. Additional Compounds of Concern: BTEX and PAH substances detected. 10 Points
Additives	None. 0 Points	None. 0 Points
Discharge Category	Process wastewater. 5 Points	Same as acute. 5 Points
Wastewater Treatment	Primary treatment only. 8 Points	Same as acute. 8 Points
Downstream Impacts	No impacts known. 0 Points	Same as acute. 0 Points
Total Checklist Points:	28 Points	28 Points
Recommended Monitoring Frequency (from Checklist):	Three acute tests recommended.	Three chronic tests recommended.
Limit Required?	No.	No.
TRE Recommended? (from Checklist)	No.	No.

- The WET Checklist completed in SWAMP (and summarized above) recommends 3x acute tests and 3x chronic tests during the reissued permit term. Those recommendations are driven primarily by the chemical-specific data and partial lack of wastewater treatment. The number of WET tests recommended during the reissued permit term have been adjusted accordingly based on the following reason(s):
 - The effluent characterization of this discharge is not considered complex or high strength where secondary level wastewater treatment is not necessary. Therefore, the acute and chronic toxicity concern of this category is reduced.
- After consideration of the guidance provided in the Department's WET Program Guidance Document (2022) and other information described above, **2x acute and chronic WET tests are recommended in a future permit term.** Tests should be done whenever the discharge occurs during April – October during the calendar year, ideally during different months.



**Figure 1. Existing and Potential New
WPDES Permitted Discharge Points**

BNSF Allouez Taconite Facility – Superior, WI

Legend:

-  Existing discharge point to unnamed tributary (OF-001)
-  Existing manhole (MH-001)
-  Existing culvert pipe between MH-001 and OF-001
-  Approximate flowpath between OF-001 and Nemadji River
-  Approximate location for potential new culvert between MH-001 and Nemadji River
-  Approximate location for potential new discharge point to Nemadji River

Temperature Limits for Receiving Waters with Unidirectional Flow

(calculation using default ambient temperature data)

Facility:	BNSF Railway Co		7-Q ₁₀ :	32	cfs	Temp Dates	Flow Dates
Outfall(s):	001		Dilution:	25%		NA	04/05/19
Date Prepared:	4/22/2026		f:	0		NA	10/28/24
Design Flow (Q _e):	1.124	MGD	Stream type:	Small warm water sport or forage fish			
Storm Sewer Dist.	0	ft	Q _s :Q _e ratio:	4.6	:1		
			Calculation Needed?:	YES			

Month	Water Quality Criteria		Receiving Water Flow Rate (Qs)	Representative Highest Effluent Flow Rate (Qe)		f	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Ta (default) (°F)	Sub-Lethal 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)
APR	48	55	32	6.15	6.15	0	61	105	61	105
MAY	58	65	32	6.15	6.15	0	71	102	71	102
JUN	66	76	32	6.15	6.15	0	84	99	84	99
JUL	69	81	32	1.29	1.29	0	NA	120	NA	120
AUG	67	81	32	0.63	0.82	0	NA	120	NA	120
SEP	60	73	32	1.88	1.88	0	109	120	109	120
OCT	50	61	32	1.29	1.29	0	105	120	105	120